Women and Natural Resource Management

a manual for the Africa region

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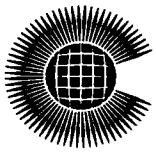

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Consultant authors

Dr Cecile Jackson (Co-ordination)

Ms Jennifer McCracken (Sections 1 and 2)

Ms Charity Kabutha (Section 3)

Ms Winnie Ogana (Section 4)

Cover illustration

Ms Geraldine Nolan

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FOREWORD

Most women in Africa are directly dependent on their local environment and sustainable natural systems for their own and their families survival. They spend the greater part of their time tending, gathering, conserving and using natural resources. As daily managers of the living environment they are experienced in the management of agriculture and food production, fisheries, forests, soil, energy and water resources.

Women have developed skills in conservation which are built into their traditional subsistence activities. At the local level, cooperative action taken by women demonstrate that by sharing their knowledge and experience they can improve the environment and also promote sustainable development. They can improve on their performance as managers of the environment if they are given access to education and training and the opportunity to participate in decision-making. At the same time, environmental management and sustainable development can be enhanced if extension workers and decision-makers make more use of women's knowledge and experience in effective resource management.

The critical role played by women in environmental management and sustainable development has been highlighted at major Commonwealth and UN meetings in the nineties. Meetings of Commonwealth Ministers Responsible for Women's Affairs have urged governments to provide greater support to enable women to use and share their knowledge, experience and traditional skills on environmental issues, and to gain new ones as a result of appropriate training. In their report "Sustainable Development - An Imperative for Environmental Protection", the Expert Group on Environmental Concerns and the Commonwealth, reiterated the importance of training women to support their work for sustainable development and recommended that special attention be given to providing women with education and training. In Agenda 21, the Earth Summit Programme of Action on Environment and Development, governments agreed that it was essential to mainstream the concerns of women throughout sectoral and cross-sectoral areas for action. Commonwealth Heads of Government have urged governments to ensure that immediate action is taken towards implementation of Agenda 21, especially the Chapter focusing on "Global Action for Women Towards Sustainable and Equitable Development". The UN Fourth World Conference on Women also urged governments to involve women actively in environmental decision-making at all levels and to facilitate and increase their access to information and education.

This manual for the Africa region was published in 1992 under the title Women, Conservation and Agriculture. It was the first of four manuals which have now been developed to form part of a pan-Commonwealth training module on Women and Natural Resource Management. The manual, which has already been used extensively throughout the Africa region and beyond, has now been been reprinted under the new title Women and Natural Resource Management for this reason. Other elements of the pan -Commonwealth training module are the manuals for the Asia, Caribbean and South Pacific regions, an overview paper on the issues and strategies for promoting women in environmental management and sustainable development internationally and a video on the Macusi Amerindian women of the Iwokrama Rainforest in Guyana. We hope that this manual and the other elements of the module will enable trainers and extension workers to address gender issues in natural resource management effectively and increase women's participation in environmental decision-making.

Sir Humphrey Maud
Deputy Secretary-General (Economic and Social Affairs).
May 1996

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SECTION 1:

Introduction

OBJECTIVES OF THE TRAINING PROGRAMME

In 1990 the Women & Development Programme of the Commonwealth Secretariat initiated a three-year project to develop training programmes for women in natural resource conservation. Its main aims are:

* to assist rural and urban-fringe women to develop sustainable farming practices and to conserve local natural and living resources, to enable women to build upon and exchange their indigenous knowledge and to enable them to benefit directly from sustainable resource management;

* to develop the skills of trainers in the Commonwealth;

* to sensitise government policy-makers and planners to the vital importance of involving women in global, national and local efforts to conserve the environment and living resources.

AIMS OF THIS MANUAL FOR AFRICA

In this context, this training manual focuses on the first of these objectives. It is aimed at those working with rural women in the fields of sustainable agriculture and natural resource conservation. It is designed to provide some ideas on how to learn from and with rural women (and men!) and how to work together with them for better management of the environment.

USERS AND USES OF THE MANUAL

The manual has been designed with two groups of users in mind. Firstly, those working with women's organizations, or mixed gender organizations, or with individual women, at the local level. These workers may be extension or development field staff of non-governmental organisations or government bodies. They may be female or male.

The second user group is those responsible for training these local level extension or development field staff. The aim of the manual is thus to help these trainers pass some of the following points to local-level workers:

* the need to consider gender and environmental issues in the planning, implementation, monitoring and evaluation of any development activity;

* the value of communicating with and learning from rural women and men to better understand the ways in which resources are being used at present and to better plan with them any improvements in resource use;

* some approaches and techniques to facilitate effective communication with rural women and men for sustainable management of natural resources;

* lessons which can be learnt from looking at examples of successful conservation activities by groups of rural women (some involving men also), as well as the lessons from less successful group activities in conservation;

* an introduction to a variety of conservation techniques, their value and limitations, and pointers to sources of further information on these practical techniques.

With this aim in mind, the manual has been written in four sections.

1. Introduction

An introduction to the interlinking issues of women, conservation and agriculture. A review of the problems of environmental degradation in Africa and a general discussion on appropriate approaches for working with rural women in conservation and agricultural development activities.

2. Learning from Rural Women

A set of guidelines on communication, learning and analysis techniques for use in investigating local natural resource issues with rural women. Some examples of where and how these techniques have been applied.

3. Women's organisations for conservation

Case studies of local level women's organisations and mixed gender organisations for conservation. Discussion of the benefits which the women have received, and the key reasons for the success, or failure, of their efforts. Suggestions on ways to try and replicate some of the successes and avoid some of the worst mistakes.

4. Conservation techniques

A source book which brings together a selection of practical field techniques for conservation, ranging from soil and water conservation, organic farming, agroforestry, and conservation of indigenous living natural resources. Brief descriptions of each technique and references for further information.

Equipped with these guidelines, case studies and practical techniques, the users of the manual can experiment with those approaches and methods which seem most appropriate to the situation in which they work. Indeed it should be stressed that the examples provided in the different parts of the manual are largely for illustrative purposes; please note that:

* not all methods of communicating with and learning from rural women are equally appropriate in different cultural settings and organizational structures. Practical problems can restrict their usefulness to only certain situations, such as where there is enough time to develop a good relationship between the rural women and the investigators, to allow the more sensitive issues to be discussed openly.

* not all successful women's organizations conservation activities are replicable. The majority have a number of very specific conditions which contribute to their success; it is unlikely that the same combination of these contributing factors will be available everywhere.

* not all conservation techniques are equally applicable in different conditions. Here the physical differences, in soils, landscape, land use, and availability of other resources will determine which techniques will be useful. Other factors, such as the cost involved in using the technique and the existing land ownership patterns will also come into play.

HOW TO USE THE MANUAL

Because of the many different situations in which users of the manual are working, this one book can not provide all the answers. It is not meant to be a cookbook to be followed exactly. Rather it is up to those using the manual to take from the pages those ideas which are useful to them, and to select the techniques most relevant to their work.

The two user groups may want to use the manual in different ways. Local extension or development workers may use it as a reference book, to dip into for new ideas in planning, undertaking and assessing their conservation work with the women themselves. They may wish to ignore the practical exercises or use them as a basis for discussion when they meet together with their colleagues.

Trainers, on the other hand, may want to use the manual as a workbook in their training programmes. Here, the exercises may be more appropriate but will still need to be adapted to the particular groups with which they are working. For some ideas on how trainers might use the manual, see the chapter "Notes for Trainers" at the end of each of the four sections.

The examples and case studies provided in the manual are just that: examples. Trainers would do better to find their own, local material to replace those given here. The format of the manual is most suited to small group discussions and group exercises, in which the training participants are all involved - the manual is designed to initiate discussion and debate, rather than to be used in lectures!
There are a number of blank pages at the end of each of the four sections of the manual. Readers can use these pages to note their own responses to the exercises or to record the points raised during group discussions using the manual. Trainers themselves may want to stick photocopies of their own case studies, photographs, exercises etc. on these blank pages, to customise the manual.

A PLEA FOR CRITICAL COMMENTS

This manual is still very much a draft. It needs to be reviewed by those who are familiar with the problems and opportunities of working at the local level with rural women. The authors

would therefore welcome comments, criticisms and suggestions, from those who have used the manual in their work. By sharing experiences from different African Commonwealth countries we can better understand the extent to which the approaches and techniques dealt with here are location-specific. Readers and users of the manual are also encouraged to send short accounts of their experiences of successful, and equally important, unsucessful activities in this area of work. Learning from others' experiences is vital if we are to be effective in our work with rural women in sustainable development. Please send your comments to:

Gender and Youth Affairs Division,
Commonwealth Secretariat, Marlborough House,
Pall Mall, London SW1Y 5HX, United Kingdom

SUSTAINABLE AGRICULTURE AND RESOURCE CONSERVATION: WHAT ARE WE TALKING ABOUT?

The terms we will be using in the manual mean different things to different people. Indeed the definitions are often topics of much discussion among those concerned with sustainable development:

* What is sustainable development?

* What do we mean by sustainable agriculture and resource conservation?

* What is environmental degradation?

The definitions used here are:

Sustainable Development: development without destruction. In the words of the World Commission on Environment and Development[1] sustainable development is "development which meets the needs of the present without compromising the ability of future generations to meet their own needs". This means development which is economically, ecologically and socially sustainable.

Sustainable Agriculture: agricultural production which contributes to sustainable development. That is, agricultural production which does not damage the resource base on which it depends.

Resource Conservation: the preservation or, more commonly, the careful use of natural resources to ensure that the existing resources are not depleted beyond their ability to recover.

Resource Management: the way in which natural resources are used, for example the way in which a forest area is used by a local community to provide wood for construction, fuel, and tool making, as well as wild foods and medicines.

Environmental Degradation: a reduction in the usefulness of a natural resource to humankind. The degradation can be caused by natural processes and/or human interference. For instance, land degradation caused by natural soil erosion and inappropriate farming practices may reduce crop yields and finally lead to the land being unsuitable for its present agricultural use.

Desertification: usually refers to degradation of arid and semi-arid lands, but can also threaten humid and sub-humid regions. It can be caused by human activities, drought conditions, or a combination of the two. It often results in a reduction in the amount and the variety of plant and animal species, a reduction in available water and soil fertility, and an increase in soil erosion.

Deforestation: the loss of forest cover by either death of trees or the removal of trees by humans. Tree felling is the result not only of industrial logging activities but also land clearance by farmers for agricultural expansion, or shifting cultivation. Overuse of forest resources for fuelwood, construction wood, fodder etc. can also lead to deforestation.

Salinization: the contamination of soils by excessive quantities of dissolved salts. It is a common problem in coastal regions and where much irrigation is used. Salts are brought to the surface of the soil. A hard crust of salt on the ground is one sign of very saline land.

Shifting Cultivation (slash & burn agriculture): farming different plots of land in rotation. A patch of ground is cultivated until either the soil becomes exhausted or it is covered by weeds. The land is then left to recover naturally while cultivation is carried on elsewhere. New sites are usually cleared by burning the natural vegetation.

WHERE DO WOMEN COME INTO THE PICTURE?

* Women comprise more than half of the world's population.

* About a third of rural African households are headed by women.

* In many countries it is the women who carry out the majority of farm work.

* Women play a vital role in meeting the food and energy needs of households. In some African countries, women contribute as much as 75% of household food production[2].

* In some areas women are now playing an even larger role in agriculture as more and more men migrate to towns for work.

* Agricultural credit and extension services are rarely designed for women. Women are often seen as gardeners rather than farmers.

* In general and in comparison to men, women have more limited access to resources such as land, capital and skills.

Women have an integral role to play in combating degradation, in conserving natural resources and in ensuring that agricultural production and development are sustainable. The word **integral** is important. The part which women play must be integrated into the whole development process. This issue of Women in Development must not be left as a side issue. Given the fact that women have often been a neglected and sometimes exploited group in rural development there needs to be a **special emphasis** on their position. This emphasis must be made within the context of other development priorities.

This manual aims to show that women must be kept in the picture. If not, the picture produced is not only incomplete but is likely to lead to agricultural development policies and practices which are unsuccessful in the long term and which are potentially damaging to the natural resource base. It must be stressed that women are by no means a homogeneous group. This manual concerns itself with women as a sub-group of the rural poor, i.e. a particularly vulnerable section of the rural population. Even within this group, there will be many differences in the position of the women, in the conditions they face, and in the opportunities open to them.

MAJOR PROBLEMS OF ENVIRONMENTAL DEGRADATION

How bad is it?

Environmental degradation is often difficult to measure. Estimates are based on many assumptions so the figures must be treated with caution. Predictions of future trends are even less reliable, as unexpected events and responses can change present trends dramatically.

However, it is worth quoting a few figures to give a rough idea of the scale of the problem in Africa, and globally. The degradation is usually measured in terms of either the costs involved or the amount of physical resources lost.

* In 1980, the United Nations estimated an annual loss (excluding indirect costs) of US $26 billion in agricultural productivity worldwide from desertification[3].

* Making degraded land fit for use can be expensive. Between 1985 and 1987 the United Nations Food and Agriculture Organisation (FAO) spent US $289 million on degraded African agricultural lands[4].

* At least 25 million metric tonnes of topsoil are lost per year, worldwide, according to the United Nations Environment Programme (UNEP). Overall, UNEP predicts a net loss of about 55 million hectares of agricultural land by the year 2000, mainly due to erosion and desertification[5].

* The annual rate of soil erosion in Africa and South America is about 7 tonnes per hectare, compared with only 0.8 tonnes per hectare in Europe.

* UNEP estimates that 4 million hectares of forests are lost annually, in Africa, of the 12 million which are lost worldwide. One figure often quoted is the reduction of

forest cover in Ethiopia from 40% 100 years ago to only 3% now. However, figures are difficult to obtain and it may be that these are underestimates.

* Alongside this reduction in quality and quantity of the world's resource base, the global population is increasing at about 1.7% per year. Africa is projected to increase its population six times before it stabilizes. The school age population in sub-Saharan Africa is set to double in the next fifteen years and triple or quadruple in the next forty[6].

* "New" problems such as global warming and ozone depletion are also emerging partly due to the greater impact of human activities on the environment and partly to our increased ability to observe these problems. For example, the release of carbon dioxide and other gases (methane, nitrous oxide and CFCs) into the atmosphere has risen sharply with the intensified burning of fossil fuels. Because of these increased concentrations, global temperatures are predicted to be between 20°C and 50°C higher by the year 2100 compared to pre-industrial times[7].

* The last twenty-five years have seen a decline in agricultural production per capita of about 1% per year in Africa, whilst there have been very significant increases in Asia and Latin America[8].

Overall we can say that our ability to reduce adverse environmental impacts and to avoid these impacts in the first place has increased. But not fast enough. Policies and practices for sustainable agriculture and resource conservation are still largely in the experimental phase and technologies for environmental rehabilitation are still far behind technologies for production increases.

What are the roots of the problems?

Environmental degradation is not a new phenomenon. Thirteen hundred years ago irrigation in dryland Mesopotamia resulted in salinization of large areas of land. But in the past, degradation was not always considered a problem. Population densities were relatively low and productive lands were sufficiently abundant to allow the degraded lands to be abandoned until the fertility was restored.

Today the causes of environmental degradation are usually very complex. There are social, ecological, economic and political reasons for non-sustainable agricultural practices and for environmental mismanagement. Past policies, development trends and traditional beliefs may be partly responsible for present-day problems. Some of these changes may be irreversible, while others can be altered or reversed. The causes also stem from different levels - from global and national, to individual farms and households.

To illustrate how a number of different factors can combine to cause environmental problems, a scenario is presented here, describing a situation which is hypothetical and very simplified but which can be seen, to some degree, in many Commonwealth African countries.

Box 1

A Scenario of Land Degradation in an African Village.

Historically, the local forest and pasture lands were owned and managed communally by the rural people living in the village while the cropland was individually used. Everyone had some access to the benefits of the forest and the grazing on the pasture and so everyone living there was interested in maintaining those resources in cooperation with everyone else. Because there seemed no risk of their communal or private land being taken away from them, the people invested much efforts in the land. In the forest they cut down only mature trees, leaving the young trees. They also planted trees on their farm land and maintained the soil fertility in the same way as their forefathers and mothers had done.

Then, the country was colonized and ruled by a foreign power who was keen to see economic development. Health services were increased and even in the rural areas people began to see the benefits. Adults lived longer, fewer children died, and so populations increased. More and more men moved from the rural areas into the towns, where more jobs were now available to support the development projects and the local bureaucracy.

But with these benefits came costs. The colonial policy of agricultural development emphasised the need for increased production, to achieve self-sufficiency and supply export goods to the colonizing nation. To feed the ever-increasing population, forest land was lost as agriculture expanded. The local people began to lose control over their land and its production. The agricultural extension agents brought recommendations from the administration in the capital city. These recommendations were sometimes forcibly imposed. For example, new soil conservation techniques were made compulsory - everyone had to obey. Cash crops were planted on a large scale, sometimes by confiscating privately-held land and turning it into state-owned land. People began to feel insecure about their property rights and so no longer made long-term investments, such as leaving fallow periods in the cropping cycle or planting trees around the cropland. Agricultural services were given primarily for the cash crops, and the government bought at least some of the harvest at a fixed price. It made economic sense for a farming household to plant a large part of their land under the cash crop, even though it made them dependent on the government for services, inputs and marketing. It also meant that the people had to buy food items and other goods from the market which they had previously grown themselves. As well as the pressures on the crop land from this intensified agricultural production there were increased pressures on the grazing land, as cattle numbers increased with the growing human population and with improved veterinary services.

continued ...

Box 1 continued

With the increasing pressures on the limited resource base, the traditional systems of cooperation and sharing began to break down. People were forced to try and make short-term economic gains at the expense of long-term social, ecological and economic losses. For example, in order to earn some extra cash, more and more households turned to cutting down trees to sell as fuelwood in the local market. The forest around the village became more and more depleted.

After the country gained its independence, the problems remained and new ones emerged. With the expatriates gone there was a severe lack of trained personnel to fill the posts in the new government. The bureaucratic machine was more or less intact, the top-down administration was still in place, but without the human resources to manage it effectively. Pressure to maintain foreign exchange reserves put further pressure on the government to increase agricultural productivity, especially of export crops and sometimes without due concern for long-term sustainability. Heavy-handed policies on landuse and land rights were still operating, and the environment and the rural poor - especially women - suffered at the hands of short-run economic goals, the elite and the powerful.

Now, these problems are still evident. Recent droughts have made matters worse. The ways in which people previously managed their production to withstand droughts and prevent them developing into disasters are now threatened. Some of the present agricultural practices are partly responsible for the ongoing degradation of the environment. The land is being "mined" by over-intensive cropping and overgrazing. Pesticides are causing pest-resistance and pollution problems. Crop expansion on the steeper slopes is causing soil erosion there and siltation problems in downstream areas. In turn the degradation itself is badly affecting the production of the land and increasing pest problems.

This rather gloomy scenario misses out many other causes of environmental problems. It also makes no mention of the many initiatives being taken to alleviate the problems. These responses at both the local and national levels will be outlined later in this manual. Meanwhile, let us consider some of the common myths about environmental degradation. In an attempt to get to the root of the problems, undeserved blame has been put on some groups of people and processes. As the above scenario illustrates, there are many and interlocking causes of damage to the environment. If we place the blame on one group or one factor, we are ignoring this complexity and giving a wrong impression of simplicity. Trying to address one factor while not dealing with other causes will not help the problem.

So, where has the blame been misplaced?

1. Low incomes

"A lack of cash makes people destroy their environment. Giving them more money will solve the problem."

Like all myths, there is some truth in this. If a household is badly in debt, the members may be forced to overcrop, or omit fallow periods in order to provide enough food for themselves. Or they may have to take casual employment in a nearby town, leaving little time for mulching, maintaining the terraces, or other conservation measures. But the myth is misleading. A lack of money is rarely the major reason why a household can not manage its resources in a sustainable way. More often, the management problems they face are political rather than financial. Their land may be taken over by wealthier farmers, or the State, and the poor may be forced onto poorer quality, more fragile land which is more vulnerable to degradation and more likely to be exploited beyond its capacity. Poor farmers often do not own land but are tenants on the land which they farm and often have only short-term leases. Living in difficult areas with poor production, they are likely to be bypassed in the government development plans for investments in, and services for, agricultural development. These are the more common reasons why they choose not to invest in environmental improvement measures, rather than simply a lack of money.

In general, the poor are more vulnerable, powerless and isolated. Without security, power and contact with other farmers and other areas, they are in a much more difficult position to manage their scarce resources. Women-headed households and poor female farmers suffer the same constraints, often to a greater degree than their male counterparts. The particular problems for female farmers is dealt with later in this section.

On the other hand, poor farmers sometimes are known to value tree-planting as good economic investment, provided they have clear rights to the land and the trees. Likewise, smallholders are often particularly innovative in developing their own soil and water conservation technologies and maximizing nutrient recycling on their plots. Environmental protection should not be thought of as a luxury, which is neither affordable to nor a priority of the poor.

2. Hunger

"There are too many people to feed with the limited resources available. Reducing the population will solve the problem."

The increasing pressures on the environment with increasing population densities have already been mentioned. Our impact on the land's resources does depend on how many of us there are. But the idea that there is a global food scarcity problem because of growing populations, and that we can only satisfy our increasing demands by sacrificing the environment, is incorrect. The amount of food produced per person in the Third World has risen by 7% since the mid-1960s. Overall there is enough food to feed everyone. In

Africa, however, food production per person has been following a downward trend. Yet the problem of hunger, seen in many African countries today, is not caused simply by too many people nor is the struggle for enough food the main cause of the damage to Africa's environment.

Instead, hunger and environmental degradation are linked by certain common causes, in a similar way that poverty and environmental damage are linked. Unequal access to food and other resources such as health, education and land means that hunger can exist even in a relatively prosperous country. Some people starve while others have plenty. In addition, international politics may play a role. If the government of a country is concerned about increasing export production to earn foreign exchange, high levels of crop production may exist alongside hunger and may also be unsustainable in the long run.

In addition, it is important to realise that vulnerable people need large families. For instance, a group of rural women and men in Ethiopia were asked why people were having large families, given the economic hardships they face. They replied that it was good to have a number of children, especially boys so that one could go to school, one could go to the army, one could look after the cows, and one could work on the land. Not only do children add to the labour force of the household, but they are also a valuable source of support when their parents become older. Only when the prospects for the household are more secure can a smaller number of children be a viable option.

So, keeping the population levels and densities in check will not solve the problems of hunger and environmental degradation. Rather, these will only be tackled effectively by ensuring that the distribution of resources is more equitable. This includes ensuring that rights to land, education, employment etc. are provided to women as well as men.

And in turn, the same policies, ensuring a more equitable distribution of resources and enhancing the power of the poorest members of society, are some of the most effective means of reducing fertility. Women who have better education and employment opportunities, and whose status does not only depend on the number of children they bear, can choose to plan their family size, and the overall result is generally a reduction in population growth.

3. Colonial powers

"The environmental problems facing African countries today are the result of what happened when they were colonies. Independence has been good for the environment."

The notion that all today's environmental problems can be blamed on past colonial times is neither helpful nor justified. Certainly there were clear environmental costs associated with some policies of the colonial administrations. The emphasis on the production of a few export commodity crops lead to large-scale monocultures, sometimes with little regard to the suitability of those crops for the types of land used. Mining operations also

brought their own pollution problems. However, the colonial systems also brought advantages, such as the introduction of environmental conservation policies. Many of today's national parks were established by the colonial administrations. As part of the explorations of the colonised country's potential, thorough surveys were undertaken of their natural resources. Some of these surveys are still very useful today in planning more appropriate land use.

Independence brought other pressures to bear on the environment. Export commodities were still a priority, this time to earn foreign exchange rather than to supply the colonizing country. With decreasing prices for these commodities, the pressures have worsened. Meanwhile the old bureaucratic systems have largely remained with their top-down approaches and adverse impacts on the local management of resources. To relieve these pressures and problems, the national economies must be stabilized, the export bases must be diversified and the priorities of the governments must better reflect the needs of all their populations - including the rural poor and the rural women, and not just the urban elite and powerful groups.

How are rural women affected by environmental problems?

As a group, rural women are at particular risk from the effects of deteriorating environmental conditions. Their livelihoods and responsibilities make them more dependent than men on the local natural resources. The constraints and pressures which they face leave them more vulnerable to lack of water, declining crop yields etc. Yet they are still neglected by many outsiders, including government development planners, who tend to regard rural women as an irrelevant group. As an integral part of both the problems and the challenges of environmental degradation, women must be treated as a central group, not left out of the action.

In rural Africa, women suffer from the disadvantages of:

1. Heavy workloads, including farm work, marketing, household chores and casual labouring. The economic responsibilities of rural women have increased, with more and more men migrating for urban employment outside the area.

2. Limited access to land. Women rarely own land. They thus have a lower financial status and more difficulty in securing loans.

3. Limited access to services and resources, including health, literacy, training, capital and food.

4. Limited access to appropriate technology and tools to ease their workload. For instance, for many rural women in Africa, food processing (such as pounding palm nuts or baking bread) is an important source of income. However, the development of the national food processing industry more often means setting up large-scale processing plants rather than helping these women by improving their access to tools, credit, raw materials and so on.

These disadvantages make rural women's tasks of farmer, mother and housewife all the more arduous and time-consuming. They face further problems when their surrounding environment is degraded. For instance as forests recede, women must spend more and more time walking to get wood for fuel and leaves for fodder. The physical effort is obviously greater, and there is less time in which to do the other essential household chores. They end up working even longer hours. Little or no time is available for other activities, such as attending health clinics, literacy programmes, or tending vegetable gardens. Thus, not only do the women themselves risk ill-health and miss opportunities, but their family, especially children, suffer too.

Women and environment in conflict?

Is it always possible to benefit both the local environment and the women who depend on the exploitation of this environment for their survival? Clearly there may be cases in which benefits to the environment may bring costs to the women, and vice versa. For instance, if an area of land, previously accessible to the local women and men, was made out-of-bounds, and guarded against intruders in order to give the soil and vegetation a chance to recover from the heavy exploitation in the past, this would clearly have benefits for the environment but, in the short term at least, would be seen as a problem by the women and men who would no longer be able to use this land to graze their livestock, collect fuel and fodder, or collect food and water etc. In the long term though they may benefit from the increased and sustained production of the land, after it has been rehabilitated.

In many instances difficult decisions will have to be taken, and compromises made, in order to avoid heavy damage to the environment or major problems for the rural women. Making such decisions is easier if the likely impacts of the activity have already been considered. If we are aware of how the environment and the local rural women will be affected by the planned activity we will be in a better position to help choose an option which causes least damage.

THE CHALLENGES

The great challenges of addressing the problems facing rural women and the problems of environmental degradation in Africa require a similar approach. The two linkages of women/development and environment/development have come to the fore relatively recently. It is becoming clear that to achieve sustainable development, the plight of rural women needs to be taken into account. If women do not benefit from a development activity, or if they suffer in some way because of the activity, can this really be called development and will it be sustainable? Likewise, the state of the environment is another critical factor to be integrated into development strategies. The likely impacts of development on both the rural environment as a whole and on rural women as an important group must be considered.

Furthermore, positive action must be taken. There is an urgent need to reduce existing damage to the environment and to develop awareness and technologies for using the land

in ways which are suitable for the environment, and therefore sustainable. There is a parallel need to take action to improve the position of rural women. When their access to assets and services is improved and when they are given the central role which they deserve in sustainable development, not only will the women benefit greatly but they will be in a much better position to care for their environment. It is clear that the position of women and the issues of environment and development are all linked. Developing agricultural policies and practices which benefit rural women and which are also in tune with the environment requires recognition of this link. The challenge therefore becomes:

How can women's role in environmental management be taken account of, and supported in order to improve the chances of sustainable development and increase women's share of the benefits?

What has been achieved so far?

Progress in raising gender awareness among the development community and in demonstrating the links between women, environment and development has been encouragingly fast in recent years. On paper at least, development agencies are concerned with the impact of their work on women and the need to take account of these impacts in the appraisal and design of their projects. At the local level, there are also encouraging signs, with many small-scale indigenous efforts by rural women, providing ample evidence that women want to and are able to improve their environment by joining together. In many environmental protection projects women have been found to be the ideal promoters and extentionists of conservation techniques. Their concern and commitment are obviously higher when the responsibilities for the work are handed over to them and when they are able to improve their status through their work.

Yet, alongside these successes there have been mistakes and misguided actions. There is considerable documentation of projects which have had adverse effects on the lives of local women, often as a result of failure to anticipate the negative effects on women alongside the positive development changes due to the project.

The three examples quoted in Box 2 are taken directly from Molnar & Schreiber[9].

Box 2

1. **Unanticipated impact on women's workload**

A Machakos-based agroforestry project in Kenya required women to collect and transport water for seedlings in the nurseries. When a water shortage forced the women to fetch the water from a river 2.5 km away they refused to go. Project planners had made no attempt to consider the impact of the project on women's work load[10].

2. **Unanticipated loss of resources**

In Burkina Faso, an area of degraded shrubs was cleared for planting trees. The choice of tree species unintentionally meant that women lost a valuable source of fuelwood, shea nuts for cooking oil and medicinal plants[11].

3. **Conflicting interests of men and women**

A tree project in Cameroon introduced fodder trees as an intercrop to stabilize soils on land previously under slash-and-burn cultivation. Men liked the new system: it increased maize yields and reduced the work for land management. Women did not like it: their groundnut production declined and they had to provide more labour for pruning the trees[12].

Certain approaches to rural development have failed to bring benefits to rural women. These can provide useful lessons for future initiatives. They include:

* the tendency to focus on male household heads in rural research and development activities. Since women are often the people responsible for much of the agricultural production, by-passing them will mean losing a valuable source of indigenous knowledge and risking poor implementation of any attempted changes in management. This focus on male household heads is also based on the misguided assumption that the information and resources channelled to them will "trickle across" to other members of the household, including the women. This is often not the case[13].

* the gender imbalance of extension work. The vast majority of agricultural and forestry extension workers are male. The average proportion of female extensionists in Africa is only 3 per cent. This represents a serious limitation in the extent to which female farmers are in contact with outside advice on agricultural technologies. Male extensionists tend to deal with male farmers rather than with all farmers. It also seems that female extensionists are provided with less training and

are found in lower ranking jobs compared with their male counterparts. Female workers are often directed into home economics extension rather than agricultural extension[14].

* alongside the overall neglect of female farmers, the extension services which they do receive are often restrictively stereotyped. Women are often regarded as gardeners and are provided with extension services in small-scale poultry or vegetable production rather than staple crops or large livestock, even though they are often also responsible for the latter. In addition, cash crops are normally introduced to men, rather than women, which in turn tends to marginalize the women from the financial benefits of this production.

* the emphasis of agricultural research is also largely on cash crops, typically grown by men, as opposed to food crops, often grown by women.

* the mechanization of agricultural production also tends to marginalize rural women from the improved technologies, as men are usually the target group for such programmes. The mechanisation is often focussed on production tasks (such as land preparation) undertaken by men rather than women. In other cases, the mechanised technologies place additional heavy burdens on the workload of women, and cut the time they have available for their more traditional income-earning activities. For example, in Burkina Faso intensified production on irrigated land increased women's workload, making it impossible for the women to spend time producing shea butter, sorghum beer, and snacks for their own cash benefit.

Ways forward

If we consider the above challenges of how best to work with rural women towards the goal of sustainable development, what themes emerge as the ways to move forward? It is wrong to expect universal answers. One important step is to adapt any potential solution to fit the local conditions and resources. There are also some general pointers towards appropriate strategies which will both strengthen the position of rural women and help them to better conserve their resources. These include:

* making more use of women's knowledge, experience and traditional skills of natural resource management;

* recognizing the differences of interest and responsibility in different resource management activities, between different members of the rural household; anticipating and dealing with areas of conflict;

* raising public awareness at all levels about the role women play in natural resource management and agricultural production;

* using more participatory approaches in agricultural development - involving both women and men in decision-making as well as implementation. Learning from them, listening to their priorities and deciding with them.

Keys for success

The above list illustrates some general strategies required for working with women in sustainable development. We can also look at what has contributed to the practical effectiveness of real-life activities - to identify the common ingredients of success. Some case studies of successful actions are presented in later sections of this manual. Each shows how a locally appropriate approach has been adapted to suit the existing conditions and the available resources and skills. Within this diversity of approaches some common features are evident and here are ten general principles which seem to apply to successful initiatives:[15]

1. **Knowing where you are** - starting with the current situation, asking, listening and observing before planning any new activities or changes.

2. **Having clear objectives** - instituting a bottom-up approach in the decision-making structure. Giving women a say in the planning, monitoring and evaluating phases as well as the implementation of the work. Facilitating information flows between women and men at different levels of the decision-making hierarchy.

3. **Poverty focus** - making a conscious link between poverty and gender priorities. Ensuring that the activities neither favour the wealthy rural women nor risk being taken over by the elite. Recognizing the need for action to eliminate disadvantages of, and prejudices against, the poor, the women, and the powerless. Seeking to provide equal opportunities and equal access to resources and services for all.

4. **Inclusiveness** - adopting an approach which does not necessarily involve only women, but being aware of the tendency of men to dominate in mixed groups. Working for the involvement of men, households and communities rather than provoking confrontation between women and other groups. Avoiding the alienation of any one group - men or women, rich or poor, powerful or powerless.

5. **Short and long-term strategies** - combining and complementing short-term and local initiatives with longer-term and higher-level initiatives. Following up, supporting and monitoring the initiatives to ensure their effectiveness and sustainability, seeking to raise awareness of gender issues among governmental and non-governmental agencies and among the public.

6. **Locally appropriate** - using local institutions and groups wherever possible.

7. **Leadership** - developing and making use of strong leadership in the organisations involved. Encouraging local women in particular to take on leadership roles.

8. **Training** - designing and providing training for women in skills which they wish to learn and which they feel will benefit them.

9. **Starting small** - taking account of the burden of work in women's traditional roles before initiating new activities and giving them additional responsibilities.

10. **Sharing information** - encouraging an open exchange of information and knowledge between initiatives with similar goals. Highlighting failures as well as successes. Allowing women to share their experiences and keeping men informed about what is happening.

SENSITIVITY TO CULTURE

It has already been stressed that the approaches chosen for working with rural women in conservation activities need to be adapted to local conditions, including the local cultural setting.

The status of women within the household and the community differs from area to area and country to country. Their activities and responsibilities also vary. These differences will affect how useful a particular approach can be. For instance a tree planting programme for rural women may be very difficult to establish if women in that area traditionally have no responsibility for planting trees. If this activity is usually done by men, it may be unpopular, perhaps a cause of conflict between the women and men, to attempt to change this custom. On the other hand, if tree planting can provide worthwhile benefits to the women, and if they are interested in such an activity, the reasons for maintaining the previous cultural restrictions on tree planting may need to be questioned.

Two examples quoted in Part III of this manual show how such restrictions may be dealt with. The case study from Sudan, from a society with many restrictions on women's activities, shows how women can be involved in non-traditional activities while still keeping in line with the customary practice of their society. The women raised tree seedlings in their own homes, and their menfolk then took them out for transplanting or sale. Another example, from Kenya shows how a group of women were able to become involved in tree planting, by obtaining a small piece of land from the local chief, to establish their own tree nursery.

It would not be appropriate here to provide guidelines as to which cultural practices should be followed and which ones, for instance those unnecessarily restrictive to women, should be questioned. This is a very personal issue; individuals have individual opinions as to which cultures and traditions they feel they should support and work with and which they should try and change. It is essential that these opinions are aired and that within the work of women's organisations a clear policy evolves from an open debate on their role in the local cultural environment.

The thinking behind this manual is that women do play an important role in conservation and farming activities and anything which serves to improve their benefits from such

activities should be encouraged. Conversely anything which prevents these benefits from reaching the rural women should be considered as an opportunity for improvement rather than an inevitable and insurmountable problem.

NOTES FOR TRAINERS

Trainers may want to use some of the following exercises in their training workshops to generate discussion on the issues raised in this section:

1. Ask the group to define some or all of the terms listed in the chapter "What are we talking about?" List their suggestions on the board. Compare these definitions with those provided and discuss differences. Add examples of each from the local situation.

2. Compile a glossary with the trainees noting the meaning of key terms (e.g. participation, gender, environment, poverty, access, training, etc.). Developing this vocabulary will help the participants become familiar with the central issues.

3. Ask the participants to work in small groups, preparing flow diagrams of the interlinkages between women, environment, and agriculture. For instance, they might want to show how environmental problems affect women, how problems facing rural women hinder their work in agriculture and conservation activities, or how agricultural production might adversely affect the environment. Spend some time comparing and discussing the diagrams produced by each group.

4. Pose some discussion questions and ask the participants to form small groups to discuss these, and summarise their thoughts on flipchart paper. Then ask each group to present their results and discuss the different viewpoints. The questions should allow the participants to use their own experience and to think about the issues in the context of their own work. Examples could be:

   * For conservation programmes, what are the values and problems of working with women; what are the values and problems of working with men?

   * What are the major causes of environmental degradation in your area?

   * In what ways are rural women a particularly vulnerable group to problems of environmental degradation?

   * In your work, have you found some traditional practices or beliefs of rural women regarding agricultural production or conservation? Can you name them and what do you think about these items of traditional knowledge?

5. Ask the participants to design and perform a short role-play to illustrate the local cultural practices and how they make working with women both easier and more difficult, which cultural practices can be challenged or changed, which need to be handled carefully, etc.

