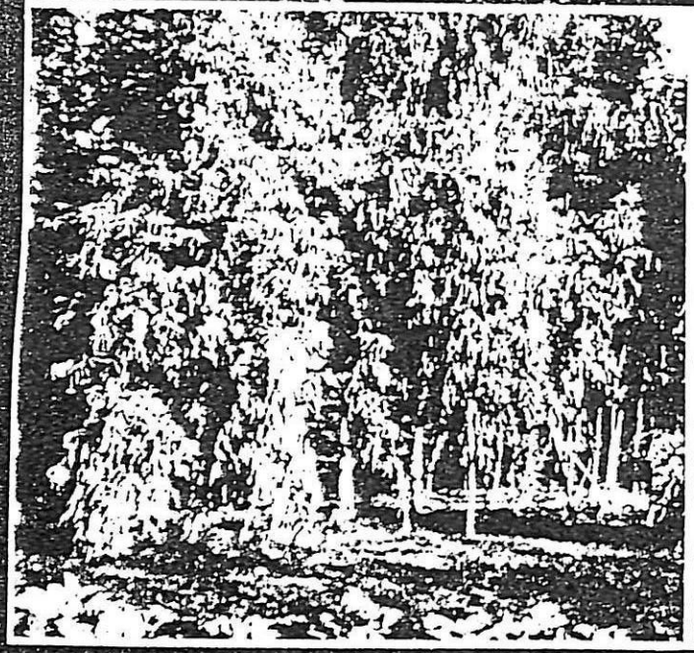
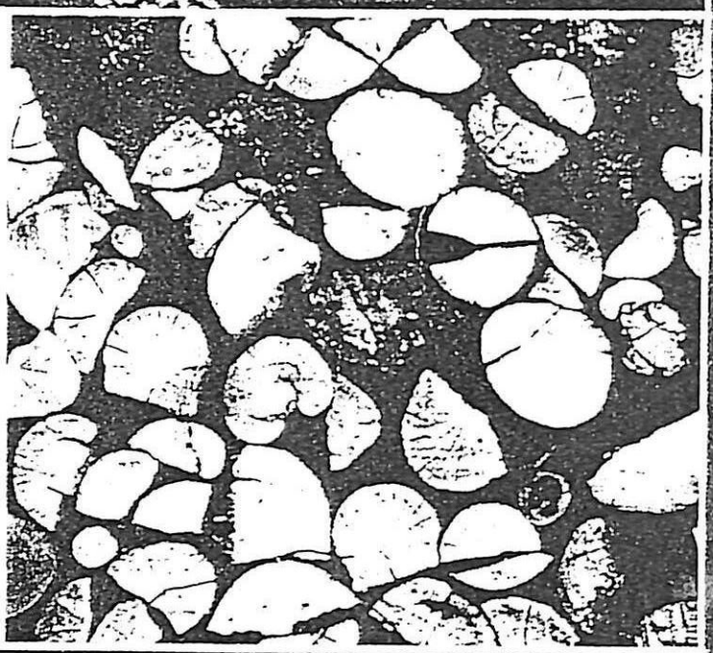
Socio-Economic Techniques for Farm Forestry Extension





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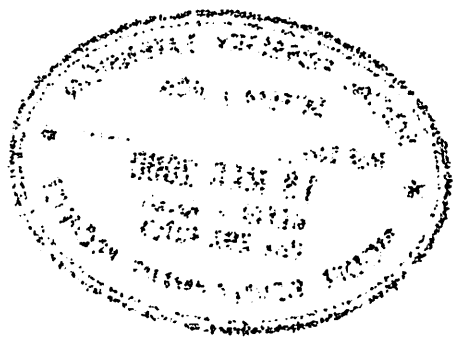
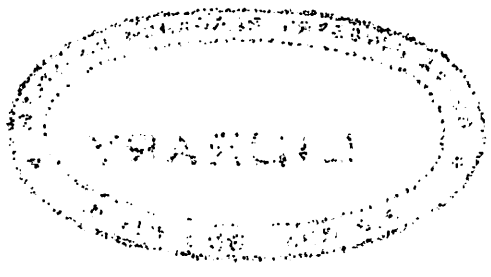
SOCIO-ECONOMIC TECHNIQUES FOR FARM FORESTRY EXTENSION





SOCIO-ECONOMIC TECHNIQUES

FOR FARM FORESTRY EXTENSION

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Contents

FOREWORD

The need for a manual on socio-economic techniques for farm forestry extension was identified by Foresters during a series of training courses held by the Forestry Extension Services Division of the Kenya Forest Department.

During the production of the manual, Mr. P. Mung'ala, Director of Forestry and Mr. D. W. Muita, Chief of Forestry Extension Services Division, provided technical guidance and logistical assistance. The manual's initial conception and outline was greatly aided by discussions held at a workshop attended by representatives of the Kenya Forestry Research Institute, Kenya Forestry Masterplan and the Ministry of Agriculture, Livestock Development and Marketing.

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Illustrations in the manual are taken from *Agroforestry Extension Sourcebook*, CARE-International 1989.

Photographs are used with the kind permission of Bellerive Foundation, Kenya.

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The Importance of Socio-Economic Issues in Farm Forestry Extension

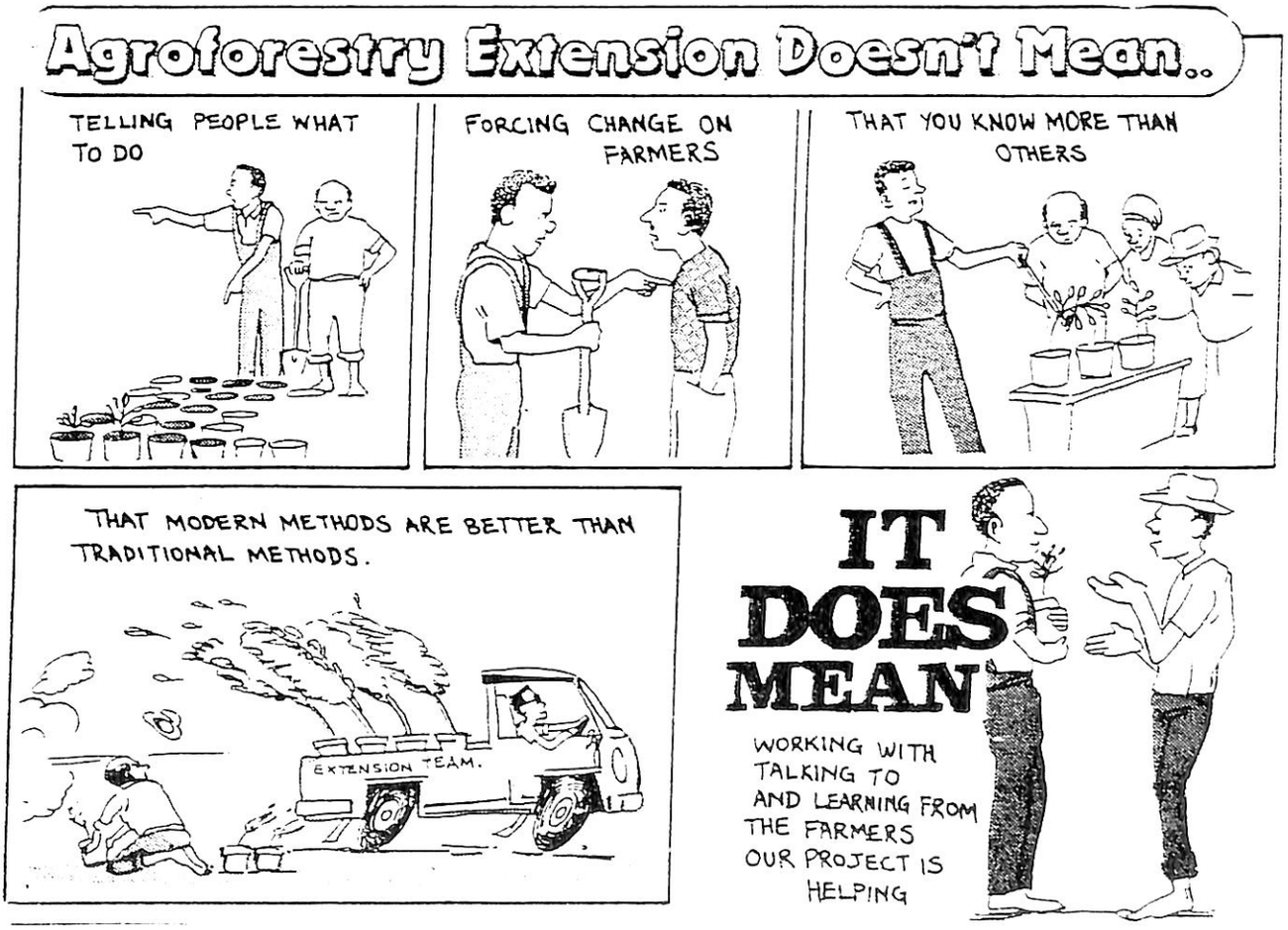
Extension workers often ignore the importance of socio-economic issues in farm forestry. This can lead to misunderstandings. An extension worker in a high potential zone of Kenya stated that the tea farmers he worked with were 'unco-operative and lazy' because they hadn't planted enough trees. He had been urging people to plant *Grevillea* and *Calliandra* for years, and nobody had heeded his advice.

In fact, this had nothing to do with farmers' laziness or lack of co-operation. It was because the extension worker failed to understand tea farmers' socio-economic situation. All year round, farmers spent most of their day out in the fields tending and picking tea - not the activities of "lazy" people! Because of the high labour requirements of their farming practices, they had little time left to plant trees or to engage in labour-intensive fodder preparation from *Calliandra*.

Neither were farmers 'unco-operative'. Most of their farms were taken up with tea, leaving little space for trees. In addition to this, they were well aware that their tea would not do well when shaded by trees, and was susceptible to the root diseases that can be spread by trees. As few farmers were carrying out zero-grazing they could see little point in planting fodder trees. Because they lived beside a forest, they made use of it as a source of both grazing and fuelwood. A nearby plantation also provided an easy and cheap source of fuelwood, poles and timber.

Farmers therefore had little time, inclination or farm-space to plant trees for fuelwood, fodder or timber. The extension worker had never considered that there might be good reasons why they were not heeding his advice. He had never examined farmers' socio-economic situation or asked them what they wanted or needed. He had seen himself as an expert coming in with technical packages which were "best" for farmers. He had never thought to reflect that maybe they had sensible and rational reasons not to follow his advice. He had ignored the importance of considering socio-economic factors, and of finding out about farmers' specific needs, problems and experience before carrying out farm forestry extension.

Source: A. M. Maina, FESD HQ



INTRODUCTION

About the manual

This manual focuses on socio-economic techniques for farm forestry extension. It discusses how to identify socio-economic issues and incorporate them into farm forestry. The manual aims to broaden the perspective of farm forestry extension beyond a 'tree-based' exercise into a 'people-focused' approach.

The manual does not deal with technical forestry topics. It deals with socio-economic aspects of farm forestry extension. It should be used in combination with a technical forestry approach.

The manual is concerned with farm forestry extension in settled agricultural areas. It looks at ways of maximising the benefits of cash income, subsistence products and environmental services from forestry-related activities for farmers in these regions.

Why are socio-economic issues important in farm forestry extension?

Farmers plant trees because they want to receive social and economic benefits. Farmers' social and economic situations also determine which kinds of farm forestry activities are appropriate, and influence how farm forestry is carried out. The impact of farm forestry on different groups and individuals largely depends on their social and economic circumstances.

If we ignore social and economic issues we run the risk of promoting inappropriate farm forestry activities which are of no real benefit to farmers. Incorporating socio-economic issues into farm forestry extension ensures that the aims of farm forestry are better achieved, and increases the participation of farmers in the farm forestry process.

Throughout the manual we will stress that:

- *The aim of farm forestry* extends beyond merely planting trees. Its objective is to get the best species to meet farmers' needs into the landscape where they grow the best and where they do the most good. This means meeting farmers' social and economic needs, and taking account of their social and economic circumstances in farm forestry extension.

- *Participation* of farmers in planning and managing farm forestry is essential. Farmers are the intended beneficiaries of farm forestry. Farm forestry extension should be directly related to farmers' needs, experiences and lives and should be

based on their participation and perspectives. The beneficiaries of farm forestry are well equipped to decide what will work best for them. The role of extension is to collaborate with farmers to help them make informed choices about farm forestry.

➲ What does the manual contain?

The manual contains a range of tools and techniques for incorporating socio-economic issues into farm forestry. These are illustrated by case studies and examples which recount actual situations and experiences which have occurred in farm forestry in Kenya.

- *Chapter One:* a background and broad overview of socio-economic issues in farm forestry.
- *Chapter Two:* the farm forestry process and socio-economic issues as they arise at different stages of farm forestry.
- *Chapter Three:* procedures for incorporating socio-economic issues into the farm forestry process and steps in identifying, planning, appraising, monitoring and evaluating farm forestry.
- *Chapter Four:* planning for socio-economic information collection and steps and procedures for preparing information collection.
- *Chapter Five:* tools for collecting socio-economic information and commonly-used socio-economic methods, their advantages and disadvantages.
- *Chapter Six:* the benefits of farm forestry and tools and techniques for measuring and valuing them.

1

SOCIO-ECONOMIC ISSUES IN FARM FORESTRY

What are socio-economic issues?

Socio-economic issues concern the human environment within which people live and act. People have different social and economic attributes, and they operate within different social and economic contexts.

People's social and economic characteristics determine how they interact with each other and with their resource base, and influence their roles and responsibilities. Social and economic differences mean that people's objectives, opportunities and problems vary.

Because of these differences, we cannot treat people as thinking, wanting and being able to achieve the same things in farm forestry. We cannot assume that farm forestry will have the same impact on different people.

Social and economic factors govern people's farm forestry needs and priorities, influence how they are affected by farm forestry and determine what is appropriate in farm forestry for different people. Social and economic factors can present constraints, conflicts and opportunities in farm forestry.

Communities are composed of different people

Socio-economic differentiation

Communities are not homogeneous. They are composed of

many groups and individuals who have different needs, constraints and perspectives, and who command unequal power, status and access to resources.

People's differences are largely based on their social and economic characteristics. Socio-economic characteristics can be seen as:

- **Intrinsic** - *To do with inherent biological and physical characteristics such as sex, age, race, etc.*
- **Ascribed** - *To do with achieved attributes such as wealth, occupation, education, status and so on, and with the roles society places on people such as mother, farmer, rich person, leader and so on. These roles may reflect people's intrinsic characteristics, or come from the society they live in.*

People with shared characteristics are often grouped together (for example as 'women', 'poor farmers', 'landless' and so on). People within a group share similar problems, opportunities and needs because of their shared characteristics. People are also grouped according to the places and levels they live and work in (for example households, villages, communities and so on). Although these residential units have common levels of interests, they are composed of different groups.

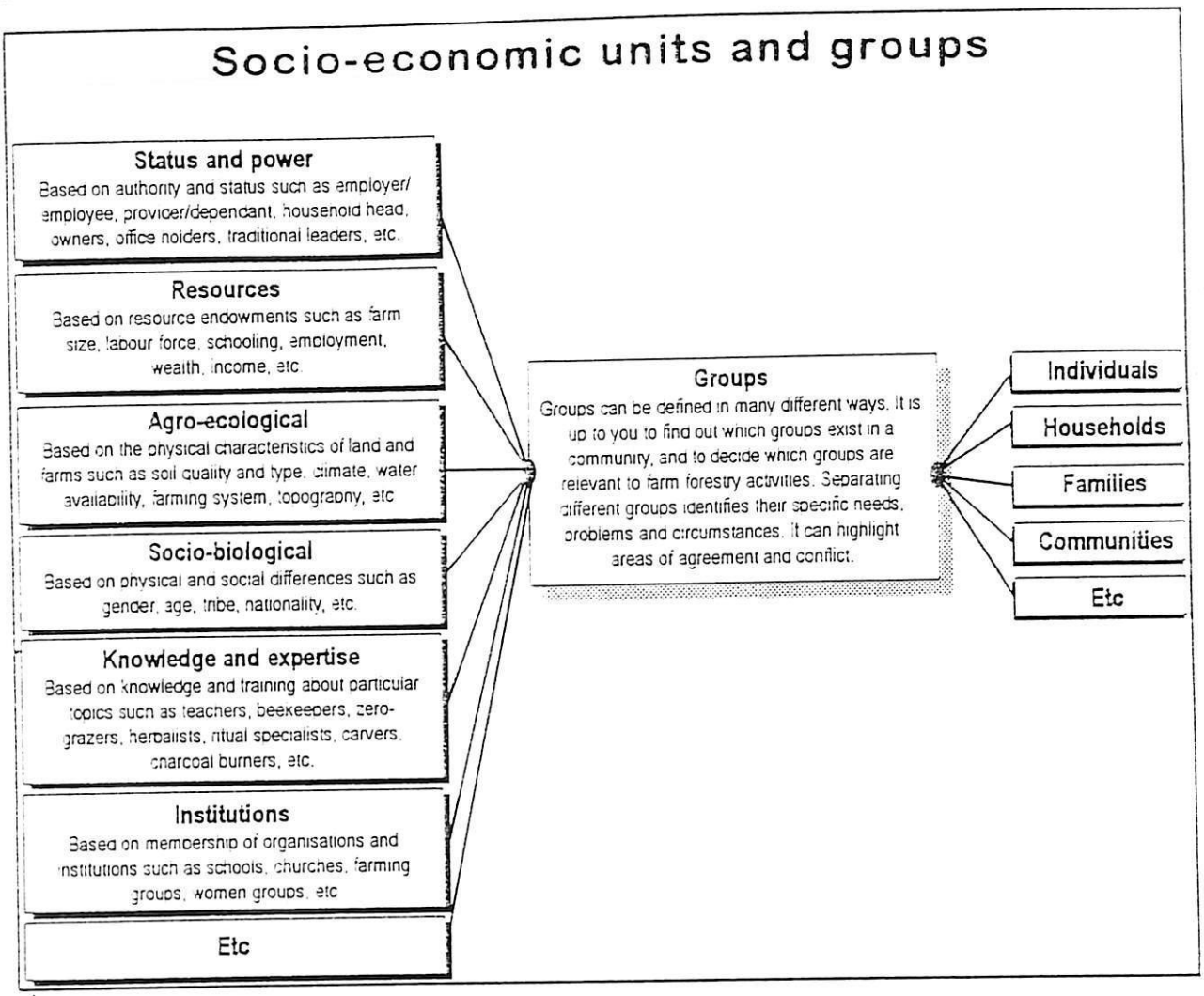
Socio-economic units and groups therefore share certain characteristics, objectives and problems within themselves. It is however important to remember that there is also variation between people in the same unit or group (for example not every 'woman' is identical) and between similar units and groups in different areas (for instance between 'poor farmers' in Nyeri and in Kitui).

As well as differences between people, every person belongs to a range of socio-economic units and groups. An individual simultaneously has several socio-economic roles and identities (for example one person may be both a woman, young, a wife, a mother and poor; she is also an individual, a householder and a community member). She has a range of objectives and problems which may conflict or overlap at these different levels.

When we carry out farm forestry extension we have to make sure that we take socio-economic differentiation into account so that nobody is marginalised or ignored by our activities. We must recognise that people have varying needs, priorities and problems which may conflict or overlap and can vary in different situations. What is a good farm forestry activity for one person or group may have negative effects on other groups and people. Conversely, farm forestry may provide a range of benefits which simultaneously meet different groups' and individuals' needs and priorities.

Socio-economic issues in farm forestry

We need to consider how socio-economic differentiation influences farm forestry, and look at the constraints, conflicts and opportunities it presents.



✪ Decisions, responsibilities and objectives

People have different responsibilities and spheres of authority. Their needs and objectives also vary, and are shaped by their socio-economic responsibilities and roles as well as by their individual aspirations.

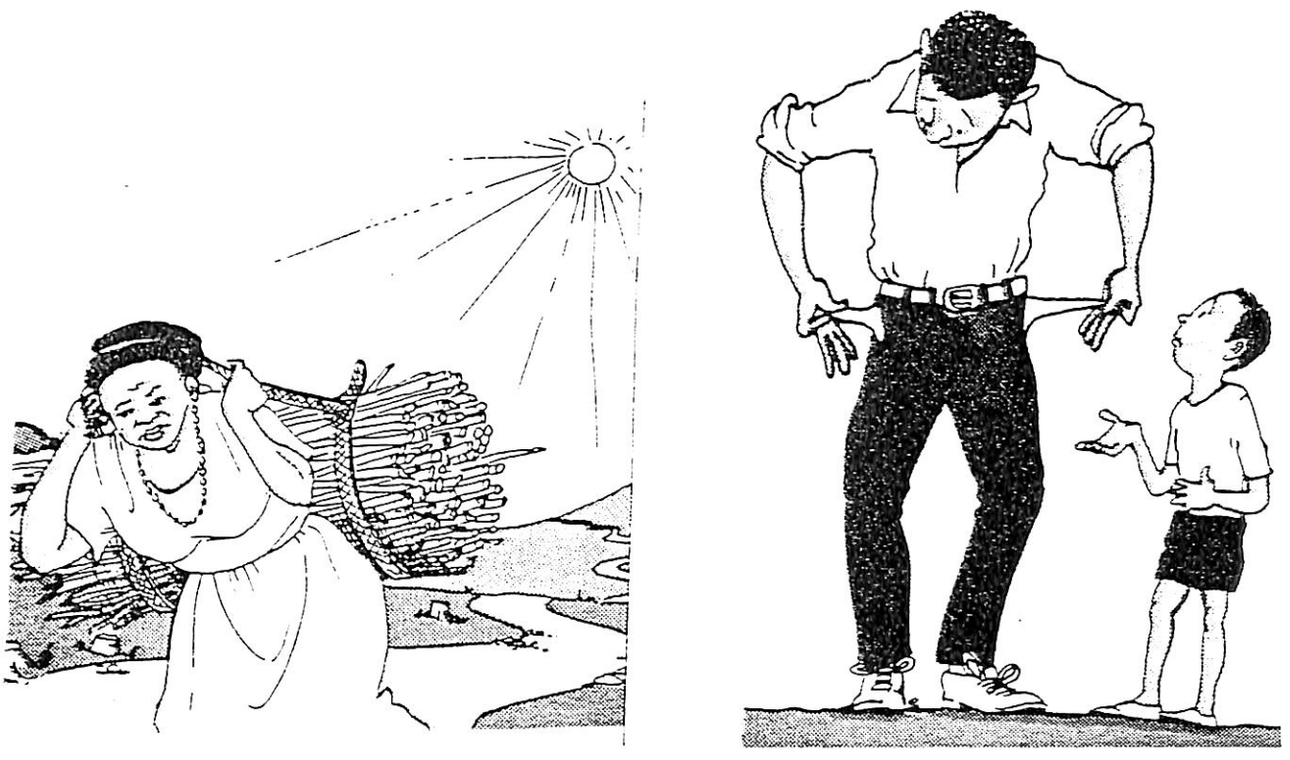
We must recognise people's different objectives and responsibilities regarding farm forestry. We can illustrate this by looking at gender differences. If house construction is a man's responsibility he may have a strong interest in trees yielding poles and timber. Women may in turn show more interest in fuelwood-yielding trees because they are responsible for household fuel needs. People's responsibilities and roles also affect decision-making in farm forestry: If men are responsible for controlling on-farm resources, it may be difficult for women to plant trees or harvest tree products.

People have other social and economic responsibilities which influence farm forestry activities. Women frequently work longer hours than men, and have a heavier load of domestic duties. These domestic responsibilities can influence women's participation in farm forestry, both by limiting the time they can devote to it and

because only farm forestry activities which help to minimise their workload may be acceptable.

In the course of farm forestry extension we need to think about:

- What are people's different roles and responsibilities in relation to trees?
- What are people's other roles and responsibilities?
- Who makes decisions about tree resources?
- Who makes decisions about other resources?



People have varying needs and objectives

Decisions, Responsibilities and Objectives

People's decisions, responsibilities and objectives can influence farm forestry in a number of ways, including:

Decision-making

Decisions about farm forestry may not rest with the people who tend and use the trees. Mr Rotich has a range of trees planted on his farm for timber, fodder, fuelwood and shade. He planted the trees, and decided where and which species to plant. His wife and grown-up children had no role in making decisions about tree planting although they tend the trees and will ultimately make use of the tree products, because he is the household head and farm decisions rest with him. He also decides when trees will be harvested, and what type of products will be taken. When his family wish to utilise trees, they must first ask his permission.

Decisions about trees may have to be made jointly if there is conflict. Mzee Wambugu has boundary-planted *Grevillea* around his farm. To begin with this led to disputes with his neighbour who was unhappy because he felt the trees were encroaching on his land. There was conflict about the trees. They eventually agreed to harvest and fell the trees only after reaching a joint agreement, and to share in any proceeds.

Responsibilities and objectives

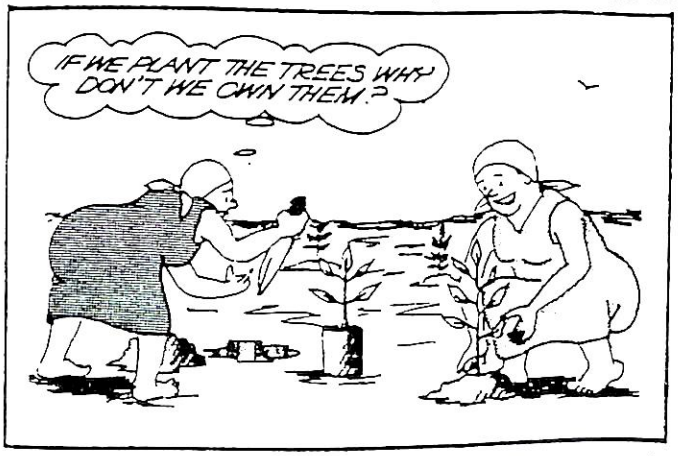
Because of their varying aims and responsibilities, people have different needs for trees. Mr Otieno has planted trees on his farm. He planted them in order to obtain a range of products, including fuelwood. His motivation for planting fuelwood trees was in response to a request from his wife, who was having to walk long distances for fuel. This was interfering with her farming and domestic work. He planted a woodlot close to the home compound so that his wife was able to have an easily reachable source of cooking fuel.

People's different objectives and responsibilities may lead to disagreement or present conflicting demands on trees. Mrs Muthoni planted many *Eucalyptus* trees in the 1970s for fuelwood, while her husband was working elsewhere. Her husband has many brothers, and he is responsible for their school fees. He wants to cut the trees and sell them for timber in order to raise cash. He is keen to replant the area with fodder-yielding trees for his zero-grazing enterprise. This is leading to conflict with his wife, who is worried about losing a cheap and nearby source of fuelwood. She is also concerned that she will have to carry out the bulk of fodder preparation if new trees are planted, while her husband keeps all the proceeds from milk sales.

✪ Ownership, access and use of resources

The ownership, access and use of productive resources is usually restricted, and may be subject to complicated arrangements. How resources are owned and used has implications for farm forestry.

Farm forestry depends on resources (such as cash, land, labour and other inputs) provided from a number of sources and people. If someone does not have access to these resources he may find it difficult to carry out farm forestry. If a person provides some of the resources which support farm forestry but is not sure of gaining benefits from the trees he helps to produce, this can also act as a strong disincentive to farm forestry.



The people who do the work in farm forestry may not reap its benefits

Two particularly important aspects of resource ownership and access are land and tree tenure. Land tenure is strongly linked to farm forestry,

because trees are immovable resources which depend on continued access over a relatively long period. Although there are instances where rights over a piece of land do not include the trees it contains, it is often the case that land and trees are owned and used as one.

Insecure or unclear land tenure can discourage long-term investments such as tree planting if the tree planter cannot be sure that he will be able to receive benefits from the trees he has planted. Where land tenure is based on communal rights, tree growing may depend on communal decisions and be subject to communal rules. Tree planting is often seen as a way of demarcating land, and may lead to conflict or unwillingness to carry out farm forestry in areas which are subject to sub-division or change of ownership.

Tree tenure is the right of owning and using trees. Different components of farm forestry (such as pollarding, harvesting, felling, etc) may entail different rights of ownership and use. Different people may have separate rights to different parts of the tree (its leaves, branches, fruits, timber, etc) and any benefits from their harvesting, sale or use.

In the course of farm forestry extension we need to think about:

- Who will own trees and tree products?
- Who has rights to the benefits of trees?
- Who has rights to land and other resources needed for farm forestry?
- Are rights to trees and other resources clear and secure?

Ownership, Use and Access to Resources

Resource rights and ownership can affect farm forestry in a number of ways, including:

Loss of tree benefits through land ownership change

If a person plants trees on land which he does not own, he can easily lose access to these trees. Mr M'Imanyara has no tree on his farm because it was only recently given to him by his father. When his father sub-divided the farm between his four sons, he took no notice of where trees were located. Although Mr M'Imanyara had planted a number of fruit trees, *Grevillea*, and *Eucalyptus*, they fell on his brothers' portions of land when sub-division took place, and he lost all rights to them.

Inability to plant or trees on land that is not owned

It may be impossible to plant or use trees if someone does not own the land. Mrs Ngala lived on her father-in-law's farm until recently. Her husband and herself were unable to plant trees because they did not own their farm. They were also unable to use trees on the farm, because they were the property of the land owner, her father-in-law.

Conflicts and encroachment on others' land through tree planting

Planting trees may encroach on other's property. Mzee Bokea had planted a number of trees around the boundary of his farm. This led to disagreements with his neighbour, who felt the trees were encroaching on his farm, shading his crops, and dropping branches and leaves on his compound. Mzee Bokea eventually had to fell some of his trees, at the demand of his neighbour.

Different tree use rights and ownership

The owner of trees may allow others rights to use his trees in particular ways. Mr Wangila has planted a range of trees on his farm. Although he has ultimate ownership of the trees and their products, he allows his wife free use of fallen branches for fuelwood. She must however consult him before cutting any wood. His sons harvest and sell fruit from the trees, but they must also obtain their father's permission before doing so, and give him a proportion of the money they make from fruit sales.

Cultural norms and customary rulings

Cultural beliefs and customary rulings have a strong influence on farm forestry. They include ritual and legal prohibitions against planting or using certain trees, regulations on where trees may be planted, limitations on who may plant trees and rules concerning the distribution and use of tree benefits.

It is difficult to make any generalisations about cultural norms and customary rulings because they vary for different people in different areas. They are however powerful determinants of people's actions, and often hold more local influence than rules and legislation set by national government.

We must always find out about local cultural beliefs and customary rulings when we carry out farm forestry extension. We must respect these codes of conduct, and recognise that they are important determinants of how people act, and what is or is not acceptable. We must remember that how people behave and what they believe will not be the same in all areas and peoples.

In the course of farm forestry extension we need to think about:

- How do cultural norms and customary rulings affect tree planting?
- How do cultural norms and customary rulings affect types of tree use?
- How do cultural norms and customary rulings affect who can plant and use trees?
- How do cultural norms and customary rulings concur or conflict with national government legislation and rules?

National policy and legislation

Farmers operate within the framework of a national government administration and legislature. This wider legal and policy environment influences farm forestry.

Legal restrictions on tree harvesting and use (for example laws regulating tree cutting, wood sales and charcoal burning) may act as a disincentive to farm forestry if farmers are not sure of their right to receive the benefits from growing trees. Laws about other resources, especially land tenure and land-use, also affect farmers' willingness to carry out farm forestry.

The national policy environment may also act to encourage or discourage tree planting. Forestry policy has a direct relation to on-farm tree growing. Other policies also influence farm forestry. National policies in other sectors (including subsidies, taxes and price controls) which encourage other land-uses such as agriculture or industry may discourage tree planting as an investment option. Conversely they may, by demanding tree products as intermediary inputs, encourage farmers to carry out farm forestry. Policies which affect the price of farm inputs and basic

subsistence goods may also encourage or discourage the production of tree-based alternatives to purchased goods.

In the course of farm forestry extension we need to think about:

- How do national laws and policies relating to trees impact on farm forestry?
- How do national laws and policies relating to other resources impact on farm forestry?
- How do national laws and polices affect farmers' resource base and availability of basic needs?
- How do national government legislation and policies concur or conflict with local norms and customary rulings?

The role of socio-economic information in farm forestry extension

We have seen that it is necessary to take social and economic factors into account when we carry out farm forestry extension. It is only by being aware of the social and economic environment within which different people operate that we can make sure farm forestry benefits farmers.

In order to take these factors into account, we need to find out about issues affecting farmers by collecting socio-economic information. We need to learn from farmers, and understand their needs, problems and circumstances. We need to recognise people's socio-economic differences and collect information from a range of different people. If we only speak to one group we may only see things from one perspective, and ignore others' needs and priorities.

2

THE FARM FORESTRY PROCESS

Stages in the farm forestry process

There is more to farm forestry than just planting trees and watching them grow. Farm forestry is an on-going process composed of different stages which occur before, during and after tree planting itself. Extension takes place at every stage of this process.

This chapter will look at the different stages of the farm forestry process. It will briefly outline socio-economic issues which arise during these stages and are important in farm forestry extension.