6. Ask the participants to design and perform a role-play illustrating the different perspectives towards a particular proposed development activity, from the point of view of (a) the development workers; (b) the men in a rural community who will be involved in the activity; (c) the women of the same community.

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SECTION 2:

Learning from Rural women

WHY ASK WOMEN?

"Don't bother talking to the women. What do they know? They just spend their time collecting dung and fuelwood. You are educated people, these women have nothing to tell you."

This was the advice given to a team conducting a survey in a fishing village in India, by the village leader (a man) during a meeting attended by about 50 villagers - all men. Talking later with a group of women who had been listening nearby, the team were told:

"We heard what the chief said, about us doing no real work. Well, just ask him what happens every day when the boats come ashore and the fish are landed. Who is it that buys the fish on the beach and takes them to markets to sell?"

This story, which could have come from many different countries, provides three good reasons for talking with rural women:

* Women are often regarded as an unimportant group, both by "insiders" and "outsiders". They are rarely involved in traditional leadership and decision-making roles. For this reason they should be a group of particular interest to those trying to learn about a community and the problems of disadvantaged groups within the community.

* Women, as well as men, are involved in a range of activities, some of which will affect and be affected by the surrounding natural resources. Thus women need to know about their local environment, for instance as they collect water and firewood, or gather fodder or medicinal wild plants. If we do not talk with these women we will miss the opportunity to learn from their knowledge.

* In addition if we are planning to involve rural women in resource conservation programmes we need to understand their ideas and knowledge of the local resources. For instance, a training programme in tree nursery management would be better if local women and men were first asked which species they felt would be most popular and which problems they were encountering in seedling survival etc. It may be found that a whole wealth of local knowledge already exists which can be used for the training programme. It may also be found that the women and men have different preferences for which trees should be grown - this is also important to know.

But these are not the only reasons for talking with rural women. Yes, these women do have particular problems which should be investigated and as a group they do represent an important source of information.

But not only can **we** benefit from talking with these women, the women also can gain from being included in our learning process. If we are better informed as a result of talking with them and learning from them they stand a better chance of getting their points of view taken into account as we use our newly-gained knowledge in our work. If we do not talk with them, our knowledge will be male-biased and possibly neglect or adversely affect women.

The role of learning in conservation activities

Of course, talking with the local people, women and men, is only part of the answer. Sensitive listening and learning is vital but to be effective there also needs to be a sensitive and cooperative approach to any subsequent activities. This section of the manual limits itself to questions of **how to learn** from rural women as well as men and how to include them in the actual learning and planning process. Later sections will look at ways of involving rural women in on-the-ground resource conservation activities. One important part of this is to involve the women from the very start, as we discuss and plan the conservation work.

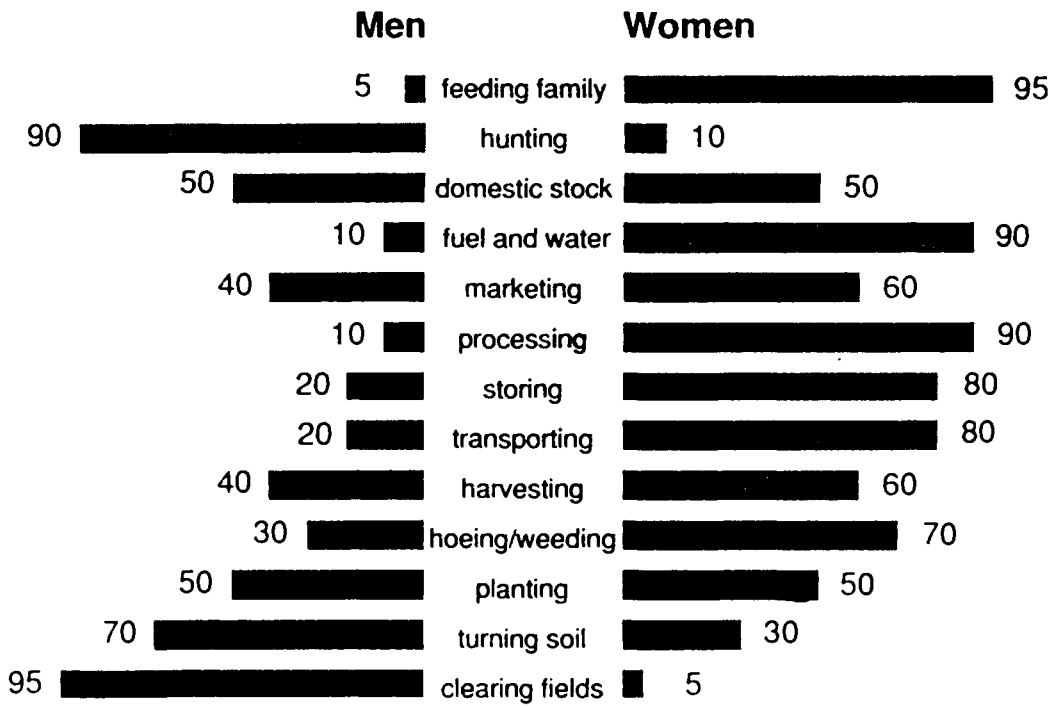
In addition many of the same communication and learning techniques can also be used in the later stages of development and conservation activities. Learning from rural women can assist the monitoring and evaluation of ongoing or completed activities. In this way local criteria for measuring success can be included in the review of the activities, and local people can be involved in deciding how best to improve any shortcomings which may emerge.

WHAT DO RURAL WOMEN KNOW?

So, in what areas do rural women have particular knowledge? We can ask this question in a different way: "What activities are the women involved in"? These activities will then tell us something of the types of knowledge which women must have and make use of in their daily lives. The answer to this question will differ from country to country, even from village to village and household to household, depending on, among other things, the social structure and how it affects the division of labour, the existence of any taboos on women's involvement in certain activities, the agricultural cropping patterns present, the extent to which cooperatives or working groups are responsible for some activities, and whether or not men are going outside the community for seasonal or year-round employment.

Box 3 suggests the general division of labour between rural women and men in Africa: men hunt, clear the fields and turn the soil, while women do most of the rest. Do you agree with this picture for your own area?

Box 3 **How the work is divided** (Africa, % of total labour in hours)



Men clear the land, turn the soil—women do most of the rest

Exercise 1 What do rural women know?

Think about the situation in your area of work. What determines the types of activities with which rural women are involved? Do any of the above factors apply? Make a list of any other reasons why women are involved, or not involved with certain activities in the communities with which you are familiar. Consider how this differs between different households.

Now, consider **who does what** in the communities with which you work. How is the work divided between men, women and children? Below are six different categories of work, each divided into a number of different activities. Try to fill in the tables by considering one activity at a time and putting an X against the people involved with this activity. For instance if the collection of fodder is done by everyone, men, women and children, put an X in each of the four boxes. If land preparation is only done by men, put an X only in the "men" column. You may like to make additional lists for the different types of livestock - sheep, goats, chickens, fish, etc., and for the different types of crops grown in your particular area.

When you have completed the table spend a few minutes identifying those activities which are not traditionally the responsibility of women, but which have become a recent addition to their workload. For instance, in some areas, women's increasing role in agriculture has meant that

they are now ploughing the land, looking after cattle and doing other, traditionally male, activities. It is useful for us to know which activities women have only recently started, not least because they may require some training to develop these new skills.

You may like to make use of these completed lists as you talk with rural women, men and children in your work. You can certainly check your ideas on the division of labour and you may want to explore in more depth women's knowledge of a particular activity. Perhaps some activities are carried out by older women, or younger women, or groups of women working together. Perhaps some activities are done by women during certain times of the day or certain months of the year, and by men at other times.

	Women	Men	Girls	Boys
1. COLLECTING & GATHERING				
* water				
* fuel				
- wood				
- dung				
* fodder				
* wild plants				
- medicine				
- food				
- other uses				
2. LOOKING AFTER CATTLE				
* supervision of grazing				
* stall-feeding and watering				
* tending to sick animals				
* milking				
* processing & marketing of milk				
* selling & buying animals				
3. GROWING CROPS				
* land preparation				
* planting				
* weeding				
* applying fertilizers, pesticides				
* bird-scaring				
* harvesting				

* transporting harvest from field
* processing
* marketing
* buying seeds and inputs

4. GROWING TREES

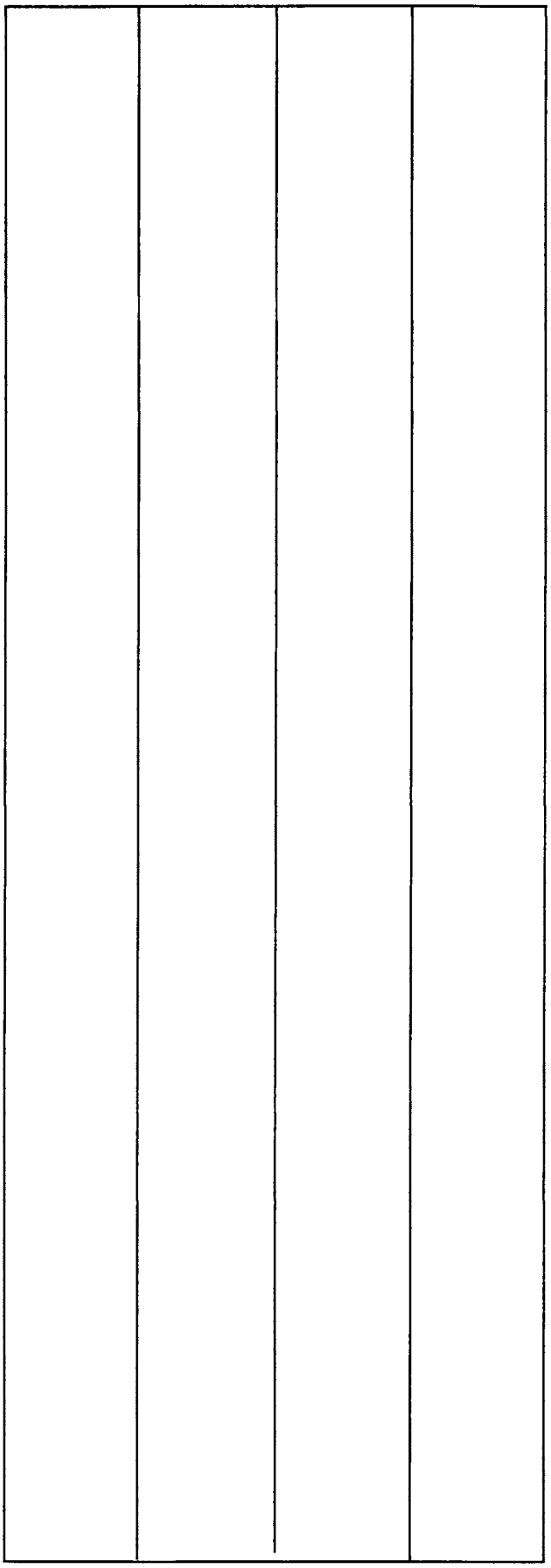
* land preparation
* planting
* protecting young trees from livestock
* applying pesticides
* pruning, maintaining
* harvesting fruit, etc.
    - fodder
    - fuelwood
    - other
* felling
* market produce

5. LOOKING AFTER THE HOUSEHOLD

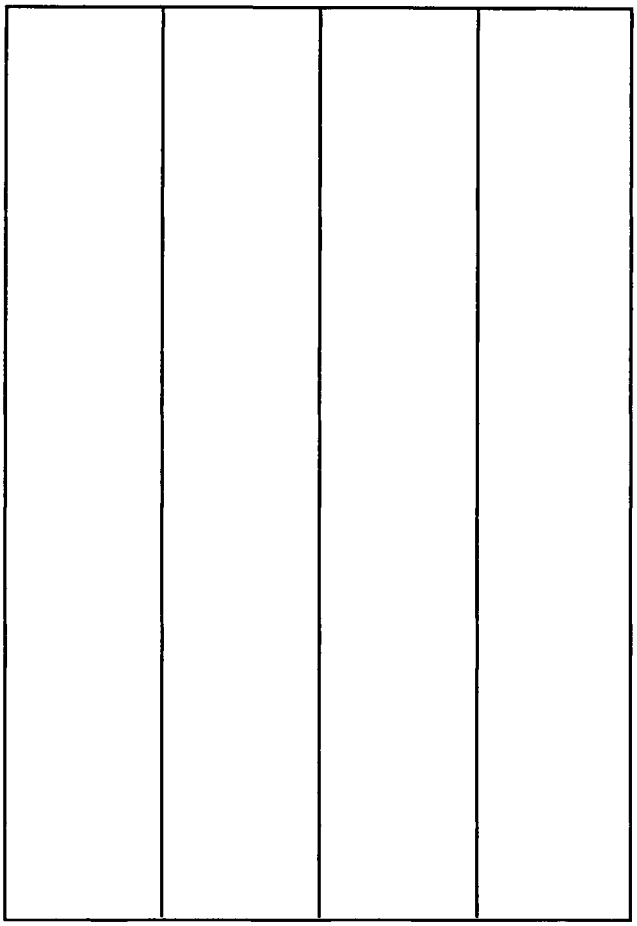
* cooking
* washing utensils
* washing clothes
* looking after children
* cleaning the house
* tending the garden
* buying household goods
* building & maintaining house
* other

6. MAKING DECISIONS

* crops
    - which crops to grow
    - where
    - when to plant and harvest
    - marketing
* trees
    - which trees to grow
    - where
    - how to use them



* livestock
    - when to buy/sell
    - price to pay/ask
    - milk to sell/use for household
    - how to manage
* credit
    - when to take loans
    - how to repay loans
    - what to use loans for
    - amount to borrow
* education
    - which children to go to school
    - when to stop their education
    - how to pay for school fees
* budget
    - responsibility for savings
    - responsibility for loan repayments
    - amount to spend on festivals, weddings
    - amount to spend on household needs (food, clothing medicines, etc.)



WHAT DO RURAL WOMEN KNOW ABOUT THEIR ENVIRONMENT?

We have been thinking about the range of activities with which rural women are involved in their daily lives. The assumption we have made is that it will be these activities and the associated knowledge and skills required to undertake them with which the women will be most familiar. It is these activities which we need to discuss with rural women if we are to learn about them.

Now, we can make another assumption. The natural resources with which women are familiar will be those which they use in their daily lives - i.e. those associated with the women's activities. So, in order to learn fully about these resources we need to talk with women as well as men.

In Sierra Leone for example, women knew 31 uses of trees on fallow land and in forests and knew what forest products would be produced in a particular fallow year; men identified only eight different uses[2].

Just how we learn about these resources will vary according to what we **need** to know and what is **relevant** to our needs. Box 4 gives suggests the types of questions which could be asked of rural wome to learn about:

a. their knowledge of and their ideas about the local environment and the natural resources which they use;

b. the status of these resources and their management by the local people and in particular by women.

This is not meant to be a complete list of questions to be asked in every situation and for every resource. It is provided here to illustrate the different angles from which questions can be asked, in order to obtain a full picture of the resource and its use.

Box 4: A possible sequence of questioning about resource use.

1. Availability of the resource

What do the women think about:

* the availability of the resource?
* the seasonality of the resource (does its availability change throughout the year and how)?
* any longterm trends (is the availability of the resource changing from year to year and how)?
* why is the availability changing?

2. Quality of the resource

What do the women think about:

* how good is the quality of the resource?
* the seasonality in quality (does the quality change throughout the year, and how)?
* any longterm trends (is the quality changing from year to year and how)?
* why is the quality changing?

3.Management of the resource

What do the women think about:
* how much the resource is being used?
* the seasonality of exploitation (is the resource exploited more at certain times of the year? When? Why? Is it exploited in different ways at different times of the year? When? How? Why?)
* any longterm trends (is the use of the resource changing over the years? If so how? Why?)
* how does the use affect the availability and quality of the resource?
* are there any limits or controls set on the levels of use? Who sets them? How do they work?
* what is the best way to manage the resource?

continued ...

Box 4: continued

You could choose a particular resource with which you are familiar (e.g. water from a particular stream, pond, lake, or fuelwood and fodder from an area of forest or common land) and work through this list to try and ask yourself about this resource. Are these questions in a sensible order? Do they produce a complete picture? What else could be asked?

As a general tip it is useful to remember we can ask about any topic from the different angles of:

Who?
What?
Where?
When?
Why?
How?

For instance if we were trying to learn about the use of water in a village and we wanted to discuss a particular stream which we know to be polluted we could ask:

Who uses this stream?
When do they use it? (time of day, month)
What do they use it for? (irrigation, washing, fishing)
Where does the stream flow to, from?
Why is the water quality getting worse?
How can the water quality be improved?

HOW CAN WE LEARN FROM RURAL WOMEN?

So, how can we work with rural women to learn and make best use of their knowledge and to share our experiences and ideas with each other? How can we learn about the local environmental conditions with rural women?

The methods that we use will depend to a great deal on what exactly it is we need to know: the amount of information, the level of detail and accuracy and the type of information. For instance, if we need detailed information on several households' use of certain resources during one year, we would probably need to spend some time living with the households, observing their daily activities and recording the details in a standardized format. On the other hand if we need to know about the resource use in a whole village or cluster of villages, we could not devote so much time and detailed investigation to each household; we may need to use a questionnaire to cover a large number of households in a relatively short period of time.

The learning techniques which will be dealt with in this section are particularly appropriate for use in the following contexts:

* where the learning and investigating takes place informally

* where most of the information to be collected is of a qualitative nature

* where the learning and investigating is being done by local people (researchers, fieldworkers, project staff) together with the rural women and men

* where the focus is at a local (e.g. village) level

* where money and/or time is limited

The techniques will **not** be so appropriate in situations where:

* much of the information needed is quantitive

* the information is needed for statistical analysis

* a formal questionnaire survey is to be the focus of the work

* information is to be collected on a large (e.g. regional or national) scale

The simple, informal techniques which will be outlined here come under the umbrella term of Rapid Rural Appraisal (RRA) and have been used in various combinations in many different contexts. As tools for learning their points of value include:

* the techniques themselves involve outsiders working with local rural women and men, and encourage a participative two-way learning.

* the techniques can be used informally with little back-up of resources and can be very cost-effective if used well.

* careful choice and use of these techniques allows the investigators to focus their work and to limit the amount of detailed information they collect. In this way they can avoid collecting too much or irrelevant information.

* by combining the use of several different techniques, the information collected can be cross-checked. Several techniques can be used to investigate the same question and the results can be checked against each other.

It should be stressed again that these are only some techniques to use in learning about local resources and resource use. They are suitable for getting certain types of information and are less useful for other types of learning (see above). Often they are best used **along with** other techniques. For instance, as well as visiting and talking with rural women, using these informal techniques, it would also be useful to consult any documents, census data, project records etc., which already exist on the area. Similarly, it would be useful to talk with local specialists who

have expert knowledge, such as the local administration officers, local shopkeepers, bankers, researchers, to learn from their own knowledge.

AND WHAT ABOUT MEN?

In the great majority of cultures the leaders and elders of a community are male. Since they are the ones responsible for making decisions it is often necessary, certainly respectful, to approach them first for their permission to talk with the women. This is particularly true if some or all of the investgators are men, in order to avoid any misunderstandings about their motives for visiting the women. It is also especially relevant in muslim societies, such as some West African countries, where women spend much of their time in the seclusion of their own homes, and where males may be prohibited from visiting them unless their husbands are at home and are clear about the purpose of the visit.

However, investigators need to be aware that the opinions expressed by male leaders are not necessarily those held by others in the community. There is a danger of placing too much emphasis on what these powerful and educated men have to say. The leaders may have their own selfish motives for telling only one side of the story. For example they may try and persuade the investigators that the priority of the community is to have a bigger and better office where they can hold their meetings, or a tractor to make ploughing an easier task. On the other hand, ordinary women and men of the community, who do not use the office and whose landholdings are too small to need a tractor, will have very different ideas!

To reach the rural women it is also useful to find out who are the **female** opinion leaders in the community. They may be leaders in the church, in a political party, they may be the more qualified women such as health workers, or schoolteachers, or they may be just ordinary women who are much respected in the community. The investigators would benefit from talking with these women, while bearing in mind that they will have their own particular opinions, not necessarily the same as those of the less prominent women.

PLEASE EXPERIMENT!

Although the techniques described here are associated with the RRA approach, they are neither new or unique to RRA. They have been used in various types of survey and research work and in a number of different sectors. Neither are they applicable only to learning from rural women! Since this is the focus of this manual, it will be this application which we will be considering, but rural or urban populations of women and men and children could be involved. Some of the techniques are especially useful in learning about different perspectives and conflicts of interest between individuals, including those between women and men. These uses will be highlighted in the discussions below. While some of the techniques are discussed in the context of their use by a **team** of investigators, it is also possible for an **individual** to make use of these techniques. Do not be discouraged if you can not work with a team of other people! Try some techniques and see which ones work. And on this note, don't rely too much on the examples provided, such as the diagrams or the ranking results. These are by no means perfect examples, nor do they

represent the only correct way to use the technique. Please don't be restrained by anything shown here. If you are in doubt whether something will work, try it and see! You may be pleasantly surprised. Experiment and invent new techniques, and if you do, share your experience with others.

HOW CAN WE BEST TALK WITH RURAL WOMEN?

The simple technique of **informal interviews** is one with which most of us are familiar. The key points about such dialogues are:

* they are informal conversations rather than formal question and answer sessions.

* they take place in the field or at the home of the interviewee. The interviewers go to meet the interviewees, rather than call them for an interview.

* questions are not fixed before the interview. Rather than using a questionnaire, the interviewers draw up a checklist of issues, from which to choose certain topics to cover in any one interview. The planned direction of the interview may well change as the discussion gets underway.

* the success of the interview depends largely on a relaxed atmosphere and an open learning attitude of the interviewer(s).

* the interviews are short, probably no more than an hour for an individual interview and no more than two or three hours for a group discussion (this depends on how rushed or interested the interviewees are).

Exercise 2: Interview technique

Before we consider what makes up a good interview, take a look at the following photographs (Plates 1-5) of real-life interview situations. The only piece of information provided is the country in which the interview is taking place. Discuss what you see in each case: does it look like a good or a bad interview? Do the people look comfortable, relaxed, interested? Who seems to be the interviewer(s) and who the interviewee(s)? What about how they are positioned, the place of the interview, the number of people? Use your own judgement and make some assumptions where necessary. You may like to note down your thoughts in the form of two lists of guidelines for interviewing, one of "Dos" and one of "Don'ts". After you have completed this exercise, you can compare your lists of guidelines with the hints given below.

Plate 1 - Interview in Ethiopia.
Credit: Robin Mearns.

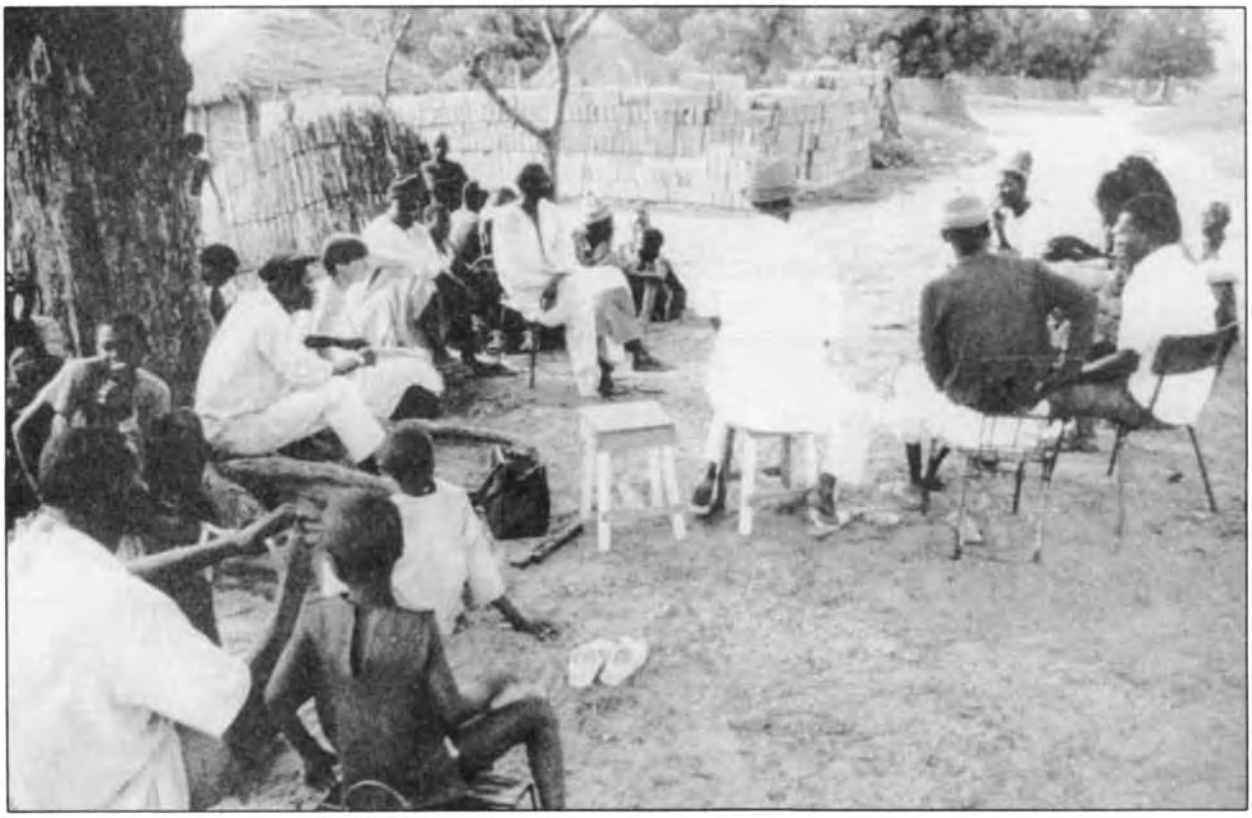


Plate 2 - Group discussion in Senegal.
Credit: Jules Pretty.

Plate 3 - Interview in Ethiopia. Credit: Jennifer McCracken.

Plate 4 - Interview in Cape Verde. Credit: Irene Guijt.

Plate 5 - Interview in Ethiopia. Credit: Jennifer McCracken.

Some hints on interviewing

* Starting off well

If coming to a village for the first time, pay a courtesy visit to the leader to introduce yourselves and why you are there. Clearly explain the likely follow-ups to your visit - can the villagers expect any benefits from the research? Be honest. Ask permission to go ahead with the work.

Approach the place of interview on foot. Vehicles give the appearance of important, rushed and wealthy intruders. Project vehicles or government vehicles with prominent logos also reinforce this alienation.

Choose the location carefully. If outside, look for an area of shade large enough for everyone present. If discussing a particular area or feature in the village, try to be in sight of it. If the interview involves drawing a sketch map of the village or looking at aerial photographs try and get to a high point from which most of the village can be seen. If the topic is sensitive or personal, it is probably best to hold the interview in the home of the interviewee, where curious passerbys are less likely to interfere with the discussion.

If possible sit on the ground or at least on the same level as the interviewee(s). Chairs add an unnecessary air of formality. Tables or desks between interviewer and interviewee are even worse. If in a group discussion try to arrange to sit in a circle, for maximum eye contact between everyone. If there are several interviewers, don't all sit together in the group.

Don't come with too much baggage. Preferably only a small pocket-sized notebook. Don't wear an official uniform. Dress casually, but carefully. If you are unsure ask advice on appropriate dress.

* Sequence of discussion

Begin by introducing yourself: who you are, where you come from, why you have come.

Check that you have come at a suitable time. Suggest that you can come back later if you arrive at an inconvenient time.

Start the interview by talking about something familiar - perhaps something close at hand such as the crop in the nearby field, the stove in the home, or the livestock in the compound. Discussing the weather and the seasons are always good ways of starting a conversation. Leave more sensitive or complex questions until later.

If the interviewee has difficulty answering a particular question, try and think of different ways of asking it. Come back to it later in the interview. Also, if you feel unsure about any answer, try to cross-check by asking the question again later, in a different way.

Always finish by thanking the interviewee and asking whether she would like to ask you any questions.

* Things to avoid

Don't ask questions randomly. Try to follow up each line of discussion before moving on to a new topic.

Try and avoid asking leading questions. Ask questions in a way that they require more than just a Yes or No answer. For instance, rather than ask "Will you plant groundnuts here after harvesting the maize?" ask "How will you use this land after the maize harvest?"

Don't dominate the interview. Try to spend more time listening than talking.

Don't ask too many questions about quantities. Switch between these and more qualitative and in-depth questions which give the interviewee a chance to express her own opinions.

Don't continue the interview if the interviewee seems uncomfortable or anxious to leave.

* Other tips

Use the six helpers of who? what? where? when? why? and how? These will offer ideas on how to probe a topic.

Take notes during the interview, after checking that the interviewee does not mind. Much of the details of the interview will be forgotten if you leave it until later to take notes.

Use the checklist as a means of guiding the interview. But don't try and cover every topic on the checklist in any one interview. Choose several topics and guide the questioning around these.

Exercise 3: A bit of drama

The attached script is for a short role-play of a **bad** interview situation. (Note the superior, official style of the interviewer, and the leading questions!). Try and make up two short role plays, based on your own area of work. One, like this one, showing what **not** to do, and the other of a **good** interview situation. Use the interviewing guidelines here to help you and use your own experience too. Try and keep the role-plays simple and humourous. If you are working in a group, you might like to split the work, so one group could write a good interview, and one a bad interview. Two people from each group could then act out their piece to start a discussion on interviewing skills.

Bad Interviewing Sketch

Woman farmer:	(On ground, grinding grain)
Interviewer:	(Comes in, wearing city jacket, stands over her, clipboard in hand) I'm an Official and I've come to ask you some questions.
Woman farmer:	(blank)
Interviewer:	Name. Family size. Husband's income. Number of chickens. (Pauses each time, answers not forthcoming) (Repeats:) Number of chickens.
Woman farmer:	I sold two yesterday.
Interviewer:	How many does that leave you with?
Woman farmer:	Well, I had five yesterday, and I have three now.
Interviewer:	So, on average you have four. (Writes it down). (Looks over to field). That maize doesn't look very good. Is that because of Stalkborer?
Woman farmer:	(Looks irritated). Yes.
Interviewer:	That sack of maize over there, is that to be sold at the market?
Woman farmer:	Yes.
Interviewer:	You'll get about 10 dollars for it, will you?
Woman farmer:	Yes.
Interviewer:	I need a chair to sit on.
Woman farmer:	I don't have one (Interviewer looks annoyed, woman gets up). I'll fetch my neighbour's chair. (Returns with a chair and a friend).
Interviewer:	(Brushes off chair, sits, looks at neighbour). What are you doing here? (Looks at clipboard). Go away I'm not interviewing you until tomorrow. (Neighbour leaves, puzzled. Interviewer sitting, woman farmer on the ground again).
Interviewer:	Do you work? Do you have a job?

Woman farmer: No, I just cook, do the housework, fetch water, fetch firewood, go to the market, keep chickens...

Interviewer: Right. So you don't work (notes it down).That's all I need for now. I'll come back later if I need

Box 5: Sequences of checklists for guiding interviews

If interviewing is spread over several days, the investigators will find themselves focussing their work more and more as their level of knowledge increases daily. In effect they use more refined checklists as their learning progresses. Below is an example of a sequence of checklists, used during an RRA exercise in Kenya which focussed on soil and water conservation[3]. Note how the issues in the first checklist are very general, in comparison to the later ones.

First checklist - used for the first two days

* Current soil and water conservation activities
* Climatic factors
* Sources of food
* Land use history, future conflicts; security and tenure
* Use of external resources; natural and economic
* Crops, livestock and trees; multiple functions
* Institutional issues
* Beliefs, experiences and memories
* Labour availability and conflicts
* Group/individual approach
* Gender issues
* Education and training; farmers, children, extension
* Health

Second checklist - used for the third day

* Livestock - fodder
* Manure
* Diseases
* Second transect
* Farm sketch map - intercropping
* Livestock
* Soil conservation
* Water management
* Health
* Education
* Female labour calendar
* Soil and water conservation during which months?

continued ...

Box 5: continued

* Important dates, major achievements, population increase, changes in cropping patterns, future changes
* Institutions (venn diagrams)
* Communal works?
* Medicinal and other uses of trees, wild plants
* Calendar for prices of horticultural crops, livestock and wage rates
* Wealth indicators

Third checklist - used for the fourth day

* Institutions - what does the womens' group do?
* Seasonal fodder use - for calendar
* Artificial insemination problems
* Food availability
* Alternative sources of income

Fourth checklist - used for the fifth day

* Historical information - distribution of land settlement arrangement
* Dams affecting rainfall - when were they built?
* Controlled grazing - when, how organised?
* Sisal and eucalyptus plantations - when were they cut?
* More dates?
* Off-farm male employment - degree of off-farm work
* Wealth indicators?
* Malaria peak - check it is in July
* Firewood - ask more women, find more about stoves
* Soil and water conservation - activities achievements
* Reasons why and why not involved in conservation
* Plans
* Traditional practices
* More farm sketch maps
* Adult education

Choosing whom to talk with

How can we select a certain number of women to talk with, from the community? If the investigators do not need to interview a set number of women, there are several ways to ensure that the women chosen to talk with are representative of the community. They can be chosen on the basis of:

* location: If the investigators are interested in learning about the range of conditions within the village they need to ensure that they visit a number of homes in each of the different housing areas. They can do this either by simply walking through the village and noting where people are living, or by using a map of the village and marking areas to visit. People on the edge of the village are among those most likely to be missed, as are the homeless, the migrants and the squatters. Special effort should be made to contact them.

* chance encounters: As the investigators walk through the area they will inevitably meet people on the paths and in the fields. These chance meetings are often valuable opportunities for the investigators to introduce themselves and perhaps to hold a brief interview.

* recommendation: The investigators may be interested in a particular group of women, such as women involved in basket making, or women working as outside labourers in a factory, or women owning chickens. In this case specific names may be recommended by someone knowledgeable in the village. In other instances the investigators may pay special visits to women and men with specialist knowledge (i.e. key informants), such as school teachers, heads of organizations, leaders, elders, and so on, to learn from their particular knowledge. One danger in relying on recommendations for selection of interviewees, is that this may introduce a bias from those who have done the recommending. For example, a women's leader may recommend only her friends and acquaintances, who will tend to be from the powerful elite group and will not be likely to recommend poorer, less eminent people. Unless specifically asked to do so, men will rarely recommend women and vice versa.

Indeed there are many other ways of selecting interviewees. You may well have your own methods which you use. It is clear though that without some consideration of sampling we will always tend to talk with those whom we feel most comfortable - often those from our own social group, people we have met before, people who are friendly towards us. This will obviously produce a biased sample and give us an unbalanced and partial view of the issues we are investigating.

HOW CAN WE GET A QUICK OVERVIEW OF THE LOCAL RESOURCES?

One of the best ways to start talking with rural women about the natural resources in their village is to ask them to draw a sketch **map** of their surroundings. It is often said that rural poorly educated people are not able to understand or draw maps or other diagrams. But the vast majority of those who have tested this assumption, by using maps in the field, have proved it wrong. Rural, non-literate women and men can understand maps well, especially if they have made the maps themselves. Maps drawn by outsiders often introduce unfamiliar perspectives. For example the orientation with north towards the top of the map is not necessarily how the rural people view their village. A North-South aligned map of the village may seem very unfamiliar to them. Symbols of houses, and land use types may also cause confusion if drawn by outsiders. In general then, unless a clearly understandable map exists of the village, such as one in the village office with which most people are familiar, it is best to ask several women to draw a sketch map themselves. Figure 1 is an example of a sketch map drawn with the assistance of local women in Kenya. Here are some tips to remember:

Mapping

* Drawing on the ground is preferable to using paper and pen since more people can join in the exercise and changes are easier to make. Sticks, stones, leaves etc can be used to represent landmarks. Once completed the 'map' can be transferred on to paper for a permanent record. (See Plates 10, 11 and 12 below).

* If large scale aerial photographs are available these can be used to first outline village boundary lines, major rivers, areas of forest etc. Details can be added later.

* It is rarely necessary to produce an accurate, scaled, finely drawn map. For the purposes of identifying the local resources and environmental features such as the location of gullies, degraded slopes or sites of conservation measures, a rough sketch is perfectly adequate.

* The accuracy of the map can be checked during subsequent interviews and meetings. Changes should be made on-the-spot. A good map is one which has been scribbled on!

* It is useful to ask a group of people to draw the first version of the map. As they discuss and argue about the correct positioning, an agreement is reached and the final product is likely to be more accurate than if drawn by a single individual.

* Investigators may like to record an individual's resource use by mapping their farm. The example here (Figure 1) shows the range of conservation measures taken by a woman farmer in Kenya.

Maps can also be used to help plan which parts of the village the investigator should visit to learn about the different resources and their management. One way to ensure that the range of local environments is seen is to go on a **transect walk** through the village.

Walking a transect

This is simply a walk, or a series of walks, which takes the investigators through the different areas of a village and allows them to see the range of conditions across these areas. The walk rarely follows a straight line, but more often zigzags through different areas. One of the main values of this technique is that it forces investigators to go to the more remote parts of a village which would otherwise not be visited. Indeed, interesting surprises often turn up! (See Box 6 below). Here is an example of what investigators found during a transect walk in a village in Wollo, Ethiopia. (Figure 2). The map which they used to plan their walk is also shown (Figure 3). The dotted line on the map represents a possible route of a transect walk which the investigators may have taken in order to produce such a transect diagram.