We can divide the farm forestry process into seven stages:

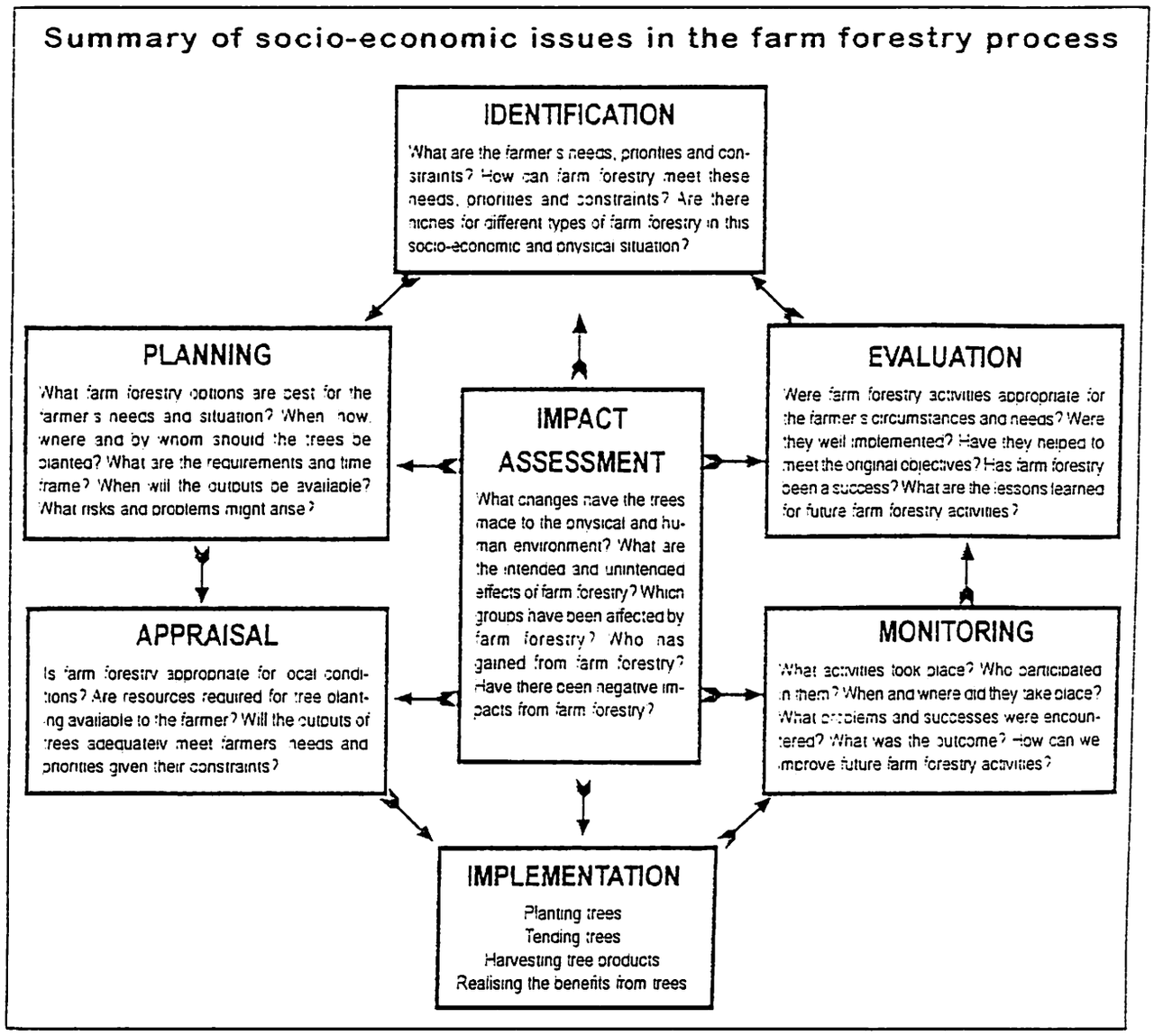
- **Identification** - *Finding a niche for farm forestry*
- **Planning** - *Choosing the best farm forestry option*
- **Appraisal** - *Assessing whether farm forestry is feasible*
- **Implementation** - *Planting, tending and harvesting trees*
- **Monitoring** - *Examining how farm forestry is being carried out*
- **Evaluation** - *Judging whether farm forestry has been successful*
- **Impact assessment** - *Looking at the changes resulting from farm forestry*

Socio-economic issues in the farm forestry process

Dividing the farm forestry process into stages helps us to identify different socio-economic issues as they arise. It provides guidelines as to which kinds of information we should be collecting and which topics we should be taking note of at different times.

Stage 1: Identification - *Finding a niche for farm forestry*

Identification involves showing that farm forestry can help to meet a farmer's needs and overcome his constraints. We need to identify a niche for farm forestry within the household socio-economy and farming system. After we have found out what a farmer's priorities and problems are, we can see whether farm forestry is a good way of meeting these needs, given his situation and circumstances.



✪ Stage 2: Planning - *Choosing the best farm forestry option*

After we have identified farm forestry as a good way of meeting farmers' needs, we need to look at the best way of carrying it out. Planning compares the costs and benefits of different farm forestry alternatives and chooses the best option to achieve the desired outputs. It sets targets and objectives, and works out how best to achieve them. It matches the best farm forestry alternative to the farmer's needs.

✪ Stage 3: Appraisal - *Assessing whether farm forestry is feasible*

After planning farm forestry, we need to see if the option we have chosen is practically feasible for the farmer. Appraisal looks at what the needs of different farm forestry options in terms of land, labour, water, cash and other inputs, the outputs farm forestry will produce and the implications of planting, tending and harvesting trees.

It judges which farm forestry alternatives are appropriate to the farmer's resources and situation.

✪ Stage 4: Implementation - *Planting, tending and harvesting trees*

Implementation is carrying out farm forestry activities. It has many aspects, including raising and planting trees, tending and managing them, harvesting them and realising their benefits.

✪ Stage 5: Monitoring - *Examining how farm forestry is being carried out*

While farm forestry is in process, we need to see how well it is being carried out, and make sure that activities are on course. Monitoring is a continuous process of collecting and recording information about how farm forestry activities are being implemented. It assesses the outcomes, problems and successes of farm forestry. Monitoring is carried out during the course of an activity or project, and its results influence further stages of farm forestry.

✪ Stage 6: Evaluation - *Judging whether farm forestry has been successful*

After we have carried out farm forestry activities, we need to judge their overall success, and learn lessons to improve future activities. Evaluation relates farm forestry activities to their original objectives and aims. It is carried out periodically at key stages of farm forestry, and helps to determine whether activities and outcomes were appropriate and adequate for meeting the original objectives of farm forestry.

✪ Stage 7: Impact assessment - *Looking at changes resulting from farm forestry*

The overall objective of farm forestry is to lead to positive changes which benefit people. We need to see whether this has occurred. Impact assessment looks at the differences that trees have made to the human and physical environment.

The aim of carrying out impact assessment is to judge the impact of trees on different people and areas. Unless we understand these changes, it is impossible to know how people benefit (or do not benefit) from farm forestry, and under what conditions farm forestry will be adopted.

Impact assessment can be carried out at any stage of the farm forestry process. It helps us to understand who benefits from farm forestry at a particular time, and how particular groups or objectives can be targeted.

3

SOCIO-ECONOMIC PROCEDURES FOR FARM FORESTRY EXTENSION

We have looked at different stages of the farm forestry process and explained why it is necessary to take socio-economic issues into account.

This chapter will look at procedures for identifying socio-economic issues and incorporating them into farm forestry.

Socio-economic procedures are based on learning about the farmer's problems, priorities, knowledge and views. They involve listening to the farmer, using his knowledge and experience, and responding to what he thinks and wants. They are not to do with telling him what to do or what to think.

Socio-economic procedures in farm forestry are a way of getting information which can make farm forestry better. They are a joint effort between the farmer and the extension worker to together come up with a farm forestry option which benefits the farmer and is appropriate to his needs and circumstances.

The *identification* stage of farm forestry involves finding out about farmers' needs and problems, and identifying a niche for farm forestry. We can divide needs assessment and problem diagnosis into five stages:

- **Step 1:** *Defining land-use and physical characteristics*
- **Step 2:** *Defining social and economic characteristics*
- **Step 3:** *Diagnosing needs and problems*
- **Step 4:** *Analysing causes and effects of problems and needs*
- **Step 5:** *Finding a niche for farm forestry*

The *planning* and *appraisal* stages of farm forestry involve choosing and designing an appropriate farm forestry option to benefit farmers. We can divide design and choice into seven stages:

- **Step 1:** *Defining the desired outputs from farm forestry*
- **Step 2:** *Identifying possible tree species and their benefits*
- **Step 3:** *Matching tree species to the farmer's situation*

- Step 4: *Comparing the costs and benefits of farm forestry*
- Step 5: *Assessing the risks and constraints to farm forestry*
- Step 6: *Formulating a plan for farm forestry*
- Step 7: *Timetabling farm forestry activities*

The ***monitoring, evaluation*** and ***impact assessment*** stages all involve finding out what has happened as a result of farm forestry, and judging its positive and negative impacts. We can divide monitoring, evaluation and impact assessment into three stages:

- Step 1: *Finding out what has happened*
- Step 2: *Finding out who and what has been affected*
- Step 3: *Assessing whether changes are good, bad and sufficient*

Identification - Problem diagnosis and needs assessment

During identification we are looking for a niche for farm forestry. We want to locate the place of trees in the household socio-economy by finding out about farmers' needs and problems, and identifying ways in which trees can help to overcome them.

In identification, we need to diagnose the farmer's problems and assess his needs. This involves:

Step 1: *Defining the land-use system*

By defining land and how it is used we can discover how farming systems work. We look at the physical landscape, method of farming and type of production in order to see what kinds of problems the farmer might face in relation to his land base and its use, and to find out the potential which exists for farm forestry.

To define the land-use system we need information such as:

- **What is the physical landscape?**
  e.g. Soils, climate, topography, water, trees, etc?
- **What is the method of farming?**
  e.g. Large-scale, smallholder, mixed, subsistence, cash, extensive, intensive, mechanised, irrigated, rainfed, etc?
- **What is the land tenure system?**
  e.g. Adjudicated, title deeds, borrowed, rented, squatted, to be sub-divided, etc?
- **What is produced on the farm?**
  e.g. Maize, beans, vegetables, fruit, tea, milk, meat, etc?

✪ Step 2: *Defining the farmer's social and economic characteristics*

We also need to look at the farmer's social and economic characteristics in order to identify possible problems and niches for farm forestry. We look at the farmer, his household situation, and his place within the community.

To define the farmer's social and economic characteristics we need information such as:

- How does the household compare to others in the area?
  e.g. Richer, poorer, better educated, more innovative, etc
- What is the household size and composition?
  e.g. Who is household head, is spouse absent, how many children and adults, how many generations, etc
- What are the sources of income?
  e.g. Farming, trade, businesses, employment, etc
- How is labour provided?
  e.g. Who works on the farm, what is the local labour market, how is labour allocated between tasks and people, etc
- Who ultimately controls household resources?
  e.g. Who has overall control over different aspects of farming, other household resources, etc
- Who has access to household resources?
  e.g. Who within the household can use different resources in the farm and household? Do outsiders have claims to use of resources, etc
- Who makes decisions about household resources?
  e.g. Who makes decisions about different aspects of farming, other household resources, etc

✪ Step 3: *Diagnosing the farmer's needs and problems*

After we have built up a broad picture of the farmer's physical, agricultural, social and economic situation, we can assess his needs and problems in the light of this information.

We need to look at the farmer's basic needs and see how well they are currently being satisfied. We can identify needs which are not being provided for adequately and needs which may arise in the future. We also identify problems which the farmer faces.

To diagnose needs and problems we need information such as:

- What are the farmer's basic needs?
  e.g. Food, income, land, fuel, fodder, etc
- How does the farmer fulfil basic needs?
  e.g. Where does food, fuel, income etc come from? On-farm or off-farm, etc
- Who is responsible for fulfilling basic needs?
  e.g. Self, spouse, dependent, non-relative, worker, etc
- Are basic needs adequately and securely met?
  e.g. Is it difficult to obtain basic needs, do shortfalls occur sometimes or always, etc
- Where does the farmer obtain production inputs?
  e.g. Where are cash, land, labour, seeds, chemicals, etc obtained
- Are production inputs adequately and securely met?
  e.g. Is it difficult to obtain means of production, do shortfalls occur sometimes or always, etc
- What are the short and long-term problems and objectives?
  e.g. Lack of income, food, timber, fodder? Poor soil productivity, land degradation, unsustainable production, etc
- What problems and needs are likely to arise in the future?
  e.g. Land sub-division, increased cash needs, larger family, less labour, etc

Step 4: *Analysing the causes and effects of the farmer's problems and needs*

As well as providing a way of directly meeting needs and solving problems, farm forestry is important for tackling the root cause of farmers' constraints and mitigating the wider effects resulting from his problems.

After we have defined the farmer's needs and problems, we need to look at what lies behind them - at their wider causes and effects, and see how these are linked to the farmer's physical and socio-economic situation.

To analyse the wider causes and effects of the farmer's needs and problems we need information such as:

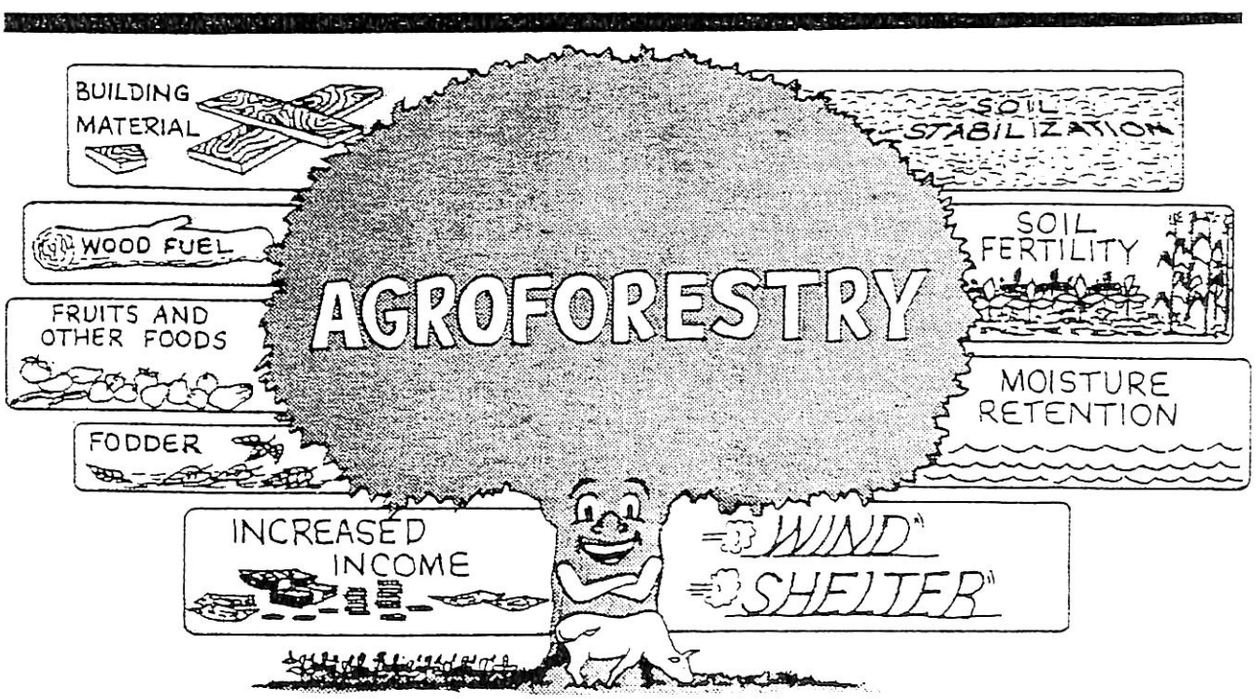
- What are the causes of the farmer's problems and needs?
  e.g. Small farm size, large family, insecure land tenure, low farm productivity, unsuitable cropping patterns, poor soils, land degradation, unsustainable farming practices, lack of woody biomass, lack of nearby fuel/fodder/timber, market failures, poor infrastructure, etc?
- What are the effects of the farmer's problems and needs?
  e.g. Over-use of land, local deforestation, poor income, poor nutritional standards, low yields, etc?

✪ Step 5: *Finding a niche for farm forestry*

Having identified the farmer's situation, needs and problems, we are now in a position to judge whether and how farm forestry can benefit him. We can look at ways of meeting his needs and possible solutions to his problems, and see if farm forestry is appropriate.

To find a niche for farm forestry we need information such as:

- How are needs met and problems solved currently, what other solutions and ways of meeting needs exist?
  e.g. Purchasing dairy meal, using chemical fertilisers, getting fuelwood from the forest, etc
- Can trees provide for basic needs?
  e.g. Provide fuel, fodder, green manure, check soil erosion, provide seasonal income, etc
- Can trees overcome problems, their causes and effects?
  e.g. Provide on-farm sources of subsistence and income products, improve farm environment, enhance land management, stimulate local industry, etc
- How are trees currently used?
  e.g. Existing knowledge and practices
- How could trees be used in ways they are not being used now?
  e.g. New tree species, new management and harvesting techniques, new products, etc



What kind of niche is there for farm forestry benefits to meet farmers' needs?