Another example of a transect diagram is shown below. This one comes from a catchment in Murang'a District of Kenya (Figure 4).

Figure 1[4]
Sketch map of Mrs Tabitha Njeri's farm
Mbari-ya-hiti Catchment Kenya (6 acres, 2.4 hectares)

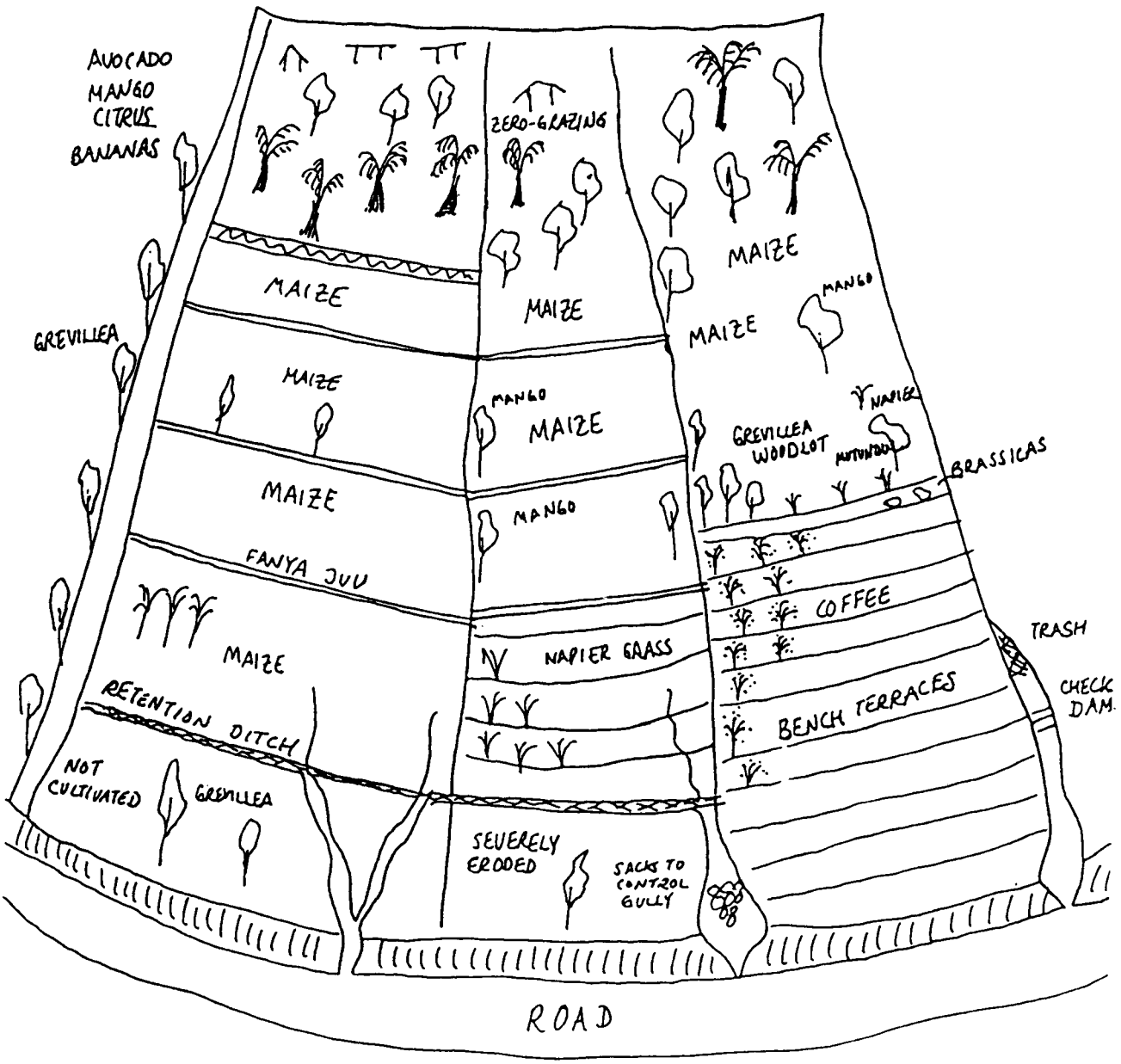


Figure 2[5]: Transect through Gobeya Peasant Association, Ethiopia.

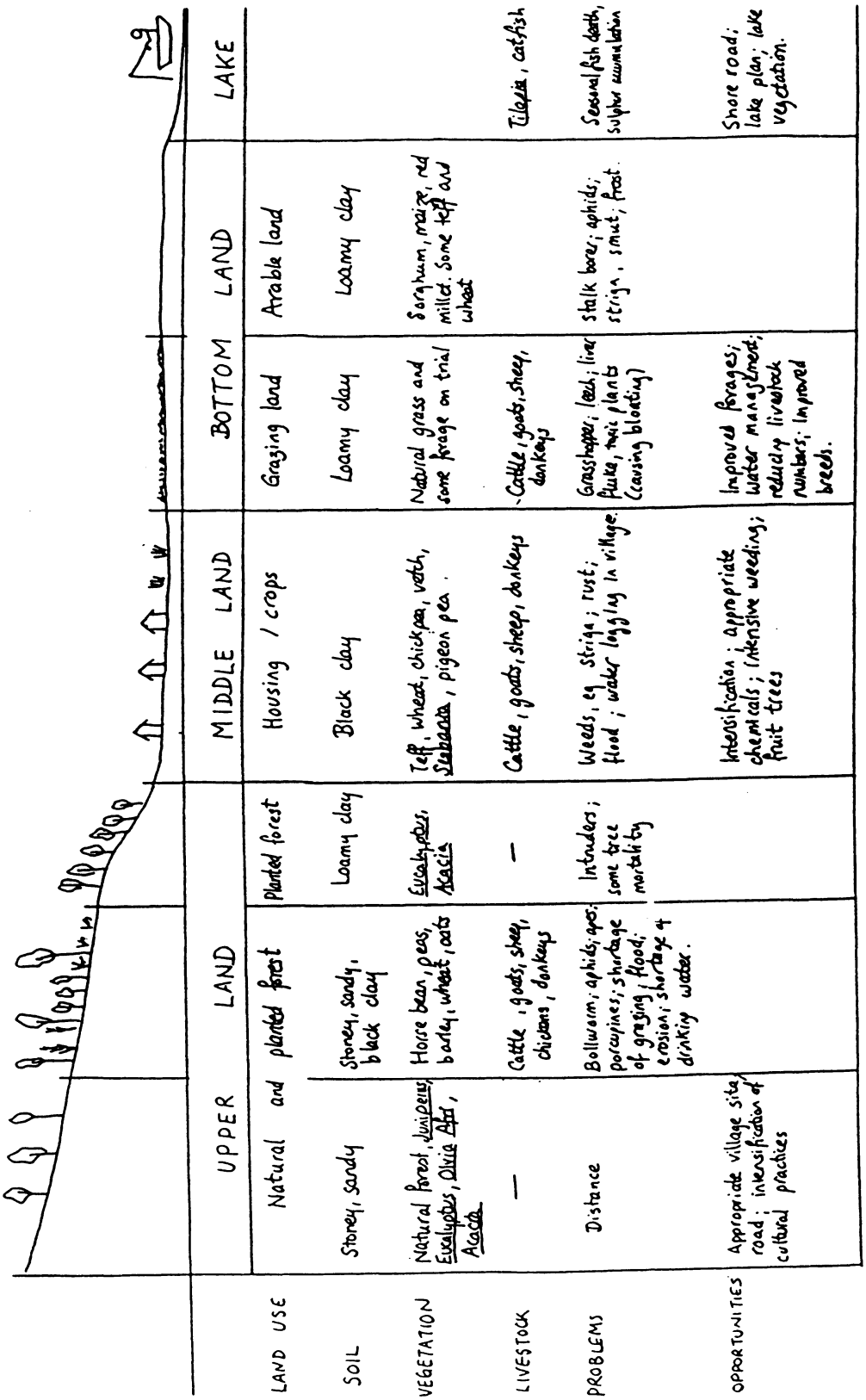


Figure 3[6]: Sketch map of Gobeya Peasant Association, Ethiopia.

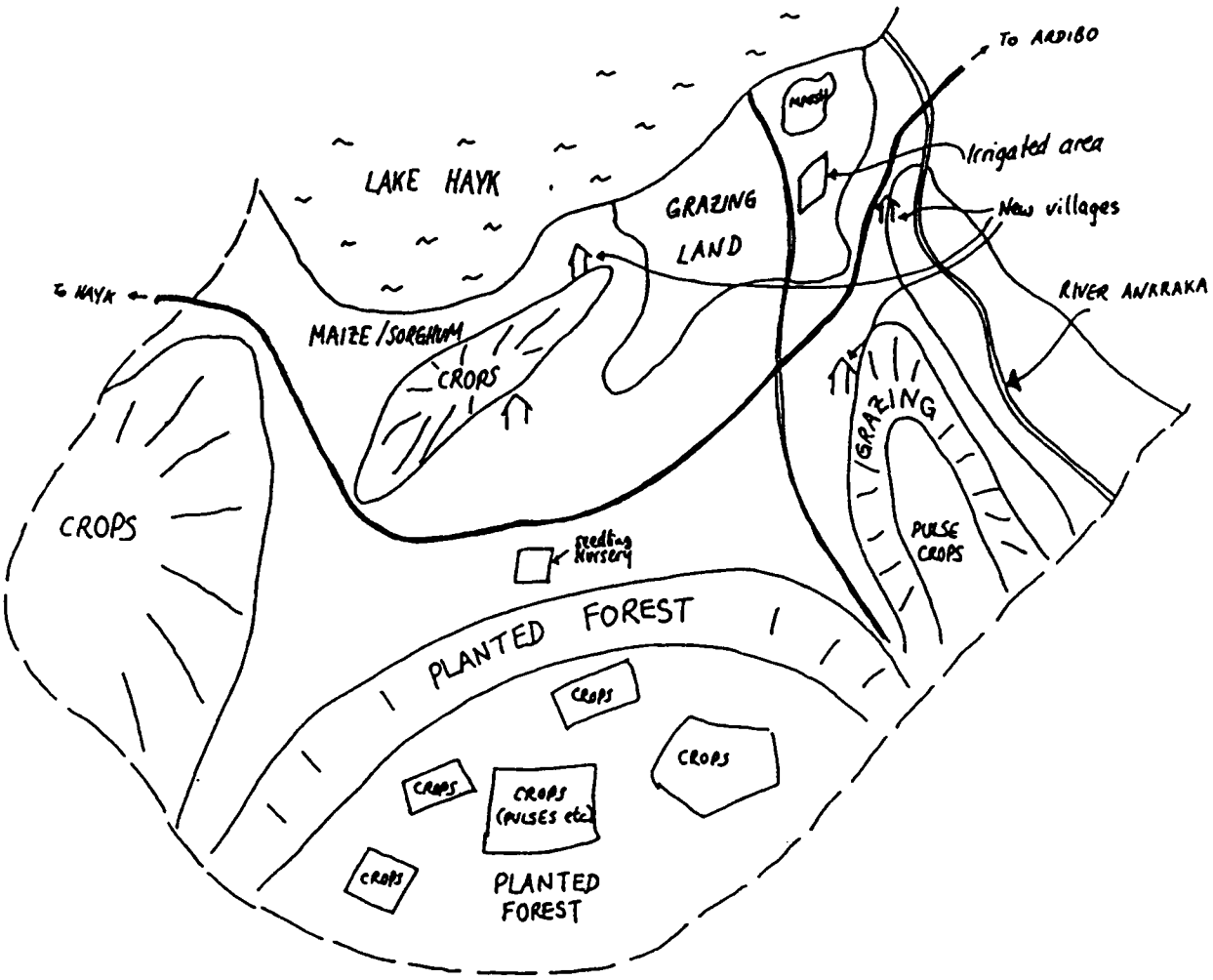


Figure 4[7]: A transect of Mihango Sub-catchment, Kenya.

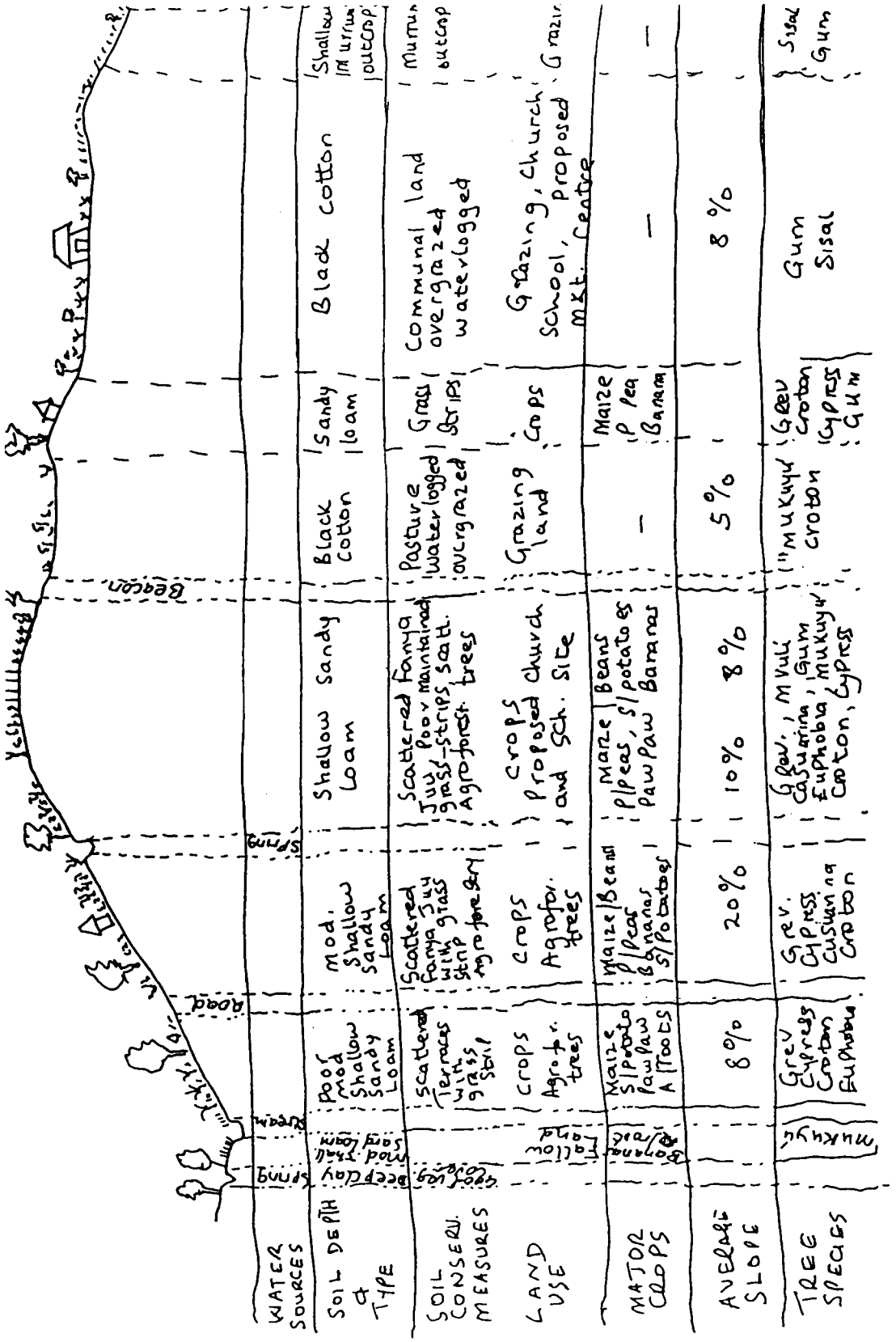


Plate 6 -
On a transect walk with a farmer, Ethiopia.
Credit:
Ian Scoones.

Plate 7 - Drawing a transect after a walk, Zimbabwe.
Credit: Ian Scoones.

Box 6: Transect walks lead to...

A team of soil and water conservation extension agents in Kenya were spending several days in a catchment to help plan their work in that area. They decided to walk two transects across the catchment to get an idea of the terrain and the conservation measures being used by farmers (See Figure 4 above). One topic which they were interested in was agroforestry and the availability of tree seedlings. They knew that the nearest tree nursery was several kilometres away in another catchment area. The team were considering how best to support farmers by agroforestry initiatives. As they were nearing the end of their transect walks, they met with a farmer who had many different types of trees on his land. Asked where he went to get his seedlings, he took the team to one of his plots - to a well stocked tree nursery! He was raising both native and exotic species and as well as using some of the seedlings himself he was distributing others free to other farmers in the catchment. The team sat down to talk with him...

In a Peasant Association in Wollo region of Ethiopia a team of investigators had been on a transect walk for several hours. They were approaching the main housing area and stopped for a rest in a roadside hut. Here they got into conversation with two farmers and began to tell of what they had seen on their walk, especially the large number of gullies running through the area. The farmers offered to show them how they had turned these gullies to their advantage so the team set off again with them to an area they had not yet covered. There they found an impressive gully cropping system, with a series of stone checkdams built along a major gully. Fields were being established in between these soil traps and healthy crops of sorghum were being cultivated. The farmers explained how they were building up these checkdams every year and strengthening them with tree roots. The team began talking with these farmers about how to help other farmers to benefit from this technique...

Some hints on transect walks

* Ask some local women and men to accompany you on the walk. Try to choose guides who have lived in the area a long time. Their knowledge will be invaluable. Without them, you will miss many features and explanations.

* Take your time. A transect walk can last a whole day. These walks are a good opportunity to meet people living in different areas of the village. You may want to spend some time talking with these households.

* Record what you see. Take notes and, if appropriate, photographs.

* Wear suitable footwear!

* Look for differences between the different areas which you pass through. Ask about the specific problems in each area.

* Summarize your walk as a diagram. But don't worry about making a good diagram - the important point is to keep your eyes open on the walk, ask questions as you go, and enjoy it!

Nature Trails

Nature trails are really a particular type of transect walk. They are especially useful for identifying local types of trees and plants and discussing their value with the women who make use of them. Nature trails can be conducted jointly by the investigators and a number of rural women (and men) who know the area. Walking through an area of woodland, the investigators can ask the women for the local names of the different types of vegetation, and samples of leaf, seed, bark etc. can be taken for later identification of their scientific names. These samples can also be used during later preference ranking exercises (described on page 28). Contrasting areas may be chosen for nature trails, to discover the differences in vegetation, soil condition etc.

Walking through a plot of relatively remote woodland would reveal many more and different natural resources to those found during a walk in a very heavily exploited patch of forest. The differences found could form an interesting starting point for a discussion with the women on the changes caused by human activity and the implications of these changes.

Aerial Photographs

As mentioned above, looking at aerial photographs can be an excellent way of getting an overview, or a "bird's eye view" of an area and its natural resources. The photographs can also show us places which we are unable (or unwilling!) to go to see for ourselves. (See Box 2.5 below)

Box 7: Using aerial photographs[8]

"To begin with, I have found the photos especially useful for thinking about different land-use patterns, particularly those which would not be immediately evident from the ground. The spatial arrangement of the shamba (farm) becomes really clear from the air, and regular land-use patterns which are common amongst smallholdings stand out... The photos tend to reduce spatial biases which even the most intrepid field worker can encounter on the ground. There is a tendency, for instance, to walk along the contours and along the ridges where there are paths, rather than from one ridge into a valley, across the river and to the next ridge. The photos enable one to identify specific features of land-use which are of interest, and then to check them on the ground. In this sense, the search through the photos for the extremes - the smallest holdings, the largest holdings, the most heavily tree-covered holdings, the most barren holdings, and so on - can be especially enlightening when one has a chance to interview farmers."

Plate 8 - Team of investigators consult an aerial photograph, Zimbabwe. Credit: Ian Scoones.

Plate 9 - Investigators and farmers consult an aerial photograph, Ethiopia. Credit: Jennifer McCracken.

It is true that aerial photographs may be difficult to obtain, and those which are available may be rather out-of-date. However, it is certainly worth trying to bring some of these photographs to the communities. Although it is generally assumed that rural people can not understand these photographs, this has often proved wrong in practice. Rural women and men can understand and do appreciate this overhead view of their local environment and can use them for example to show the boundaries of their village.

HOW CAN WE LEARN ABOUT HOW WOMEN PERCEIVE THEIR ENVIRONMENT?

Every person sees their surroundings in a slightly different way, through their own eyes. How can we find out about these differences?

One way is to use a variation of the mapping technique. In this case, rather than asking a group of people to produce a map on which they all basically agree, we can ask several individuals to draw how **they** see their local area.

Comparing these different impressions of the same area can reveal some interesting points of view.

Discussion question: How do you think personal maps drawn by women and men would differ? How would they see their environment?

In India, Anil Gupta reports how women's drawings of their village reflect their more limited environment, compared to that of the men in the village[9]. He asked both women and men to draw their village or the parts of it which were important to them. The women's drawings included trees, plants and almost without fail, temples. The equivalent drawings of men usually included transport links beyond the village, whereas the women's drawings showed virtually none.

Another example comes from Shewa Region of Ethiopia where fieldworkers of a non-governmental organisation asked the Peasant Association leader to draw a map of the Peasant Association (PA). His map, drawn directly on paper and translated here in English (Figure 5), is markedly different from that produced by a woman in the PA who was also asked to map the area. She drew her map on an area of ground outside her home, using stones, leaves and pieces of household waste to represent landmarks. This was then transferred on to paper (Figure 6). What differences can you see between these two?

A few differences between these two perspectives are worth mentioning. The PA leader has drawn a much more detailed map. This is probably partly because he was using a pen and paper, rather than drawing on the ground. He may well be more familiar with map drawing than the woman. Perhaps he has based this map on one which he has previously seen.

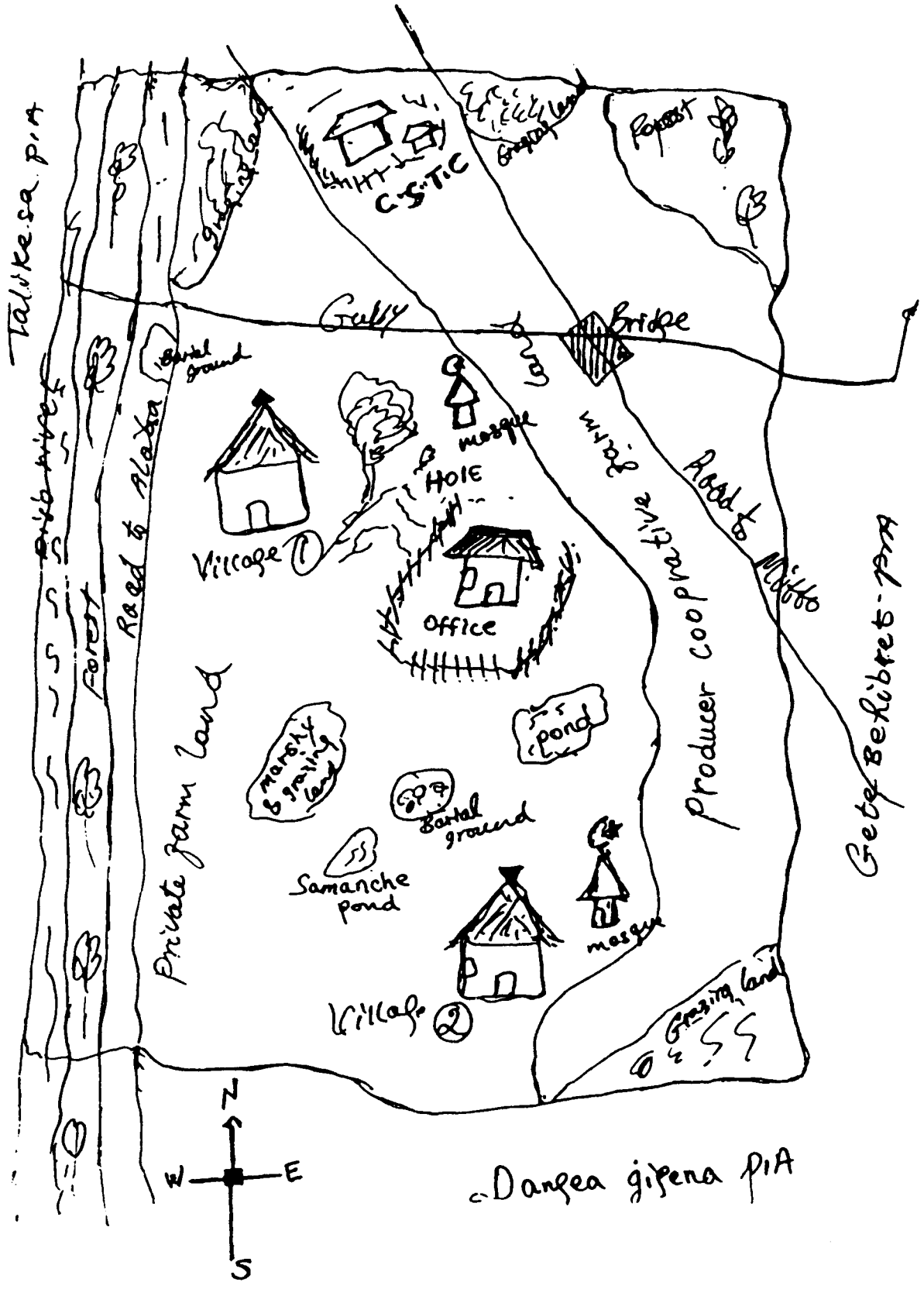


Figure 5[10]: **Sketch map of Kuteyo Sabola Peasant Association, Ethiopia. As drawn by the PA Chairman.**

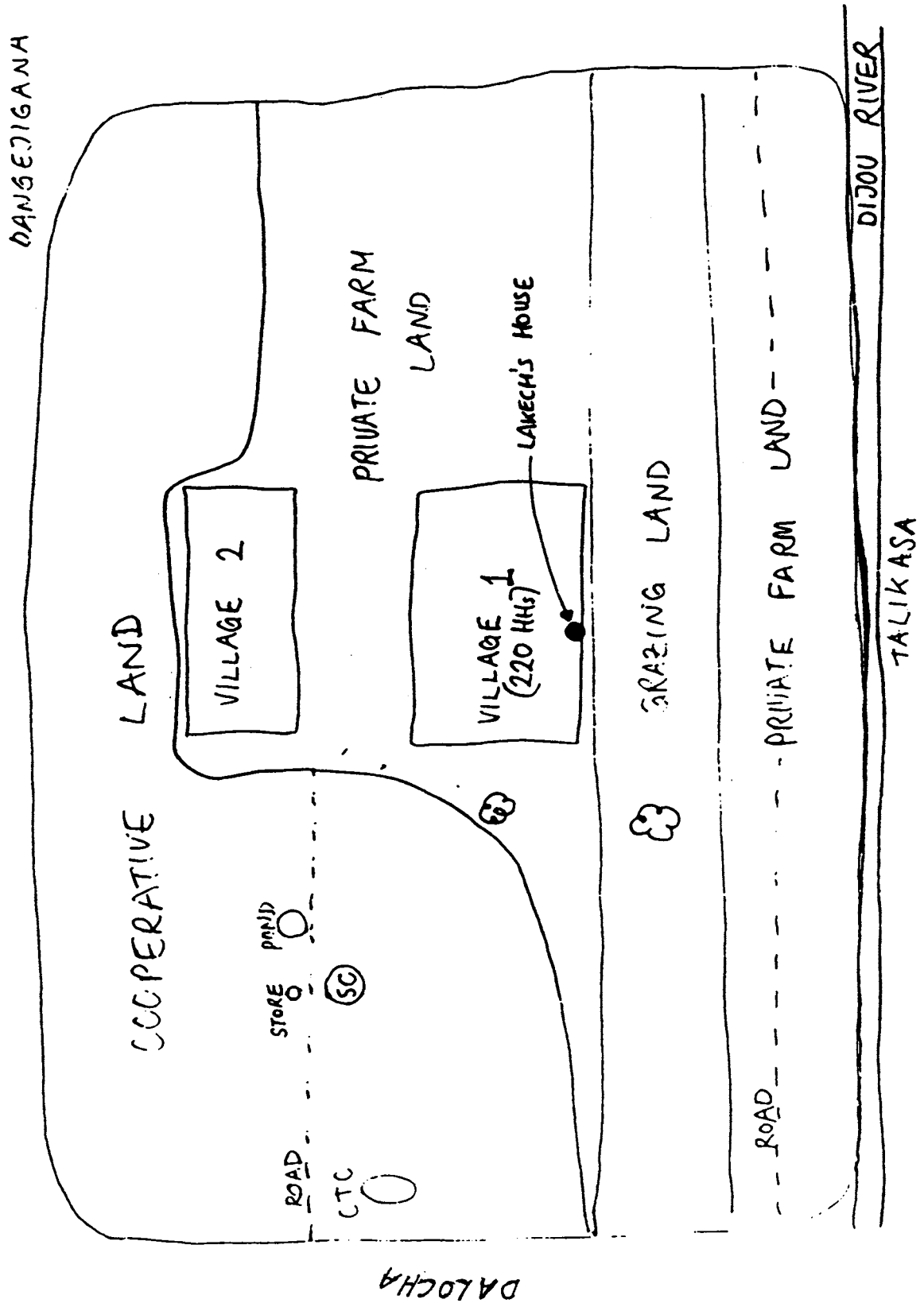


Figure 6[11]: Sketch map of Kuteyo Sabola Peasant Assocation, Ethiopia. Drawn from a map on the ground, made by Lakech, a woman living in village 1.

Plate 10 - Mapping on the ground, Senegal. Credit: Jules Pretty.

Plate 11 - Farmers in India make a model of their village. Credit: Robert Chambers.

Plate 12 - The finished product! Credit: Robert Chambers.

The dominant feature of the leader's map is his office, shown as the same size as the whole village!

The woman's version, while broadly agreeing with the map drawn by the leader, shows the Service Cooperative (SC) compound (which includes the leader's office) to be much smaller and less central.

The area of land owned by the Producer's Cooperative takes up a larger proportion of the woman's map than in the leader's version. The woman has omitted the small areas of grazing land and forest land which, according to the leader's map, exist on the periphery of the Cooperative land. Indeed during subsequent interviews in the PA this was found to be a very contentious issue, as many women and men in the PA who were not members of the Cooperative felt the Cooperative was taking over far too much land. The resulting shortage of quality private farm land and grazing land was becoming a major problem, they said.

In another study, in Sierra Leone a group of men and a group of women were each asked to draw a sketch map of their village and mark on it points where they felt important improvements were needed. The results were quite different (Figure 7): Why do you think the two groups painted such different pictures?

HOW CAN WE LEARN ABOUT THE WORKLOAD OF RURAL WOMEN?

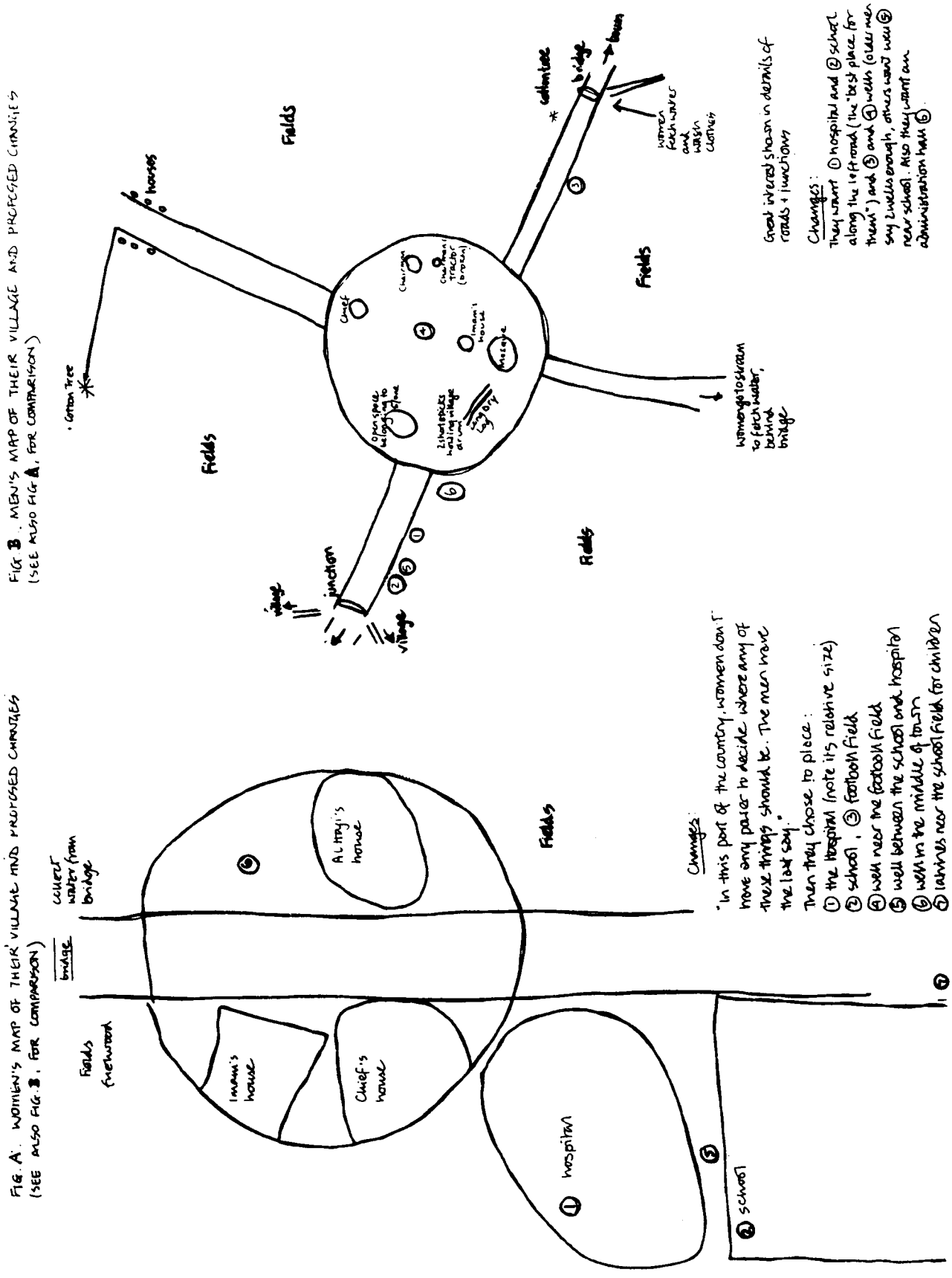
There are two problems in finding out about the workload of rural women:

1. Unless we spend several months with them it is very difficult to see for ourselves the types of activities with which the women are involved and especially the different tasks at different times of the year. In exercise 2.1 you may well have found it difficult to identify which tasks are done by women, men, girls and boys. The way in which jobs are divided up in a family will vary from place to place and even from household to household.

2. It is extremely difficult to quantify the workload of rural women, either in terms of hours worked per activity or effort involved per activity, or even hours worked per day. If you have ever had to fill in timesheets to record how many hours you spent on particular projects, you will understand the problem very well! Part of the problem is that a woman may be doing several different jobs at the same time. While she is supervising the family's livestock grazing on the common land she may also be collecting dung and wood for fuel and wild plants for adding flavour to the meal she will prepare.

How can we get at least a rough estimate of their workload? One way is to construct a **labour calendar** to show how the relative labour demands of women change during the year. An example of such a calendar is shown below (Figure 8). This particular example also includes the tasks done by young girls.

Figure 7[12]: Women's and men's maps of a village in Sierra Leone.



Some hints on constructing labour calendars

* Start by asking the women which month is the busiest for them. Give this month a maximum height on the calendar bar-chart. Ask what activities they are involved with during this month. Note these down.

* Then ask for the second most busy month. To get a relative measurement, ask how it compares with the busiest month: is it half as busy, or three-quarters, or one quarter as busy? Or, preferably ask the women to draw the appropriate height of this month's labour demand.

* Continue with the third and fourth most busy months. Then it may be easier to continue by asking for the least busy month (i.e. the slackest month) then the second slackest, third and fourth. The "middle" months can then be filled in by comparing against others already dealt with.

* It may be more appropriate to begin the calendar, not with January but with, for example, the month at the beginning of the agricultural cycle. This is the case in Figure 8. It is also useful to use the local calendar when constructing the diagram, and afterwards to translate it into the calendar system with which we are most familiar (see Figure 8).

* All this is easier if the women draw the calendar themselves.

* A group of women can be asked to produce a labour calendar. As in the mapping technique, this is useful to get a consensus answer but may hide individual differences.

* It may be useful to know the differences between the seasonal labour patterns of women and men in the same village. In this case, repeat the exercise with men. The differences may be striking, as the example below shows!

Box 8: Our labour calendar is wrong![14]

In a village in India, a group of men and women were asked to draw their labour calendars - one for men and one for women. They drew both calendars on the ground, using pieces of straw to mark the bars of each month's labour demand. When both calendars were complete, the women came closer to view the final results. They began to discuss among themselves, and looked quite agitated at what they saw. When asked what the matter was they said: "When we compare these two calendars, they do not tell the truth. Our calendar is wrong! It only shows agricultural work, not our extra household work. We must add a whole band to the bottom of our calendar, to show that we do extra work at home as well as in the fields!" The adjusted calendar showed the women with a much higher workload than the men.