Problem Diagnosis and Needs Assessment

Mrs Ng'ang'a lives in Ndaragwa Division, Nyandarua on the north western slopes of the Aberdares. She has expressed an interest in farm forestry, and is discussing the matter with the local Forestry Extension worker. She is not sure how farm forestry can help her.

The Forestry Extension Worker discovers that Mrs Ng'ang'a's farm lies adjacent to the Aberdares Forest Reserve, on the banks of the permanent Kaheho River. Her farm runs down a steep slope, below which are several other farms. The area is wet and receives good and reliable rainfall. She farms a relatively large area - 4 hectares - and grows maize, cabbages, carrots and potatoes. She keeps 3 cross-breed cattle, which she usually grazes in the forest. She still farms on her father-in-law's land, part of an area settled in the mid-1960s; subdivision is yet to take place.

Mrs Ng'ang'a lives alone with her 4 children, all of whom are at school. Like many men in the area, her husband works in Nakuru and returns home two or three times a year. She carries out the bulk of agricultural work on the farm, although she employs a herdsboy and is occasionally helped by her children in the school holidays or by her husband when he is at home. Although her husband is mainly absent, she must seek his permission before she undertakes any major changes on the farm. In practice she makes most of the decisions about day-to-day running of the farm, in consultation with her father-in-law who still owns the farm.

Mrs Ng'ang'a is responsible for feeding and sustaining her family. Her basic requirements are food and fuel for the household, and cash for purchased foods, farm inputs and schools fees. She produces milk, maize and vegetables on her farm for household consumption although often has to buy in other foods and additional maize. Her income comes from vegetables and milk, and from the small amounts of income her husband remits. She obtains most of her fuelwood from the Aberdares forest - although there are a number of trees on the farm, they belong to her father-in-law and are not considered her property to use. Her father-in-law has given his son the rights to a row of nearly-mature *Grevillea* which surround her homestead. These yield a small amount of fallen wood which she can use for fuel, but her husband is saving them for timber and fears that cutting branches will affect the quality.

Mrs Ng'ang'a is able to obtain adequate fuel for domestic purposes, although she spends a lot of time walking to the forest and collecting dead wood. She has problems growing enough food for her family as maize yields are low; at certain times of the year she has to buy in food from local markets. She realises a low income from her vegetables because middlemen pay such low prices, and is often left with unsold and rotting cabbages and potatoes. Milk, marketed through the local dairy co-operative, remains unsold in the rainy season when roads become impassable. Much of her income from milk is used in purchasing cattle feed and other farm inputs.

Mrs Ng'ang'a's states that her major problems are poor crop yields, inadequate income for farm inputs and other expenditure and time-consuming fuel collection. These problems have a number of causes - poor soils and inability to purchase enough fertiliser, bad roads and poor marketing of milk and vegetables, lack of nearby and accessible fuel sources. They also have wider impacts for Mrs Ng'ang'a. She feels her farm productivity is low and her family doesn't eat well; she has problems meeting necessary expenditures, including school fees; farm inputs and animal feeds; she spends too much time walking to and from the forest to collect fuel; and has noticed that the fringes of the forest are becoming severely depleted because there is so much local cutting of trees for fuelwood and poles.

Mrs Ng'ang'a has considered and tried several ways of overcoming these problems - by increasing her use of farm inputs, by taking her vegetables to the local market herself, and by purchasing fuelwood from a neighbour. None of these solutions have been satisfactory as she lacks sufficient time and income. Mrs Ng'ang'a and the Forestry Extension worker agree that, in principle, farm forestry could help her. Trees could be a way of obtaining fuelwood and fodder, yield leaf litter to be used in green manure, and provide a source of income.

➲ Planning and appraisal - Design and choice

During planning and appraisal we assess the costs and benefits of different farm forestry alternatives. We choose the best option to meet the farmer's needs and suit his circumstances.

Planning and appraisal comprise the design of a farm forestry intervention whose inputs and outputs are appropriate to the farmer's situation. This involves:

✪ Step 1: *Defining the desired outputs from farm forestry*

By the end of the identification stage we should have identified whether there is a niche for farm forestry as a way of helping to overcome a farmer's needs and problems. We now need to define the outputs which farm forestry will be expected to provide to achieve these ends.

To define the desired outputs from farm forestry we need information such as:

- What are the farmer's needs and problems?
  e.g. Income, fuel, animal feeds, soil fertility, soil erosion, etc?
- Which outputs can farm forestry provide to meet these needs and problems?
  e.g. Income - fruit, timber, fuelwood: fuel - fuelwood; animal feeds - fodder; soil fertility and erosion - green manure, soil holding, etc?

✪ Step 2: *Identifying tree species and their benefits*

After we have defined the desired outputs of farm forestry, we need to see which trees are capable of producing them. We identify the outputs and characteristics of different trees species. This will give us a shortlist of trees which can potentially provide the outputs identified in Step 1.

To identify trees and their benefits we look at different trees in the light of the farmer's needs. We need information such as:

- Which trees can provide the desired outputs?
  e.g. Fruit-Macadamia, Avocado, timber-Markhamia, fuelwood-Grevillea, fodder-Calliandra, green manure-Grevillea, etc
- What other benefits and secondary characteristics do these species have?
  e.g. Multipurpose trees, other outputs, speed of growth, nitrogen fixing, drought resistant, easy to establish, can be boundary planted, etc

✪ Step 3: *Matching tree species to the farmer's physical and socio-economic situation*

Step 2 has provided a list of tree species which can potentially provide outputs the farmer needs. During identification we have defined the farmer's physical and socio-economic situation. We now need to compare our list of possible trees with the farmer's situation and resources, so as to enable us to choose appropriate farm forestry species.

We first assess the physical and socio-economic requirements of the trees we have listed in Step 2. This gives us information about the inputs they will need. We

compare these requirements with the physical and socio-economic resources available to the farmer. We can now shorten our list of possible farm forestry species by eliminating those whose requirements do not match the farmer's resources and situation.

To match tree species to the farmer's physical and socio-economic situation we need information such as:

- What physical conditions do different trees require?
  e.g. Soils, water, climate, space, etc
- What socio-economic inputs do different trees require?
  e.g. Continuous and periodic labour, cash for bought inputs, specialist knowledge, etc
- Which trees' requirements can be met by the farmer?
  e.g. Which physical characteristics required by different trees does the farm area have? Which socio-economic requirements of different trees does the farm-household have? etc
- How is the farmer already using and managing trees on his farm?
  e.g. What tree species are already used and fit in with the farmer's situation? How can these practices and knowledge inform farm forestry? etc

Step 4: *Comparing the costs and benefits of different farm forestry options*

During Steps 1, 2 and 3 we have used a process of elimination to list a range of tree species which are appropriate to the farmer's physical and socio-economic situation and can provide outputs which will meet his needs and problems.

We aim to maximise the benefits and minimise the costs of farm forestry. By looking at the costs and benefits of different farm forestry alternatives we can choose the option with the maximum benefits and minimum costs. Assessing costs and benefits will also help us to plan for farm forestry activities by providing a schedule of inputs and outputs.

To compare the costs and benefits of different farm forestry options we need information such as:

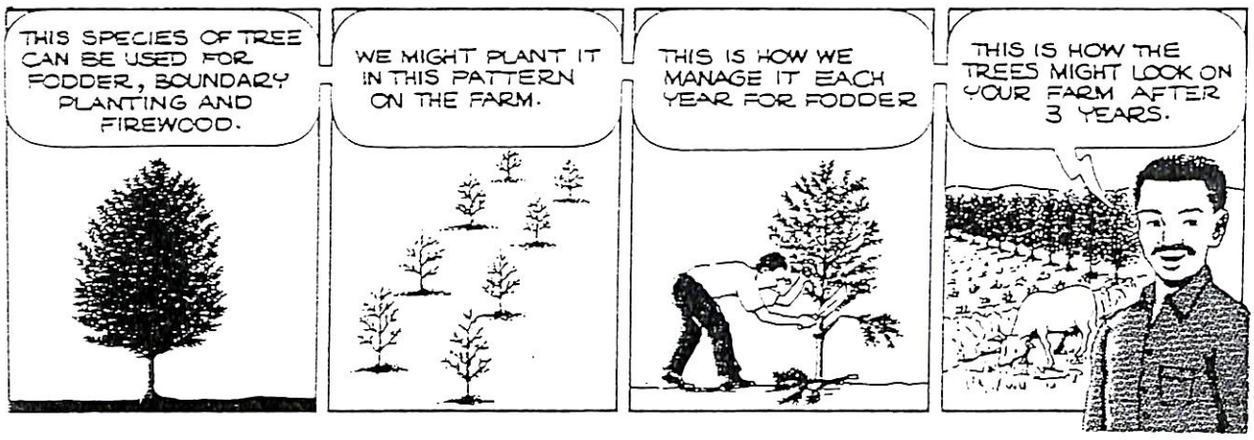
- What quantity and quality of desired outputs will each tree produce?
  e.g. How much fruit, fuelwood, fodder etc do different trees produce? Are there significant differences in the quality of these outputs?
- How soon will different tree species provide the desired outputs?
  e.g. Are some trees faster growing and faster yielding than others?
- What additional or secondary benefits does each tree have?
  e.g. Do certain trees yield other outputs or have other benefits in addition to the outputs desired by the farmer?
- What material, financial and human inputs does each tree require?
  e.g. What are the relative costs of different trees in terms of their required inputs?
- Which trees are preferred by the farmer?
  e.g. What additional costs and benefits do different trees hold for the farmer? What costs and benefits do the farmer identify? Which tree species do the farmer prefer?
- Which trees maximise benefits and minimise costs?
  e.g. Which trees yield the best benefits, entail the least cost, and are preferred by the farmer?
- How can tree benefits be maximised, outputs be processed and further value-added?
  e.g. How will the farmer maximise the benefits from tree planting? What kind of processing and further work will tree products require to meet their objectives? Can the farmer add value by processing tree products?

✪ Step 5: *Assessing the risks and constraints to farm forestry*

We have chosen farm forestry species in the light of the farmer's situation and needs, and looked at the costs and benefits farm forestry will imply for the farmer. Now we must try to anticipate what kinds of risks and constraints might arise during farm forestry, and think of ways of avoiding or minimising them.

To assess the risks and constraints to farm forestry we need information such as:

- What are the risks of tree planting?
  e.g. Drought, pests, failure to grow, shading of crops, etc
- How can we minimise these risks?
  e.g. Drought-resistant varieties, anti-pest measures, proper knowledge and training, careful planting, use of existing knowledge and practices, etc
- What are the constraints to tree planting?
  e.g. Lack of cash, insecure land-tenure, labour, water, lack of seeds, poor infrastructure, etc
- How can we overcome these constraints?
  e.g. Use of low-cost techniques, hiring labour, planting near to rivers, etc
- What are potential conflicts in tree planting?
  e.g. Provision of labour, conflict with neighbours, decision-making and control over trees and outputs, cultural prohibitions, etc
- How can we avoid these conflicts?
  e.g. Allocate labour equitably, plant away from boundary, agreement over decisions and control, etc



How will farm forestry take place?

✪ Step 6: Formulating a plan for tree planting

Having chosen farm forestry species and thought of ways to minimise risk, we must now decide on how to go about tree planting. We need to plan where, when and by whom trees will be planted.

To formulate a plan for tree planting we need information such as:

- Where will seeds or seedlings be obtained from?
  e.g. Purchased, produced on-farm, obtained from FD nursery, etc?
- Where will different trees be planted?
  e.g. Boundary, by the homestead, in crops, driveway, etc?
- How many of each tree will be planted?
  e.g. How many trees will provide the desired level of inputs, subject to the farmer's availability of physical and socio-economic inputs?
- When will the trees be planted?
  e.g. What is the best timing for planting subject to the farmer's physical and socio-economic inputs?
- Who will plant the trees?
  e.g. Farmer, spouse, worker, outsider, etc?
- Who will tend the trees?
  e.g. Farmer, spouse, worker, outsider, etc?
- What management will the trees require after planting?
  e.g. Management, expertise, training, etc?
- What local knowledge and management practices exist?
  e.g. Existing knowledge, practices, etc?
- Who will be responsible for providing material, labour and financial inputs for trees?
  e.g. Farmer, spouse, worker, outsider, etc?

✪ Step 7: *Timetabling farm forestry activities*

Tree planting is only one stage of farm forestry. We need to anticipate future activities, including harvesting, processing, using and selling tree products. We need to plan and schedule these activities with the farmer.

Design and Choice

Mrs Ng'ang'a has identified a possible niche for farm forestry as a way of helping to overcome her problems. Because it is difficult for her to make major decisions about farm activities by herself, she waits until her husband's next visit home and they both discuss with the Forestry Extension worker the best way to go about tree growing.

Mrs Ng'ang'a has defined her major problems as poor crop yields, inadequate income, and lack of nearby fuel. Mr Ng'ang'a adds that he is planning to set up a zero-grazing enterprise and wonders whether farm forestry can assist in this. They both decide that farm forestry could provide a source of improved soil fertility and leaf litter, fuelwood, fodder, timber and fruits as outputs which would help in meeting their needs and problems.

There are a range of trees which can in principle provide the outputs the Ng'ang'as need. The Ng'ang'as and the Forestry Extension worker discuss the tree species they know about, and come up with a list of possible trees which can produce what they need. This list combines trees the Ng'ang'as know about because other farmers have planted them, or which grow naturally in the area, and trees the Forestry Extension worker recommends. They discuss several trees which can provide leaf litter, fuelwood, fodder, timber and fruits - *Calliandra, Carica, Cordia, Eucalyptus, Grevillea, Leucaena, Macadamia, Persea* and *Podocarpus*.

They then look at these trees in terms of their requirements, and see how far these match the resources available to the Ng'ang'as. The Ng'ang'as live in a high altitude, high rainfall area with acidic soils and steep slopes. They have little cash or labour time available to spend on trees, but plenty of space and water. This shortens their list of possible tree species to ones which are suitable to the area and to the Ng'ang'as' situation - *Calliandra, Cordia, Eucalyptus, Grevillea, Leucaena, Macadamia* and *Podocarpus*.

The Ng'ang'as have now come up with a shortlist of possible tree species which can provide the outputs they need and are suited to their physical and socio-economic situation. They now look in more detail at these trees to see what their costs and benefits are. They discuss the trees' additional good and bad characteristics, and look at their other uses. The Ng'ang'as rank the trees and choose those they think are best for them. These are - *Calliandra, Grevillea* and *Macadamia*. These trees can provide the outputs they require, are suited to their situation and have other characteristics which will help in other areas, such as honey production and nitrogen fixing. The N'gang'as feel that *Calliandra, Grevillea* and *Macadamia* will maximise benefits and minimise costs for them.

Now that they have chosen their preferred farm forestry trees, the Ng'ang'as and the Forestry Extension worker next look at the risks and problems which might occur in planting *Calliandra, Grevillea* and *Macadamia*. They see the major risks as termite infestation of *Grevillea*; the problem of finding the best variety of *Macadamia* for the area; the susceptibility of *Calliandra* to drought, and its liability to bloat cows and taint milk if it is used as the sole source of cattle feed. To overcome these risks, they will use chemicals on their *Grevillea* seedlings if they show signs of infestation, seek the advice of the Forestry Department as to the most suitable variety of *Macadamia* for the area, mix fodder with purchased dairy meal and ensure that *Calliandra* is planted in a well-watered area of the farm.

Mr and Mrs Ng'ang'a also attempt to anticipate other risks and constraints. These include lack of labour and time for tending and harvesting the trees, and possible conflicts in decision-making and land ownership. Mr Ng'ang'a agrees that his wife will have control over the planting and tending of trees, and over minor harvesting of fuelwood and fodder. They decide that before any major tree operations, such as felling, are carried out a joint decision will be made. Mrs Ng'ang'a's father-in-law is also consulted, and gives his permission for his daughter-in-law to plant trees, but only on the part of the land which will eventually become her husband's farm. He agrees that she may make use of his trees for fuelwood until her own trees mature. Mrs Ng'ang'a feels that the additional time she will have to spend on tree management and manure preparation will be compensated for by the lower amount of time she will spend fetching fuelwood each day. They have decided that the herdsboy will carry out fodder preparation in lieu of taking the cattle into the forest to graze.

Having chosen suitable tree species for planting on the farm, the Ng'ang'as formulate a plan for farm forestry. They will obtain the seedlings from a nearby farmer who has a nursery. This farmer, in combination with the forestry extension worker, will provide advice about planting and tending the trees. They decide to plant *Grevillea* around the boundary of the main maize fields, where they will also be near to the house. *Calliandra* will be intercropped with maize and vegetables, which they hope will have the additional benefit of improving soil fertility. A grove of *Macadamia* will be planted beside the home, where they will be easy to harvest. They agree to start planting trees at the beginning of the next rainy season, when Mr Ng'ang'a will be home. He has undertaken to provide cash to purchase seedlings and other inputs.

After consultation with the Forestry Extension worker, the Ng'ang'as decide that they will pollard the *Grevillea* every year, starting in about 5 years time. From their own local observations they know that each tree should yield enough fuelwood to last the household about a month, and so they decide to plant 15 trees, allowing extra seedlings in case any die. After 20 years, they will fell the mature trees for timber. Under the advice of their neighbour, who also grows *Calliandra*, they learn that they will be able to cut fodder twice a year once the trees are established. They will mix *Calliandra* from their 50 seedlings with dairy meal. The farmer also instructs them in mulch and compost preparation and application, using leaf litter from the trees.

	Calliandra calothyrsus	*Carica papaya*	*Cordia africana*	*Eucalyptus saligna*	*Grevillea robusta*	*Leucaena leucocephala*	*Macadamia tetraphylla*	*Persea americana*	*Podocarpus latifolius*
USES									
Fuelwood	☑		☑	☑	☑	☑		☑	☑
Fodder	☑					☑			☑
Manure	☑		☑		☑	☑			
Timber			☑	☑	☑		☑	☑	
Fruits		☑					☑		
Other uses	Bees, poles, erosion, nitrogen, soil consvn		Hives, utensils, bees, mulch, fibres, soil consvn	Charcoal, poles, bees	Poles, bees, mulch	Bees, soil consvn, nitrogen, poles	Charcoal, oil, bees		Poles
ACCEPTABLE?	☑	☑	☑	☑	☑	☑	☑	☑	☑
REQUIREMENTS									
Physical	Suitable	Prefers lower altitudes and higher temperatures	Grows naturally in the area	Suitable	Suitable	Suitable	Suitable	Prefers lower altitudes and higher temperatures	Grows naturally in the area
Labour	Low	Low	Pruning	Low		Low generally, manure - high	Low	Low	Low
ACCEPTABLE?	☑	☒	☑	☑	☑	☑	☑	☒	☑
COSTS & BENEFITS									
Growth rate	Fast, easily established		Slow, easily established	Fast, easily established	Fast, easily established	Medium, easily established	Medium, not easily established		Slow, easily established
Yields	High		Low	High	Medium	Medium	High		Low
Other	Multipurpose		Evergreen, drought resistant	Long roots, high water demand	Mixes easily with crops Multipurpose	Mixes badly with crops High water demand Problem of psyllid pest Multipurpose.	Continuous yields		Evergreen, drought resistant
Rank	1		4	6	2	5	3		7
ACCEPTABLE?	☑		☒	☒	☑	☒	☑		☒
RISKS & CONSTRAINTS									
Risks and constraints	Can taint milk if fodder not mixed. Susceptible to drought				Susceptible to termites		Poor varieties may not be suitable		
Measures	Mix leaves with dairy meal. Ensure sufficient water				Use chemicals on seedlings		Make sure varieties are suitable		
ACCEPTABLE?	☑				☑		☑		

To timetable farm forestry activities we need information such as:

- When will tree products be harvested?
  e.g. Timing of production and harvesting of different tree products? One-off harvesting or periodic harvesting? etc
- How will the tree products be harvested?
  e.g. Coppicing, pollarding, cutting, picking, etc
- Who will harvest the tree products?
  e.g. Farmer, spouse, worker, outsider, etc
- What inputs will be required for harvesting?
  e.g. Extra labour, machinery, materials, money, etc
- Who will be responsible for procuring these inputs?
  e.g. Farmer, spouse, worker, outsider, etc
- How, when and by whom will the tree products be used?
  e.g. For sale, domestic use? In combination with other products? Continuous or periodic use? Farmer, spouse, worker, outsider, etc
- If the tree products are to be sold, where and when will they be sold?
  e.g. Local markets, to middlemen, to businesses, to neighbours? Regular or occasional sales? Individual sales or as part of group or co-operative? etc
- If the tree products are to be sold, who will deal with marketing?
  e.g. Farmer, spouse, worker, outsider, etc
- If the tree products are to be sold, what kind of processing and valued-added can be carried out?
  e.g. Can fuelwood be split and stacked? Can timber be sawn? Can fruits be prepared in any way? Can wood be carved or made into furniture or poles? Can nuts be shelled and packaged? Can farmers form marketing or processing groups? etc

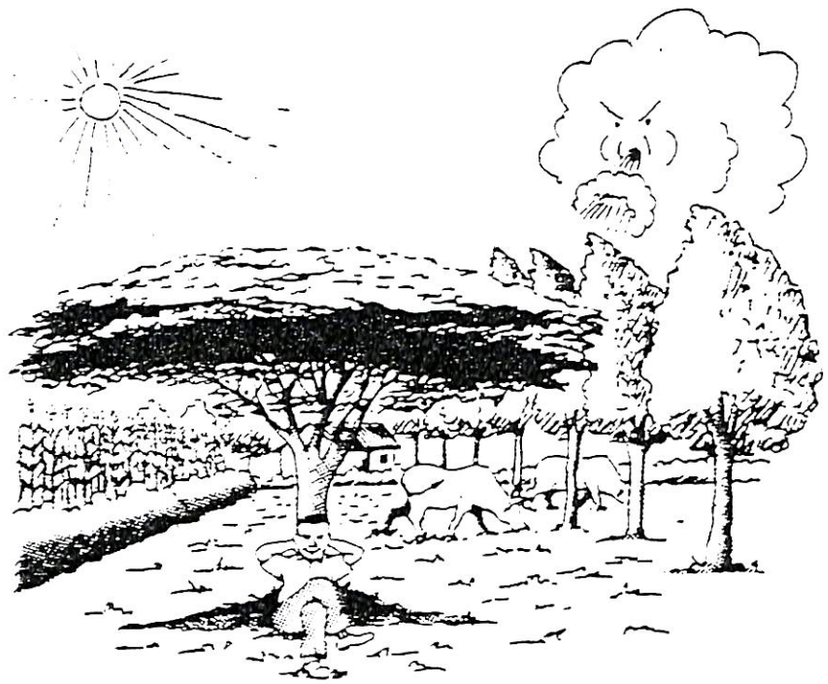
Monitoring, evaluation and impact assessment: Events and effects analysis

Monitoring, evaluation and impact assessment are all to do with finding out what has happened as a result of farm forestry, judging its positive and negative outcomes and learning lessons so as to carry out farm forestry better in the future.

Although monitoring, evaluation and impact assessment take place at different times in the farm forestry process they are all concerned with looking at farm forestry events and their effects:

- **Monitoring:** *Looks at on-going activities and assesses their outcomes, problems and successes*
- **Evaluation:** *Looks at completed activities and judges how successful they were in terms of their original objectives*
- **Impact assessment:** *Looks at the changes which have come about as a result of farm forestry, and who and what has been affected*

Monitoring, evaluation and impact assessment are much easier if you, or farmers, keep records of farm forestry activities, outputs and outcomes. These records can then be combined with other information to look at what has happened as a result of farm forestry.



Has farm forestry been successful?

➲ Monitoring, evaluation and impact assessment involve:

✪ Step 1: *Finding out what has happened*

We first need to find out what has happened in farm forestry. We document what its outcomes and results have been in different areas.

To find out what has happened in farm forestry we need information such as:

- What farm forestry activities have been carried out?
  e.g. Tree production, planting and harvesting in 10 farms, barazas, farmer training, etc
- What has been the outcome of farm forestry activities?
  e.g. More seedlings, more trees, better local awareness of farm forestry, etc
- What planned and unplanned results has farm forestry had?
  e.g. Increased income and soil fertility, increased milk and crop yields, better fuelwood and polewood availability, less use of forest reserve, decreased boundary disputes, establishment of carving co-operative, etc

✪ Step 2: *Finding out who and what has been affected*

Once we have found out what has happened during farm forestry, we can look at who and what has been involved and affected. We want to look at both planned and unforeseen effects on different people and things, and at both positive and negative impacts.

To find out who and what has been affected by farm forestry we need information such as:

- Which groups and individuals have been involved in farm forestry?
  e.g. Household living on steep slopes, dairy farmers, etc
- Which groups and individuals have benefited from farm forestry?
  e.g. Livestock owners, women, unemployed, poor, children, etc
- Which things have improved as a result of farm forestry?
  e.g. Soil fertility, fodder and fuel availability, woody biomass, local business, local nutritional standards, etc
- How have people benefited from these changes?
  e.g. Livestock owners - less feed costs; women - less time spent collecting fuelwood; unemployed - wood-based employment and industry; poor - better crop yields; children - better nutrition, availability of school fees, etc
- Which groups and individuals have lost out from farm forestry?
  e.g. Shopkeepers, women, neighbours, crops, casual workers, etc
- Which things have got worse as a result of farm forestry?
  e.g. Local business in farm inputs, crop competition for shade and moisture, increased local pest infestations, less casual farm employment, etc
- How have people lost out from these changes?
  e.g. Shopkeepers - reduced sales of agrochemicals and dairy meal; women - loss of social time, additional workload; neighbours - shade and roots; crops - pests, shade and competition for moisture; casual workers - loss of employment in fetching fuelwood, grazing cattle; etc
- What problems and successes have been encountered by different groups and individuals?
  e.g. poorer farmers - lack of cash to sustain farm forestry; women - lack of labour time to tend trees; rich farmers - development of commercial polewood industry; livestock owners - development of on-farm fodder sources; slope farmers - establishment of soil-holding terraces; etc

✪ Step 3: *Assessing whether the changes are good, bad and sufficient*

Overall, we want to see whether the changes and outcomes of farm forestry can be considered to have been good or bad, and to assess whether trees have had a sufficient impact to make a difference to people. In monitoring we assess this in terms of on-going changes and their implications for future activities, in evaluation we look at changes and outcomes in terms of whether they have achieved their original aims, and for impact assessment we see how changes are good or bad for different people and things.

To assess whether changes are good or bad we need information such as:

- How can the outcomes of farm forestry provide lessons learned for future farm forestry activities?
  e.g. In the light of what has happened, how can successes be replicated and failures avoided in the future? What are the next steps forward? etc
- Has farm forestry achieved its desired outputs and projected results?
  e.g. Has farm forestry helped the people and areas it was meant to assist? Has it produced the outputs it was meant to produce? Has it resulted in the benefits it was meant to achieve? Has it helped the groups who were targeted? etc
- Overall, can farm forestry be considered to have been a success or a failure?
  e.g. Have the successes of farm forestry outweighed its problems? Have its overall effects been positive? In what ways can it be said to have failed? etc

Events and Effects analysysis

We will illustrate events and effects analysis in the context of evaluation of tree planting by the Ng'ang'as. Evaluation took place 6 years after tree planting, when the trees had started yielding fuelwood, fodder, green manure and fruits, in order to judge how successful farm forestry had been.

The Ng'ang'as planted 15 *Grevillea* trees around the boundary of their farm, 50 *Calliandra* as hedges among their crops, and 12 *Macadamia* close to the homestead. They have been harvesting fuelwood from the *Grevillea* since the year before last, using *Calliandra* for fodder for the last 4 years, and the *Macadamia* have been bearing nuts since last year. They have been making compost from leaf litter and cow manure, and applying it to their crops for the last 4 seasons.

Not all the Ng'ang'as' seedlings survived. Six out of the 15 *Grevillea* have died due to termite infestation, and two had to be felled at the insistence of Mr Ng'ang'a's brother. Although Mr Ng'ang'a undertook to provide cash for pesticides when necessary, he had inadequate money. A hedge containing 10 of the *Calliandra*, planted on the far side of the farm, received insufficient water and failed to survive during the dry season. Two of the *Macadamia* seedlings were stunted and never bore fruit.

The major positive changes which have occurred as a direct result of tree planting have been:

- Tree cover on the farm has increased
- A large proportion of the household's fuelwood and fodder are produced on-farm
- Household income has risen
- Expenditure on purchased fertilisers and animal feeds has decreased
- Mrs Ng'ang'a no longer obtains fuelwood from the Aberdares forest

Mrs Ng'ang'a has also noticed that tree planting has contributed to wider benefits:

- Crop yields have increased
- Water and topsoil runoff have decreased
- The children are better fed
- There is adequate money for school fees and other expenditure
- Milk yields have risen

There have also been negative effects from farm forestry:

- The roots of some of the *Grevillea* planted around the edge of the farm started to grow onto Mrs Ng'ang'a's brother-in-law's portion of land. He argued that these roots were interfering with his crops, and encroaching on his land. Mrs Ng'ang'a was forced to fell these trees to avoid dispute
- Mrs Ng'ang'a's workload has risen slightly
- Some of the crops which lie under the *Grevillea* trees have suffered from too much shade.

A number of people have been affected by farm forestry. They include Mrs Ng'ang'a, whose tree-related workload has increased but whose labour time spent on fuelwood collection has decreased significantly; Mrs Ng'ang'a's income and subsistence have also risen because of better crop yields and a higher marketable surplus. Mr Ng'ang'a's income from *Macadamia* nuts and milk has increased significantly. The Ng'ang'a children have benefited from a better diet. Farm forestry has had a mixed effect on the Ng'ang'as' neighbours, who have had problems with encroachment from *Grevillea*, but have benefited from reduced water runoff from the Ng'ang'as' farm.

The Ng'ang'as attempt at farm forestry has been largely successful. Although they suffered lack of labour time and cash for inputs, these problems had little overall negative impact. An important lesson learned from the exercise is the potential for farm forestry to improve household subsistence, income and environmental conditions.

There have been a number of small problems in farm forestry - dispute with neighbours, lack of labour and cash, and the failure of some seedlings to grow. However overall, the Ng'ang'as feel that farm forestry has been a success because it has produced the results and outputs they desired - green manure, fuelwood, fodder, better farm productivity and additional income. They feel that farm forestry has resulted in positive changes.

4

PLANNING TO COLLECT SOCIAL-ECONOMIC INFORMATION

➲ Planning to collect information

We have looked at different stages of the farm forestry process, outlined what kinds of socio-economic issues might arise and suggested steps for incorporating them into farm forestry. To recognise and address these issues, we need to find out about the social and economic circumstances of the farmers we are working with. This means we need to collect socio-economic information.

The aims of collecting socio-economic information are to understand farmers better, to involve them in the farm forestry process and to target their specific needs and circumstances. We should always bear these aims in mind when we are collecting socio-economic information.

We want to collect the best socio-economic information possible with limited time and resources. Before we start collecting information we need to plan the exercise carefully.

There are three aspects of planning to bear in mind before we start to collect socio-economic information:

- **Preparation** - ***Material, methodological and logistical planning***
- **Participation** - ***Ensuring farmers' involvement in the exercise***
- **Perspectives** - ***Choosing groups and individuals to be involved in the exercise***

Preparation - *Material, methodological and logistical planning*

Good preparation is absolutely crucial if we want to collect good socio-economic information. We should have a clear idea about why, how, where and when the exercise is being carried out.

- **Why?** Think about the aims of the exercise so you don't end up collecting useless in-formation. Collecting information is of no use as an end in itself. It is only useful as the basis for constructive action. Make sure you have decided the issues and topics you want to learn about.
- **How?** Think about how you will collect socio-economic information - what tools and methods you will use, what equipment and materials the exercise will need.
- **Where and when?** Think about where you want to collect information, and what physical areas you will cover. Make sure people know you will be coming, you can reach them easily, and have arranged to stay there if necessary. Think about the timing of the exercise and how it fits in with people's routine. Consider how long it will take, given the information you want to collect and the physical areas you want to cover.

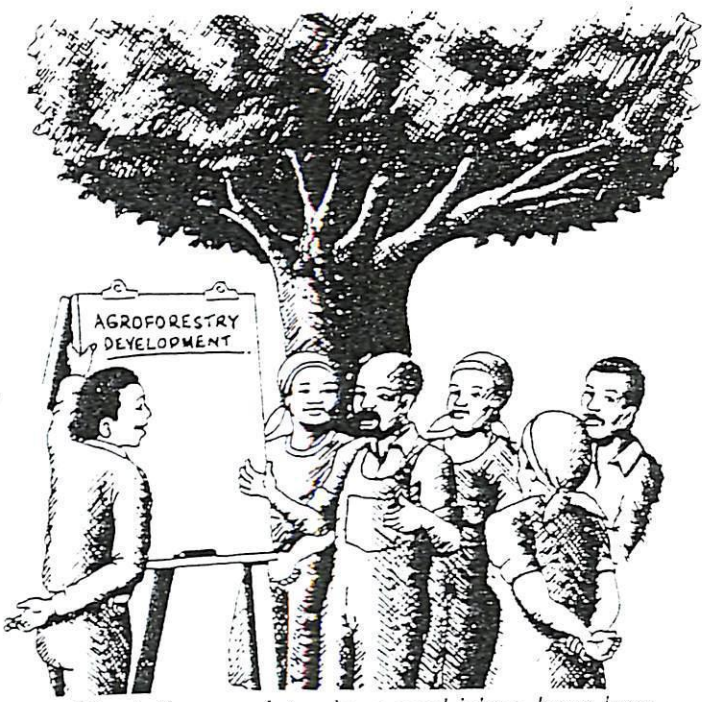
Always plan the timing of the exercise carefully, and make sure you don't disrupt people's activities

When planning to prepare to collect socio-economic information we need to ask:

What preparations are necessary?