Figure 8[13]: Labour calendar for<u>Women</u> + <u>Girls</u> (10 years)
<u>Kuteyo Sabola P.A., Ethiopia</u>

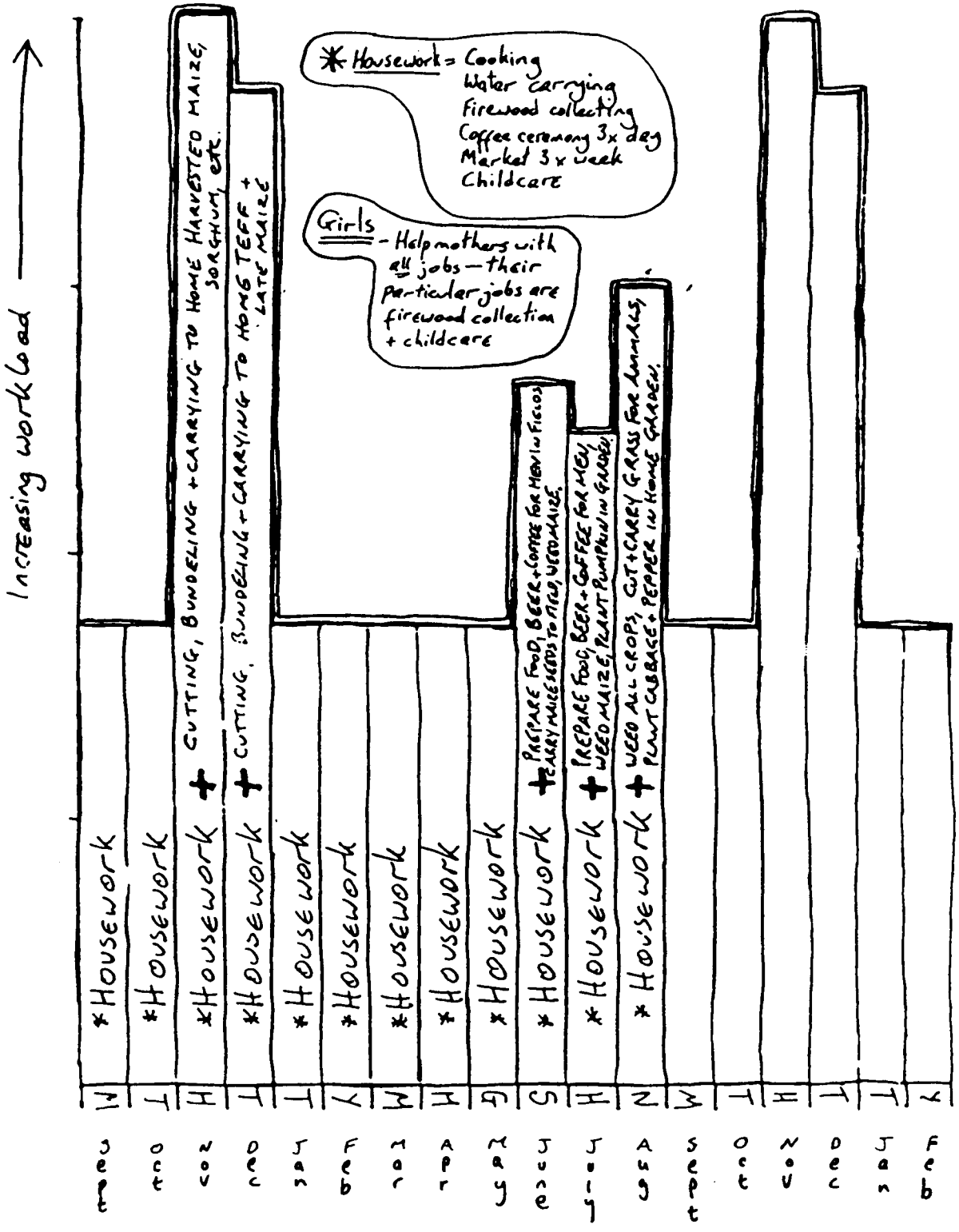


Plate 13 -
Constructing labour calendars for women and men, using rice straw in India.
Credit:
Robert Chambers.

Plate 14 -
A woman in India uses stones and seeds to construct a seasonal calendar.
Credit:
Robert Chambers.

Constructing labour calendars is an essential exercise when planning to start activities in an area. The results will indicate which months the women and/or men will be busiest, when the extra activities may have to compete with agricultural or other labour peaks, and when the slack periods occur during which time the new activities may be most appropriate. Other calendars will also help in planning the timing of activities. For example a calendar of local events will highlight times when distractions are most likely, such as election periods, fasting months etc.

Daily activity schedules

A typical day's work can be the topic of an interview and here again, interesting comparisons can be drawn between the ways men and women spend their time. An example from Cape Verde (Figure 9) shows the activities of a man, who has more free time than a young woman who, although she attends school also has many other jobs to do.

Different women will also have different daily routines. An example from the Gaza Strip (Figure 10) compares the routine of a rural woman with that of a young, urban professional woman.

You may like to draw your own schedule for a typical day, and think about how such information could be useful to someone planning a project in your area. How would this type of information help them plan the work?

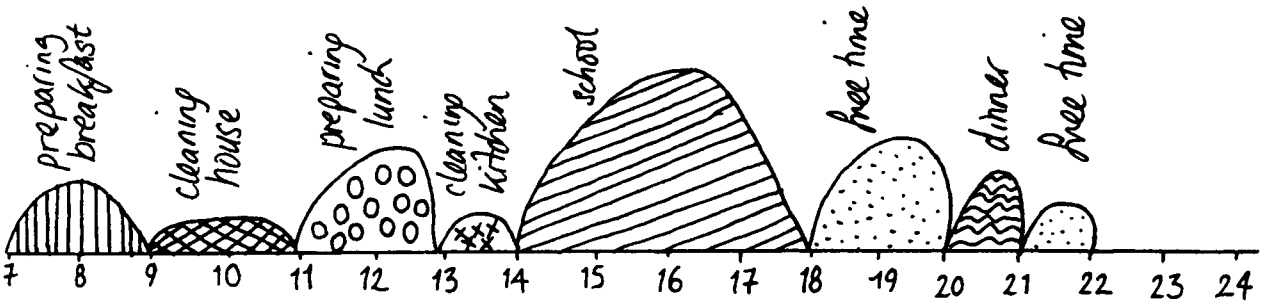
HOW CAN WE LEARN ABOUT DIFFERENT PREFERENCES FOR RESOURCE USE?

Learning why people make the decisions they do is the key to understanding the ways in which they are using the natural resources. These choices are usually made on the basis of a number of many criteria. These criteria are measures, or yardsticks, by which people assess the utility of an item. In comparing different items, two individuals in similar situations may make very different choices or may make similar choices for very different reasons. How can we learn something about these complex decisions and how they are made?

One simple technique which can be of some help is **preference ranking**. This involves asking an individual (or a group) to rank in order of their own personal preference a set of items, and to give the reasons for their preferences. These items could be anything from tree species, livestock types, or vegetable types, to income sources, types of fertiliser, or land managment techniques. The resulting ranked list therefore shows both the order of preference of the items and the criteria on which these preferences are based. There are several different ways of finding out about these preferences. Two of the preference ranking techniques are outlined here - pairwise comparison and matrix ranking.

Figure 9[15]: Daily routines of a young woman and young man in a village in Cape Verde.

young woman



young man

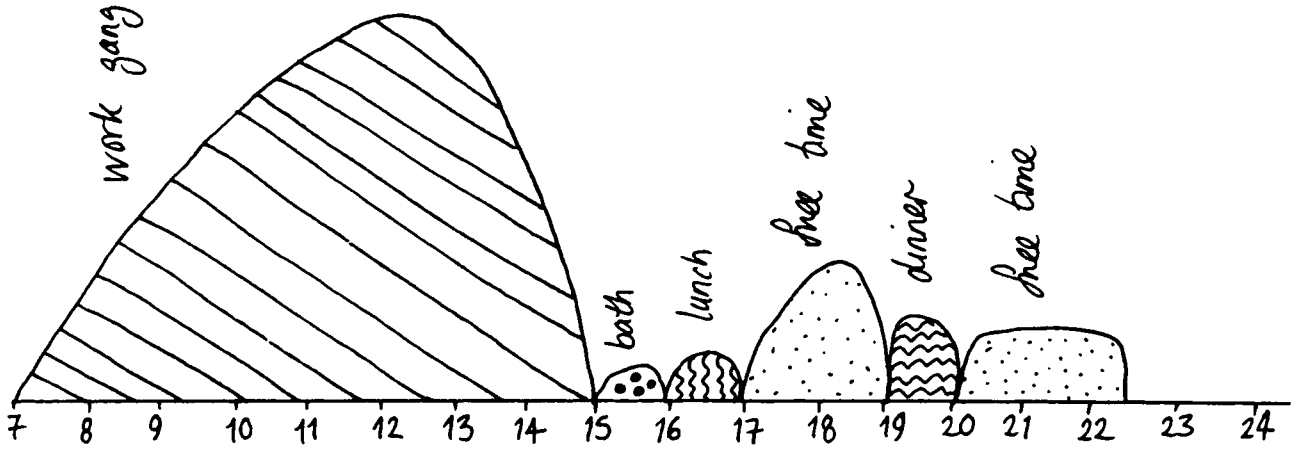
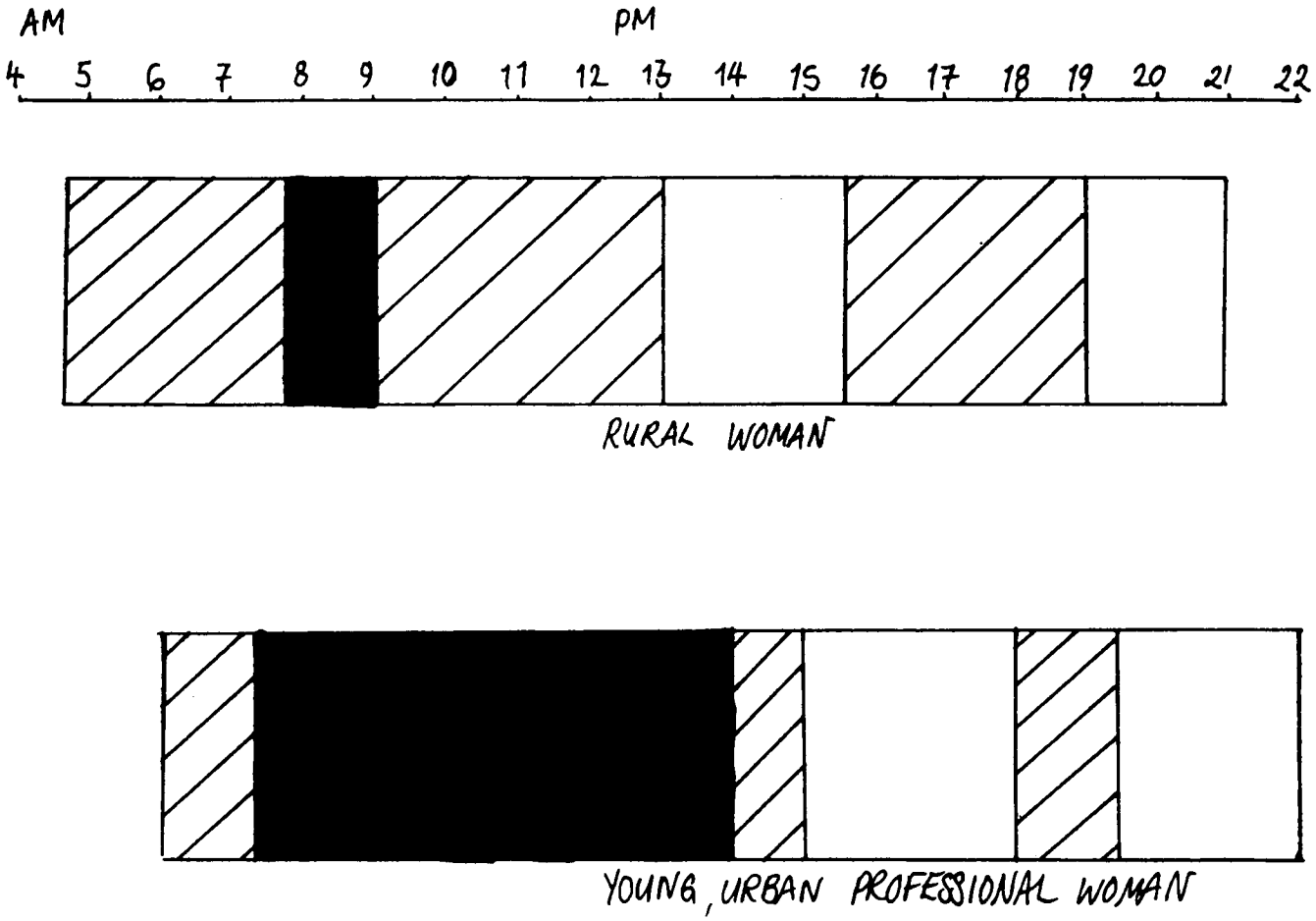


Figure 10[16]: Daily routines of women in the Gaza strip.



Pairwise Comparison

This version of the technique involves a sequence of comparisons, where two items at a time are rated against each other. Here are the steps involved:

1. Ask the woman to choose the set of items to be ranked. For example, if you are interested in learning of women's interest in growing vegetables, ask a woman (or a group of women) to choose a number of vegetables with which they are familiar. For the purposes of the ranking exercise, it is probably best to limit this number to five. More than this tends to make the exercise rather long. Let us assume the woman has chosen to rank sweet potato, cabbage, carrot, onion and tomato.

2. Pick any two of these five vegetables and ask the woman which of these she would prefer to grow. If possible have examples of each of these vegetables to hand, to stimulate discussion. Alternatively, use five pieces of paper on each of which you have drawn, or written the name of, one of the vegetables. So, if you choose to first compare, say, onion with tomato, present these vegetables, or pieces of paper representing them, in front of the woman. Note which she prefers and use probing questions to find out why she prefers this one.

3. Then chose a different pair of vegetables and ask the woman which one of these she would prefer to grow and why.

4. Continue until you have worked through all the combinations.

5. Draw up the results as a list and ask the woman whether she agrees with the end result.

One way to keep a record of each comparison is in a matrix. The one for this example could look something like:

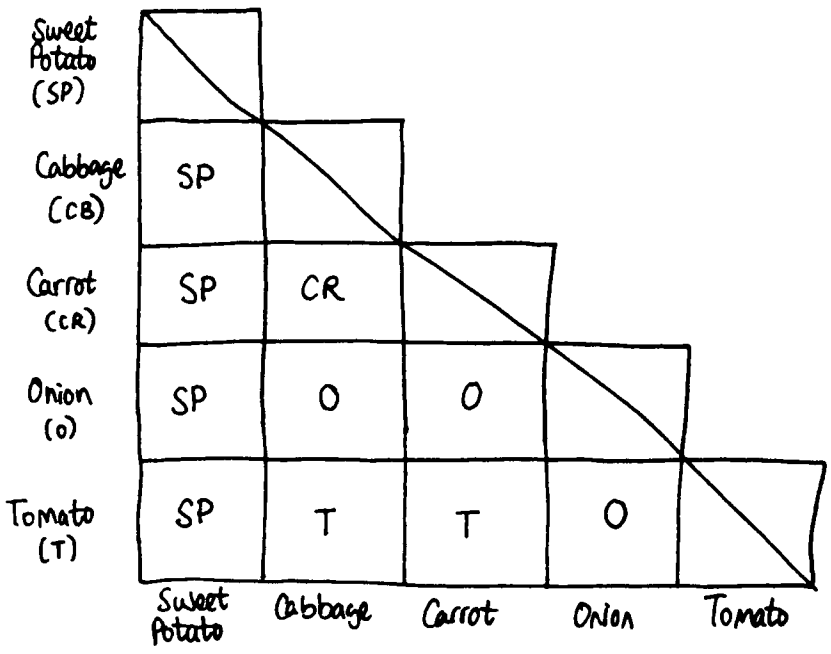


Plate 15 - Women ranking six different rice varieties in India.
Credit: Robert Chambers.

The "winner" of each comparison is entered in the appropriate box. In the case of ranking five items, as above, you can see there are ten different comparisons to make (i.e. 10 boxes to fill in). The final ranking is then simply a matter of adding up the number of times each vegetable appears as a "winner". Here sweet potato won 4 times, onion 3 times, tomato twice, carrot once and cabbage was never preferred in a comparison. Hence the ranking in this case is:

1. Sweet potato (most popular crop)
2. Onion
3. Tomato
4. Carrot
5. Cabbage (least popular crop)

The more interesting result of the ranking technique however is often the criteria which have been used - the reasons the woman gave for each preference she made.

Below are the results of a ranking exercise in Ethiopia where a group of women ranked six tree species which they use for fuelwood.

Box 9: Fuelwood preference ranking by a group of women in Wollo, Ethiopia[17]

		GOOD	BAD
1.	Agame (4)* -	- best for baking	- thorny
2.	Degita (5)	- charcoal	- used immediately
3.	Dedeho (2)	- available	- no charcoal
4.	Debobesha (3)	- charcoal	- available
5.	Sebensa (1)	- available	- thorny
6.	Weiba (6)	- incense - ladies use it for beauty - medical use - income generating	- worms

* Ranking of availability in the area

Another example, from Sudan, shows just how many different criteria can be revealed through this technique. This is the combined result of two separate ranking exercises. These two ranking exercises produced 31 quite different valued criteria for the use of resources from these eight trees!

Box 10: Good and bad points about eight trees from two preference rankings by farmers in Sudan[18]

FAVOURABLE	UNFAVOURABLE
SIDIR: Ziziphus spina-cristi	
1. Edible fruits	1. Cannot plant
2. Thorny fencing	2. Source of trouble in courtyards because of thieving children
3. Leaves for fodder	
4. Medicinal bark	
5. Windbreak	
6. Bark for washing bodies in funeral ceremonies	
7. Wood for building and furniture	
NEEM: Azadirachta indica	
1. Shade tree	
2. Fuelwood	
3. Wood for building huts	
4. Trees will grow after pruning	
5. Grows from seedlings	
6. Ornamental	
7. Multiple uses	
8. Wood for handtools	
SUNUT: Acacia nilotica	
1. Pods medicinal	1. Cannot plant
2. Pods used in marriage ceremony	
3. Strong burn - used in brickmaking	
4. Wood for roofs, boats, furniture, beds, tools	
5. Produces gum - ingredient for inks and strengthens sand when mixing for building	
6. Pods used for tanning leather	

continued ...

Box 10 continued

TALH: Acacia seyal

1. Strong fire	1. Very susceptible to termites and wood-borers
2. Smoke with good aroma	2. Wood has to be soaked for 3 months for resistance to termites
3. Smoke anti-rheumatic	
4. Produces gum	
5. Fuelwood	3. Never planted
6. Skin colouring and perfume	
7. Flowers for fodder	
8. Wood for burning	

SALEM: Acacia raddiana

1. Wood for building	1. Moderate fire
2. No aroma to smoke	
3. Straight and strong, good for sticks	
4. Flowers and fruit for fodder	
5. Wood for building huts	

HARAZ: Acacia albida

1. Fruit for fodder	1. Susceptible to termites and wood-borers
2. Wood for furniture and beds	2. Mild fire
3. Wood for mortars for grinding	3. Weak wood
4. Shade tree	4. Wood not straight
5. Best wood for building boats - very light	
6. Wood for tablets for writing Koranic verse upon	
7. Young boys use it to float across river	

TUNDUB: Capparis decidua

1. Fruit for fodder	1. Mainly branches, no thick stems
2. Used to treat jaundice	
3. Hedges	

EUCALYPTUS: Eucalyptus sp.

1. Ornamental and beauty value	1. Too tall for dense shade
2. Seedlings available enough for building	2. Wood fragile, not tough
	3. No regrowth after pruning
	4. Susceptible to termites and wood-borers

A third example, from Kenya, deals with soil conservation techniques. Note the reason why some families chose not to construct infiltration ditches - because of the danger that small children will fall into them!

Box 11: Good and bad points about soil and water conservation structures according to some farmers in Murang'a District of Kenya[19]

* RETENTION DITCHES (CUT-OFFS)
- protects crops and structures below
- holds much water
- has 2 lines of napier grass
- forms a bench easily

but:
- ends can break and water rush down farm
- uses up large proportion of farm
- requires much labour to construct

* FANYA JUU+
- reduces the slope
- prevents run-off down slope
- napier grass planted on topside
- does not use up much of farm

but:
- it is laborious work throwing the soil uphill when slope is steep

* BENCH TERRACES
- no loss of nutrients when apply manures/fertilisers
- when short and tilted back there will be no run-off and much infiltration
- no waste of land

but:
- very laborious to construct

* INFILTRATION PITS
- slow down flow
- increase infiltration

but:
- risk that children will fall into holes

* FANYA CHINI++
- easy to dig

but:
- wastes space
- increases the slope

* GRASS STRIPS
- not so effective on steep slopes because so much water runs off

\+ (terrace constructed by throwing soil up the slope)
++ (terrace constructed by throwing soil down the slope)

Direct Matrix Ranking

This is a different version of the preference ranking technique. It involves the following steps:

1. Ask the woman to choose the items she would like to rank, as in the pairwise comparison technique.

2. Taking each item in turn ask about its good points and bad points. Try to get as many as possible.

3. List all these criteria. Turn negative criteria (bad points) into positive ones. For example "vulnerable to pests" becomes "not vulnerable to pests." So all criteria are now positive.

4. Draw up a matrix with the items across the top and the criteria down the side.

5. For each criteria in turn, ask which item is best. Give this item the value of 1. Ask which is next best, give this item value 2, ask which is next best, and so on.

6. Work down the matrix filling in the rankings.

7. Finally ask the question "If you could only choose one of these items, which would you choose?". This will give some indication of the relative weighting of the different criteria.

Here are two examples of matrix ranking from Kenya (Tables 1 & 2)[20].

To come back to the question of weighting the criteria, look at the example of fertiliser types. It appears that farmyard manure is the most popular fertiliser, as it has come first on eight criteria. However it is conceivable that if the farmers were extremely concerned about cost, i.e. they put great weight behind the criteria of low cost, farmyard manure (the most expensive fertiliser) would <u>not</u> be chosen as the priority. In other words, when farmers were finally asked which fertiliser they would choose if they could only choose one, they may choose not farmyard manure but another less costly type.

RANKING OF CHARACTERISTICS OF

FOUR TREE SPECIES BY MRS ZENA IBRAHIM,

MUNIAS DIVISION, KAKAMEGA DISTRICT, KENYA, 7 MARCH 1988

	EUCAL-YPTUS	GREV-ILLEA	SESB-ANIA	MULUL-USIA
SPEED OF GROWTH	3	4	1	2
TIMBER	1	2	DON'T KNOW	DON'T KNOW
FIREWOOD	1	4	2	3
IMPROVES SOIL	3=	3=	1=	1=
OK WITH CROPS	3=	3=	1=	1=
KITCHEN SMOKE	1	4	2	3
STATUS/POPULARITY	1	4	2	3
MARKET VALUE	1	DON'T KNOW	NIL	NIL
BEAUTY	3	1	4	2
RESISTS TERMITES	1	DON'T KNOW	2=	2=

1 = BEST 4 = WORST

Table 1[20]

COMPARISONS OF FIVE TYPES OF FERTILISER BY FOUR FARMERS

IN VILLAGE KUCHIAROLE, DISTRICT BANKURA

ACCORDING TO THEIR CRITERIA 28 APRIL 1988

	FYM	DAP	GROMOR 28-28	MOP	UREA
LOW COST	5	1	4	2	3
PRICE RISES LITTLE	1	3	4	2	5
EASY TO APPLY	5	2=	2=	4	1
GOOD NUTRIENT PROPORTIONS	1	3	2	4=	4=
HIGH N CONCENTRATION	4	3	2	NIL	1
MICRONUTRIENTS	1	-	-	-	-
N AVAILABILITY TO PLANT	4	1	2	NIL	3
LASTS WELL IN SOIL	1	2	3	4	5
IMPROVES SOIL FERTILITY	(+) 1	(-) 3	(-) 4	(-) 2	(-) 5
SOIL HOLDS WATER BETTER	1	2=	2=	2=	2=
ACIDITY NOT INCREASED	1	DK	DK	DK	5
EFFECT ON PESTS/DISEASES	1=	3	4	1=	5
MARKET AVAILABILITY*	2	1=	1=	1=	1=
STORING QUALITY*	2	3	4	1	5

* = suggested by interviewer

1 = BEST 5 = WORST

FYM = Farmyard manure
DAP = Diammonium phosphate
MOP = Muriate of potash

Table 2[20]

Exercise 4: Preference ranking

To make sure you understand this technique, try a ranking exercise yourself to rank whatever type of items you wish. As a suggestion, you could choose to rank five different types of fruit on the basis of which fruits you would like to have available at your local market. If there are several of you, you might like to split up into groups of two or three. In each group, one person could be the interviewee (i.e. the person who is being asked to rank the items) while the other one is/are the interviewer(s). If several groups are trying this technique, you can compare the results afterwards. In this case you might like to each rank the same set of items, to make comparisons easier. You can choose whether to try the pairwise comparison or the direct matrix ranking method.

Try this question before reading the next section on the uses of ranking.

Discussion question: Can you think of any ways that the criteria used by women, choosing which tree species they prefer would differ from those used by men?

Uses and limitations of ranking

As hinted above, the ranking technique can discover the reasons behind why women and men make different choices. Often women farmers make choices about food crops and fruit on the basis of their nutritional value, their ease of cooking and their medicinal qualities as well as their growth characteristics. Men on the other hand often emphasise the economic value of the crops, and rarely mention these criteria which the women find important. When ranking tree species, men are mostly concerned about the multiple and diverse uses of the wood (for construction, implements, fodder, fuel etc). Women often use criteria such as the type of smoke it gives off when used as firewood, the thorniness of the branches when gathered for fodder or fuelwood (usually a women's job), and again the medicinal and nutritional value of the bark, leaves and fruit.

These differences in criteria can sometimes help to explain the conflicts in interest between men and women when new species, new techniques or other innovations are introduced into the area. It would be useful, for example, if agricultural extension agents planning to encourage tree growing through agroforestry first conduct some ranking exercises with a number of women and men to discover what features of the trees are important to each group.

This raises one limitation of the ranking technique. Because the choices made are so individual to every person, a ranking result should not be used to recommend a particular item which appeared as no. 1 in one, or even several, rankings. The idea that a farmer actually chooses one item is in practice a false one. A farmer very rarely grows one species of tree, or uses one soil conservation technique. Rankings often show the need for choices to be available, and should not be used to advocate concentrating on only the winning item.

Likewise the results of a limited number of rankings should not be extended to produce recommendations for a whole village or area. In other words ranking should not be used as direct planning tools. They can give some ideas but should not be relied on for anything beyond this.

Finally ranking exercises are fun! They generally take about half an hour to complete and are a good way to open a discussion. For instance, a group discussion on fruit tree growing could be livened up by beginning with a group ranking of the commonest fruit trees in the area.

HOW CAN WE LEARN ABOUT CONFLICTS OF INTEREST IN A COMMUNITY?

A community is generally composed of a number of different groups, some in direct conflict with each other, some more powerful than the rest, and some particularly disadvantaged. Within these groups there may be differences of opinion and points of conflict. Even within one household decisions are more often based on compromises between the different members' priorities rather than a total agreement of ideas. For example, farmers relying on the same irrigation system may not agree on how the water should be shared. Those with larger plots of land at the beginning of the water channel may be more successful in any disputes over the management of the system.

Landless households in a village may petition the village council to allow them to farm some of the common land, presently used for grazing. Livestock owners in the village may react against this, seeing it as a threat to their herds. Members of the village council are more likely to be livestock owners than landless.

The men of a village may have become interested in a coffee project which has just been started in the area. They have heard that their incomes could double if they replaced some of their maize crop with coffee trees. They are keen to work with the project. However, the women are very unsure about the idea. They fear that their workload will increase, as they have heard how much care the coffee trees need. They also feel there will be problems if they grow less maize - where will they get enough food for the family and what will replace the maize stalks for fodder for cattle? They also wonder who will benefit from the extra cash which the coffee trees might provide. The women and men discuss the project and can not agree.

How can we learn about these conflicts of interest? These issues tend to be hidden from outsiders, especially those who visit the community for only a short period. Those who stay longer often see the seemingly uniform community gradually revealed as much more complex, as different interest groups become evident.
One technique which can be useful in this respect involves **focus group discussions.**

Focus group discussions are a particular type of discussion, where a set of people are brought together specifically to discuss a particular issue. As the discussions focus on this one issue, they can deal with it in some depth. If the group is made up of people with common concerns, or people facing a common problem, a focussed discussion can allow them to be more frank and

honest than they may otherwise be, say in an open meeting in the community. Hence these discussions are ideally suited to dealing with particularly sensitive issues.

Focus group discussions differ from other types of interview in that the "interviewer's" role is one of moderating the "interviewees" discussions rather than asking questions to each member of the group. Once the discussion gets underway the interviewer/moderator plays a part in guiding the discussion and recording it (usually taking notes).

One application of this technique allows discussions to take place **within** different interest groups and then **between** these groups. In this case, following a series of focus group discussions, each with a different interest group, representatives are chosen from these groups to attend another focus discussion where their different views can be aired. Given that they have already aired their own views in front of the moderator, these final mixed group discussion meetings can quickly become open and uninhibited debates between the different interests represented. The moderator now plays a part in keeping the discussion balanced and preventing it becoming overheated.

Box 12 is an example of how focus group discussions were used in this way.

Box 12: Focus on conflict[21]

In a Peasant Association (PA) in Wollo, Ethiopia, a team of investigators (made up of both local and non-local fieldworkers) was exploring ways of local level planning for natural resource management. They were especially interested in the management of the hillside closure areas in the PA. These are sites where agriculture and grazing are restricted, with armed guard patrols preventing human or livestock intruders, in order to allow natural regeneration of vegetation and to protect any newly planted trees.

Problems had arisen because of unclear regulations about the permitted levels of use of the products of these closed areas (i.e. grass, twigs, fallen branches etc.), and those entitled to these benefits. The majority of PA members were not involved in the planning and management of the closures and many felt their livelihoods had been adversely affected by the closing of these previously communally-held or privately-managed areas.

Different groups in the PA had different opinions about the closures and how they could best be managed. The investigators arranged for a series of focus group discussions on this issue, including groups of:

PA leaders
Producers' Cooperative members
Private farmers
Women's group members
Youth group members
Old men
Old women
Closure site guards
Livestock owners/non-owners

These groups, composed of between 3 and 15 local people and 3 or 4 investigators, each met for about one or two hours. The investigators made use of a checklist to guide the discussion around a number of points, but stayed in the background and rarely intervened in the discussion. Ranking games were used to focus on preferences and attitudes to different management options. The opinions of the group members were recorded as notes, and verbatim quotes were also noted to illustrate particular local views.

After these meetings, about 2 or 3 representatives from each group came together in a workshop meeting in the PA, where each group could voice their views and discuss the differences of opinion. The end result of the meeting was a clarification on where the groups priorities overlapped, where they conflicted, and an agreement on what should be done next.

The following is a summary of some of the focus group discussions with quotes recorded during these meetings.

Box 13: Summary of focus group discussions on management of hillside closures, Wollo, Ethiopia.

Group	Issues raised	Plans for Management
PA leaders	- Shortage of land - Definite benefits of closures	- Thinning of bush and pruning to increase grass production - Cut and Carry - Controlled grazing? - No new closures - PA Level control
Women	- Cannot get access for fuelwood, clay, etc - Extra labour in collection - Wildlife pests	- Alternative home as trees will be taken - Open the areas for use
Site Guards	- Fear for lives - Lenient on poaching - Do job because of food-for-work	- More guards - More PA support - Supervised cut and carry
Old Men	- Rights of use not clear	- Increase use-grazing access, wood and bark

PA Leaders
"The closed areas will supply us with fuelwood, construction wood, grass for our animals from cut-and-carry and they will also stop erosion of the land. However they also result in a shortage of grazing and farm land and hinder livestock rearing."

Women
"We are not allowed to go into the closed areas to get anything from there. I can not even take a stick for a toothbrush!"

Site Guards
"Farmers come to cut the trees at night. We can hear them and see the remains of the trees in the morning. If we catch them and report them they will be our enemies and will threaten us and want to kill us. Sometimes we have to report our neighbours and friends."

Old Men
"We do not deny that closing the land controls erosion. But we have to get opportunities to use the area, for example taking the dried branches and bark for fuelwood, or being allowed to graze our animals on the gentler slopes within the closures."

Livestock Owners
"If you do not have enough grazing land, having cattle is like having a wife from a bad family."

Organising focus group discussions

* Keep the size of each group to a manageable number of people - the optimal size is probably between 3 and 15.

* Choosing who should attend a focus group meeting is liable to introduce bias. If a leader is asked to nominate participants, his or her choice will be influenced by his/her friends and acquaintances. This is difficult to overcome, but the representativeness of the group should be borne in mind.

* Choose a site where the group will feel comfortable to talk. Choose a site where there are unlikely to be any unwanted observers or intruders. Informal settings, such as sitting on the ground under a shade or shelter, are more conducive to frank discussion than formal arrangements. Sitting in a circle allows everyone to see each other.

* Choose a time which suits the group of people.

* Start the discussions off on a light-hearted note. Ranking games are ideal.

* Explain carefully at the beginning of the discussion why you would have called the group together, and what you would like to discuss.

* Try to ensure that every member of the group gets an opportunity to speak. Don't allow one member to dominate the discussion.

* The discussion should not last much more than two hours, unless all of the local members of the group want to continue.

* Organising these meetings takes time and attending them also makes use of valuable time for the rural people. Be aware that people may miss important opportunities for employment or may have to delay other activities to attend the meetings.

* Following up the meetings by supporting the implementation of any agreements reached is a vital part of the work.

A word of caution

There are a number of risks involved in investigating conflict. Firstly by making the conflict more public and by providing a forum in which the differences can be discussed openly, these different opinions may become even more hotly contended, and the conflict may actually deepen. People who previously had not been involved or interested in the arguments may, once they hear it being discussed, start to take sides.

A related danger is that the more powerful and influential interest groups in the community may be put in a better position to force their opinions on other groups. They may use the group discussion sessions for propaganda purposes rather than for constructive discussion with others.

These two dangers require very careful organizing of the investigations. Those responsible for managing the group discussions need to be able to control the different interest groups represented and to encourage the less strong groups to speak out. They also need to be very open and explain why they are trying to gather such information.

A third potential danger is that the investigators may appear to take sides in the argument too. If, for example, they spend more time talking with one particular interest group, the other groups may see that as evidence of support for that group's argument. This may cause problems at later stages if any degree of favouritism is suspected. Again, this can only be avoided by careful organization and sensitivity to each group's fears and suspicions.

Despite these difficulties and dangers, it is often very important to learn about conflict situations. For example, an apparently inexplicable pattern of land use may make sense once it is discovered that there are disputes and conflicts over rights to that area of land. Also, conflicts between different groups in a community may hinder any community-based activities which are being planned. In such instances it is worthwhile investigating the conflicts, in a sensitive and careful way.

HOW CAN WE LEARN ABOUT ENVIRONMENTAL CHANGES?

The environmental history of a village can explain much about why the present situation is as it seems and can help to explain people's attitudes to the present day resources. For example, a seemingly over-exploitation of forest land can be better understood if we find that up until very recently there was abundant areas of forest and little problem of obtaining wood. Similarly present trends in resource use or environmental degradation can be used, with care, to foresee any problems which may lie ahead or any opportunities for preventing these problems.

There are several ways of learning about past changes and trends:

Interviews

Talking with older people, we can learn much about the changes they have seen in their lifetime. They may also be able to remember the stories told by their parents and grandparents, of how the land was used by previous generations. If we bring together a group of old people, they can help to check each other's memories, to provide more reliable information.

Old aerial photographs

If available these photographs can provide valuable information on landscapes, for example showing the size of lakes, forest, grazing areas, the course of rivers, the extent of housing areas, or the types of crops grown. They are useful tools to help jog the memory of old women and men during interviews on changed environment.

Historical transects

One way of representing previous landscapes is as a series of transects. An example below comes from Indonesia, and illustrates the numerous experiments with tree production on the agricultural land, following felling of the fruit trees, and the changing land use on the upland slopes, after deforestation during the Dutch colonial times (Figure 11).

These historical transects can be drawn either during interviews with old women and men, or can be constructed by the investigators after interviews and discussions in the field.

Historical calendars

Previous years' seasonal trends can be shown as a series of calendars, to illustrate changes in this aspect of resources and resource use. Like historical transects these can be constructed during interviews with elderly members of a community and checked on-the spot. An example here was drawn during a group interview with farmers in Ethiopia, recounting monthly rainfall over the previous five years (Figure 12). The farmers based their recollections around memorable events such as the land redistribution of '74-'75 and on what they remembered about that time, e.g. the area of land they were farming or the crops they were growing. The approximate picture which this provides is valuable in itself, as the farmer's perspective of rainfall and its variability. In addition, in such a case as this where no other resources of rainfall data are available for these years, this estimate is the best we can get.

Models

One step on from mapping on the ground, constructing a model of a village can be a valuable exercise in learning about the land use and topography of the area. These models do take time and can become quite elaborate but are also a great deal of fun.

Models are also a good way of reconstructing past landscapes, in particular looking at land use and the status of the environment in former days. Equally they can show what future landscapes may look like. In India, farmers constructed two different models of their catchment area in the future. (Mascarenhas, pers. comm). One model, with many trees and well managed slopes showed how they would like it to be. The other model had bare slopes, gullies and a very degraded landscape. Indeed to make it worse still, a farmer collected ash from his home and scattered it over the model! This was how they saw their village if nothing was done to prevent overuse of the present resources[24].

Figure 11[22]: Transect-through-time illustrating land use trends in Kates village, 1900-1987, Java, Indonesia.

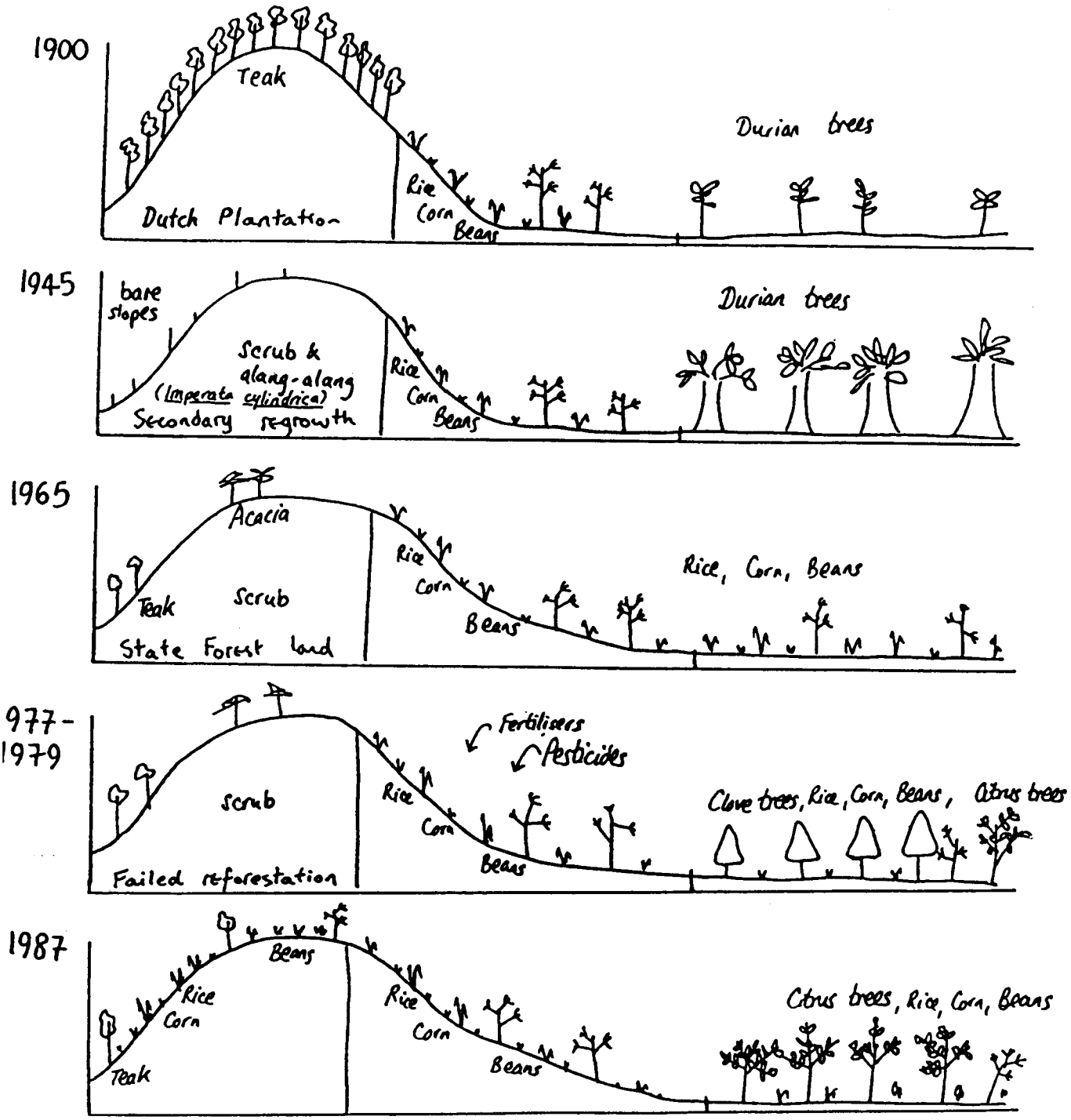
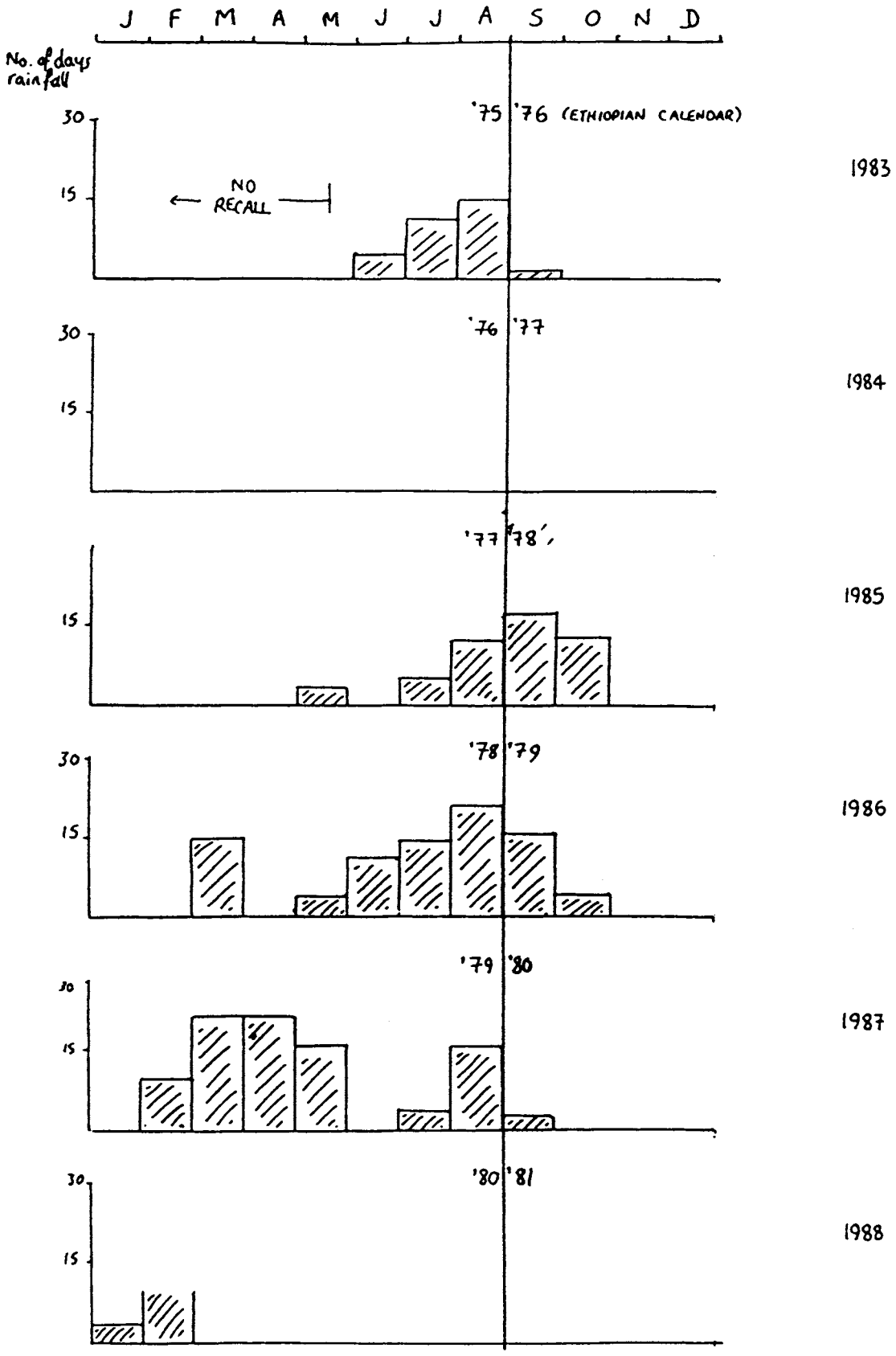


Figure 12[23]: Farmers' recall of rainfall over last five years, in Gobeya Peasant Association, Ethiopia. Data collected by interview, February 1988.



HOW CAN WE LEARN ABOUT LOCAL INSTITUTIONS AND GROUPS?

Learning about which formal institutions are present in a community is relatively straightforward. But how can we learn about the informal groups and the extent to which the various institutions link together and collaborate? If we are investigating the use of natural resources in a village, we need to know which groups are responsible for deciding how the resources are used - for example, the water management committee (controlling use of irrigation water), the village council (controlling disputes over land), the local women's groups (organising a rota system for working in the village tree nursery), and so on.

A quick way of starting to learn about this is to construct a **venn diagram**. This is simply a set of overlapping circles, each circle representing an institution or group and the overlap between circles depicting the extent to which the institutions overlap and collaborate in practice. The relative size of the circle representing an institution is drawn to indicate the relative importance of the institution in the village - i.e. the influence which it exerts in the community. The venn diagram may be first constructed using cut-out circles of card, which are placed overlapping on top of each other. This can be done by a local leader or schoolteacher or anyone else familiar with the formal and informal groups in the village. Once satisfied with the lay-out of the circles, the diagram can be transferred on to paper. Two examples are shown below, one from Botswana (Figure 13) and one from Sudan (Figure 14).
The completed venn diagrams are summaries of which groups are present within a community, which outside groups have contacts inside the community and how these different groups are linked together. For example, the venn diagram of a village in Botswana (Figure 13) shows the women's group, a relatively small (unimportant?) group, as being far away from the chief and the village committee. This may reflect the attitute of the person who constructed the diagram; perhaps a male member of the village committee would have drawn such a picture, with the committee represented by a large circle at the top of the page. It would have been interesting to ask, for example, a member of one of the women's groups to construct her own version of the groups in the village. How might her diagram be different?

AND WHAT NEXT?

So, what happens after we have spent some time talking with and learning from rural women? Where do we go from there? Obviously our learning will only be a success if we can make some use of the new knowledge and the ideas which we have obtained. This includes:

Reporting the results

The women and men who have spent time talking with us, answering our queries, and discussing their ideas deserve the opportunity to hear what we have learnt from our visits with them. If we are to work together well with the local people we need to make time to share our findings with them and keep them up-to-date with our own ideas and plans.

We need to find a suitable means for reporting these results. It may be useful to organize an open **community meeting** where everyone is invited to attend. Such meetings are a valuable means of informing a large number of people at one time, but have certain limitations, including:

* the size of the meeting can become very large, making it difficult to communicate effectively with those at the edge of the crowd;

* the time of day at which the meeting is held will determine how many and who can attend. While men may be most free during the early evening, women may not be able to leave their homes then if they are caring for young children;

* any discussions in large meetings tend to be dominated by the usual set of leaders and elders and other elite - usually males. Those facilitating the meeting need to make every effort to involve others, including any women who are attending. However this is a difficult task and may create an atmosphere of antagonism with the leaders and discomfort with those being pressed to make contributions. It may be better instead to hold separate smaller meetings to discuss in more detail any points arising in the community meeting. These smaller meetings would need to be organised carefully, to ensure representatives of each different section of the community are invited. (See previous notes on focus group discussions). In some communities separate meetings would need to be held for the women and men.

Remembering the above points, good use can be made of **visual presentation material** to show those results which can be depicted pictorially. Posters, cartoons, maps and calendars can be presented. These charts can help to brighten up the meeting and can be left behind afterwards, perhaps to be used in the local school or to be discussed during future meetings in the community. If used in meetings where useful discussion **is** possible, these charts can be excellent visual cues for stimulating and focussing the discussion around the issues which they represent. However care needs to be taken to avoid any chances of the pictures being misinterpreted! There are numerous stories of visual presentations causing confusion and misunderstanding in rural villages, such as the case of a team who brought a film about the dangers of malaria to show in an African village. The sight of a mosquito on the large screen caused many "oohs" and "aahs" from the audience and after the show the main response was "Well thank goodness there are none of those enormous insects in our village! We are safe from this problem." Testing the pictures with a selected audience before using them in a large meeting is one way to help avoid any potential communication problems. A better way is to involve the local women and men in designing and preparing the posters and diagrams. Some people may already have been involved, e.g. in drawing maps of the village, or constructing labour calendars, and they best know how to make these pictures accessible to others in their village. Failing that, the outsiders can at least try to reduce any obvious sources of confusion including using as little written text as possible, and using local script and local terms for any text which is included. The job of presenting these diagrams is another one best done by local people - those who have been asked to preview the diagrams before the meeting or those who have been involved in preparing the diagrams.

In addition to holding these report-back meetings, producing a **written report** of the newly-gained information is a valuable part of the survey/learning work, and one which is often a required output. These reports are best produced as quickly as possible after the field visits. A few tips on what to include in the report alongside the main findings of the investigators:

Figure 13[25]: Venn diagram of institutional structures in Moshaneng village, Botswana.

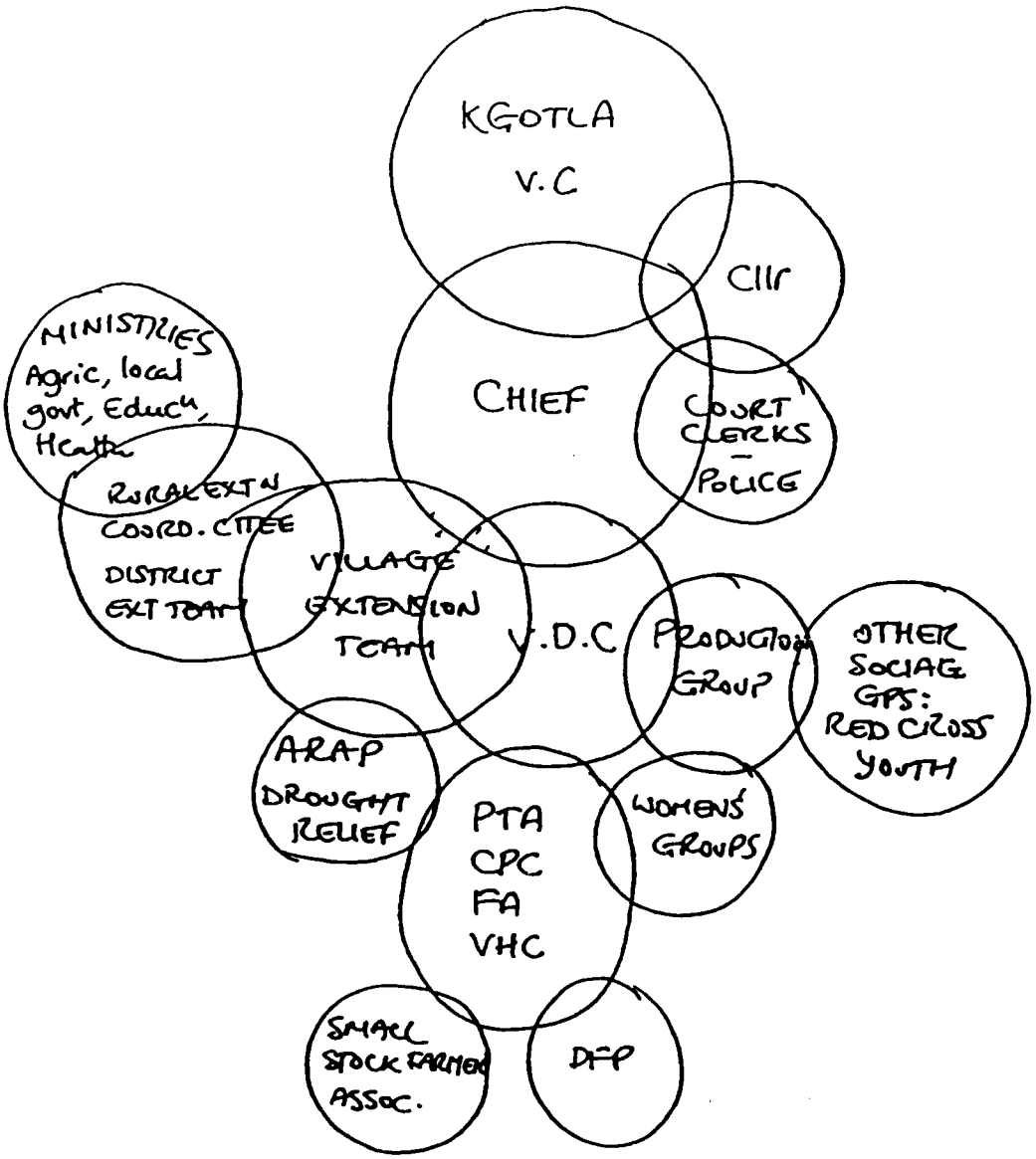
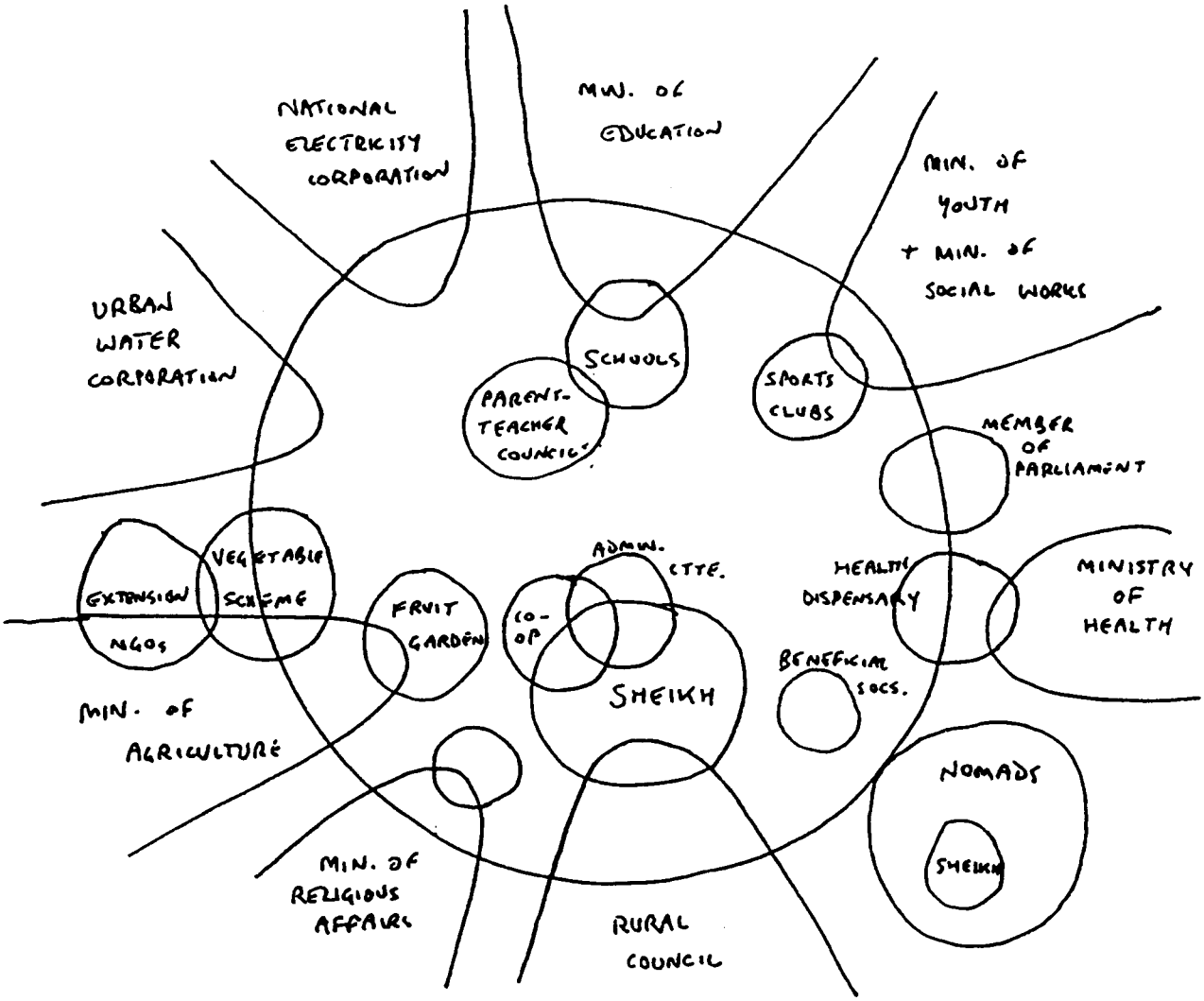


Figure 14[26]: Venn diagram of institutions in Faki Hashim village, Sudan.*



copies of the diagrams and drawings produced during the interviews and discussion sessions;

* a selection of interesting quotes noted down during interviews. Do not include the names of those quoted if there is any chance that this will cause problems for them;
* detailed information on some particular women, men or households visited who illustrate well a particular point, e.g. as examples of people facing one of the major problems in the community;

* lists of people visited and interviewed and list of any group discussions held. Again, if providing actual names of those interviewed is not possible, or is likely to cause problems in a sensitive situation, omit names and give only brief descriptions of each person contacted. For instance whether a large or small landowner, or a landless labourer; a man or women; a newcomer or an established resident; etc. This list will show the range of contacts made and will indicate the representative nature of those interviewed;

* brief accounts of any problems encountered in the work, e.g. the difficulties in using some techniques or the logistical problems which hindered the work (i.e. anything which may help those doing similar work in the future).

Planning activities

It is impossible to produce one set of guidelines on how to make the necessary steps: from **learning** about an issue by talking with rural women to **action** in the form of carrying out activities seen as priorities. This process is very dependent on, among other things, the agency involved and its existing structure, the investigators involved and their preferred way of working, the type of activities being planned and the main initiators. For example, if the outside agency involved is flexible and thinks that the planned activity is possible and worthwhile, the planning stage will be quicker and more trouble-free. Likewise if the activity being planned is straightforward and simple, suggested and supported by the local women and men, the planning will go more smoothly. Funds may be made available quickly and local responsibility is likely to be high. In such instances, local participation in carrying out the activity is also likely to be high, as are the chances of the activity being a sustainable one.

If however there are no plans for any immediate follow-up activities, the information can still be valuable for, say, reviewing the impact of past activities and revising existing work plans or using as a baseline for future studies or field activities. In any case, the investigators have benefited from learning directly from the local women and men and will now be able to have something of an "insider's view" in addition to their own perspectives. Equally, if the learning work has been truly participatory, the rural women and men involved will also have learned from the experience. These learning benefits can be of real longterm help in encouraging cooperative efforts in future conservation activities, as the outsiders and insiders work with each other. (See Section I of the manual).

The learning process of investigators and rural people will not stop with the identification of activities. As the activities are planned in detail, discussed among the different people involved and finally implemented, the investigators and the local people will continue to learn more about

the resources, their use and their users. And since it is most often the local women and men themselves who are the users of the resources, it is essential that they be involved in every stage of the work, from the initial learning to the later learning to evaluate the activity.

SOME PRACTICAL POINTS TO REMEMBER

It is impossible to plan a perfect piece of fieldwork - something always changes the programme! But here are a few things to bear in mind when planning the work to try to avoid some obvious pitfalls:

People

To be successful the number of people working in this learning/survey work needs to be kept small. The actual number will depend on the purpose of the study, the size of the area to be visited, and the way the survey is to be organised. If only one outside person is to be involved it is obviously easier from the point of view of organising the necessary logistics. If, however, a team of outside people are involved there are particular points to remember. When visiting a community the team would be most effective (and less intimidating!) if split into small groups of two or three people. If the team members switch between the field visits, each person gets the chance to work with everyone else. This mixing of the team members is a good way of encouraging real teamwork and making use of the different experience and skills of every participant.

It would be rare to require an all-female or all-male team. A balance of women and men on the team makes the investigation itself more balanced.

Local people are the ideal investigators. They generally have fewer difficulties in communicating with the rural communities. They know the local dialect, the local forms of address and customs, and they are less likely to become the centre of attraction when they visit a village. They can quietly get on with the work. However, it can also be useful to include some non-local people on the team, to bring a different perspective. They may be able to contribute ideas which they have learned elsewhere and since they know less about the area they will be less likely to make prior assumptions about what they will find there. Indeed local investigators often admit that they find it difficult to ask questions in their neighbourhood, as they already have their own ideas about the answers!

Payment?

If local women and men are involved in the investigations, for example if they accompany the outside investigators on the transect walk, or spend some time in group discussions, then the question arises: should they be paid for this work? There are arguments for and against these payments. On the one hand, these people have given up their own time to help the investigators and to provide them with information. In doing this they may have missed the chance to earn money or may have had to postpone an important task on their farm. In such a case, some kind of compensation would seem reasonable. However the use of financial incentives is full of

dangers. People may be quick to provide information in order to get payment, but the quality of information they provide may not be as reliable as that provided by those who are genuinely interested in the investigations, even if they are not paid.

One possible option is to pay the local women and men in kind rather than in cash. For example, they may appreciate receiving some tree seedlings, a simple extension booklet, or a hand-tool. Like so many guidelines in this manual, there is no one correct way. The appropriate solution will need to be worked out according to the local situation.

Timing

The work needs to be planned for a period of time when:

* the rural women and men are not too busy to spend time with the investigator(s);

* the climate is not likely to hamper the work (e.g. the roads are not likely to be blocked by heavy rainfall);

* the workload of the investigator(s) is not too heavy;

* ideas for action which may result from the learning work can be fitted into the planning schedule of the agency involved;

In any case, if the work will involve several days of visits in a community, the investigator(s) should first visit the local leaders to explain their plans and to ask their permission.

Where to stay

If the investigator(s) would have to travel long distances to reach the communities they wish to visit, or if transport facilities are not freely available, it is probably better to arrange to stay overnight in the community. Staying there also helps the investigator(s) get to know the people and the place more quickly. Evenings are often good times for discussion, and early mornings and late evenings can be interesting times to watch activities such as farmers using night irrigation or outside labourers going to and from their daily work.

NOTES FOR TRAINERS

Firstly, to reiterate an earlier suggestion - please do not feel constrained by any of the exercises, case studies, diagrams, or photographs used here. You will have more locally suitable material to use instead. You will see, for instance, that many of the photographs in this section come from countries outside Commonwealth Africa. This is because the author had easier access to photographic examples of the techniques being used in these countries. Trainers using this manual may like to replace some of these photographs with similar ones from their own countries, where they are available.

This section of the manual has been laid out in the form of eight questions. Related to each question are a number of exercises which you, the trainer, might like to try. They are designed to encourage interactive learning by the participants and to stimulate discussion on the techniques and topics being described. Here is a list of some exercises to explore each question:

1. How can we best talk with rural women?

* Ask the participants to look at the photographs of interviews. In small groups, or as an open discussion, they could identify good points and bad points about the way each interview is being conducted. They could make out their own set of guidelines, or "Do's" and "Don'ts" for good interviewing. A list of hints is provided and they could compare this with their own ideas.

* Ask one group of participants to design and perform a role play to illustrate a bad interview situation. An example of such a sketch is provided but encourage them to make up their own. Similarly, ask another group to design and perform a good interview situation (e.g. with an informal, conversational manner, with polite introductions and explanations by the interviewer, and with careful questioning on a couple of topics). Leave some time for the groups to discuss the issues raised after the dramas.

2. How can we get a quick overview of the local resources?

* If all the participants know the area around the training site, ask them to split into groups to draw a sketch map of the local environment. To make it more interesting, ask one group to draw their map on the ground, one to use paper and pen, one to use blackboard and chalk, etc. and compare the types of maps produced.

* If possible, ask the participants to walk a transect across the area in which they are staying. The route of the transect can be decided after drawing the map, and can be designed so as it includes all the main types of land use. Ask them to draw a summary of the transect, noting down vegetation type, ownership, water sources, key problems and limitations, and so on. 3.

3. How can we learn about how women perceive their environment?

* Ask the participants to look at the maps in Figures 5 and 6, from Ethiopia. There are several key differences between the image of the village as seen by the male PA leader, and by the woman. Ask the participants to work in small groups to see what the maps tell us about the person who has drawn it (i.e. what they feel is important, what is less relevant to them, and so on). Ask them to present their key ideas on flipchart paper and discuss the results of each small group.

* Similarly, ask the participants to work in small groups to analyse and discuss the two maps in Figure 7. Again, much can be learned about the different priorities of the women and men of the village.

4. How can we learn about the workload of rural women?

* To practice drawing labour calendars, ask the participants to divide into groups of three. In each group one person can be the respondent, with two interviewers. It is the respondent who draws her/his own labour calendar (i.e. their work pattern over a year), while the two interviewers help and ask questions following the hints provided. If there is time, repeat the process with a different respondent in each group. Finally with the calendars transferred on to large/flipchart sheets of paper, compare the results. Note different work patterns and what they show about the different respondents. Discuss the value of this type of information in planning, monitoring, or evaluating a project initiative.

* In a similar way, ask the participants to practice drawing their own daily activity schedules. They may also like to try and recall the different patterns of their youth. Again present and compare the schedules of each respondent.

5. How can we learn about different preferences for resource use?

* You as the trainer could take on the role of director of a fruit and vegetable development project, in your own country. Tell the participants that you have already conducted a survey of the producers, to find out which types of fruit and vegetables they prefer to grow. You now want to know the preferences of the consumers. So, divide the participants into groups of three, with one respondent (i.e. consumer) and two interviewers in each group. Ask the participants to choose 4 types of fruits and 4 types of vegetables to use in the preference rankings. Make sure all the respondents are familiar with all of these. Give half the groups the opportunity to rank the fruit, and the other half can rank the vegetables. Each group can divide whether they would like to use the pairwise comparison technique or the matrix ranking. Allow 30-40 minutes for each ranking. Finally ask a spokesperson from each group to report back the findings and identify the key results of use in planning the project.

6. How can we learn about conflicts of interest in a community?

* To give the participants some practice in handling situations of conflict, ask them to choose a topic around which they could perform a role-play to highlight the conflicting viewpoints of different groups in a community. For instance, they might choose to explore the issue of firewood scarcity, and show the viewpoints of the poorer women (who spend more time and/or money collecting or buying the firewood), richer women (who have alternative sources of fuel, or who are involved with fuelwood merchants who come to the village to sell the scarce resource), the older women and men (who call for a return to the days when fuelwood was plentiful) and newcomers (who bring reports of what has happened in other parts of the country). When the drama has been performed and the different viewpoints and conflicts discussed, ask the participants to enact a village meeting to further discuss their positions. Asign the role of an outside extension agent to one of the participants. This person's role is to control the discussion so everyone gets a say, and to try and facilitate a consensus on how the problems can best be solved. Finally, allow the participants to step out of their roles and discuss the problems involved in dealing with such sensitive situations.

7. How can we learn about environmental changes?

* Ask the participants to look at Figures 11 and 12. Ask them to think about how these diagrams were constructed, what they can contribute to information about present day events, and what other suggestions they might have for other diagrams to represent environmental change.

8. How can we learn about local institutions and groups?

* Once the participants have looked at the venn diagrams in Figures 13 and 14, ask them to draw similar diagrams for the project with which they are involved, or one with which they are familiar. If possible, ask several participants to draw their own perspectives of the same project; perhaps participants who work at different levels of the project (e.g. field and local extension officers, compared with office-based managers). Compare their diagrammatic representations. What do they show us?

Finally there are several general discussion questions highlighted in this section. You might like to ask the participants to discuss these in small groups, or you may prefer to use them to stimulate an open discussion by all participants. Likewise, exercise 1 (the matrix of the relative responsibilities of women, men, girls and boys) may be conducted in small groups or in plenary, to initiate discussion on what rural women know.

FOR MORE INFORMATION

If you would like to learn more about how to learn from and with local women and men, here are some suggestions for futher reading:

1. Abel, N.O.J. et al. 1989. Amelioration of Soil by Trees. Guidelines for Training in Rapid Appraisal for Agroforestry Research and Extension. Commonwealth Science Council, UK and Forestry Commission, Zimbabwe. £10.95

These guidelines are designed for training research and extension personnel in rapid appraisal methods for development of agroforestry in peasant land use systems. The methods described are based on the principles of interactive research, learning-by-doing and interdisciplinarity.

Contact: Commonwealth Science Council
Commonwealth Secretariat
Marlborough House
Pall Mall
London SW1Y 5HX
UK

2. Davis-Case, D. 1989. Community Forestry. Participatory Assessment, Monitoring & Evaluation. Forest, Trees and People, Community Forestry Note 2. Food and Agriculture Organisation of the United Nations, Rome Italy. Cost unknown.

This book outlines the concepts, approaches and techniques that need to be an integral part of a truly participatory development strategy. It includes a section outlining 23 different tools for participative analysis and communication.

Contact: Community Forestry Officer
Room 823bis
Policy and Planning Service
Forestry Department
FAO
Via delle Terme di Caracalla
Rome 00100, Italy

3. Epstein, T.S. 1988. A Manual for Culturally-Adapted Market Research (CMR) in the Development Process. RWAL Publications, Bexhill-on-Sea, UK. Cost unknown.

This manual discusses the number of emerging participatory approaches in rural development and provides guidelines as to how established market research methods can contribute to the improvement of project success rate. It also outlines why and how these methods have to be culturally adapted.

Contact: RWAL Publications
Lloyds Bank Chambers
15 Devonshire Road
Bexhill-on-Sea
East Sussex, TN40 1AH
UK

4. Feuerstein, M-T. 1986. Partners in Evaluation. Evaluating Development and Community Programmes with Participants. Macmillan Publishers. Cost Unknown.

This guide is designed to be used in the field by busy practitioners with little or no formal training in evaluation methods. The methods, principles and examples it contains can be used in many different types of programmes, but they are particularly appropriate to development and community programmes.

Contact: T.A.L.C.
Box 49
St Albans
Herts AL1 4AX
UK

5. Hope, A. and Timmek S. 1987. Training for Transformation. A Handbook for Community Workers. Mambo Press, Gweru, Zimbabwe. Cost unknown.

This book, produced in three separate volumes, is aimed at educators and community workers in the field. Based on the approach by Paulo Freire, it gives practial advice on how to

use participatory analysis and participatory education for the development of self-reliant communities.

Contact: Mambo Press
PO Box 779
Gweru, Zimbabwe

6. Kumar, K. 1987. Rapid Low-Cost Data Collection Methods for A.I.D. A.I.D. Program Design and Evaluation Methodology Report No. 10. A.I.D. Washington, USA. Cost unknown.

This guide is written for the use of A.I.D. managers who commission studies for gathering information for designing, implementing, monitoring and evaluating development projects and programmes. It is designed to help managers determine whether a rapid, low cost method would be appropriate for their specific information needs and to prepare the scope of work for the contractor who will be conducting studies based on these methods.

Contact: A.I.D. Documentation & Information Handling
Facility
7222 47th Street, Suite 100
Chevy Chase, MD 20815
USA

7. Kumar, K. 1987. Conducting Group Interviews in Developing Countries. A.I.D. Program Design and Evaluation Methodology Report No. 8. A.I.D., USA. Cost unknown.

This guide describes the nature, uses, advantages and limitations of group interviews with reference to the conditions of developing countries. It is designed for use by A.I.D. managers, contractors and host country nationals. It explains the steps involved in conducting two types of group interviews - focus group interviews and community interviews.

Contact: as above

8. Kumar, K. 1989. Conducting Key Informant Interviews in Developing Countries. A.I.D. Program Design and Evaluation Methodology Report, A.I.D., USA. Cost unknown.

This guide provides general guidance on the use of key informant interviews as rapid, low-cost data collection method. It is designed to assist A.I.D. staff, contractors and host country nationals to determine whether key informant interviews are the most appropriate method for gathering information in a particular situation and to design, conduct and supervise studies based on key informant interviews.

Contact: as above

9. McCracken, J.A., Pretty, J.N. and Conway, G.R. 1988. An Introduction to Rapid Rural Appraisal for Agricultural Development. Sustainable Agriculture Programme, IIED, London. £4.00, free to Third World individuals and institutions.

An overview of the Rapid Rural Appraisal approach and some of its techniques. This publication is not designed as a field guide but provides examples of where the techniques have proved useful. Strong emphasis on diagramming.

Contact: Sustainable Agriculture Programme
IIED
3 Endsleigh Street
London WC1H ODD
UK

10. McCracken, J.A. et al. 1991. Diagrams for Shared Learning and Analysis. Participatory Rural Appraisal Handbooks: No. 2. IIED, London and FAO, Rome (in press).

This handbook covers a range of diagrams: maps, transects, seasonal and daily calendars, historical and predictive diagramming, cartoons, flow diagrams, decision trees, pie diagrams and venn diagrams.

Contact: Sustainable Agriculture Programme
International Institute for
Environment and Development
3 Endlseigh Street
London WC1H 0DD

11. McCracken, J.A. et al. 1991. Annotated Bibliography: Participatory Rural Appraisal Handbook No. 4. IIED London and FAO Rome (in press).

This bibliography includes approximately 250 references to publications on general participatory research and development approaches; case studies of RRA and related approaches, including non-agricultural applications; and documents on specific techniques.

Contact: Sustainable Agriculture Programme
International Institute for
Environment and Development
3 Endlseigh Street
London WC1H 0DD

12. Nichols, P. 1991. Social Survey Methods. A Fieldguide for Development Workers. Development Guidelines No. 6. Oxfam. Cost Unknown.

This manual is aimed at readers with no specialist knowledge of social research methods or statistics. In particular it is designed to help those working in remote rural areas, with little money or technical back-up. Guidelines are provided on, for example the fieldwork team, choosing the sample, and presenting the findings.