- What issues are we dealing with?
  e.g. Fuelwood and fodder needs, poor soil fertility etc
- What information do we need?
  e.g. Farm size, cropping patterns, labour availability, local knowledge and practices etc
- Which methods will we use to collect the information?
  e.g. Household questionnaires, participatory tools, observation and measurement etc
- What is our timetable?
  e.g. One week. First day: village meeting, second day group discussions, third and fourth days household interviews, fifth day village meeting etc
- Do we need to make any other preparations?
  e.g. Visiting the area, telling people we are coming, buying stationery etc

Participation - *Ensuring farmers' involvement in the exercise*



Check the people's views and ideas have been incorporated into the exercise

Participation is a key element of farm forestry. Farmers are the intended beneficiaries of farm forestry, and should participate in the farm forestry process and at every stage of information collection.

When we are collecting socio-economic information, we should not just see farmers as informants but as equal participants. We need to get their ideas about the exercise, find out what they think and whether they are willing to be involved. We should make sure farmers have a forum to express their own needs and views.

We should always inform people in advance that we will be wanting to spend time with them so that they are expecting us. We should make sure that they are aware of what we will be doing, why we will be doing it and who we will want to speak to. Asking people questions can cause a lot of unnecessary suspicion, disruption and bad feeling if they are not prepared for the exercise. Collecting socio-economic information depends on people's good will and interrupts their normal activities. We should make sure that they are willing participators in the process.

When planning to prepare to collect socio-economic information we need to ask:

How can we ensure participation?

- Have local people been informed of the exercise?
  e.g. Have you visited the area in advance and told people when you will be coming? etc
- Have local people participated in identifying the need for the exercise?
  e.g. Is the exercise a response to farmers' requests? Have you discussed the potential for farm forestry with them? etc
- Have local people been consulted about the exercise?
  e.g. Have you asked whether people think the exercise is a good idea, etc? Have you asked about the best ways of collecting information? etc
- Have local people's views and ideas been incorporated into the exercise?
  e.g. Has the exercise been designed according to local people's suggestions, needs and situation? etc
- Will local people participate in carrying out the exercise?
  e.g. How will they be involved? How will they participate? etc

Perspectives - *Choosing groups and individuals to be involved in the exercise*

Getting a broad view of socio-economic issues means taking different people's perspectives into account. Even when we are only targeting a single group in farm forestry we also need to take other perspectives into account to ensure that it will not lead to conflicts or negative effects. Different people have different views and opinions. We should ensure that we don't exclude anyone's views or perspectives when we collect information, and make sure that the information we collect is representative of the broader community.

Different people have different views and opinions

When we are collecting socio-economic information from a small group - for example a single household - it is easy to focus on every individual. However, when we are looking at a lot of people such as a whole community, it is impossible to deal with everyone individually. It is necessary to collect information from only a limited number of people. This means that we have to choose carefully the people we deal with so as to get the best possible information. We want to choose a sample of people who can accurately represent wider views and perspectives.

Whose perspectives will we cover?

- What are the different socio-economic groupings in the area?
  e.g. Men and women, cash croppers and subsistence croppers, large and small farms, landowners and squatters, institutions, etc
- Who or what is being targeted in farm forestry?
  e.g. Women, poor farmers, soil degradation, fodder, etc
- Which socio-economic groupings are relevant to the exercise?
  e.g. People who have planted trees, livestock owners, people farming on slopes, women, etc
- What issues and approaches will the exercise use for different groups?
  e.g. Which tools will be used, and topics covered, for different groups?
- Will the exercise cover a broad range of perspectives?
  e.g. Have different groups and individuals been carefully chosen to represent broader groupings?
- Will the exercise exclude any group's perspective?
  e.g. Do different groups and individuals chosen for interview cover different local groupings?

5

TOOLS FOR GATHERING SOCIO-ECONOMIC INFORMATION

Summary of tools for collecting socio-economic information

METHOD	ADVANTAGES	DISADVANTAGES
Observation	- Does not depend on questions - No language barrier - Non-intrusive - Can reveal things people aren't directly aware of - Gives information about rhythms of everyday life	- Time consuming - Can be biased by the observer - May be an atypical situation or circumstance - Being watched can disrupt what people do - Lack of familiarity may result in misinterpretation
Group discussions	- Flexible - Can respond to different people's interests - Gives a range of opinions and perspectives - Can highlight areas of conflict - Shows areas of consensus	- One person can dominate discussion - Some groups may be intimidated - Hidden agendas
Individual interviews	- Flexible - Can respond to different people's interests - Can deal with personal and sensitive issues - Respondents unbiased by others' views and expectations	- Intrusion on privacy - Hidden agendas - Not a balanced view
Case studies and life histories	- In-depth and detailed information - Comprehensive description	- Not easily generalised - Not a balanced view
Checklists	- Support discussion and interviews - Make sure required topics are covered	- Only useful in combination with other methods
Questionnaires	- Directly comparable and quantifiable information - Covers exact topics and questions - Generalisable to a larger population	- Inflexible - Non participatory - Long duration - Brings in preconceptions and predetermined topics/questions - Difficult to analyse
Participatory tools	- Flexible - Informal - Involve respondents - Short duration - Simple to carry out and analyse	- Do not gather directly comparable and quantitative information

We have looked at socio-economic issues in farm forestry, when they arise, what they comprise and how they can be identified and incorporated into the farm forestry process.

This chapter will look at tools and methods for gathering information about socio-economic issues. A brief description of each tool will be given, how to carry it out, its advantages and disadvantages, and what kind of information it yields.

Many different tools can be used to collect socio-economic information. We will deal with some commonly used tools, and give examples of how the ones involving more complicated methods (questionnaires and participatory tools) can be used for farm forestry. These tools and examples are not exhaustive, they are just a selection of the most useful methods for gathering socio-economic information and a range of possible situations when these methods can be used.

Commonly used tools for gathering socio-economic information include:

- Observation
- Interviews and discussions
- Case studies and life histories
- Questionnaires
- Participatory tools (ranking, transects, mapping, seasonal calendars and daily routine charts)

Using tools to gather socio-economic information

Gathering information about socio-economic issues has more to do with past experience and general knowledge than with any technical 'skills'. The methods described in the following paragraphs are just a way of formalising and organising your experience and knowledge into workable tools with which to gather information. These tools, and the procedures described in the previous chapter, should be adapted to specific situations and circumstances. They aim to make the collection of socio-economic information easier and more structured, but should not be seen as comprehensive or unchangeable.

There are many different tools for collecting socio-economic information. Each has advantages and disadvantages, and is suited to different situations and types of information. Tools can be used separately, or can be combined to supplement and cross-check each other.

Observation

What is observation?

Observation is watching what people do and seeing what things look like. It involves taking note of events, relationships, situations, circumstances and activities.

- **Participant observation**

  Participant observation is when you actually join in with the activity you are looking at. You observe something that you yourself are participating in. This is much easier if you hold some characteristics in common with the group you are observing (for example, if a woman joins in with fuelwood collection, if a man joins in with construction, etc). Having shared characteristics is especially important if you are observing something which might be sensitive or involve protected knowledge.

- **Observation and measurement**

  Observation and measurement involve taking quantitative measures while you are observing an activity. For example, how *much* fuelwood people are collecting and using, how *many* poles people are using to build a house, how *long* it takes to feed livestock.

How is observation carried out?

Before starting observation, it is necessary to decide what you will be looking at and what you will be looking for. Think carefully about the aims of the exercise. Prepare a checklist of things to observe, and points you want to note.

Once you start observing, just watch what people do. Be aware of everything that is going on, and take note of what is happening. Try to interfere as little as possible in what people are doing - as far as you can, be 'invisible'. The less you say the better. If you have any queries, you can ask about them after you have finished the exercise.

Keep a low profile when you are observing people and activities

It is better for only one person to observe. Being watched by a big group can be distracting for the people who are being observed, and can even change their behaviour. It is always better if the observer is not a total stranger. If necessary you can be accompanied by someone who knows the area and local customs well.

What are the advantages and disadvantages of observation?

The biggest advantage of observation is that it does not depend on what people say. Instead it learns from watching what they do. As long as people do not change their behaviour when they are observed, observation presents a true picture of events as they happen which is unbiased by people's views and may reveal things that people are not directly aware of.

A possible disadvantage of observation is that you are an outsider. Your interpretation of events may be biased or misconceived. Especially if the you are not familiar with what people are doing, it is easy to get the wrong idea when you observe them. You may be looking at an atypical situation or be disrupting what people do without being aware of it.

What kind of information does observation yield?

Observation yields detailed information about what people actually do and how they act. It gives information through watching rather than through asking, and so finds out about people's views and perceptions through their actions rather than their words.

Observation is also a good way of finding out about things about which it is difficult to ask direct questions. The information yielded during observation, especially when it is combined with measurement, can be compared at different times and for different people.

When is observation useful?

Observation is especially useful during the identification stage of farm forestry. It can play an important part in defining the physical characteristics of farming systems and the social and economic characteristics of farm households.

During monitoring, evaluation and impact assessment, observation provides a means of gauging the effects farm forestry has had on the landscape, on production and on social and economic relations.

Interviews and discussions

What are interviews and discussions?

Interviews and discussions are one of the most versatile ways of collecting information from individuals and groups. They can be adapted to a wide range of situations. Semi-structured interviews and discussions are among the most useful ways of speaking to people. An interview or discussion is said to be 'semi-structured' when it has some element of planning and guidance, but is not entirely predetermined (unlike a questionnaire, see below).

Semi-structured discussions are flexible and can respond to different people's interests

How are interviews and discussions carried out?

Before carrying out a semi-structured interview or discussion, it is a good idea to compile a checklist which outlines the topics you will want to discuss. The checklist should not completely dictate the discussion, but act as a guideline to gather particular information and deal with particular topics.

As you start the discussion, explain what you will want to talk about. Although you will have decided broad topics beforehand, you should allow the discussion to progress along the lines the respondents take it, and permit questions which arise as you go along. Try to guide the discussion without doing too much talking and avoid judging people's answers. You are there to learn, not to talk or to tell people whether they are 'right' or 'wrong'. Ask for a fuller explanation if the meaning is not clear.

When you are talking to several people, encourage participation from the whole

group. If a small number of people seem to be dominating, encourage others to join in the discussion. It is better for a group discussion to be small and selective. Between 5 and 10 people is a good size, if you have too many participants the discussion may become unfocused and not so intimate, if you have too few you will not get enough debate and diversity of opinions.

✪ What are the advantages and disadvantages of interviews and discussions?

The main advantage of semi-structured interviews and discussions is that they are flexible and can respond to different people's interests. When they involve just one person, the respondent can express views that might be constrained if others were present. When discussions involve several people, they can take account of a diversity of views, experiences and problems. They show which areas people agree on, and which areas they disagree about.

A disadvantage of semi-structured group interviews and discussions is that it is easy for one person to dominate, or to over-express their own particular views. It is up to you to avoid this problem as it arises and to encourage others to participate. Certain members of the group may be intimidated or afraid to express their own views. This is why it is essential to choose groups carefully, and to avoid mixing people who may not be free in front of each other.

✪ What kind of information do interviews and discussions yield?

Semi-structured interviews and discussions do not usually yield quantitative information. They are good ways of finding out people's views and perceptions in an informal atmosphere. They allow participants to show their areas of interest and to take the discussion in directions they feel are important.

Where groups are involved, discussions can show up areas of conflict and agreement, and highlight the particular views of different individuals and groups. With individuals they can present personal information and views which the respondent may be reluctant to discuss in front of other people.

✪ When are interviews and discussions useful?

Semi-structured interviews and discussions are useful ways of gathering information at all stages of the farm forestry process. They can be adapted to most situations and topics.

Case studies and life histories

What are case studies and life histories?

Case studies involve speaking to someone who was involved in an event or activity

Case studies and life histories are detailed accounts of events or activities from people who were involved in them. They present a very specific and personalised set of opinions, and involve an in-depth description of how events took place. They can involve one or several people.

How are case studies and life histories carried out?

Case studies and life histories involve speaking to the person or people who were involved in an event or activity. They describe in detail what happened over a particular time.

In a case-study or life history the respondents are telling you a story, and it is their own memories and opinions that count. You should avoid expressing your own view or placing your own interpretation on the event under discussion, although you can ask for clarification on matters which are not clear, or prompt for further explanation.

What are the advantages and disadvantages of case studies and life histories?

The main advantage of case studies and life histories is that they present an in-depth, detailed explanation of events and activities.

A disadvantage of case-studies and life histories is that they usually cannot be generalised. They illustrate how a particular situation occurred at a particular time from a particular person's viewpoint, but they are so specific and detailed that they do not reflect wider situations or experiences.

What kind of information do case studies and life histories yield?

Case studies and life histories yield in-depth personal information. They do not usually provide quantitative or directly comparable data. They are good ways of finding out in detail about how people respond to events or situations.

When are case studies and life histories useful?

Case studies and life histories are especially useful for finding out why people acted in a particular way in response to a particular situation. They provide a particularly good means of gathering detailed information about what has happened in farm forestry during the course of monitoring, evaluation and impact assessment. Life histories and case studies can also be useful in the identification stage of farm forestry for diagnosing farmer's needs and problems and finding out what kinds of solutions farmers apply to them.

Questionnaires

What are questionnaires?

Questionnaires are a list of questions which are asked of a respondent or respondents. Questions are determined beforehand, and are the same for every respondent. They are usually administered to a sample of people in order to get representative information about a larger population.

Although questionnaires are usually carried out with individuals, they can be used in discussion with households or groups.

How are questionnaires carried out?

Questionnaires should be prepared well in advance, and should include all the topics about which you want to obtain information. It is important to think how each question should be asked, so as to get the best possible information.

When you are using a questionnaire to obtain information from a small number of people it is important to choose the sample carefully. Make sure the group you are dealing with is truly representative of the larger population, and is composed of a range of different groups and individuals.

Once a questionnaire has been drawn up, it is essential that it is tested to make sure that it covers all the topics you want to learn about and that questions are relevant and phrased correctly. After testing, any necessary changes can be made before the main exercise starts.

Do not be afraid to end an interview if people are not happy with the questions they are being asked

One of the most important things to bear in mind when you are administering a questionnaire is the burden you are placing on respondents. If people start to get bored, or are not happy with the questions they are being asked, do not be afraid to end the interview. Never force someone to answer questions, and make sure that the questionnaire does not take too long. One hour is usually the maximum time that you can expect someone to spend answering a questionnaire.

✪ What are the advantages and disadvantages of questionnaires?

The major advantage of questionnaires is that they gather information about predetermined topics. They can yield directly comparable and generalisable information which can be extrapolated to a large number of people.

The success of questionnaires depends largely on the way in which they are designed and administered. A badly carried out questionnaire survey will not yield good quality information. It is important to bear in mind the limitations of questionnaires - they do not deal with people's in-depth views and perceptions, but provide factual answers to set questions. Questionnaires lack flexibility because they are predetermined and fixed, and can lead to misconceptions if they are not combined with a deeper understanding of people's situation and circumstances.

✪ What kind of information do questionnaires yield?

Questionnaires can yield quantitative and comparable data about a large number of people. They are best for dealing with factual topics and uncontroversial issues. Because questions are determined beforehand, they do not usually deal with people's perceptions and views but give information about set topics and issues.

Questionnaires

We will illustrate the use of a questionnaire in the context of finding out about farmers' socio-economic and physical land-use characteristics.

We can use a questionnaire to collect basic factual information, including the physical and land-use characteristics of farms, household size and composition, and sources of income and other resources.

In order to deal with more sensitive or detailed issues, and to probe more deeply about the topics covered in the questionnaires, we will use other less formal tools for gathering information. Questionnaires will present us with basic quantitative information which can be easily summarised and compared between farmers.