Contact: Oxfam
274 Banbury Road
Oxford OX2 7DZ

13. Participatory Rural Appraisal Handbook. 1990. National Environmental Secretariat, Kenya, Clark University, USA, Egerton University, Kenya and the Center for International Development and Environment of the World Resources Institute.

This handbook explains the use of participatory rural appraisal (PRA) for developing community-based resource management plans. It uses case study material of RRAs conducted in Kenya. This handbook has also been summarised as a booklet: Mwagiru, W., Thomas-Slayter, B.P. and Ford, R. 1989. An Introduction to Participatory Rural Appraisal for Rural Resources Management. Clark University, USA and National Environment Secretariat, Kenya.

For both these publications contact:

Director
National Environment Secretariat
Ministry of Environment and Natural Resources
PO Box 67839
Nairobi, Kenya

or:

Director
Program for International Development
Clark University
Worcester
Massachussetts 01610
USA

14. Pretty, J.N. et al. 1991. Semi-structured Interviewing. Participatory Rural Appraisal Handbooks No. 1. IIED, London and FAO, Rome (in press).

This handbook provides guidelines on how to select informants, how to prepare to interview, appropriate styles of questionning, how to avoid errors and biases, and so on.

Contact: Sustainable Agriculture Programme
International Institute for
Environment and Development
3 Endsleigh Street
London WC1H 0DD

15. Pretty, J.N. et al. 1991. A Guide for Trainers. Participatory Rural Appraisal Handbooks: No. 3. IIED, London and FAO, Rome (in press).

This handbook provides guidelines for trainers who wish to introduce the techniques of semi-structured interviewing, participatory diagramming, and ranking and scoring. General guidance is given on how to train groups.

Contact: Sustainable Agriculture Programme
International Institute for
Environment and Development
3 Endsleigh Street
London WC1H 0DD

16. Rojas, M. FAO. 1989. Women in Community Forestry. A field guide for project design and implementation. Food and Agriculture Organization of the United Nations, Rome.

This guide focuses on practical ways to include women in project design and implementation and is meant to be a tool to facilitate descussion, offer options and promote action on behalf of women and forestry.

17. Rugh, J. 1986. Self-Evaluation of Rural Community Development Projects. A World Neighbours Publication, Oklahoma, USA.

The basic purpose of this manual is to help those involved in running rural community development projects to learn how to do more effective and appropriate evalution themselves. It discusses the questions: why evaluate, evaluation for whom, evaluation by whom, levels of evaluation, when to evaluate, what to evaluate and how to evaluate.

Contact: World Neighbours Development Communications
5116 North Portland Avenue
Oklahoma City
OK 73112
USA

18. Russo, S. et al., 1989. Gender Issues in Agriculture and Natural Resource Management. The Gender Manual Series. US Agency for International Development.

This manual provides methods, guidelines and examples for integrating women into agricultural and natural resource development projects. It includes lists and question sheets to identify gender issues that should be addressed by those involved in project assistance. The manual also presents case studies describing efforts to incorporate women in development activities.

Contact: Dissemination Manager
Office of Women in Development
Agency for International Development
Washington DC 20523-0041
USA

19. Society for Participatory Research in Asia. 1987. Training of Trainers. A Manual for Participatory Training Methodology in Development.

This manual deals with the topics of the role of trainer in participatory training, designing a training programme, small groups, learning-training methods, and evaluation and follow-up.

Contact: Society for Participatory Research in Asia
45 Sainik Farm
Khanpur
New Delhi 110 062

20. Theis, J. 1989. Handbook for Using Rapid Rural Appraisal Techniques in Planning, Monitoring & Evaluation of Community-Based Development Projects. Save the Children Federation/US, Sudan. Cost unknown.

This handbook presents research tools specifically designed for use by development workers. It deals with the issue of local participation in RRA work, and although compiled for SCF's programme in the Sudan, it is relevant to others working in related fields.

Contact: Mohamed Ali Idris
REU Manager
Um Ruwaba
Save the Children/USA
Box 3896
Street One, New Extension
Khartoum, Sudan

21. Theis, J. and Grady, H. 1991. Participatory Rapid Appraisal for Community Development. A Training Manual. Cost Unknown. Save the Children Fund.

This manual, available in English and Arabic, introduces the basics of the PRA approach, and includes simple exercises to practice the tools and techniques. Guidelines are provided for trainers and for those designing and writing up the results of a PRA.

Contact: Joachim Theis/Heather Grady
SCF
48 Wilton Road
Westport, CT 06880
USA

22. Vella, J. 1989. Learning To Teach. Training of Trainers for Community Development. SCF and OEF International.

This manual is designed to be used in training of trainers workshops and includes guidelines on, for example, adult to adult communication, using pictures and sociodrama.

Contact: OEF International
1815 H St, NW
11th Floor
Washington DC 20006
USA

23. Wasonga, L.M. and Zwart, G. 1984. A Manual for Extension Workers in Arid and Semi-Arid Zones. For Promotion and Management of Women's Group Projects. Ministry of Finance and Planning, Kenya, and Food and Agriculture Organisation of the United Nations, Rome. Cost unknown.

The purpose of this manual is to provide workers with guidelines to assist them when working with women's groups who have organized themselves to undertake income generating activities. The manual contains case studies of projects in arid and semi-arid lands of Kenya.

Contact: Ministry of Finance and Planning
PO Box 30005
Nairobi
Kenya

FOOTNOTES TO SECTION 2

1. Table taken from Rojas, M. FAO. (1989). Women in Community Forestry. A field guide for project design and implementation. Food and Agriculture Organization of the United Nations, Rome.

2. From Goswami, P. and Hoskins, M. (1980). Assistance to local community forestry: report to the Government of Sierra Leone. FAO/SIDA Forestry for Local Community Development Programme. Rome, FAO.

3. Taken from Soil and Water Conservation Branch, Ministry of Agriculture, Kenya and International Institute for Environment and Development, London. (1990). Report on the Rapid Rural Appraisal Workshop held at Blue Posts Hotel, Thika. July (1989).

4. Figure taken from document cited in footnote 3.

5. Figure taken from Ethiopian Red Cross Society (1988). Rapid Rural Appraisal. A Closer Look at Rural Life in Wollo. Ethiopian Red Cross Society, Addis Ababa and IIED, London.

6. Figure taken from document cited in footnote 5.

7. Figure taken from document cited in footnote 3.

8. Extract taken from article by Dewees, P. in RRA Notes 7, (1989). IIED, London.

9. From Gupta, A. (1989). Maps drawn by farmers and extensionists. In Chambers, R., Pacey, A. and Thrupp, L.A. (eds). Farmer First. Farmer Innovations and Agricultural Reseach. Intermediate Technology Publications, London.

10. Figure taken from Action Aid-Ethiopia/IIED. (1989). Action Aid in Local Partnership. An Experiment with Rapid Rural Appraisal in Ethiopia. Sustainable Agriculture Programme,

IIED, London.

11. Figure taken from document cited in footnote 10.

12. Figure taken from Welbourn, A. (1991). The Social and Economic Dimensions of Poverty and Ill-health. Liverpool School of Tropical Medicine.

13. Figure taken from document cited in footnote 10.

14. Story as remembered from Chambers, R. pers. comm.

15. Figure taken from MDRP-DR/SARDEP and IIED. (1991). Tecnicas Uteis de Comunicao para extensionistas. Relatorio dum seminario em diagnostico rural participativo (DRP) Santo Antao, Cape Verde.

16. Figure taken from Theis, J. and Grady, H. M. (1991). Participatory Rapid Appraisal for Community Development. A Training Manual. SCF, USA.

17. Taken from ERCS/IIED. (1989). Participatory Rapid Rural Appraisal in Wollo, Ethiopia: Peasant Association Planning for Natural Resource Management. Ed. by Scoones, I.C. and McCracken, J.A. Ethiopian Red Cross Society and IIED, London.

18. Taken from Pretty, J.N. and Scoones, I.C. (eds). (1989). Rapid Rural Appraisal for Economics: Exploring Incentives for Tree Management in Sudan. IIED, London and Institute of Environmental Studies, Khartoum.

19. Taken from document cited in footnote 3.

20. Taken from article by Chamber, R., in RRA Notes 1, (1988), IIED, London.

21. Taken from document cited in footnote 14.

22. Figure taken from Pretty, J.N., McCracken, J.A., McCauley, D.S., and Mackie, C. (1988). Agroecosystem Analysis Training in Central and East Java, Indonesia. IIED, London.

23. Figure taken from document cited in footnote 5.

24. Mascarenhas, J. MYRADA, India. pers. comm.

25. Figure taken from Scoones, I.C. (ed). (1989). Participatory Research for Rural Development in Zimbabwe: A Report of a training exercise for ENDA Zimbabwe trees project. IIED, London and ENDA-Zimbabwe, Harare.

26. Figure taken from document cited in footnote 15.

SECTION 3:

Women's Organisations for Conservation

INTRODUCTION

The aim of this section is to look at successful attempts to mobilise women for rural development and analyse the conditions and the ingredients of success. The Case Studies are drawn from hot tropics/temperate zones, savannah and arid areas. This range of agro-ecological zones is intended to cover a diversity of ecological, socio-economic, cultural and technological backgrounds.

* **Arid Ecological Zones:**

SOS Sahel Village Extension Scheme, located in the Shendi Province of Sahel zone of Sudan

* **Semi-arid Ecological Zones**

The Katheka Women's Group Soil and Water Conservation Project, located in Machakos District, Eastern Kenya.

* **Hot Tropics and Temperate Ecological Zones**

Nimba County, Liberia: the Diamond Mines Rehabilitation Project;
Goviefe-Agodome Afforestation Project, Ghana
The Nyakinyua Gitiri Afforestation Project, Murang's District, Kenya.

* **Women's Groups and conservation activities in Kenya.** Because of the important role women's organisations play in natural resource conservation in Kenya, the author has found it necessary to devote a section to this experience.

Case study framework and information sources

Three elements are basic to the framework used for the following case studies:

One, the nature and needs of women's organisations and the need for recognition and strengthening of these together with the systems that support them.

Two, the role of women in development, particularly as it relates to resource conservation.

Three, how do women form part of wider social and economic systems?

The major information sources are development literature, personal experiences, interviews with individuals and discussion with women's groups in Kenya. One of the problems encountered in writing the following case studies has been lack of an adequate information base. There is a lot of literature on women in development, but it is dominated by descriptions of how women might participate in development and conservation activities. Case studies of women's experiences in conservation are few and far between.

The nature and needs of women's organisations

The women's organisations discussed in this section are grassroots organisations whose members, for the most part, eke a living from the soil and have come together to conserve the resource base. Reference to other forms of organisations (service-oriented welfare groups, political women wings, worker organisations, etc.) has been limited to their role and responsibility in supporting these grass-roots level groups. These grassroots organisations use a variety of names such as women's groups, women's committees, women's co-operatives, women's clubs, and clan groupings.[1]

There is a notable predominance of women in these groups, a phenomenon which is easy to understand. Women are the providers at the family level and are therefore quick to respond to development proposals. Part of the explanation could also be traced to the fact that women take calculated risks more readily than men. This last fact can be illustrated through an experience from one women's association - the Organisation of Rural Association for Progress (ORAP). ORAP is an organisation of about 300 groups which was initially purely a women's organisation but when men saw positive results, they (men) began to join the group. One female member of the group explained this phenomenon in the following way, "Men are always slow in taking things up. They want to wait and see. When there is progress, they come".[2] There are many instances where, compared to men, women have been found to be more committed environmentalists for similar reasons.[3] During the 1985 Women's Conference, (End of UN Decade for Women - Nairobi), Dr Mostafa Tolba, Executive Officer of UNDP underlined women's role in conservation when he commended women for being effective agents of change.

Women's organisations and groupings discussed below were formed for very specific reasons, but they all demonstrate a common goal and commitment to conservation. Women's organisations play an important role in collective and personal development. On the one hand, the members are able to express their needs more effectively, groups satisfy social needs, help pool resources and define development paths.[3] Secondly, the groups also "help one another in times of need or hardship and also help the community meet its needs".[4] The mushrooming of these grassroots organisations during the last decade is thus not surprising. Today, grassroots, environmental and anti-poverty groups "probably number in the hundreds of thousands", and their "collective membership runs in the hundreds of millions".[3] These groups display great diversity in a variety of areas; for example, the scope of activities, group composition and access to resources. But, in the midst of this diversity are some common needs. Access to resources, credit systems and information for conservation are almost universal needs in these organisations.

Lack of these critical inputs has been found to adversely affect women's programmes. Women's "lack of access to appropriate technical expertise is a major obstacle for women in improving their productivity".[5] The degree of resource related problems, however, varies between and within countries and sometimes even between communities.

These observed disparities have variable causes but often narrow down to the social, economic and political climate prevailing in each country. As an illustration of this diversity, one study found that women in Muranga district of Kenya have greater control over resources as compared to their counterparts in Kakamega district.[6] Similarly, these differences between women should be fully appreciated and taken into account when designing women's programmes.

Activities undertaken by these grassroot groups can be loosely classified into: income generation and resource conseration programmes. The Soya Bean projects in West Africa, the Organisation of Rural Association for Progress (ORAP) Zimbabwe, women gardening groups in the Casamance area of Senegal, the women refugees horticultural project in Golgotta, Ethiopia are but a few of the income-generating examples.[3] Some very notable resource conservation examples include the famous Chipko of India and the Green Belt Movement of Kenya.

The role of women in development

Women's role in development as defined here, demands that women be treated as equal partners, with full rights to participate in decision-making. Unfortunately, women have not made major strides in this direction due to continuing barriers to their full participation in the development process. It is now accepted that for women to fully participate in the development process, radical adjustments are required to remove these barriers. Only then will women's access to education, training, resources and management be realised. "Women's work" has been described as consisting of a triple role - productive, reproductive and community management.[8]

Women are integral to any community and should not be seen as an isolated group. It is today widely recognised that without complementarity between women and men, there is no hope of success in development. Women have a wish to be recognised as equal partners, but they have also demonstrated that they are key actors in maintaining society. For example, when women villagers initiate conservation activities, their intention is not to compete with men, but to complement men's activities in order to improve family, environmental and social welfare.

Case study selection

In the process of compiling this section, some difficulties have been encountered. Firstly the scarcity of relevant case studies particularly those that originate from outside East Africa. Where found, case studies in women's activities were either too brief
or irrelevant to the section.[9] In contrast, information on "Why" and "How" women should participate in development is in abundance. It is, however, assumed that the non-availability of material relevant to this section is not due to total lack of examples but possibly of comprehensive documentation and/or information exchange.

Secondly, research on women has in the past concentrated on only a few critical issues such as women's roles in food production, and other areas are still relatively unexplored. This underlines the dire and urgent need for research and documentation of women's conservation activities at the grassroots.

In selecting the case studies, it has been desirable to make as wide a selection as possible for the purposes of learning from a wide variety of experiences. The key factors influencing the selection of the following case studies are as follows.

* Ecological variations.
* Social, cultural and economic backgrounds.
* Variety of conservation activities undertaken by respective groups.

* Group status, for example the author's emphasis on presenting experiences from grassroots organisations.

In many parts of the areas covered by these case studies, women do not own or control land resources. In most cases, land is owned and controlled by men, who have the sole right to make decisions on how land is utilised and managed. Yet, in these same areas, women have traditionally played a key role in agriculture and conservation; even where this has not been the tradition, social and economic changes have placed new challenges on women. The net effect is that, women are expected to carry out the bulk of agricultural activities to sustain their families. And because they do not enjoy as much freedom as men, options for women's participation in conservation are potentially limited in scope and extent.

From the above, it might be concluded that any intervention strategy that addresses constraints to women's participation in conservation without occasioning social and political confrontation may be described as having achieved a level of success. But it is very rarely, if ever, that conservation is perceived or promoted as an end in itself. It therefore follows that success is not complete until women are the direct or indirect beneficiaries from conservation activities.

Success indicators

Very often, it is very difficult to discover whether women are direct beneficiaries of conservation activities. Some of the most common measures used to evaluate success in development activities are direct indicators, such as increase in women's incomes, increases in agricultural output, and sustained conservation. These might be ideal within a certain context, but they are very difficult to measure. "Proxy" indicators can be
practical, these range from observation of improved kitchen and home environment (for example better clothing for women and children), increased participation of women in social activities, social and political acceptance of women as managers and decision makers, to perceived improvement of nutrition resources, farm and rural environment and increase in/or demonstration of women's leadership roles and organisational skills.

Although there are some cases where quantitative measures are used, qualitative or "proxy" indicators dominate success measures used in selecting the case studies discussed in this section. For example, from Shendi Village in the Sudan, the prevailing social, religious and economic conditions indicate that the acceptance of unprecedented roles for women as conservationists is an indicator of success. Examples of success abound in such a context: women preparing nursery materials for men to produce seedlings (a non-traditional practice), the successful introduction of tree planting in women's home gardens - fruit trees in particular have the potential of improving the family diet, especially during the lean months of the year. From the same region, women's initiative in producing seedlings for sale has created a new potential for women's income generating activities.

The case studies from Kenya demonstrate another variety of success indicators. These include the highly developed women's organisational skills, the emergence of women's leadership roles, independent generation of women's incomes and of decision making on how the incomes are used. The Kenyan women's groups are also characterised by a high degree of unity and their ability to solve problems, which is indicative of skilled management and women's ability to

define, develop and maintain common goals and objectives amongst group members. Moreover, the women's groups of Kenya have demonstrated the ability to incorporate men when they need assistance for addressing "tricky" situations (Katheka male night patrols to protect women's work): this indicates a high level of awareness of locally viable and acceptable gender roles amongst women, and is again an indicator of success. Sustainability of women's conservation-efforts, which have grown in magnitude and range over the last twenty years is yet another indicator of success.

Readers are offered an opportunity to draw out other indicators of success in women's conservation activities from the rest of the case studies in Exercise 1 (Section 3.11).

CASE STUDIES

Arid ecological zones

Case Study 1: SOS Sahel : Shendi Village Extension Scheme Sudan

SOS Sahel International succinctly summarizes the environmental, social and economic situation in the Sahel with the following statement:
"The Sahel stretches across Africa, from the Atlantic coast of Mauritania to Ethiopia and the Red Sea. The word Sahel is the name given to those countries which border the southern fringes of the Sahara. It is a huge area of low rainfall, sparse vegetation and poor soils. Yet this fragile environment is home for millions of rural people. They are in the frontline against the expanding desert which swallows up land and ruins livelihoods. It is here that famine strikes first ..... of all the development priorities in the Sahel, forestry is one of the most urgent.[10]"

SOS Sahel International is an association of African and European voluntary agencies working to protect the fragile environment and increase food production in the Sahel region of sub-Saharan Africa. SOS Sahel intervention programmes are characterised by a high level of response from villagers, and women in particular have demonstrated that Sahelian communities are ready to change their lives for the better.

The Shendi Village Extension Scheme (SVES) is a project that addresses the problems of desertification, sand encroachment on agricultural land along the Nile. It is situated about 20 kilometres north of Khartoum on the Eastern bank of River Nile. This project is one of two community forestry projects sponsored by SOS Sahel International, based in Britain. SOS Sahel began operations in Sudan in 1985, soon after the drought of 1984 when the situation was in dire need of external resource input. When SOS Sahel began operations in Shendi, virtually all forestry schemes in northern Sudan were run by the government. The SVES and other projects of its type were readily welcomed by both the government and local communities. The SVES budget for 1985-89 was Sterling pounds 550,000 with the principal funders being European Economic Community, Band Aid and the Overseas Development Administration of the British Government.

The Nile Province is characterised by extremely low and unreliable rainfall. Most agricultural production is irrigated. Drought, desertification, resource degradation, low incomes, and a declining quality of life are key developmental issues in the area. The population and culture within this area is basically Arabic, and the religion is Muslim. Social and religious customs

inhibits the free movement of women within society, and therefore mixing with the opposite gender. It is therefore not surprising that many projects working in this area have had difficulties in addressing women as a target group. Yet, the women here lack training, and skills for resource management and need direct access to developmental processes.

The SOS Sahel was one of the first groups to successfully tackle this problem by addressing women as a target group in the Shendi Village Extension Scheme. When the SOS Sahel began operations in Shendi in 1985, the project set out with a clear goal: to promote participation of men, women and youth in this
community forestry project. This case study is therefore a good example of a mixed gender activity, one where men and women complement each other.

Conservation activities undertaken by the project include establishing shelter belts to break the wind and stop desert sands, introduction of fast maturing species to provide fuelwood, planting of woodlots and trees in home compounds to provide fuelwood, and planting windbreaks in agricultural land. Apart from protection of land, development of renewable wood resources is promoted to reduce stress on natural resources in the area, and to provide alternative fodder for animals. Besides conservation activities the project is also involved in addressing other community needs such as provision of water, social development and income generation; efforts that have improved the lives of women. The project has also involved local people in innovations such as the use of puppet theatre as an educational tool.

Involving women in this afforestation project was not without problems. Raising seedlings and planting trees are traditional male roles in this area and the project had no difficulties in getting the men to participate. The most difficult hurdle was to get the women involved without disrupting the traditional community life. Fully aware of these cultural difficulties, SOS Sahel chose a non-confrontational strategy. The process started by establishing a women's extension department which initiated women's participation because it was acceptable to Sudanese men, since their women could work with another woman. The fact that the department also encouraged women to grow seedlings and carry out other community nursery activities within their own homes, ensured that the model was acceptable socially and culturally. The women's extension department conducted baseline surveys to ascertain issues and constraints that were likely to inhibit women's participation.

Some of the constraints were found to be lack of women's access to tree management, lack of conservation skills, low income, lack of income generating activities and in general their restricted position in society. In dealing with the issue of women's participation the women's department took these constraints into consideration.

Following baseline surveys the women's department established that women might be willing to become involved in tree planting, but they had limited resources, knowledge and skills. To alleviate this problem, the women's section of the project encouraged women from the village of Seyal Kabir to form women's committees which would plan and implement women's programmes. Through this committee women were able to work together in groups, but they also engaged in individual activities such as home compound nurseries. A core element in encouraging women's participation in tree planting was training. Women were trained by female staff on how to raise seedlings, how to take care of planted trees and how to manage planted and existing woody biomass.

Women's organisations for conservation

To complement the role of men who actually establish the shelterbelts in the fields, women produced tree seedlings within homestead nurseries. Later on, the Seyal Kabir model was replicated in other villages. The women's committees have been so successful that apart from providing seedlings for shelterbelts and home compound planting, women now sell seedlings and generate income. At present, these seedlings are sold to the project, but in the Phase II of the project, market sales will be started. Women also contribute to the forestry programme by making mats for shading seedlings in community nurseries; the mats are made at the home by the women, and taken out to community nurseries by the men.

Between 1985 and 1987, the women's nurseries in Shendi produced and sold to the project for community shelter belts a total of 5,710 seedlings while another 3,959 seedlings had been exchanged for seedlings of the women's own choice from the village nurseries. In addition, women had planted about 5,500 trees, with a majority of the seedlings coming from their own nurseries or earned from seedling exchange.

Plate 16 - A woman tending her seedlings at home. Credit: SOS Sahel.

One group of women also planted a woodlot in a section of their village and later on, began growing vegetables within these woodlots. The production of vegetables contributes to improved nutrition in the villages. Local acceptance of the fact that women can generate income from their nurseries is viewed by SOS project staff as an indicator of the elevated status of women.

The above are significant achievements in a dry climate and harsh conditions which are not conducive to forestry activities such as seedling production. More important, the role of the women's committees has broken the cultural barrier without causing confrontation or conflict of interest between men and women. Women are now managing trees planted around their homes and therefore have direct access to tree resources. The fact that women have been trained to raise seedlings, grow trees, and on the whole understand the nature of conservation using locally viable processes means that women have at their disposal training and experience for renewal of conservation activities. Women have used water from their kitchens to raise seedlings, and it is a good example of locally sustainable effort.

The SVES, which was originally set up by expatriates, is now managed by Sudanese staff seconded from the Sudanese Forestry department, and by local employees. All the Sudanese technical staff have been trained, with special emphasis being given to training of women extension workers. Establishing a high level of locally trained technical staff, handing over of project management activities to local staff and the overwhelming response of villagers, especially women, are all key indicators of success. Sustainability is also ensured through training of local people. SOS Sahel anticipates "the next step for the SVES is to hand over responsibility for forestry activities to the villagers themselves, starting with those who have worked longest in the projects". This however, is going to be difficult to achieve as many activities are dependent on the project for inputs and management.[11]

SOS Sahel has already demonstrated that the success achieved in Shendi is replicable elsewhere. The model for women's participation has been replicated within the Ed Debba Community Forestry Project, which is working to protect both villages and agricultural land from sand dune encroachment in the Northern Province of Sudan. A unique characteristic of the project in Ed Debba is the high prevalence of "women's extension nurseries". Seedlings from these nurseries are sold in the village market for cash income and the project is also encouraging women to produce seedlings for internal and external shelterbelts.[12]

The core elements of success in mobilising women's participation within the SOS Sahel experience are as summarised below.

1. Respect for cultural and religious norms - the organisation supports and encourages women to raise seedlings within their home compounds thus not flouting the cultural and religious norms.

2. Use of local people to promote women's participation - hiring a local extension leader made it easier for the project to reach the local women.

3. Promotion of gender complementary activities - while the women raised the seedlings, the men planted. Since the women would not go out to establish the shelter belts, the project would have faltered without the men.

4. Addressing locally recognised priorities - the advance resource degradation and energy shortage were already of major concern to the community, hence the positive response to the project.

5. Commitment to women's participation - the project had women as a target right from the start and did everything possible to sustain this participation.

6. Flexible approach (for example buying seedlings from women).

7. Integrated approach - both in terms of mixed gender and diversity of activities.

Semi-arid ecological zones

Case Study 2: The Katheka Soil and Water Conservation Project: Machakos district, Eastern Province of Kenya.

The Katheka Soil and Water Conservation Project is an example of a women's initiative to combat accelerated resource degradation. This degradation process is seen as significantly contributing to declining food production, drying of water sources and scarcity of fuel wood. Katheka sublocation, with a total population of 3500 people living in three villages and covering an area of 11 square kilometres, lies in a difficult environment. The climate is harsh (low unreliable rainfall rarely exceeding 1000mm even in a good year), the soils are porous and rocky and the terrain is rugged and difficult to work. The vegetation is sparse (acadias, scrub bush and coarse grasses) and the peoples' standard of living meagre. Basic services such as electricity and piped water are non existent and there is only one health centre.

In 1987, approximately half of the houses in the sublocation had corrugated tin roofs, a common measure of wealth in the area. The area is isolated and the only connection to the outside is a rutted and dusty road. No resident in the area owns a vehicle or a motor cycle; in fact only 13 own bicycles. Maize, beans, pigeon peas and fruits form the main subsistence crops, while low-yielding coffee is grown by a substantial number of farmers. The majority of the people also keep livestock as an insurance against drought. Water scarcity, soil erosion, low yields, unemployment and poverty are among Katheka's most pressing problems.
As in most parts of Kenya, married women in Katheka do not own land. Ownership of land by women is limited to cases of widowhood or single motherhood. In the latter case, the single woman will have bought the land since inheritance laws still discriminate against unmarried daughters. Since the Katheka women are responsible for producing family food, they have access to the land and in many cases control the food crops. The men control the cash crops (mainly coffee) although it is the women who till the land. Because the women have to feed their families, they have also to tend the land in order to produce enough.

The problems of resource degradation in Katheka are not new and in fact go as far back as 1920's. The problems had become serious by the early 1970s. During this period, the area was intensively grazed, soil erosion massive, food production per capita declined and there were few village institutions capable of dealing with the situation. Survival in the area was therefore at stake. Reversal of this situation called for hard options and speedy action. The Assistant Chief of

the sublocation started to promote what has today transformed Katheka - building and strengthening local institutions as a vehicle for change. The ultimate goal was to reverse resource degradation and boost food production. He encouraged school enrolment and supported the transformation of mwethya groups from family groups to village-level institutions. Since then, these groups have become instrumental in initiating resource management planning and action in the village. The number of groups has continued to grow unabated during the last 15 years.

While in the early 1970's Katheka had only five such groups with membership of 40 in each group; by 1987, 12 such groups had been registered and by 1988, they had risen to 15 groups. The average membership in any Mwethya group is about 35-40 and in all cases, the majority of the members are women of all ages. In the mid- 1980's the groups formed one umbrella organisation to strengthen the negotiating power of the groups. The individual groups have, however, continued with their regular activities and today are respected by the entire community.

The Mwethya groups are well organised and smoothly managed. There are few internal conflicts between members possibly because of their unity of purpose and shared problems. Each groups has an executive committee elected through the ballot. A constitution representing the interests of every member is drawn, discussed and endorsed by the members. These groups are dynamic and closely adhere to their constitution. Twice a week they work on a member's farm and once a week on communal projects such as construction of roads and gabions and the rehabilitation of dams.
The individual members decide on the type of work to be done on their farms, but in most cases, they work on either new or old bench terraces. On the whole absenteeism is rare; severe penalties are applied for absenteeism, including the imposition of fines. One of the most visible of the mwethya group efforts is the extensive bench-terracing system, a striking feature of the Katheka landscape. The terraces are deep (1 metre high) and are beautifully reinforced with grass. The women dance as they dig and shovel the soil away, possibly to keep their spirits up during this environmental struggle. Each group currently constructs or repairs 1500 to 4000 metres of bench terraces each year, totalling 18 kilometres per year for the entire sublocation.

Another related activity is water conservation. The seasonal rivers usually have a thick layer of sand which insulates water during the dry period. The residents scoop this sand away, draw the water and then return the sand. The net result of these activities has been very positive: soil erosion has been reduced substantially, crop yields significantly increased through improved water conservation and increased water supply in the micro environments, and water resources conserved. Tree planting, which was until recently a neglected aspect of resource conservation is also picking up.

The resource conservation activities that the Katheka women undertake are not limited to individual members' fields. They also work on communal projects such as schools, rehabilitation of gulleys and gravelling the roads. What is intriguing about these communal efforts is that for the most part, they individually identify the activity and plan the intervention without coercion or request from local administration. This Katheka example shows that resource conservation in developing countries remains predominantly a woman's responsibility.

Besides resource conservation, the women have embarked on income generating activities to meet other family needs. Nearly all the groups now make baskets for sale, others specialise in

brick making while the umbrella organisation has expressed a wish to undertake a paraffin sales business. This new dimension clearly brings out the need for more integrated approaches in the development of women's programmes.

The Katheka women's success in resource conservation has occurred without much external technical support. The women have had no formal training in resource conservation and their traditional knowledge has on occasions proved inadequate. This lack of technical support in the area can be easily explained. Katheka, because of its remoteness and lack of basic facilities and services, has failed to attract agricultural extentionists. For a period of 4 years (1984-1987), the area had no extention officer. To overcome this problem, the women persuaded a retired agricultural officer to instruct them on how to lay out the terraces. The request was granted and the few women who were taught how to lay the terraces have continued to be a useful resource to the community. The other areas in which skills were found lacking were in tree planting and development of water sources such as wells.
The community uses simple technology that is easily managed. The most widely used implements include: the hoe, mattock, fork jembe, shovel and oxen drawn cart for ploughing. A local artisan provides repair services at an affordable price. This ensures that the tools are available for work at all times. Lack of spare parts and expertise, (characteristic of complex technologies in large projects), is therefore not a problem in this community. This should however not be interpreted to mean that no change is needed in Katheka. In fact the current technology requires upgrading. Oxen ploughs would help plough the land and dig trenches. Oxen carts for carrying wood, water and other commodities would relieve the women from the back breaking chores and release useful time for other productive activities.

It is now almost universally accepted that links with the outside world are as important as they are inevitable. Events within Katheka best demonstrate this fact. While the Katheka community has done well in the area of resource conservation, it has found it difficult to ward off destructive external threats to its resources. During the last 10 years or so, building contractors from Nairobi have been attracted by high quality sand found on the Katheka river beds. The mining of sand has two major implications on the community: the huge lorries ruin the roads (that the women so painstakingly maintain to ensure that sick people can be taken to hospital) and the water resources are diminished by the removal of river sand.

The community has however not given up and through its usual determination to survive, the men and women have dug deep trenches across the tracks leading to the rivers. Although the lorries occasionally manage to circumvent these barriers, the ingenuity of the people is impressive. But possibly more impressive is the fact that the people clearly see the linkages between resource conservation and increased yields of water, food and trees. This example is in itself a major lesson: these grassroots organisations require policy and other forms of support to protect their hard won sustainable development.

When the research team from the National Environment Secretariat (Kenya) went to Katheka, it was primarily to establish why the village, so remote and isolated had done so well. The team was able to summarize the elements of success in the following way.

1. Viable local institutions -mwethya groups, youth groups and church organisations have been the driving force behind these achievements.

2. Strong and supportive leadership - the Assistant Chief, has promoted local organisations and encouraged them to devote their energies to resource conservation for survival.

3. Manageable and appropriate technology - the community uses tools that can be effectively managed at the village by the community. This has automatically removed the need to import "expertise" to maintain the tools.

4. A challenging environment - resource conservation to increase production was a priority, hence the entire community is involved.

5. Manageable pace of development - development was in harmony with local capabilities e.g. technology.

6. Strong self-help spirit - traditionally, the people, particularly the youth used to form work groups and would on rotational basis carry out all kinds of work in the group member's farms. The mwethya groups therefore were a perfect fit into the society.

Box 14 : Kenyan women resist sand mining threat

WOMEN ARE LEADING the fight against profiteering sand excavators who are damaging the environment in order to supply Nairobi's booming construction industry.

Sand traders in the Machakos District buy permits - which provide about half of the local council's revenue - entitling them to take as much sand as they can transport from designated sites. Fleets of ten-tonne trucks have been ferrying the sand to the capital by day and night.

Water shortages

While the traders and the council make some quick money, the local community - and particularly women - pay the real cost of the operation. In some areas severe erosion caused by the large scale removal of sand has led to water shortages.

These have increased the burden on women who are forced to walk long distances to fetch water - sometimes up to 8 Km a day - or to dig holes in dry river beds in an effort to reach the water table.

"The women benefit little from the trade," says Charity Kabutha, former senior education officer with the government's National Environment Secretariat. "They know that even if they were paid for the sand, the income would hardly compensate for the loss of water."
Kabutha points out that it is mostly the local women who build makeshift dams using stones, branches and sisal to check the rapid run-off of rain from the sandy soil into the river. Their efforts to retain water supplies are undermined by excavators who remove the sand that builds up behind the barriers.

continued ...

Box 14: continued

Further damage is caused by the trucks which make up to four trips a day, damaging vegetation and compacting the soil, making it less permeable to water. The result is lower crop yields from the land bordering the rivers. With many men working away from home, this makes it harder for the women to make ends meet.

Controls have proved only partially effective. "Sand scoopers think that since they own a permit they own sand wherever they find it and trespass on other people's land to collect it," says Julius Mwinde, an ecologist with the National Environment Secretariat.

Laws have been passed allowing sand excavation only during daylight hours in an attempt to prevent excavators from trespassing on undesignated land by cover of night. Even so, night excavating continues.

Women help themselves

To cut costs and maximise profits, some drivers fetch sand from the nearest convenient spot instead of travelling to the sites allocated by the council.

But the women are fighting back, often through mwethya, or self-help groups, of which there are more than 27,000 in Kenya. As well as implementing conservation measures to stop water run-off, they build trenches to stop the lorries from driving onto their farms or along undesignated routes. Vigilante groups are sometimes organised against the unwelcome intruders.

Winnie Ogana in Nairobi
Extracted from "African Business" Sept 1990

Hot tropics and temperate zones

Case Study 3: The Nyakinyua Gitiri women group afforestation project (Kanuro, Muranga District, Kenya)[19].

The Nyakinyua Gitiri women's group afforestation programme represents a women group's determination to reverse environmental degradation to support sustainable development. It operates in a temperate ecological zone, in the high potential highlands of Central Province, Kenya.

This group was possibly little known about until 1989 when it made history by winning the UNEP's Global 500 Award. The award is highly competitive and winning it is no mean achievement. Their winning demonstrates the dynamism of this
44-member women's group brought together in 1980 by the desire to protect an environment threatened by deforestation and consequent soil erosion.

The Nyakinyua Gitiri women's groups is based in Kahuro village, Mugoiri location, Muranga district in the Central Province of Kenya. Ecologically, this is a high potential zone: high bimodal rainfall (March and October), fertile soils and a well developed infrastructure (piped water and electricity generally available, a tarmac road passes through the area). The topography is dominated by steep slopes and ridges, a setting that encourages soil erosion. A cash economy based on these resources has developed; coffee, bananas and dairying are the main cash earners. These favourable conditions have resulted in high population densities, and extreme parcelling of the land. The land is very intensively cultivated and the practice of having fallow periods has, of necessity, been completely discarded in recent years.

Landlessness is a common phenomena in Muranga district. Cultivation on river banks and steep slopes (although strictly prohibited) is perhaps a demonstration of the hopelessness of the situation. The net effect of all these activities is accelerated soil erosion which has left the land bare and created deep gulleys. The rivers have turned brown, with soil and silt a permanent reminder to the residents that their environment is in real danger of degradation. Women in this area enjoy high social standing and play an important role in the process of decision-making at the family level. They are allowed to own capital assets and indeed some of them own land. This rather high status for women can be traced to the country's war of independence when many men were killed and others interned and women had to take over the male roles. To a large extent, women in this area control land resources. One good example of this is where women are signatories in coffee accounts.[13] It was therefore not surprising that the women got together to arrest resource degradation without much assistance from men. They took up the challenge as the story below shows.