Name of farmer _____ Name of village/area _____

How many people live on the farm all the time?	Adult men		Adult women	
	Boys		Girls	
How many people mostly live away?	Adult men		Adult women	
	Boys		Girls	
How many people are employed?	Permanent		Sometimes	

Farm size _____ acres Has the farmer other plots? ☐ Yes ☐ No

Is the farm:	Owned	Rented	Borrowed	Squatted	Not divided

Does the farmer keep livestock? ☐ Yes ☐ No

Number of:	Cattle	Sheep	Goats	Poultry

What crops does he grown for home use?

What crops does he grown for sale?

What are his main sources of income?

Farm	Yes	No
Trade	Yes	No
Business	Yes	No
Employment	Yes	No
Others (list)		

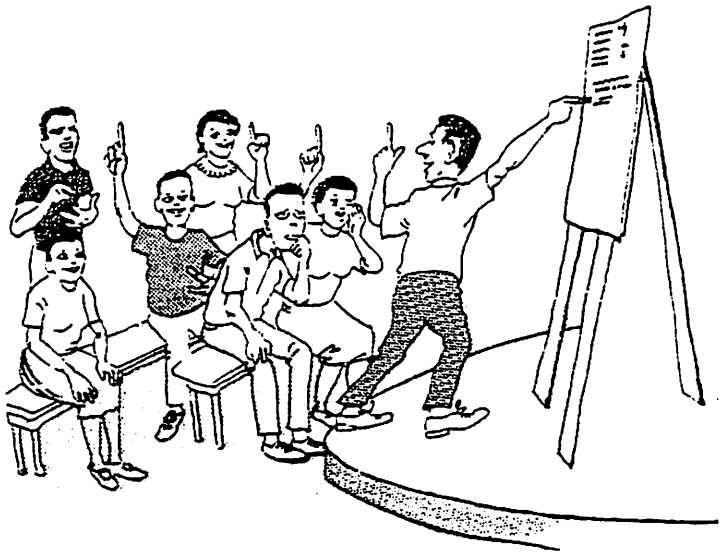
When are questionnaires useful?

Questionnaires are especially useful for gathering information about a large number of topics or a large number of people. They can be useful for defining and comparing the physical and socio-economic characteristics of a large number of farmers, for finding out about the impacts of farm forestry for a large area or whole community, and for identifying the characteristics of a large number of tree species.

Participatory tools

What are participatory tools?

Participatory tools are a way of learning from, and with, community members. They attempt to go beyond merely gathering data by involving people in information collection and basing themselves on people's opinions, perceptions and circumstances.



Participatory tools are based on people's opinions, views and circumstances

There are many types of participatory tools. They are adapted to the specific circumstances of information collection, and are usually used in combination with each other and with other methods. We will look at a selection of the most useful and widely used tools, including ranking, transects, mapping, seasonal calendars and daily routine charts.

Ranking

Ranking is a way of finding out and comparing people's perceptions, priorities and preferences. It involves ordering things according to their characteristics or worth, with the aim of showing their position relative to each other. It can be applied to people, objects, priorities, problems and solutions.

Ranking is especially useful for diagnosing people's preferences, needs, problems and solutions, and for ordering them in terms of priority. It can be used to look at the relative costs and benefits of different tree species and to categorise farmers according to their personal attributes. It is also a good way of finding out whether people think about the impacts of farm forestry in monitoring, evaluation and impact assessment.

Participatory Tools: Household Ranking

Household ranking is a way of looking at the differences between people according to local perceptions, and finding out about criteria which are relevant to farm forestry. It allows us to make broad generalisations about the attributes and composition of a community, to find out about local perceptions of wealth and socio-economic differentiation and to generalise information from a small sample to the whole community. We will look at household ranking in the context of finding out wealth categories and other characteristics.

Thua village is composed of households who differ in many ways. We want to see how these households are distributed according to wealth, and we also want to find out about the grazing practices of different villagers with a view to assisting in fodder-related farm forestry interventions. We can use this information to make generalisations about the composition of the village, about people's livestock and grazing practices, and to see how the two are related.

We first make a list of householders, with the assistance of elders. We write these names on pieces of card. We choose three informants, and ask them for key information about the villagers. For the purpose of our exercise, we decide to note the villagers':

- size of farm (small (S), medium (M) or large (L))
- number of livestock (none (N), few (F), many (M))
- method of grazing (extensive (E), confined (C), zero (Z))

We note these characteristics on the cards, and ask each informant to sort the cards into piles, depending on how he sees the wealth of the villager. The informants decide, and explain what constitutes, these wealth categories. Once the villagers have been sorted, we assign a rank to each villager based on the piles the different informants have sorted them into. This rank is calculated for each informant as follows: the number of the wealth category divided by the total number of wealth categories times a hundred (ie if someone is in the third category out of five, their score would be (3/5)X100=60).

To get each villagers average rank, we add up the total of different informants' ranks for each household, and divide by the number of informants. We then divide all the ranks of all the villagers into an overall number of wealth categories, depending on their rank. The total number of wealth categories will be the average of the number of wealth categories decided on by the informants. This gives us an idea of the different wealth brackets in a village, and outlines key characteristics of different wealth categories:

Household	Farm	Livestock	Grazing	A rank	B rank	C rank	Average rank	Category
Syomwenowa	L	M	Z	100	100	100	100	
Mbutu	L	M	E	100	100	67	89	Richest
Muthui	L	F	C	75	100	67	81	
Kioko	M	M	C	75	80	67	74	
Kilonzi	L	F	C	75	60	67	67	
Mutia	L	F	E	50	80	67	66	Upper
Mutisya	L	F	E	75	80	33	63	
Musenze	M	F	Z	75	80	33	63	
Mwanzia	M	F	C	50	60	67	59	
Kitungu	M	N	Z	50	60	67	59	
Ndua	L	F	E	50	60	33	48	
Mulwa	S	F	Z	50	60	33	48	Lower
Mwenwa	M	F	E	50	60	33	48	
Musioka	S	N	E	50	40	33	41	
Muange	S	F	C	50	40	33	41	
Kisengese	S	F	C	50	40	33	41	
Mutie	M	N	E	50	40	33	41	
Ndululu	S	N	E	25	40	33	33	
Kasioki	S	N	E	25	20	33	26	Poorest
Nzioki	S	N	C	25	20	33	26	
Number of wealth categories				4	5	3	4	

Participatory Tools
Pairwise Ranking

We will look at pairwise ranking in the context of finding out a farmer's preferences for different fuelwood-yielding tree species.

Mr Kipchoge has identified a range of tree species which he can plant on his farm, and is finding it difficult to pick the best alternative. He has identified:

- *Grevillea*
- *Calliandra*
- *Eucalyptus*
- *Leucaena*
- *Cassia*

We note down each tree species on a card, and place two of these in front of Mr Wafula, asking him to choose which he prefers. We note this down in the matrix below. We present a different pair of tree cards, and repeat the choice, carrying on until we have tried all possible combinations. We then count how many times each species appears in the matrix, and find out their overall ranks.

GREVILLEA	*CALLIANDRA*	*EUCALYPTUS*	*LEUCAENA*	*CASSIA*		TOTAL	RANK
	GREV	GREV	LEU	GREV	***Grevillea***	3	2
		CALL	LEU	CALL	***Calliandra***	2	3
			LEU	CASS	***Eucalyptus***	0	5
				LEU	***Leucaena***	4	1
1 = most preferred; 5 = least preferred					***Cassia***	1	4

Participatory Tools
Preference Ranking

We will look at preference ranking in the context of finding out farmers' constraints and problems.

When we are speaking to a group of people and want to see what their main problems are, we can use out preference ranking. For example, a group of five women may agree that their major problems are:

- lack of fuelwood
- low income
- poor maize yields
- lack of fodder
- high fertiliser prices

We want to find out, overall, how bad these problems are relative to each other. Different women have different opinions, so, to get the perspective of the group as a whole, we can carry out preference ranking. We ask each woman to say in which order she places these problems, add up the total scores, and then rank them according to the group's overall views:

Problem	Ngeru rank	Njogu rank	Maina rank	Kimathi rank	Wambui rank	Total	RANK
Fuelwood	1	2	1	2	1	7	1
Income	4	1	3	1	2	11	2
Yields	3	3	5	4	3	18	4
Fodder	2	5	2	3	4	16	3
Fertilizer	5	4	4	5	5	23	5
1 = Biggest problem; 5= Smallest problem							

Participatory Tools
Direct Matrix Ranking

We will look at direct matrix ranking in the context of how a man sees the benefits of different trees - why he prefers certain tree species, and what is good or bad about them.

Mr Mwamburi has decided that he only wants to plant one species of tree on his farm, but requires a number of products from it. In order to choose the best tree species he first of all lists the outputs he requires:

- fuelwood
- leaf litter for green manure
- timber
- bee forage

He then lists the trees which can produce these outputs:

- *Cordia*
- *Grevillea*
- *Leucaena*
- *Croton*
- *Prunus*

He ranks each tree species as to how good it is for each output in order to choose which tree, overall, will be best for meeting his needs:

	CORDIA	*GREVILLEA*	*LEUCAENA*	*CROTON*	*PRUNUS*
Fuelwood	2	1	5	3	4
Green manure	3	1	2	4	5
Timber	3	2	4	5	1
Bee forage	1	2	5	4	3
Total	9	6	16	17	13
RANK	2	1	4	5	3

1 = best; 5 = worst

✪ Transects

A transect is a pictorial diagram of different land-use zones. It is compiled while moving through an area, and combines observed characteristics with information learned in discussion. It provides an overview of the area and gives an opportunity for noting the agricultural, human and natural landscape.

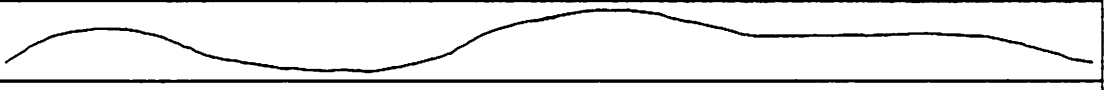
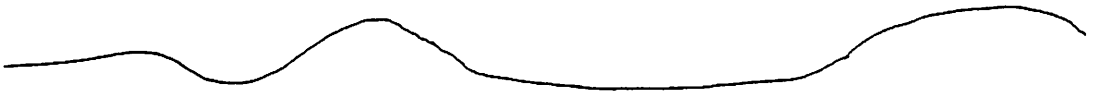
Transects are especially useful during the identification stage of farm forestry for defining the land-use and physical characteristics of farms.

Participatory Tools
Seasonal Calendars

A calendar is a good way of showing people's needs, problems, opportunities and situation as they vary over the year. We will illustrate seasonal calendars in the context of identifying people's problems and opportunities for farm forestry. We first define how people see the year in terms of different months and seasons. We decide on a range of factors that are important to people, and provide indicators of their well-being and problems. These are:

- cropping patterns
- farm activities
- labour use
- expenditure
- income

From this information, we can illustrate problems as they arise over the year, and identify niches for farm forestry as a way of meeting needs and problems:

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
RAIN	Short rains		Dry season			Long rains			Cold and damp			Dry
												
CROPS	T e a											
					Maize						Maize	
	Potatoes			Potatoes				Potatoes				
ACTIVITIES	Tea											
				Land prep					Land prep			
						Weeding					Weeding	
	Harvest				Harvest					Harvest		
LABOUR												
EXPENDITURE			Food, School fees			Inputs			Food, inputs			
INCOME			Kibarua		Crops				Kibarua		Crops	
	Milk, tea											
CASH												
PROBLEMS			Cash, food						Cash, food			
				Pests					Pests			
				Pasture/grazing								
												Fresh veg
FARM FORESTRY NICHES	Income generation, fodder crops, IPM, fertility enhancing, green manure, fruits for home consumption and sale.											

✪ Daily routine charts

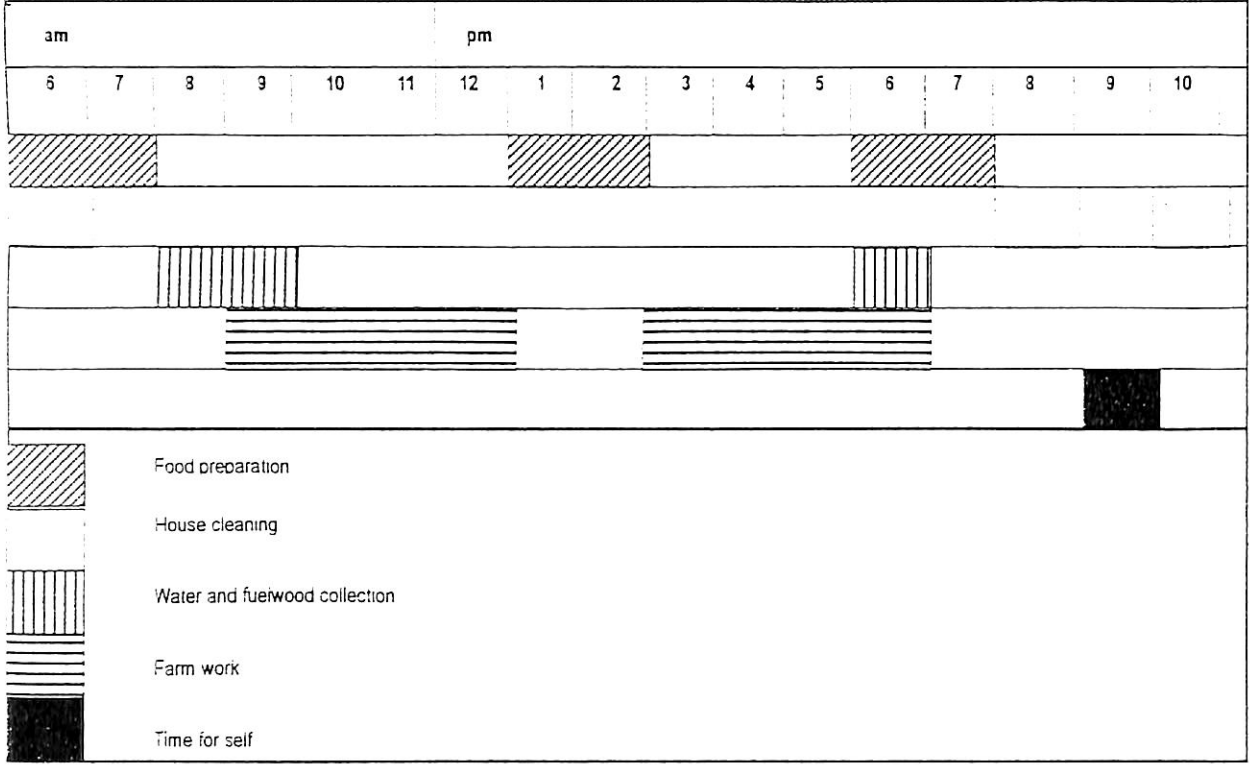
Daily routines show how and where people spend their day and what their activities are. It follows their different work tasks and leisure occupations.

Daily routine charts are especially useful in planning and timetabling farm forestry.

Participatory Tools
Daily Routine Charts

Daily routine charts help us to find out about people's daily patterns and see what kind of activities they carry out. We will illustrate daily routine charts in the context of learning about a woman's activities with a view to seeing what are the most appropriate times to carry out farm forestry activities.

Mrs Nyale lives alone on her farm and is interested in carrying out farm forestry activities. Because she has many duties and responsibilities, we want to find out the best times to visit her and discuss farm forestry. We also want to see how farm forestry can fit in with, and if possible reduce, her daily work load. In order to do this, we construct a daily routine chart which outlines how her time is spent:



Participatory Rapid Appraisal Exercises

Participatory tools are often combined as a *Participatory Rapid Appraisal (PRA)* to identify people's needs and problems, and to examine courses of action to improve their situation. We will look at an example of a PRA carried out to plan for community-based development activities.

The Organic Matter Management Network (OMMN) was invited by farmers of Karatina, Nyeri District, to come and help them to decide ways of overcoming local constraints and problems. In order to collect information and to come up with a practical plan of action, a PRA was carried out. This made use of a range of participatory tools for collecting information.

A transect walk was carried out to see the area and its situation. Farmers also mapped the village to show its physical characteristics and to highlight problem areas. They looked at seasonal resource flows and activities in order to investigate when particular problems arose. Old men and women reviewed their living memories of the area, identifying changes which had taken place in key areas and their possible causes. The community carried out scoring and ranking for different resources and resource uses, including trees, in order to come up with a prioritised list of resource needs.

A list of priority areas for community action arose from these participatory exercises. Farmers ranked these areas according to their importance, and also ranked possible solutions and opportunities for action. An important priority was the provision of fuelwood, fodder, income and environmental improvements.

The farmers looked at different ways of providing these benefits, and assessed what different courses of action and solutions would imply in terms of financial and other resources. It was agreed that the establishment of on-farm nurseries were a good way of promoting farm forestry in the area in order to provide fuelwood, fodder, income and environmental benefits. A workplan was drawn up showing agreed activities, their facilitators and resource requirements. Farmers gave their commitments to carry out their responsibilities as identified and allocated.