When the women got together in 1980, they had a vision: to heal the denuded land and to protect all other areas damaged by soil erosion. They, however, did not underestimate the demands of this undertaking; they knew that besides their own labour, some capital input was required to set up the tree nursery that would raise all the seedlings needed to realise their objective. The beginning was difficult for this group; they lacked the basic resources for setting up the tree nursery: money and land. In fact the group initially abandoned the project when they found that it was not profitable. But with encouragement and modest support from the Ministry of Agriculture (polythene paper for raising seedlings and 3 drums for water) the women decided to give it another trial, this time determined to succeed. In an effort to sustain the project, the group combined raising of seedlings with goat rearing and basket making.

When the women were ready to start in 1983, they found themselves without land for a tree nursery. Luck was on their side this time. The local chief allocated the women a small piece of land (0.1 hectare) outside his office for the purpose. In 1983, the group started off by raising 8000 seedlings. In 1985, they had 15,000 seedlings. By 1988, the group had 25,000 in the nursery ready for planting the following year. In 1989 alone, the group raised 35,000 seedlings. To date, the group has raised about 97,000 seedlings. The women themselves have planted some, distributed others to institutions, such as schools, and sold the rest for cash. Besides tree planting, the group undertakes other forms of conservation. They have rehabilitated deep gulleys in the neighbourhood.

The groups also "owns" a one-quarter acre demonstration plot. A man who recognised the commitment and hard work of this group, gave them this plot which has today become a focus of agricultural demonstrations. The women have been taught all aspects of farming. In fact they feel that they no longer need agricultural extension officers. The women have also benefited from training sessions held outside the district. They have been to a neighbouring district to learn more about dairying and food processing. They say that they now easily make juices and jam. Again in recognition of their hard work, the County Council of Muranga have allocated the women a commercial plot which they hope to develop when they get enough funds.

Although the group members have had no individual direct benefits from their project, they indicate that the intangible gains are immense. These include the world fame of the group, afforestation of the area and the social gains which include assistance of the poor members in payment of school fees. The group has also designed a "revolving" loan system to assist the members meet some basic household needs. Each month, each of the members contributes Twenty Kenya shillings (equivalent to about one dollar) and this amount is given to 3 women every month. The members spend the money on items of their own choice but school fees and household items such as cups and plates are the commonest items of expenditure. The group is also notably humanitarian. At least once in a year, they assist an orphanage in the neighbouring location. The assistance is mainly in form of food produce. Considering that the members have hardly enough for the families because of the small-sized farms, this is a commendable gesture.

But what has become of the proceeds from seedling and goat sales? All their profits have been banked but twice they have lost their money through the collapse of local financial institutions. They again have opened another account, this time with a more stable institution. Their dream is to build a shop, start a tailoring business and train young girls who have prematurely dropped out of school.

Analysis of why the group has done that well reveals the following elements of success. 1.The group made a decision to initiate the project to fulfil a felt need and were therefore committed to its success. This unity of purpose meant that the women explored all avenues to ensure that income would be generated to support the primary project.

2. The charismatic leadership embodied in the chairlady of this group. She is a shining example to the group and has their full confidence.

3. Immense support from the administration and the Ministry of Agriculture. The chairlady also recognises the great support provided by the entire community. She says that although she refused to have male members, they are always available when called upon, including her own husband.

4. Sufficient training in all aspects of tree planting husbandry and the fact that children are also taught the technology.

5. Carrying out well understood and accepted activity: Tree planting has a history in this area

and the women had no trouble in distributing the seedlings. The high demand partly explains why the number of seedlings has continued to increase every year. During the annual tree planting week, the group supplies most of the seedlings free of charge.

6. A clear understanding of the linkage between resource degradation and productivity has led to the group's fiery drive to protect the environment. The once eroded slopes are now all green and the deep gullies healed. This success has provided an impetus for future action.

7. An ecologically suitable environment for tree growing. The survival rate for seedlings in this area is very high, and that in itself is a motivating factor.

Case Study 4: The Kyapee land reclamation project, Nimba County, Liberia.

The Kyapee land reclamation project represents a successful grassroots (mixed gender) resource management effort using local techniques. The achievements of the project reflect successful local entrepreneurship, resourcefulness as well as dedicated and committed leadership.

Kyapee village is in Zoe-Geh District, Nimba County, Liberia. It has a small population of possibly no more than 900 people, divided into 3 clusters each of about 300 households. The average household size is about 6. The population falls into two groups: indigenous and migrant. The indigenous Gio (Dan), population is said to have settled in the area during the last century. They are experienced farmers. The migrant Mandigoes from the neighbouring Mali and Guinea settled in the village in the early 1950s and started diamond mining in late 1950s. A look at the geographical setting shows that the village is underlain by metamorphic rocks which are diamondiferous and which extend
into swamps. The climate is tropical high temperatures (18.4 - 33.7 degrees celsius), heavy bimodal rainfall (2000mm per year). The tropical forests which once covered the village have been replaced by secondary forest, through many years of shifting cultivation. Within the swamp vegetation are residual pockets of tropical forest. The prevalence of water and insect carried diseases which include malaria, filaria, hookworm and diarrhoea brings out some of the difficulties the village has to live with.

Some of the key environmental problems facing Kyapee village are associated with the effects of a rapidly increasing population and indiscriminate diamond mining. The village community fully understands the linkages between resource degradation and production for survival. The diamond mines reclamation programme is an attempt to halt this degradation process and to create productive land. The reclamation process is tedious and lengthy. It begins with the weeding of the vegetation around the pits and the weeds are left in the pit to decay. The decayed vegetable matter is spread out in the pit as a first layer, and is then covered with soil generated by the mining activity. This process of layering (vegetation and soil) is repeated until the pit is full. When full, the compost is mixed manually (by feet). This composting technique ensures and sustains the fertility of the soil for continuous cultivation. This ingenious technique was initiated by one farmer in the village and the results were so encouraging that the chief acquired an extensive tract of abandoned diamond mines in the swamp from an individual owner in the village on behalf of the village for utilisation.

The reclaimed land has been divided into 32 pieces each of 0.3 hectare. Rectangular ridges are built around these plots to trap water and nutrients in the swamp for rice cultivation. Each plot is separated form one another by narrow channels through which the swamp water flows freely to every section of the rice field. During land preparation, the soil is turned thoroughly to remove all the unwanted weeds that would stunt the growth of the rice seedlings. The rice is rotated with groundnuts, beans and potatoes during the dry season. Through this process, the village has reclaimed 25 acres of land.

One of the factors behind this tremendous success has been strong community organisation and social cohesion. The unity of purpose generated by this organisation has had immense influence on the success of this village. Two well-organised agricultural groups each with 300 members, have, through their dynamism and commitment, rallied the support of the entire village. Each of the groups has a chairperson and a secretary. These two officials are appointed by the town chief with the approval and consent of the entire village. The social cohesion and the democratic decision making process amongst this working groups is indeed very remarkable. All acknowledge the traditional authority in the village. Absenteeism is rare but when it occurs is punishable by a fine. These groups have received a lot of encouragement and support from the town chief who chairs all development meetings. In fact, the chief was instrumental to the village acquiring communal land for rice growing; the two Agricultural Working Groups are accountable to him.
The substantial gains made by Kyapee village speak for themselves. The reclaimed communal swamp has become a major source of development funds for the whole village. The proceeds from the rice growing efforts have been used to undertake a number of self-help project such as the construction of an access road to the village and building an elementary school. The success of the Kyapee village initiative can be explained in the following ways:

1. The programme was recognised as a priority to the community. The people's survival was threatened by high population increases coupled with increased resource degradation and extra land was required to ensure survival.

2. Local institutional support. The two strong Agricultural Groups mobilized enough labour for the challenging reclamation work. The unity of purpose among these groups has sustained dynamism and commitment.

3. Strong and supportive local leadership. The town chief acquired the land from a land owner for the project. He chairs all development meetings in the village and the working groups are accountable to him. This political support has been a source of tremendous strength for the village.

6. An easily manageable technology. All able-bodied members of the community could contribute.

Case Study 5: Agroforestry Practices in Goviefe - Agodome, Ghana.[14]

The Goviefe-Agodome afforestation programme is an example of how a local institution can be mobilised by an outside organisation to initiate productive activities. In the case of Ghana, the outside body was the Mobilisation Squad (Mobisquad), a government body, which revitalised the existing local groups and jointly embarked on an ambitious afforestation programme.

The Giovefe-Agodome is a small village of approximately 500 people located 250 kilometres to the north-east of Accra. It is low lying (200 metres) and has a hot and generally humid climate (30 degrees centigrade). Annual rainfall averages 1200mm per year and is biannual i.e. March-July and September-November. The vegetation is predominantly savanna with only scattered pockets of deciduous forests along river valleys and on high ground. No primary forest remains, all having been cut down in the last 50 years. The residents depend on agriculture for survival. Maize and cassava are the staple foods of the area. Coffee and cocoa, which used to be extensively grown have been abandoned due to declining soil fertility, falling world prices and farm inputs are too expensive. The land area under yams is also diminishing due to declining yields. There is no open market in the village but some local exchange of commodities occurs at the household level.

One unique feature of the village of Goviefe-Agodome is the large number of trees, both exotic and indigenous, which have been planted for various purposes. Every household maintains at least a tree either for shade, for its fruits or ornamental purposes. The main road which passes through the village is lined with a well-trimmed, evergreen hedge. These features are not recent creations. They have grown up with the people and the village and a high premium is attached to trees. Traditional and social meetings are conducted under the shade and protection of trees. Traditionally, when the big, old trees fell, there was an organised ceremony in honour of the fallen tree and a symbolic planting of a new one in its place. This background is necessary for one to appreciate the activities and the determined effort demonstrated by the Goviefe-Agodome Afforestation project.

Official or formal planting of trees in the area has a long history. During the colonial administration, especially between 1919 and 1939, tree planting was encouraged and a lot of ornamental, shade and fruit trees were planted in the area as a whole. After the World War II, however, many able bodied men moved out to other parts of the country in search of job opportunities. The remaining population cultivated the land indiscriminately without concern for the forest. The people of Goviefe-Agodome began to observe the adverse effects of deforestation in the early seventies and individuals reactivated tree planting activities with emphasis on commercial trees. This was the environment in which the project started its work.

As mentioned above, the afforestation programme was a response to threatened resource productivity in the face of increasing population. The economic hardships occasioned by resource degradation and supported by a strong tradition in treeplanting signalled success for the project right from the onset. Strong and well-structured institutions have also played a significant role as explained below.

Ghana's national pattern of institutions is replicated at all levels of administration. The three

main bodies at the national level (Committee for Defence and Revolution, the Mobilisation Squad and the 31 December Women's Organisation), are replicated, at the village level. At the head of the village is the Chief with his Council of elders, the Youth Group embraces the mandate of the Mobisquad and the Queen Mother and her Council assume the duties of the 31 December Women's Organisation. These organisations, particularly the Mobisquad, have played a major role in the development of Giovefe-Agodome. The Mobisquad, whose mandate was to "translate the aims of the Revolution into practice" had a responsibility for providing basic social services and farming assistance in the rural areas. They are movements of men and women united by a common goal; to improve the quality of life of rural communities through provision of social services. For decision making and co-ordination, the Mobisquads have executive committees elected by the members.

Giovefe-Agodome village Mobisquad was established in 1981 but was initially sluggish. In 1985, the village leadership recognised the potential of the organisation in mobilising the traditional groups for development. The Chief and his Council of Elders, the Queen Mother and her Council, church groups such as the World Vision gave full support to the Mobisquad and other traditional organisations.

The fact that the Mobisquad took about 4 years to become fully operational is possibly an indication that forces external to a community, be they national or even lower levels, have to be legitimised by the local communities and organisations. The Giovefe Mobisquad embarked on active community development programmes in 1986. Although its mandate is primarily provision of services, afforestation became the first activity. The Mobisquad was trained by a Forestry Extension Officer and because of the available local knowledge and the simplicity of the techniques used, the group quickly grasped the principles of 'modern' tree growing. This activity was selected because it had multiple benefits; it would reduce soil erosion, provide energy, and cash which would support the development of social services. The main afforestation species are leucaena and teak. Leucaena is quick growing and provides woodfuel, fodder and improves the soil by nitrogen fixation. The teak, on the other hand, is slow growing (10 years) but fetches good prices. The group also grows cassava, yams and maize to raise funds to benefit individual members and support community development efforts. Quick benefits have sustained the enthusiasm and the zeal of the group. This is what gave rise to the short-term and long term goals of the programme. The programme has recorded major successes in the last four years and below is a summary of its history.

In 1986, the Mobisquad received seedlings from the Department of Forestry and with these, their programme started. In the same year, they planted cassava, yams and maize and raised 750,000 cedis from their proceeds. The groups set aside 30,000 cedis for community development (community toilet and clinic) and divided the rest among the members. In 1987, the group established its own tree nursery with about 5000 seedlings which were planted on both private and communal land. The Mobisquad set aside one day per week for communal work. By 1989, the group had 9.6 hectares of crop and tree nursery. In 1988, half the proceeds from the sale of crops was used to buy shares for the members to belong to a co-operative society. The group now has a co-operative certificate. Work on a day care centre and a village pleasure garden has been initiated. The group has to date (1986-1989) generated 5 million cedis (about US$16,700). By local standards, this is no mean achievement. The success of the Giovefe afforestation

programme can be traced to the following factors:

1. Afforestation is a traditionally accepted activity and was thus well received and adopted.

2. Although the idea was "externally" introduced (the national level Mobisquad), the details of the project were conceived and implemented by the local members with very little assistance from outside. The establishment of a tree nursery, the preparation of the land for cultivation and transplanting of seedlings and maintenance of the farms have all been undertaken by members who share the respective responsibilties.

3. The project has brought some immediate benefits to the members of the group. This is an incentive and encouragement to invest more in terms of time and energy.

4. The wealth of local knowledge and tree planting husbandry has been a useful asset during the implementation of the project. The advisory services of a local agricultural extension officer has however enhanced the local skills by injecting a "modern scientific" dimension.

5. The existence of well structured and strong institutions in the village has been a major asset. The Chief and his Council of Elders, the Youth Group, etc., are all formally recognised institutions that command a lot of respect from the village. Their contribution to the success of the project has been immense.

6. The existence of a communal spirit has made it possible for people to come together to contribute their own labour for the common good.

7. The fact that the people had already recognised the dangers of environmental degradation and had initiated planting of trees made it much easier for the programme to take off.

Women's groups in Kenya

Case Study 6: Women's groups and Conservation in Kenya[15].

Over the last two decades, hundreds of women's groups have been formed in Kenya with two specific aims: combating environmental degradation and generating household income. These groups are composed of a 20-100 members, and it is estimated that depending on its size, each group might have a capacity for producing between 2,000 to 10,000 tree seedlings in one season. Quite often, the stated objectives of these women's groups are to mobilise women for environmental conservation, developing and enhancing women's leadership roles in environmental management and, promoting women as equal participants in environmental conservation.

The majority of groups own and operate community nurseries, while in rare case some groups might encourage women to form on-farm or individual nurseries. There are three options through which members of these groups contribute to environmental conservation and generate income. One, women's groups can sell seedlings directly to villagers; two, women can plant some of the

seedlings from their nurseries on their own farms; three, women's groups can sell seedlings for cash in the market.
The groups are characterised by a high level of community involvement. They rely on grassroots support from local leaders and extension agents and sometimes monetary support from rural elites and politicians. Nursery sites are sometimes donated by a group member, but some groups have managed to elicit land from public institutions such as schools, churches and local administration. Women provide voluntary labour on a duty roster basis, but sometimes members contribute through the Kenyan "Harambee" system a nominal fee to hire a nursery labourer. Women use their own farm tools in most cases and augment seed supplies from NGOs and government Ministries by collecting seeds locally. The majority of women's nurseries have a multi-purpose role in that they also produce vegetables for consumption and sale. The key to success of women's groups is that they own the nursery produce, the proceeds of which might be divided amongst the women or ploughed back for nursery maintenance.

In most cases , women's groups operate independently; however, many initially require an initial injection of technical and capital input in the form of technical assistance, materials such as seed, poly tubes and nursery tools. There are various non-governmental organisations, church groups and local institutions which promote and/or support women's groups by providing this initial input. While it is not possible to discuss the role of all these NGOs and institutions here, three examples have been provided. These are the Green Belt Movement (indigenous NGO), CARE International in Kenya (international PVO) and KANU Maendeleo Ya Wanawake Organisation (KANU-MYWO) which is a local institution.

The Green Belt Movement

The Green Belt Movement was originally formed by the National Council of Women of Kenya, but now operates independently. The Movement has promoted the formation of hundreds of women's group nurseries, mostly located in the high potential and marginal zones of Kenya. The Movement buys seedlings from women and issues them free of charge for planting of green belts in many parts of Kenya. Women also plant green belts around their nurseries and take some of the seedlings to grow trees on their own farms.

Groups assisted by CARE-Kenya

CARE-Kenya has been working with women's groups in Siaya district, Western Kenya, since 1985. Many of the groups assisted by CARE were existing on a clan or village basis and CARE's input has been to provide materials such as watering cans, nursery implements, seed and technical advice. Although generally known as women's groups, the groups in Siaya have a male membership. Hundreds of small scale farmers have benefitted from the activities of groups assisted by CARE in Siaya, and the women's groups supported by CARE have made a tremendous contribution to environmental conservation and diversification of household income and nutrition resources.

Groups Affiliated to KANU-Maendeleo ya Wanawake
KANU Maendeleo Ya Wanawake (KANU-MYWO) started originally as a national organisation aimed at promoting women in development. A few years ago this organisation was adopted by

Kenya's only political and ruling party, KANU. Women's groups affiliated to the original MYWO were automatically adopted by KANU-MYWO. The organisation supports women's conservation groups by, providing access to external and local sources of funding for materials, equipment, and providing institutional support. The programmes promoted by KANU-MYWO range from rural energy and conservation to tree planting and soil conservation efforts. The key to the success of groups operating under this organisation is emphasis on a grassroots approach, reliance on local resources, and an integrated approach to development. For example a typical KANU-MYWO affiliated group might engaged in a variety of activities such as management of tree nurseries, selling of tree seedlings, tree planting on individual farms, making and marketing local crafts, constructing energy saving stoves, and marketing agricultural produce.

In spite of their high rate of success, women's groups in Kenya face many problems. Because their nurseries are often located near the road or on public land, the nurseries require fencing to keep animals out. Fencing wire is extremely expensive and without input from various sources the women would not succeed. Pests, flooding, poor selection of species and organisational weaknesses are other problems that affect women's conservation activities. At the farm level, some women may experience lack of support due to traditions which discourage women from tree growing and management. This is especially prevalent in some parts of western Kenya. At the organisational level, women chance being exploited by unscrupulous middlemen and even some of their own members.

It is intriguing, however, that in spite of these problems, women's groups in Kenya have been so successful. Listed below are the core reasons for success of women's conservation efforts in Kenya:

1. A social climate that is committed to and supports women's participation in conservation efforts.

2. Policies that recognise, emphasise and support women's role in development.

3. Traditions that have promoted women to form and manage mutually supportive groups.

4. The spirit of Harambee (self-reliance) which permeates Kenyan society.

5. Availability of organisations and institutions that inject initial capital and technical training.

6. The district focus for rural development policy which has been implemented by the government of Kenya.
7. Availability of a cadre of locally trained
extension staff who speak local languages, and more often than not live within rural villages.

LESSONS FROM THE CASE STUDIES

The case studies above have demonstrated that women are important actors in environmental conservation. The case studies also indicate that communities (both men and women) are

becoming increasingly aware of the linkage between resource degradation and the deteriorating quality of life. For example, it is now recognised within many communities that soil degradation contributes to low agricultural yields. In particular people have found that the total involvement of community members has a crucial role to play in environmental conservation. Thus communities are now emphasising that effective conservation can only be achieved with the participation of all members of the community. Women in particular appear to have demonstrated the potential for group efforts.

Some of the case studies show the dynamism of women as environmental managers. Others demonstrate that women and men can work together successfully to complement each other for a common goal. This demonstrates the importance of gender complementary roles. In Katheka while women have found it easy to construct terraces, they alone would not have been able to keep away the sand scooping lorries. Men are able to do this, and can spend nights out in the fields protecting the water sources. Men also prepare and repair farm implements, such as handles for hoes and mattocks, and hand them over to the women for conservation work.

While communities are often well aware of local problems and needs, they may not always have the resources to address the problems which do not have simple solutions. No community exists in isolation of others, or of the national government (and the international economic and political situation) and therefore traditional groups in developing countries require this kind of support.

The support can take various forms e.g. material inputs, technical assistance, financial and in some cases, policy measures that protect their work. In nearly all the cases studied, the communities and women's groups were found to be lacking in some skills or were in some ways vulnerable. For example the Katheka case showed that people's efforts could be threatened by sand mining. Another example was the Kyapee village in Liberia, where migrants were threatened by abandoned diamond pits.

It is also apparent that most practices have been carried out not solely for conservation but as a vehicle for achieving another primary objective. The Mwethya groups, for example, build bench terraces to increase agricultural production on their individual farms. The case studies indicate that for local conservation activities to be successful there must be motivating factors. Such a factor might be perceived need or extreme threat to survival. Other factors might be awareness campaigns conducted by
non-community members or even direct benefits to the individual. The Giovefe Mobisquad profits from the cash cropping activities are, for the most part, distributed to the members and only a small percentage is used for communal purposes. The Katheka women's groups devote most of their group effort to individual members' farms and much less on communal work. Even work on communal land is done to improve the livelihood of the women; the ditches to limit sand scooping, roads to reach health centres are examples. A supportive political and social system is always a prerequisite for group conservation efforts. The case studies from Kyapee in Liberia and Katheka in Kenya bring this out clearly. In both cases village groups relied on administrative officials for support.

The case studies also show that, in many instances, work leading to effective resource management is not undertaken until the local situation has deteriorated to the extent of

undermining survival and assurance of basic needs. The Kyapee example in Liberia, the Nyakinyua Women's group afforestation project in Kenya confirm this phenomenon.

The case studies have also shown that external agencies promoting conservation need local input to succeed in promoting action. For example in Sudan, SOS Sahel had to hire a local woman to work with the women. The participation of local people appears to legitimise agency intervention. Even where local governments are involved, for example the mobilisation squads of Ghana the involvement of local people is critical in promoting action.

Deliberate respect for cultural and social norms is another prerequisite for successful conservation activities, especially where the activities are initiated by outsiders. The case of SOS Sahel in Sudan underlines this fact as do the women's traditional groups in Kenya.

The technologies used for conservation have to be simple and appropriate for local conditions. In Katheka, there is a blacksmith who repairs implements made of iron. These technologies will be even more successful if there are local people, such as the retired agricultural officer, who can provide technical assistance. People are more likely to sustain conservation technologies when they can look inwards for support from within their own communities.

Plate 17 - Water, a resource for life. Credit: FAO.

Plate 18 - Training for women is a prerequisite for sustainable conservation efforts. Young women farmers in Ethiopia. Credit: FAO.

Because women lack training, when they initiate conservation efforts they have to involve men for technical support. Cases where such support is available from other women have demonstrated that the process is smoother and more participatory. However, gender complementality must not be overlooked.

Financial management skills are often lacking amongst women. This is a major deterrent to conservation, and development projects of all kinds. Women need to maintain oversight and control of their money in order to protect their own interests. Training in financial management would be welcomed by many African women's groups.

Conservation projects are most popular and spontaneous if accompanied by other benefits such as income generating activities. This has been demonstrated in Kenya, where thousands of women's groups have combined conservation with income generating activities and are seen by communities as a means to a better life. Another example is Liberia, where the farmers are conscious of the value of increasing land productivity.

The core elements of success can be summarised as:

a) Organisational structures that favour women's participation in development. Even within gender mixed groups, the role of women must be fully recognised and put within the right perspective.

b) Policies that favour and promote the role of women in development and create the right environment for their participation.

c) Respect for cultural and social norms, which may, however, need to be circumvented to promote women's participation in conservation efforts where necessary.

RECOMMENDATIONS

a) Recognition and support for local groups is a crucial factor in promotion of conservation.

b) Use of local expertise is not only desirable in local communities, but also a necessary condition for success.

c) Understanding and respect for cultural and social norms creates the right atmosphere for successful conservation efforts, but this does not mean that culture is static and unchanging or that women must not challenge injustices against women.

d) Training of women is a prerequisite for sustainable conservation efforts. Training is required in all fields, but management skills are a priority.

e) It is important that policy makers are sensitized to women's needs in development. The Katheka case study from Kenya shows how licencing for sand mining has militated against the conservation efforts of the community and ignored the women's views and interests.

f) The use of simple, locally available technologies is extremely important. Training in technology must be sensitive to women's needs and physical ability. It is hard work for the women of Katheka to establish terraces. If a simple technology could be found it would ease their burden.

POTENTIAL FOR CASE STUDY REPLICATION

The case studies have demonstrated how certain factors influence women's activities in agriculture and conservation. Since the case studies are used here to demonstrate "successes and lessons learned", the question of whether these successes are replicable is pertinent.

Some of the case studies might be easily replicated in areas with the same ecological, economic, cultural and religious setting. For example, in Sudan the SVES experience has already been replicated. Experiences from women's groups in Kenya have been replicated over and over, with a high level of success.

However, in considering whether these case examples can be replicated it is important to recognise the great variety of ecological zones, group constitutions, social, cultural and economic backgrounds. These factors indicate that it is impossible to use any of the case studies as a "blue print" for success. But this is not necessarily a disadvantage: it serves to re-emphasise the dangers of assuming women to be a homogenous group. Women all over the world may have parrallel problems and aspirations. But they live under very diverse conditions, and these have to be taken into consideration in planning for development activities. This does not however, prevent cautious use of the case study experience as relevant background information for planning purposes.

What is more important is to use the core elements of success in the process of planning and intervention. For example, the demonstrated respect of cultural norms as a core element of success should be practised within each cultural setting. Cultures might differ from one place to another and even within similar ecological zones, but the need to work sensitively within cultures will remain a core element of success in development initiatives. Another core element is the need to recognise and place within the right perspective women's role within the social and economic system. All over the developing world, there have been many instances where women's work load, and even marital problems have been made worse through efforts to bring them into the mainstream of social and economic activity.

The factors raised above indicate that attempts to replicate successful experiences should not seek to replicate or create identical activities from one place to another. Rather emphasis should be given to lessons learned from processes and methods that have worked. This means that, for example, instead of replicating the Nyakinyua Gitiri group, other organisations should seek to emulate the spirit of this group. Key questions are: what process did they follow? How did they get together? What were the triggering factors? How have they shared their workload? How have they maintained group cohesion and achieved their common goals?

These questions underline the fact that knowledge of successful experiences, is not enough by itself; the need for detailed knowledge of women's social and economic setting, their felt needs

and problems are key elements of success, and are integral to the successful replication of experiences from the above case studies.

NOTES FOR TRAINERS

Case studies are a very useful means of bringing to life the experiences of women's groups working in conservation. Trainers can use the six case studies provided as a basis for discussions on the practical lessons to be learned from each case. Alternatively they may prefer to use their own case study material, to make the discussions more focussed on the local area.

Below are some exercises which you, the trainer may find useful. Use them to get some ideas, and adapt them to your own needs.

Exercise 4: Indicators of success

Background
This exercise is designed to allow the training participants to identify, describe and assess the applicability of different indicators for measuring the success of development activities.

Method
Ask the participants to divide into working groups of 3 or 4 people. Assign each group one of the case studies described in this section of the manual (or use your own material if it is more appropriate). Allow each group to spend 40 to 60 minutes reading through the case study, and discussing and answering the following questions:

* What indicators are used in this case study to measure the success of the activity?

* What type of indicators are they (qualitative, quantitative, or proxy measures)?
* How might these indicators be relevant to the area you are working in?

Ask a spokesperson from each group to report back on their discussions. Compile an overall list of the indicators identified, and discuss how they could be measured in practice.

Exercise 5 : Lessons from the Ndimbo Land Use Project

Background

The case study here of the Ndimbo land use project illustrates some of the problems associated with planning an activity which requires the cooperation of women for its success but which does not take account of the women's priorities from the start.

Methods

Ask the participants to divide into working groups of 3 or 4 people. Allow them 40 to 60 minutes to read the case study below and answer the list of questions provided. Ask each group to summarise their ideas on large sheets of paper, to briefly present their findings to plenary.

Case study example

The village of Ndimbo is situated in East Africa, near a small lake which is part of a gazetted national park. The people of Ndimbo are traditionally hunters and gatherers, who have over the years lost their hunting grounds through nationalisation and demarcation of their traditional land into a national park. In the past, the Ndimbo lived in a peaceful environment with an abundance of land and engaged in barter trade with other communities living on the other side of the lake. When the park was established near their village in 1965, the rights remaining to the natural environment were taken away from the people of Ndimbo, and they found themselves surrounded by a forest which they were not supposed to utilise. Even the road going into and out of their village was only a "buffer zone" which they could walk through but not utilise for economic and other purposes.

To secure some permanent claim to the little land left to them, the Ndimbo started cultivation on a permanent basis. They found themselves lacking in agricultural skills, but over the years they learned how to cultivate crops traditionally grown by agriculturalists living on the other side of the park. The men of Ndimbo learned how to make farming tools instead of hunting tools, and one man became the local tools expert. His skills were later handed over to his four sons.

Over the years, the Ndimbo found that try as they might, their women could not avoid going into the national park for firewood, wild vegetables and fruits; Ndimbo men on the other hand went into the park in search of honey, and the occasional
animal hunted furtively to supplement their diet. Noting this infringement on park resources the government employed park wardens and guards to keep people out of the park. The Ndimbos, who were on the verge of starvation, started thinking of how they could improve their environment to make it more productive. They appealed for help, and the government after acquiring some project funds decided to post an agricultural officer, a forester and a veterinarian to assist the Ndimbos improve their resource base and conserve their small farms.

Ecological, social and economic data derived from various research programme carried out by people who helped the Ndimbo to bring their plight into the limelight indicates that the soils are reasonably fertile, rainfall is adequate for production of crops such as millet, sorghum, legumes

and seasonal vegetables; average land holding is 1.5 hectare. Men own land in Ndimbo, but women have traditionally played a key role in procuring food, managing homes and gathering firewood, and they had a strong position in society. In the past the men of Ndimbo were always within two days walk from their homes, but many men migrated to the urban areas in search of jobs when land shortage ensued. In the majority of households, only old men and young boys were left with the women. The women have survived through sheer determination and a social system that operates on the basis of strong clan groupings. These groups were previously lead by men, but their absence meant that women took charge of social leadership.

The Ndimbo land use project was started in 1972 with the objective of improving land use management practices, initiating resource conservation and introducing new agricultural crops. The project was implemented by a group of experts who came from outside the Ndimbo community. The group assumed that since this was "an African society where men dominate social and economic activities" the project would address men as a target group. The Project established an extension system dominated by men, who would give extension messages to the community. To enable the community to use modern land use management practices, the project decided to implement a small scale income generating project which would make tools for agriculture in the area.

After two years of project operations, hardly 20 farms had adopted the farming techniques initiated by the project. The villagers, lead by the women farmers, boycotted the modern tools and purchased their tools - sometimes on credit or through barter trade from the four village tool makers. When the project was evaluated after three years, it was recommended that the project should do a 'baseline survey' and to re-define the needs of the villagers before going into the next phase.

You, the reader are requested to imagine that you are leading the team which will carry out this basic research and plan the second phase of the project. The following questions are meant to assist you in defining your research and identifying issues vital to the success of the project.

a) Describe the key lessons learned from the Ndimbo land use project. What issues might have reduced the effect of the the project at the household level?

b) Describe the methods you would use to find out about the needs of the villagers.

c) List the key information you would need to know before planning the second phase of the project.

d) In your own opinion what would be an ideal strategy for extension to improve land use and resource conservation.

Exercise 6: The Bidii Women's Group Irrigation Project

Background

The reasons why conservation projects fail can be explored using this case study. The need to start small, taking into account the existing responsibilities and workload of the local women and men, can be highlighted.

Method

Ask the participants to divide into groups of 3 or 4 people. Allow them 40 to 60 minutes to read the case study below and answer the list of questions provided. Ask each group to summarise their ideas on large sheets of paper, to briefly present their findings to plenary.

Case study example

Kiiako village, situated in East Africa, is a small village that was little known even in its neighbourhood before 1985 when one of the many women's groups in area (group known as "Bidii") came to prominence through massive assistance to start an irrigation project. The village is remote and is situated about 100 kilometres from the regional capital and 300 kilometres from the national capital. Literacy levels, particularly for women, are low (30%). Low rainfall, sparse vegetation, black cotton soils that are difficult to work characterise Kiiako's environment. Roads are dusty in the dry season and impassable during the rains; there is neither electricity nor telephone communication. Access to drinkable water and health facilities are limited. Production technology is fairly simple; oxen plough being the only advanced farming implement. As a result of the constricted economic opportunities, there is heavy male outmigration to the urban areas for paid employment. The absence of men in this community has made it necessary for the women to take up some roles originally carried out by men. To say the least, life is difficult in this area.

Remittances from the men working outside the area are small and intermittent mainly because jobs that pay well are difficult to come by. Women therefore engage in small income-generating activities to meet some of the family needs. Because the women lack capital and other production skills, they engage in small businesses which such as basketry, pottery and livestock keeping. This the women do in groups rather than individually. In this community of 10,000 people, 40 such groups are to be found. Most of the groups have male members. The presence of men in the groups is found to be an asset when manual jobs need to be done.

The above is the environment in which the "Bidii" women's group operates. Today, perhaps the most regularly asked question is how this group was picked for assistance in the midst of so many other groups. This is the explanation: the group's patron was at the time a politician with strong external connections. Through this connections, the patron was able to interest a donor to consider assisting this particular group. The available donor wished to support an irrigation project. Through the project, the group would be provided with equipment such as diesel pumps, fibre glass pipes, sprinklers, cold storage, lorries and saloon cars. The donor projected that after 5 years, at least 200 hectares would be under irrigation and would support at least 2000 women.

The donor would carry out a comprehensive technical survey and design the project on the basis of the survey findings. To ensure the success of the project, a Technical Advisor would be attached to the project for a period of 2 years after which the women would take over the entire management of the project. The patron was overwhelmed by the offer. The terms of this assistance were totally accepted and what remained was the signing of the contract. To the women, the offer signalled the end of a 5-year struggle to make a living through poultry and goat keeping. The news about massive assistance that would bring about an economic revolution to Kiiako village spread far and wide.

Project implementation was almost on schedule. The technical survey and design was completed within 6 months of signing the contract, the equipment arrived 3 months after and actual irrigation started within a period of another 4 months. Irrigation was initially started on 15 hectares of land. The rationale was to use this as training ground for the women and the area would be extended as the women became familiar with the technology and general management. The yields matched the high inputs and there was every sign that the women would make good money through the project once the area was extended. The two-year contract for the Advisor soon ended and he was soon to leave. How much had he achieved during that period? Some of the women had learned how to operate the equipment, and rudimentary understanding of book-keeping but not much else about the technology. The land under irrigation was only 25 hectares, less than the plan had anticipated. Two years after the departure of the Advisor, this is the situation. The group only operated during the first year and then closed down, the women found that the enterprise was not viable because they had to hire a technician to maintain the equipment, they needed an accounts clerk to keep the books and with the escalating fuel prices, they could no longer keep the pumps running. Today,
the equipment is lying idle and the women have employed a watchman to keep vigil
while they look for another donor to revive the project. In order to raise funds for the watchman's wages, the women are leasing out some of the tractors.

This is perhaps one of the many examples of projects that failed thus causing suffering to the "target" group and disappointment to the donor.

You are responsible fore briefing the donor on the problems the project has faced, to begin negotiations and planning so as to avoid a similar catastrophe again.

Consider the following questions:

a) What factors contributed to the project failure? Illustrate, with a flow diagram, the negative impacts of the project, and the root causes of these impacts.

b) Draw up a checklist of strategies which the women's group would need to follow in dealing with the donor to ensure a longer term success than before.

c) Draw up a similar list for the donor, to ensure their involvement is a success also.

ACKNOWLEDGEMENTS TO SECTION 3

Information contained in this section was obtained from an exhaustive review of relevant literature (both published unpublished), and also from organisations and individuals undertaking grassroots development. My personal involvement with grassroot resource conservation groups enriched the analysis of available materials. These sources have provided invaluable information without which compilation of this document would not have been possible.

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C. KABUTHA

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SECTION 4:

Conservation techniques

INTRODUCTION

This section of the Training Manual brings together a brief description of some simple techniques and methods which have been applied in conservation projects and a series of case studies which show how groups of rural women have used these ideas. This section is not meant to be a textbook, field manual or guidebook. It does not have all the recipes for a successful project but it should encourage groups to ask questions, discuss ideas and seek advice from technically qualified people. Often the extension service will have information which is useful or national NGO groups could offer specialist advice.

The techniques described here are well tried and tested and have been successful in some areas of Africa. However, there are often local well adapted methods which are similar and work well. Not every idea will work every time, in every new location. Therefore this section of the manual is complementary to sections I, II and III which illustrate how to use the advantages of women's groups to tackle environmental problems and how success has already been achieved in many cases. This final section is a sourcebook which sketches in some of the methods used. Trainees will note there are several blank pages for your own ideas, and the listing of local sources of support such as extension officers, research centres and non-governmental organisations working in the field.