The exercise resulted in a number of activities, including the establishment of on-farm tree nurseries producing species such as *Grevillea robusta, Sesbania sesban, Calliandra calothyrsus* and several fruit trees.
Source: K. Kareko, FESD

A PRA was carried out in Miroleni Catchment, Bahati Division, Nakuru District. It combined observation, semi-structured interviews, group discussions, transects and ranking. From the information collected using these tools it was possible to draw a physical background to the area, chart its history and assess farming systems, conservation activities, infrastructure, health and social services.

There has been a lot of forest clearance in the area around Miroleni, and land productivity has declined over time. A range of farm forestry species have been planted, and their products are used for income and subsistence. Despite this, fuelwood scarcity was perceived to be the major problem in the area, and declining soil fertility a constraint to maximising farm production. Identified measures to address these problems included the establishment of tree planting on farms.
Source: D. K. Njoroge, Divisional Soil and Water Conservation Officer, Bahati

Summary of the use of socio-economic tools and procedures in the farm forestry process

STAGE	*PROCEDURES*	*USEFUL TOOLS*
IDENTIFICATION	Defining land-use and physical characteristics	Observation, transects, mapping, discussions
	Defining social and economic characteristics	Observation, questionnaires, discussions
	Diagnosing needs and problems	Discussions, ranking, case-studies
	Analysing causes and effects of problems and needs	Discussions, ranking, case-studies
	Finding a niche for farm forestry	Discussions, ranking, case-studies
PLANNING & APPRAISAL	Defining desired outputs of farm forestry	Discussions, ranking
	Identifying tree species and benefits	Questionnaires, discussions
	Matching trees to farmer's situation	Discussions, ranking
	Comparing costs and benefits of farm forestry	Discussions, ranking, measurement* valuation*
	Assessing risks and constraints to farm forestry	Discussions, ranking, case-studies
	Formulating a plan for farm forestry	Discussions, mapping, calendars, daily routines
	Timetabling farm forestry activities	Discussions, mapping, calendars, daily routines
MONITORING, EVALUATION & IMPACT ASSESSMENT	Finding out what has happened	Questionnaires, observation, discussions, case-studies
	Finding out who has been affected	Questionnaires, observation, discussions, case-studies
	Assessing whether changes are good or bad	Questionnaires, observation, discussions, case-studies, ranking

* See next chapter

6

TOOLS FOR MEASURING AND VALUING TREE BENEFITS

We have looked at tools for gathering socio-economic information in farm forestry. This chapter will look at a special category of socio-economic tools, methods for measuring and valuing tree benefits. These are primarily used to help the farmer calculate and compare the costs and benefits of different tree species during the planning and appraisal stages of the farm forestry process. By calculating tree benefits we can work together with the farmer to demonstrate the potential profitability of farm forestry, assess the advantages and disadvantages of different tree alternatives and plan for future farm forestry inputs and outputs.

Methods for measuring tree benefits include:

- **Measuring direct outputs**
- **Measuring secondary impacts or final products**
- **Measuring savings generated by trees**

Methods for valuing tree benefits include:

- **The market price of outputs**
- **Savings generated by trees**
- **Non-cash indicators of value**
- **Inputs and value-added in tree production**

Measuring tree benefits

Why do we measure the benefits of trees?

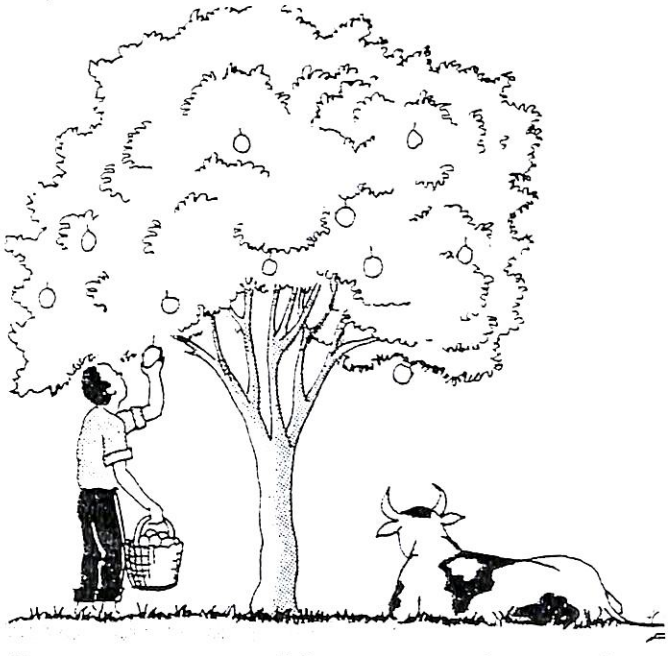
The benefits of trees are multiple. Although two trees may provide the same kind of benefits, they may not provide them in the same quantity or quality. Measuring tree benefits helps farmers to choose the best farm forestry options by weighing up the advantages and disadvantages of different trees. It also helps in planning for the future if farmers can measure the benefits they can expect to receive from farm forestry.

How do we measure the benefits of trees?

There are three basic ways of measuring the benefits of trees. Each is suited to different types of benefits and situations. These are:

- ***Measuring the direct output of trees***

Looking at the impact tree products will have on other products or sources of output. This is a good way of measuring tree products which are used to generate other outputs or products. For example, how many litres of milk will fodder generate, how many more sacks of maize will improvements in soil fertility lead to, how many kilos of honey can be produced from tree pollen, etc.



How can we measure different outputs from trees?

- ***Measuring the savings generated by trees***

Looking at the savings in money, time or other goods and services that are made by using on-farm tree products. This is a good way of measuring benefits from tree products which are used directly or to generate other outputs or products, but for which it is difficult to estimate or measure quantities. For example, savings in money to buy fertiliser by using green manure, savings in animal feeds by using tree fodder, savings in time by using the farm rather than the forest as a source of fuelwood, etc, can be measured.

Measuring tree benefits

Farmers use a range of methods to measure the benefits they gain from farm forestry.

Measuring the direct outputs of farm forestry

Mzee Njeru has a number of *Cordia abyssinica* trees planted on his farm. He uses them to make beehives for sale. Each tree produces an average of ten beehives. He also grows *Grevillea* for fuelwood, and pollards them every two years. Each pollarding produces enough fuelwood - about 20 headloads - to last his family a month.

Mrs Ojwang knows that her choice of tree management determines the outputs she receives. She has a number of *Grevillea* planted on her farm. If she pollards her *Grevillea*, she makes them more susceptible to rot, and loses the top log of the tree. A mature unpollarded *Grevillea* will yield two logs of approximately 180 board feet each. By pollarding - which can be carried out 20 times before the tree is ready for felling - she can gain one ox-cart of fuelwood to sell.

Measuring the secondary impacts or final products

Mrs Siuki has planted *Grevillea* around her shamba. She uses the litter to make compost. Without any applications of compost or fertiliser, she found that one debe of potato seed yielded only two debes of potatoes. By just applying fertiliser, this yield rose to four debes. Now that she uses leaf-litter compost and fertiliser, she can get up to eight debes of potatoes for every debe of seed. These higher yields are also a result of the *Grevillea* trees keeping her potato fields shaded and moist.

Mzee Rono plants trees on his farm to provide pollen for beekeeping. Most of this honey is produced from tree pollen. He has ten hives, each yielding 30 kg of honey a year.

Measuring the savings generated by trees

Mr Wafula's farm income is based on milk production. He has ten milk cows which each require [illegible] kilos of dairy meal a month. He has planted *Calliandra* as hedges on his farm. Now that the trees are mature, he is able to substitute every 1 kg of dairy meal with 3 kg of *Calliandra*. Every month he now uses only one 90 kg sack of dairy meal per cow, and makes up the rest of the feed with *Calliandra*.

Mr. Wafula has planted *Grevillea*. These trees keep him self sufficient in fuelwood. Rather than buying an ox-cart of fuelwood every month, he uses fuelwood from his own farm.

Valuing tree benefits

What is the value of trees?

The value of a tree is what it is worth to people. This varies for different trees, different products and different people. The value of a tree does not have to be a cash amount. Money is only one possible indicator of value, and other measures may sometimes be more relevant to people. Other indicators of value can be chosen. Especially for tree products that are not bought and sold, such as subsistence, 'quality of life' and environmental benefits, non-cash measures may be a better indicator of value.

Why do we measure the value of trees?

The aim of valuing trees is to express their benefits in terms of a measure or indicator that is meaningful to the farmer, and can be compared with the value of other farm enterprises. If the farmer knows the value of trees, he can make informed decisions about the best land-use to maximise returns from his farm. Valuation is important both before and after tree planting is carried out.

The value of farm forestry is high. It is often underestimated or not properly considered. Although most people are aware of the value of crops and livestock on their farm, many farmers do not think of the values that trees can provide. This

means that farmers may not be able to make fully informed choices or to choose the most economically valuable farm forestry option. It also means that trees may be marginalised as a land use and investment option. It is important to be able to provide some estimates of the value of trees, so that the farmer can weigh up different land-use alternatives, maximise his farm income and minimise his expenditure. Here valuation is important *before* tree planting is carried out.

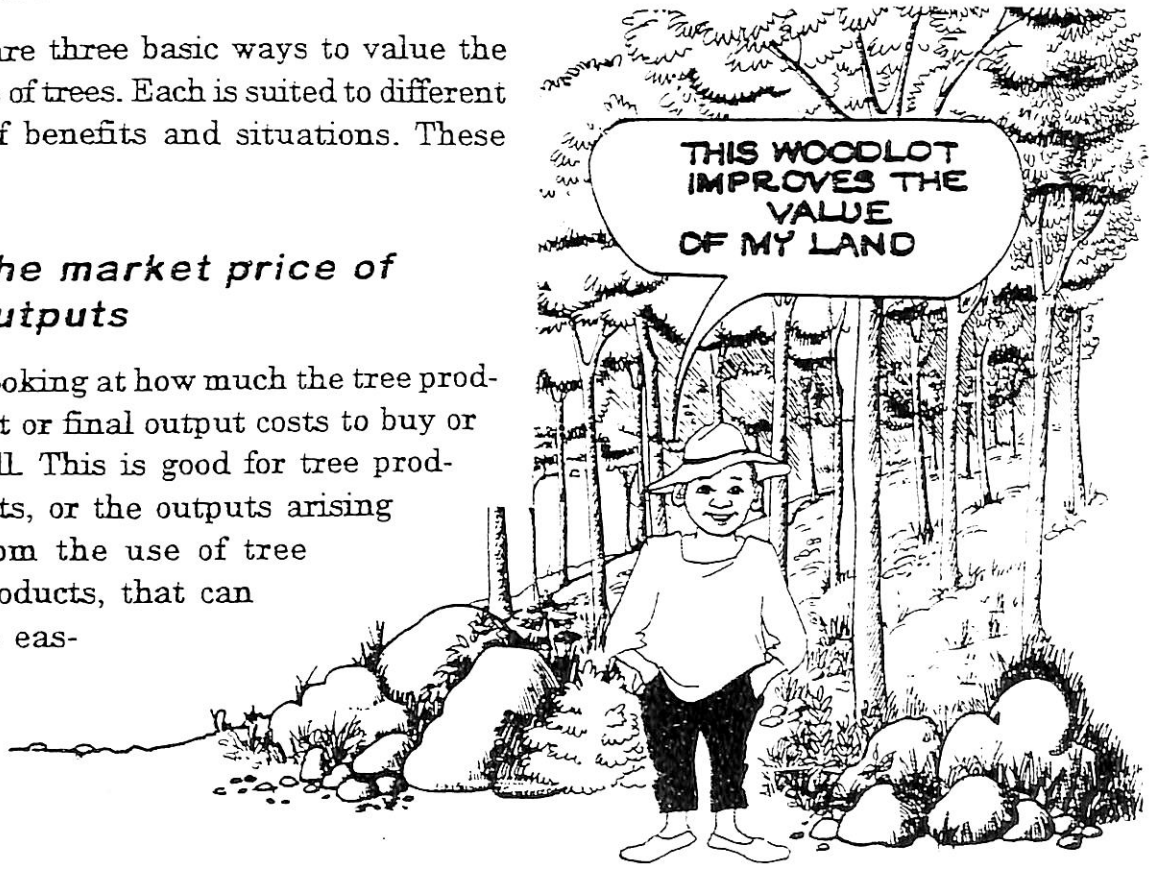
It is also important to make sure that tree benefits are realised and maximised. By looking at the value of trees, the farmer can be aware of what trees are really worth. As well as showing the potential of trees as a land-use or investment option, valuation can help farmers realise the full market value of trees and tree products when they sell them. Farmers often sell their tree products for very low prices, frequently for less than the amount of time, money and other inputs they have invested in them. Valuing trees can provide the farmer with information about what price for tree products they should be receiving. Here valuation is important *after* tree planting is carried out.

How do we measure the value of trees?

There are three basic ways to value the benefits of trees. Each is suited to different types of benefits and situations. These are:

- ***The market price of outputs***

  Looking at how much the tree product or final output costs to buy or sell. This is good for tree products, or the outputs arising from the use of tree products, that can be eas-



Valuing trees shows that they are a good investment and land-use option

ily measured and have a market. For example, the number of headloads of firewood multiplied by the local price of fuelwood, the number of kilos of fruit multiplied by the local price of fruit, the number of different types of poles multiplied by their local price, the number of litres of milk multiplied by the local price of milk, the number of additional sacks of maize multiplied by their local price, etc.

- ***The savings generated by trees***

Looking at the price of products saved by using on-farm trees. This is good for tree products which cannot themselves be bought and sold locally, but have close market substitutes. For example, the amount of fertiliser saved by improvements in soil fertility brought about by tree planting and green manure use multiplied by the market price of fertiliser, the amount of kerosene saved by using fuelwood multiplied by the market price of kerosene, the amount of animal feeds saved by using tree fodder multiplied by the market price of feed, the amount of time saved by using on-farm fuelwood multiplied by the local wage rate or the income generated by alternative activities, etc.

- ***Non-cash indicators of value***

Looking at the value of the tree or tree products in terms of something other than money, which can if necessary be converted into cash. This is especially suited to tree benefits which have no market, no market substitutes, and whose outputs cannot easily be measured. For example, how many goats is a pole worth, how many sacks of maize can a beehive be exchanged for, etc.

- ***Inputs and value added in tree production***

Looking at how much time and other inputs are used to produce tree products. This is suited to tree products which cannot themselves be bought and sold locally, but have clear linputs involved in their production. Inputs and value added in tree production is also the cost of tree production. If the farmer is selling trees or tree products, this is the price he should receive to cover his costs. For example, how much labour was used to plant, tend and harvest the tree times the local wage rate, how many polybags were used times the cost of polybags, how many seedlings were purchased times the cost of seedlings, how much pesticide was used times the cost of pesticides, etc.

Valuing Tree Benefits

We have seen how farmers in Runyenjes Division, Embu District use a range of methods to measure the benefits they gain from farm forestry. They also value these benefits in different ways.

The market price of outputs

Mrs Ojwang, who produces timber and fuelwood, uses market prices to value tree products. When she cuts a mature *Grevillea* it will yield two logs of approximately 180 board feet each. She can sell each board foot for KSh 10, giving a total tree value of KSh 3 600. By pollarding she can gain only one log - worth KSh 1 800 - but harvests 20 ox-carts of fuelwood over the tree's lifetime, worth KSh 200 each - a fuelwood value of KSh 4 000. The total value yielded by a tree used for timber and grevillea is therefore KSh 5 800.

Mrs Siuki values her *Grevillea* in terms of the productivity gains litter, shade and moisture give to her potatoes. For every debe of potato seed used, her farm yields an additional four debes of potatoes by using leaf litter in combination with fertiliser over using fertiliser alone. Each debe of potatoes is worth KSh 200 at the local market, meaning a gain of KSh 800 per debe of seed potatoes planted. In total, she plants three debes of seed potatoes each season, giving her a gain of KSh 2 400.

Savings generated by trees

Mr Wafula saves dairy meal by using *Calliandra* as cattle feed. For each cow, he saves one sack of dairy meal a month by using *Calliandra*. Each sack of dairy meal costs KSh 650. Every month, he saves KSh 6 500 on feeding his 10 cows on *Calliandra*.

Mr. Wafula is now self sufficient in fuelwood because he uses on-farm *Grevillea*. He used to buy an ox-cart of fuelwood every month, at a cost of KSh 200. His trees are therefore worth KSh 200 a month to him in terms of fuelwood.

Non-cash indicators of value

Mzee Njeru makes beehives from his *Cordia abyssinica* trees, each of which produces an average of ten beehives. Each beehive can be exchanged for a she-goat. To buy a she-goat in the local market costs KSh 500. Every *Cordia* tree therefore has a value of KSh 5 000 to him.