It would be an impossible task to include all the possible conservation practises in only a brief section of one text. Therefore the techniques included are selective and have been linked to the case studies. The idea is to give a flavour of what can be done, rather than describe every technique in detail. This section will therefore not enable you to construct a 'caag' but it will tell you what it is.

SOIL EROSION AND CONSERVATION

Soil erosion is fast becoming one of the most worrying agricultural problems in Africa today. Millions of tonnes of soil are lost through this process each year. Though erosion is a natural process that is as old as the earth itself, recent trends of land use are causing increasing concern throughout the continent. The main causes of soil erosion stem from people's efforts to settle, feed themselves and their animals, and to make an income from the land. These efforts include the clearing of forests and of land, incorrect or excessive cultivation, overstocking and over-grazing of livestock, poorly designed roads and urbanisation.

Erosion results in loss of the top soil, which largely determines the natural fertility of the land. That loss reduces productivity of the land, on a continent where the backbone of most economies is agriculture. With an annual population growth rate of 3 percent - the highest in the world - pressure is mounting on agricultural resources. Consequently, many people have been forced on to marginal lands which have fragile ecosystems that are easily degraded if not handled with extra care. Other people have moved onto steep slopes, which are more prone to erosion than flat land.

Over-stocking and over-grazing have also caused untold damage in Africa in the past few decades. In arid areas, soil is compacted around water holes, vegetation cover is destroyed and erosion results. Rotational grazing or de-stocking can counter the effects of over-grazing and over-stocking, but community agreement is essential.

Soil is among the world's most precious natural resources, yet it is not always valued as it should be. Problems of soil erosion increase when land users do not, for various reasons, take into serious consideration the need for long-term management and protection of top-soil. This may be due to lack of awareness of the problems or solutions among farmers and other community members. Such a situation determines the extent of degradation which has already taken place, as well as the likely trends in future.

Erosion starts off a chain reaction of events of which the first sign is a decline in crop yields. Then, as soil is lost and gullies form, the use to which land is put must be changed. Crop-land becomes pasture, pasture turns to scrub. Eventually, nothing useful can be grown on that land. Consequently, the people struggling to eke a living are confronted with a situation where food becomes scarcer and expensive. Malnutrition becomes common among their families. The repercussions of food shortages and higher prices, are felt by urban dwellers who may not appreciate that they are suffering directly from the effects of erosion. To tackle such a situation, community members need to be reminded that efficient soil conservation could enable the land to support populations more than 50 per cent larger than if erosion were allowed to continue unchecked.

Preventing soil erosion is a great deal easier than curing it. Soil washed down fields and carried to the valleys below can never be returned. But once erosion has been controlled, it is usually possible to restore fertility to the land, increasing its productivity.

Where traditional soil and water conservation techniques are used, the most logical step is to use them as the starting point. These techniques are not widely known because they are not well documented. Conservation experts have therefore tended to ignore them.

Where soil and water conservation projects have to start from scratch, the local population should be involved, as closely as possible, in the planning and design. All too often such projects are characterised by a 'top-down approach', with outsiders imposing what they consider best for the local population. A "bottom-up" or participatory approach would achieve better results.

Ideally, techniques should be simple enough for farmers to apply with little or no external support. Complex techniques, some of which may require complicated calculations, should be avoided whenever possible. The techniques introduced should be productive, leading to perceptible short-term benefits where possible to motivate the people to continue applying them in future. The maintenance requirements of soil and water conservation structures should be minimal, otherwise farmers will not maintain them due to time and labour constraints.

Experience in many places has shown that farmers give the highest priority to conservation measures in their own fields. For the participatory collective approach, some form of incentive is needed to maintain momentum without which the number of volunteers may dwindle rapidly. Conservation structures built collectively are also seldom adequately maintained. In Burkina Faso fields with rock bunds built by groups usually get a lower priority than the family fields of group members. This in most cases is reflected in lower yields.

Soil conservation methods

Strip cropping

Different types of crops can be planted in alternating parallel strips along the contours. These crops mature at varying times throughout the year and the taller crops in the strips act as windbreaks. The farmer may plant strips of fodder grass on the contours at intervals. The grass serves to hold the soil in place and prevent a gradual move of precious soil downslope.

Contour ploughing

In this method farmers plough along the contour, that is following a level line across the slope. The ridges and hollows left after ploughing are on a level, and so they catch and hold the rain. Ploughing up and down the slope leaves the ridges and hollows running up and down the slope, so rain runs downhill taking soil with it. This beneficial effect is improved if planting, cultivation, and weeding are also done along the line of the contour. This is called contour cultivation.

Contour belts or bunds

There are many kinds of cross-slope barriers, all of which are laid out on a level line along the contour so that they slow the downhill movement of soil and water.

* strip cropping

Strips of different crops are planted in bands along the contour. This slows the movement of water downslope, and also strips of crops with dense vegetation will intercept some of the soil washed down from a more open crop on a higher strip.

* stop-wash lines

Can be lines of grass, or shrubs, or stones, or sticks. Trash lines are the same but built up with crop residues, or from hand weeding, perhaps with soil added. Any combination of materials can be used - whatever is to hand.

* contour bunds, contour furrows

These need more labour but can be more effective for catching or holding the surface run-off. A ditch is dug on the contour, and the soil used to build a bank (or bund) below the ditch. A variation used in Kenya is 'fanya juu' where the bank is built on the uphill side of the ditch.

Cut-off drains

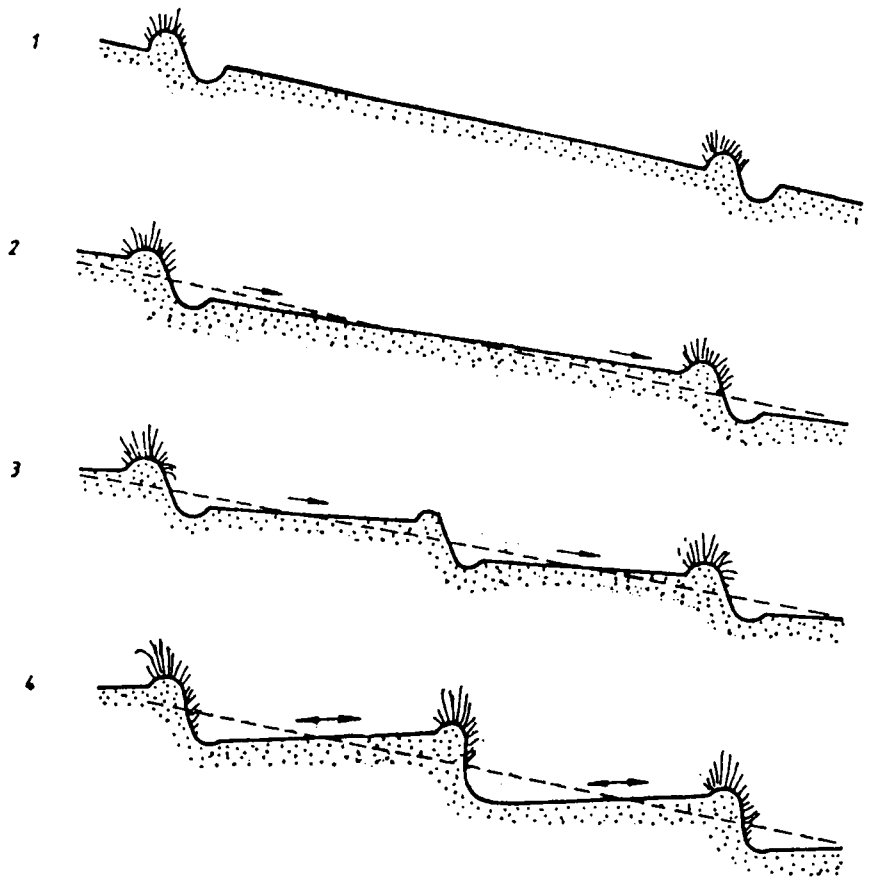
A cut-off drain is a channel dug to divert water from a field or a farm. This kind of drain prevents the field from being flooded where it may wash away the crop and soil. To be effective, the cut-off drain must have safe discharge gutters and it must be complemented by other soil and water conservation measures like grass waterways, grass strips and terracing.

Case study: Rwanda

The success of the Project Agro-Pastoral (PAP) whose low-cost agricultural technologies have helped improve the natural potential of farms in Rwanda, can be largely attributed to indigenous knowledge. The popularity of these technologies have been high because they are built upon traditional agricultural practices.

Rwanda is a small country whose population growth rate of 3.8 per cent per year and 230 habitants per square kilometre puts it among Africa's most densely populated countries. There is no spare land to bring into cultivation so Rwanda must find a way to intensify its smallholder agriculture. Farm sizes are small - 70 per cent of the farmers have less than 1 hectare from which they produce meagre amounts of maize, sorghum, sweet potatoes, cassava, beans and bananas for their families. Soil erosion coupled with poor soils result in very low crop yields.

Figure 15: The 'fanya juu' method of terracing



1. Terraces built at 2m vertical interval by throwing excavated soil up-hill to form a ridge, which is planted with fodder grasses,
2. Movement downslope by cultivation and erosion starts to build up a lower terrace.
3. Main terrace banks built up higher, and intermediate terrace added.
4. Final profile is nearly level terraces with well-vegetatedterrace risers.

Under the circumstances, the challenge is to come up with a viable agricultural system which will increase productivity, protect the environment and minimise purchase of external agricultural inputs.

Chemical fertilizers are not really the answer. Transportation costs covering 1,800 km from the nearest port, make fertilizer prices in Kigali, between two and three times the world price. The small farmer cannot afford this expensive commodity, nor can the government subsidize the price given its limited sources of foreign exchange.

Responding to that challenge, the Rwandan Ministry of Agriculture, Livestock and Forests set up PAP in Nyabisindu. Originally established as a dairy improvement programme, PAP has evolved into a development and training project focusing on livestock production, erosion control, soil fertility and agroforestry systems. It is estimated that between 10,000 and 14,000 farmers receive information generated by the project.

PAP's training emphasizes the value of mulches, animal and green manures, erosion control and raised beds, which were already known to many Rwandan smallholders. The production systems promoted are based on existing farming practices in the country, and cover annual and perennial crops, livestock and trees.

Farmers are encouraged to build compost mounds in their fields. Livestock are confined in specially built structures where animal manures and vegetable waste are composted. Livestock are fed upon grass and legumes grown on field borders and erosion-control strips, and animals are staff fed.

Integrating trees into the farm make a major contribution in meeting energy needs of families. Also, planting of trees along contours, together with grasses and shrubs, reinforces erosion control structures such as terraces.

Farmers are made aware that unsuitable agroforestry practices can reduce yields of intercropped annual crops due to competition for light and nutrients from the trees. Systems are therefore structured such that the various components complement instead of compete with one another. Competition by the trees for water and nutrients may be controlled by pruning back the roots of trees each year.

The integration of various farming practices which are low technology has brought real hope for the future to many a Rwandan farmer.

Plate 19 - Soil degradation in Kenya; the construction of a check dam Machakos. Credit: FAO.

Water conservation methods

Earth dams

Surface water can be stored through the construction of earth dams. Large dams, or dams on large streams need technical advice, but small earth dams can be built simply, by individual efforts or by a group as a community-based project. The stored water may be used for many purposes including watering livestock, for irrigating a vegetable garden or a tree nursery or a horticultural project, or for fishing.

The dam is built across a stream or waterway, and holds up water in the basin on the upstream side. Soil is scooped out from the upstream side of the dam and this increases the size of the basin which stores water. The soil is carried to the dam wall and packed down by ramming with poles. It will pack more tightly, and be stronger, if the soil has some moisture. If the soil is very dry and there is water available it may be worthwhile carrying water to sprinkle on the soil as it is placed in the dam wall because this will allow it to be packed down better. Organic material like leaves and roots should not be included in the wall as this will decay and reduce the strength of the dam.

Villages need to be alerted to the danger of earthen bunds failing. The pressure of water can break through the bunds, particularly during the first season after construction, before the bunds have consolidated. It is not correct to assume that the bigger the bund, the less likely it is to break. If not spotted in time, it only takes a small crack, or a tunnel caused by a rodent to lead to failure, because once the water has found any small passage through the bund it will enlarge itself. Grass and small shrubs will add to the strength and durability of earth bunds or earth dams, but trees should not be allowed to grow there because dead roots can allow tunnels to form.

Construction of the dam can be managed either by individual efforts or by a group as a community-based project.

Sand dams

Water can be stored below ground as well as in open ponds. If a weir is built across a stream that carries a lot of sediment during floods, the storage space will gradually be filled up. When water washes over the weir it carries with it the silt, clay, and floating debris leaving the heavier sand particles behind. A surprisingly large amount of water is stored in the space between the sand particles, and this can be extracted from shallow wells. Water stored in this way is not lost by evaporation, and is kept free from contamination. When the sand dam is full to the level of the weir, the weir can be built higher to increase the storage volume.

Weirs

Sometimes a weir may be more suitable than an earthen dam. The difference is that when the storage is full the water will flow over the top of the weir so it has to be built of something which will not wash away. Concrete or rocks set in mortar are best, or a cheaper but less permanent method is to build the weir of gunny bags filled with sand. You do need a rock bar to give a solid foundation to the weir.

Water harvesting from rock outcrops
Where there are naturally occurring outcrops of rock as found in many African countries, these can be used to provide good quality water for domestic use or livestock. A collecting channel is made by building a low wall of brick or masonry which catches the water running down the rock and leads it into some form of storage. This could be a brick tank above or below ground, or for domestic use it might be worth using a corrugated iron tank, or a large scheme might be used to fill an earth dam.

Wells
Hand-dug wells can provide water in areas where the water levels are not too far below the ground water surface, and where a layer of rock does not lie below that surface. To select the best site to sink the well, women and the older residents should be consulted since they are the most likely to be the best informed among villagers on the availability of water.

Well-digging projects, often seen as a quick way to provide communities with water, have failed in many places. A major reason is that those responsible for projects have often sunk wells without consulting the local people, and inappropriately locating the new water sources near main roads to markets, leading to overcrowding. These watering points tend to be over used by both people and livestock who trample the surrounding area. This may lead to soil erosion.

The construction of hand dug wells is often dangerous and the following guidelines may prevent accidents and prolong the life of the well.

- If the well is deeper than a woman's height, the sides should be supported by timber or a stone wall. In sandy soils, wells of any depth may need to have the sides strengthened.

- There should always be a kind of wall or raised bank around the well to stop surface water carrying in dirt and disease.

- Livestock should never be allowed to drink directly from the well. Make a lined drinking trough some distance away so the well is not contaminated.

- Also make a separate place for washing some distance away from the well.
- For wells which are used by many people make a simple frame over the well so that buckets pulled up by rope come straight up the middle without hitting the sides.

Planning water conservation
Some measures used in water harvesting may seem obvious, but they are often overlooked. One needs to take the trouble to find out what people are doing themselves, then build on the traditional technique rather than introducing techniques completely new in the area. Building on what is locally available gives greater acceptability to such an undertaking.

There is a need to determine the people's problems and priorities against their social-economic background before introducing a measure which may appear totally unrelated to their immediate needs. Unless this is done, community participation is likely to be minimal. Participation should be encouraged among the local people basing it on their perceptions of a situation.

Sophisticated systems, which the people cannot afford, replicate or maintain themselves, should be avoided at all costs since they are doomed to fail in the long run. A flexible approach should be adopted, whenever possible, rather than a rigid one. This calls for gradually evolving techniques, admitting mistakes and making room for modification as the need arises.

Making water available should be seen against the wider context. Efforts should not be wasted to avail water in vast quantities for agricultural use where, for example, soil fertility is poor and the chances of getting good crops are minimal.

Case studies: water harvesting

Caag in Somalia

The 'caag' system (pronounced 'aag') is a simple water-harvesting technique using earth bunds to contain run-off from small gullies. The bunds are commonly made by a simple two-person push-pull shovel. The main earth bund is made approximately on the contour and extended up the slope at both ends into a U-shape but with one tip shorter than the other, allowing excess run-off to flow around it. This then automatically controls the depth of flooding, which is usually not more than 25cm at its deepest. Sometimes a piece of 300mm diameter plastic pipe is set in the bund and can be unplugged to allow excess water to drain away. There may be more than one U-shape bund down the slope, and the area may have a live thorn face to keep out livestock.

Teras in Sudan

Near Kassala in Eastern Sudan - a country believed to have the richest tradition of rainwater harvesting in sub-saharan Africa - there is a unique system virtually unknown outside the area. The small-scale rainwater harvesting applied here is known as "teras", the Arabic word from which the English word "terrace" originates. Teras refers to the earth bund which forms three sides of each plot.

Each teras, of about two hectares in size, has a catchment of at least double that area. Using earth bunds, a teras forms a catchment which traps the water from several directions.

The main bund, about 40 cm in height is sited across the slope, approximately on the contour, which ensures an even spread of water behind it. Side bunds then extend up the slope. Sometimes extra bunds divide the teras into sub-units. Run-off flows into the 'open end' of the plot and the excess finds its way round the tips of the bunds, higher up the slope.

Water harvesting in Ethiopia

One water conservation project in Tigray in northern Ethiopia, illustrates that water and soil conservation activities are often inseparable. Under the project, various forms of water harvesting are employed in which the farmer takes advantage of erosion-causing run-off from the mountainous terrain which is a common feature in Ethiopia. Terraces and soil ridges are constructed at the base of a mountain on a gentle slope, below a stonelined ditch. The terraces and ditches are cut to form right angles to the slope of the mountain.

Figure 16 - The Caag System

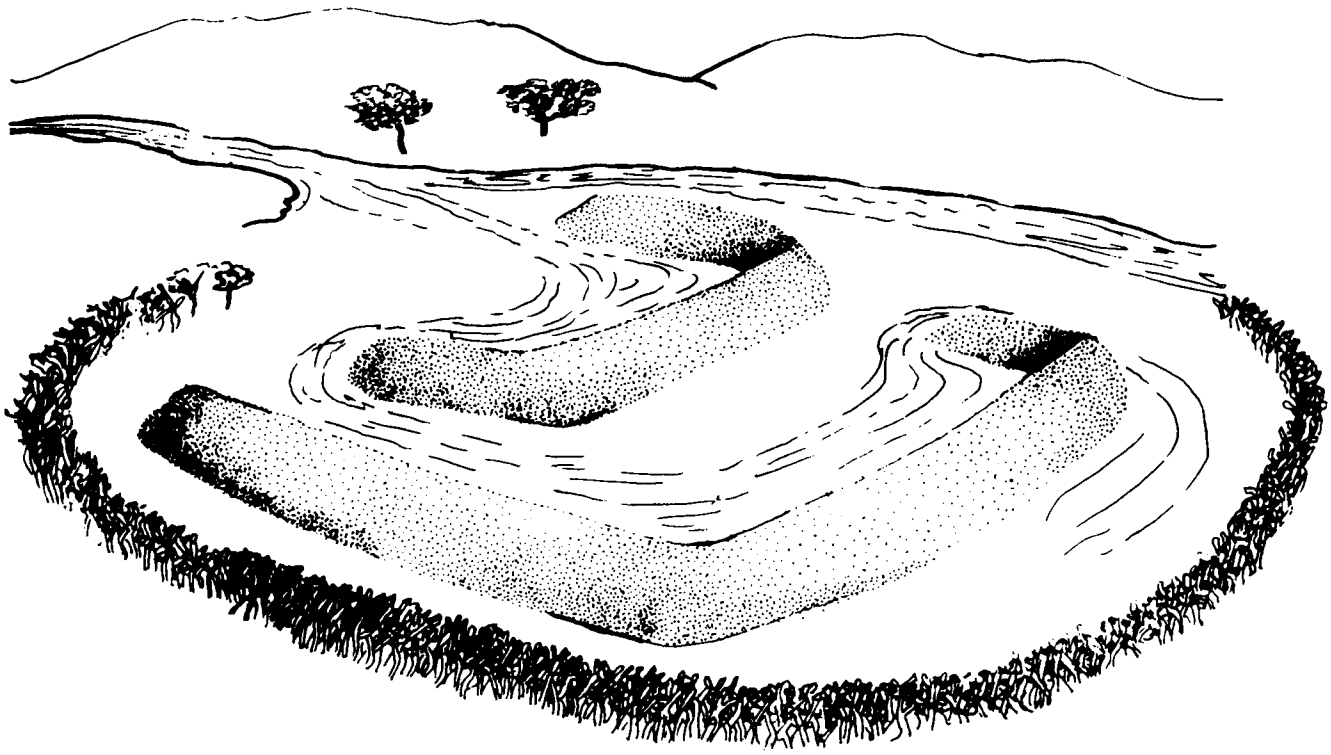
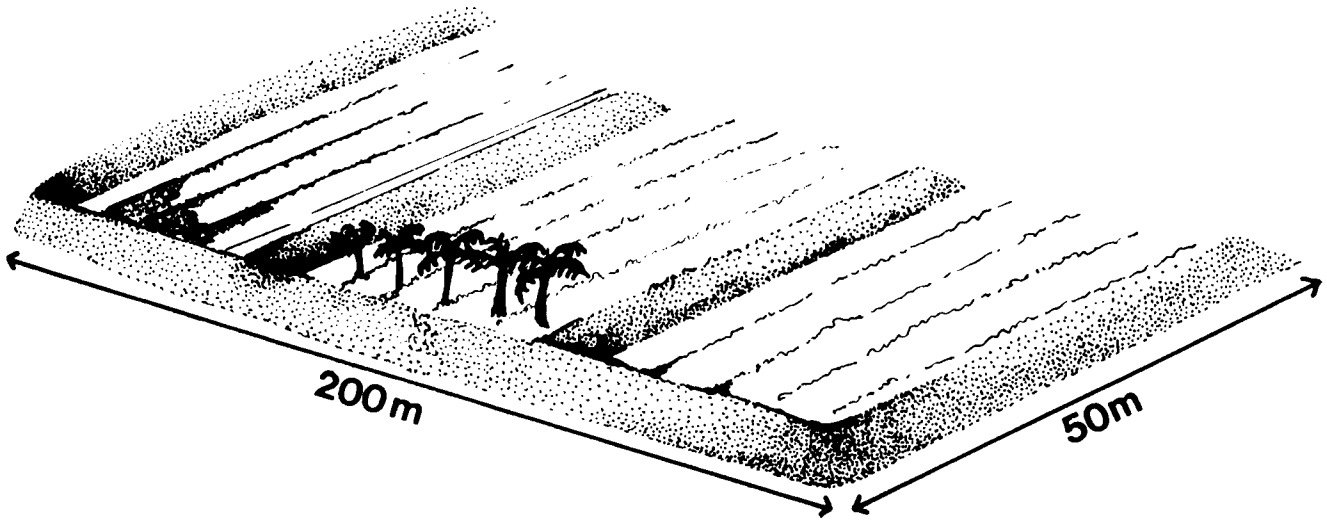


Figure 17 - The Teras System of the Sudan



During flash floods, water drains at high speed from the mountain into the ditch which protects the terraces by breaking the momentum of the flood. From there, the water flows down the feeder canal and through the weir into the terraces on both sides.

The project is labour intensive, requiring tools such as spades and matocks for use at a rate of 1,000 person days per hectare. Such organisation, which is necessary for communal work, is lacking in much of Africa. Though traditional communal organisation still exists all over Africa, it has rapidly eroded due to colonialism, new forms of land tenure, cash cropping, population pressure, warfare and rural-urban migration.

Taking advantage of flooding in Nigeria

In many areas flooding is frowned upon as being among the natural disasters, but in parts of Hausaland in Nigeria, this calamity is put to good agricultural use.

The use of "fadama" land, which are areas seasonally water-logged or flooded such as low-lying areas adjacent to streams and depressions, is an important practice for farmers. Mostly, they are in the hands of rich farmers who use them to grow high value crops such as vegetables for sale in urban areas, or perennial crops such as sugarcane.

Fadamas tend to be neglected in the wet seasons, but in years of poor rainfall they can be employed as a seasonal mechanism for planting additional crop. At the end of a poor wet season it is often possible to plant a rapidly maturing variety of maize in the fadamas, which are also used to grow rice.

Case study: the women's dam

The great agricultural potential of Burkina Faso's Yatenga plateau has been hampered, year after year, by severe water shortages. The rains, which are erratic and quickly disappear into the soil, render most farming attempts futile.

Most of the villagers, who cannot afford drills and pumps, employ traditional means of collecting surface water to meet the daily needs of their families and their animals. The methods used include hand-dug drinking holes, wells and small earthen dams.

For years, villagers of Saye talked of building earthen dams to catch rain water and retain it for the next dry season. Finally, in 1979, during one of the most severe water shortages known in that area, village women organised a meeting where they decided that should their men refuse to help them build a dam, they would do it themselves. The women succeeded in enlisting help from hundreds of people of all ages in Saye and the two neighbouring villages. The timing was perfect; everyone came as it was the dry season and there was little other work to be done. Women, youth groups and children worked to the music of the older "griots" (traditional court singers), who together with some youths had come armed with drums. The women composed songs on what they would grow around the dam in future. The old men who would not work sat under trees encouraging the workers, and looking after babies. Some grandmothers worked in the gravel pit, loading baskets and pails for the younger women to carry four kilometres to the work site. The project finally complete, the entire group celebrated together.

Similarly taking up the challenge, the nearby village of Somiaga set about building their own dam. With 1,600 in habitants, Somiaga had almost four times as many workers as Saye, so they constructed their dam in three months.

Through setting up the two dams, the villagers learnt a significant lesson: the importance of self-reliance.

Case study: water treatment at household level

Sudanese women living along the Nile use the seeds of the Moringa oliefera tree to treat muddy river water. In so doing they provide safer water and better health for rural households, using simple technology which costs little.

The women crush the seeds and mix them with a little water to form a milky solution which is then stirred into the turbid water and left to settle for at least an hour. The powdered seeds cause mud particles to cling together, forming larger, heavier particles which sink to the bottom, leaving the water above clear.

This technology is based on traditional knowledge - that of women - and available raw materials. The technology covers an aspect of water supply which is often overlooked, having been overshadowed by a host of efforts to find solutions to a sufficient water supply. Where turbid and polluted water supplies are the only available water source, the usual treatment proposed by Western-trained experts for household and communities in the Third World have been sedimentation by storage, sand filters and chlorination.

Using the seeds, the women have avoided high technology solutions which involve various technical and financial considerations to install, and once in use, create import dependency, as well as problems with operation and maintenance.

This technique can be taught to rural women with neither the money nor other technical and financial considerations to benefit from a modern drinking water supply based on advanced technology within their natural environment. The technique can be taught to leaders of women's groups who in turn convey these purification techniques to the rest. But this technique may not have an impact unless the women are assured that the tree can be grown easily and fast, yielding plenty of seeds year after year.

Moringa oliefera, a fast-growing multi-purpose tree believed to have originated in India, is grown in many other countries in tropical Africa, Asia and the Americas - although mostly for uses other than water clarification. The tree, which can be cultivated on marginal land, has various uses in other countries. It has high potential as a food source; people in Burkina Faso eat up to 80g each of the leaves daily.

Moringa oliefera leaves contain as much Vitamin A as carrots, and are richer in Vitamin C than tomatoes, carrots, peas and radishes. The protein content of the leaves is equivalent to that of

peas, beans and radishes. The leaves also have calcium and phospherous amounts that are higher than other vegetables. Cultivation of the tree in home compounds and terraces is practiced in Southern Ethiopia, where the leaves are an important vegetable during the dry seasons.

Moringa oliefera has also been identified as a valuable fodder tree for the maintenance of livestock in hilly, rainfed areas not suited to intensive cultivation all year round. Roots of this tree are used as condiments, but more important are the oil seeds, which have different traditional uses in Egypt and Southern Madagascar, and are used for cooking oil.

Therefore this species is a good example of a multi-purpose tree which serves a variety of uses. Often these species are well known and are more suited to agroforestry programmes than imported exotic species. The challenge is to identify these species and encourage nursery propagation, and mobilise community interest in planting.

ORGANIC FARMING

Principles

Environmental degradation not only leads to soil erosion but also to declining soil fertility. Soil may be physically damaged when it is repeatedly worked with heavy equipment in wet weather, or when it is compacted around water holes in grazing land. Damage may also occur when soils are deprived of their natural nutrients and their organic matter or humus content.

The nutrients required for plant growth can be replaced by the artificial, or chemical fertilizer. Such fertilizers cannot, however, replace the humus content; only crop rotation and good farming practices can. Artificial fertilizer is also expensive, requires transportation and often has to be imported. By reviving traditional sound husbandry practices, it is possible to obtain good yields, build up soil fertility and soil condition.

Organic farming is based on the mixed farming principle and makes optimal use of humus by composting organic matter produced on the farm by both plants and animal. The result is a better moisture holding capacity of the soil, less erosion and better plant and animal health. Also, the crops are better able to resist drought conditions, insects become less of a problem, better yields are sustained over longer periods, and the environmental pollution caused by non-organic or chemical fertilizer does not occur.

When little attention is paid to maintaining humus in the soil, the biological activity of the soil becomes imbalanced, resulting in an increase in pests and diseases: a decrease in water holding capacity of the soil, and an increase in soil erosion. As with the undernourished human being, poorly fed soils produce undernourished crops and animals, which easily fall prey to pests and diseases. Where land is intensively mono-cropped, it becomes increasingly difficult to maintain soil fertility. Also, diversity in production means less risk and improved diet and health. Production is based on recycling of organic waste and careful handling of manure and compost and careful soil cultivation.

Weed control is based on crop rotation and physical methods. Pest and disease control is sustained by understanding and maintaining physical, biological and ecological balances. These include traditional methods.

Therefore organic farming may be defined simply as a method growing crops without dependence on artificial fertilizers and chemical pesticides, with the aim of maintaining a healthy and balanced environment where plants can thrive.

The three major benefits of organic farming are increased yields, reduced costs and a healthy environment. Soil fertility is improved through composting, cultivation practices, crop rotation, intercropping, agroforestry and natural control of insects and diseases.

Crop rotation

When a farmer grows one crop on the piece of land continuously for many years, several things may happen. The soil fertility declines, weeds grow in number and pests and diseases affecting the crop increase more than previously. The situation can be arrested through crop rotation. The farmer who does not practice crop rotation is likely to experience heavy losses from parasitic fungi, nematodes and pests, all of which increase where similar crops are planted repeatedly. Plant diseases caused by fungi and bacteria living in the soil, increase if the same crop is planted season after season.

Crop rotation also helps reduce damage of crops through those insects that attack only a limited number of plants. For instance, when maize is grown continuously in the same field, the stock-borer invades it. Wireworms attack roots and tubers when potatoes are planted in the same field season after season.

Growing a variety of crops in the field improves the nutrient supply to individual crops. Crops with a lot of leaf growth like maize, spinach, cabbage and kale, have different nutrient requirements from the root and bulb crops like cassava, sweet potatoes, onions and carrots.

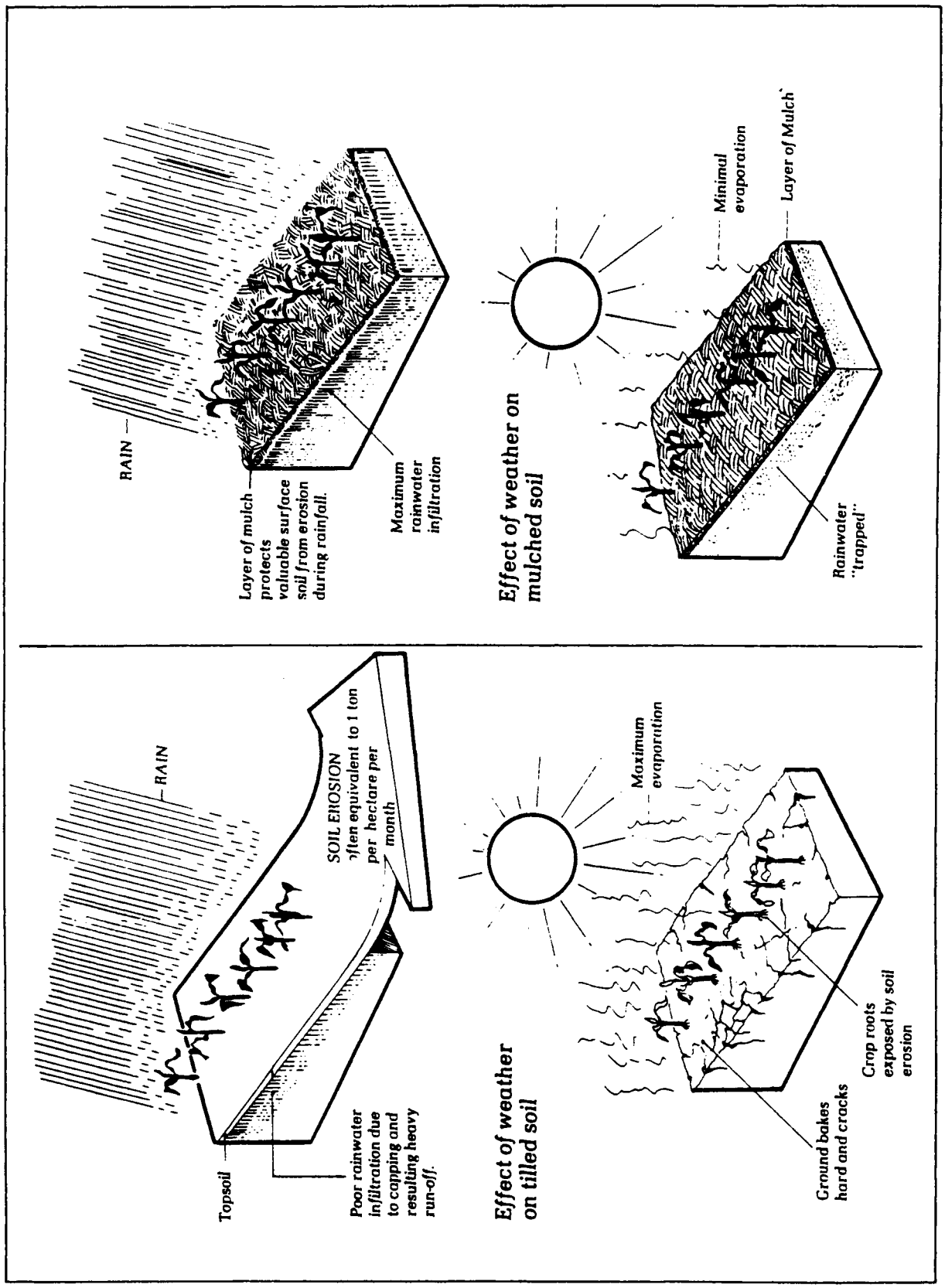
Mulch, legumes and pigeon peas

Enriching soil through composting or mulch

A farmer can use compost to obtain a good crop without having to apply expensive chemical fertilizers. Compost can be made by converting manure, leaves, crop stalks, roots, kitchen waste and other vegetation into humus, which is valuable plant food. When applied, compost provides food to the plant without first having to be broken down by micro-organisms in the soil.

The making of the compost can be hastened by mixing in top-soil, which contains micro-organisms, vegetation and old manure, under a moist and airy atmosphere. To enrich compost the ash from domestic fires can be added as it contains valuable nutrients. To hasten this process even further, the mixture should be turned every two to three weeks. Processed this way, the compost should be ready for use between six to nine weeks.

Figure 18 - Mulch for erosion prevention.



In contrast inorganic fertilizers consist of chemicals with little or no organic matter. Though chemical fertilizers supply nutrients that are readily available after application, they are expensive, often unavailable and generally do little to improve soil structure. Many farmers have difficulty calculating how much chemical fertilizers to apply, often leading to under-fertilization or over-fertilization neither of which produce the desired results.

Many tropical soils which are sandy cannot hold the chemical nutrients long enough for the plants to use them or in clay rich soils the clay particles holds or 'fixes' fertilizers which are unavailable to the plant. Often the first rains wash fertilizers out of the soil. Correct application of inorganic fertilizers is, therefore, necessary and critical.

Often, traditional crop patterns adapted by local farmers turn out to be the best use of the land as well as the best combination for providing essential proteins for human diets. Field extension workers planning to introduce new species should consider the potential of indigenous crop mixtures as a starting point for the design of soil management practices.

Legumes

Legumes, including beans, ground-nuts and peas, contain nitrogen-fixing bacteria in their root systems. Legumes are often grown in association with other crops in intercrop or crop rotation systems to provide nitrogen for other plants. For example, peas or beans are often grown with maize in a naturally beneficial system. Such multi-cropping practices reduce the need for chemical fertilizers. All food crops can benefit from being grown in rotation with leguminous plants, like beans and peas, which take nitrogen from the air and transfer it into the soil through nodules found on their roots. The legumes can be planted to help the soil recover after long periods under food crops. Nitrogen is replaced without using fertilizers for the same purpose.

In addition to their compatibility in the field, legume and maize combinations complement each other nutritionally. By eating both, human beings can receive their complete protein requirements - without adding meat and dairy products. Other plants have similar relationships, both symbiotic and nutritional.

Pigeonpea for food and shelter

Scientists in Malawi, Nigeria, India and northern Australia suggest that the perennial pigeonpea which is a legume can produce as much biomass as Leucaena leucocephala, which is the most productive tree species in the world. The pigeonpea produces food, fodder and firewood. Its leaf litter improves soil fertility.

Field trials by scientists working on genetic improvement of dry land crops for the International Crop Research Institute (ICRISAT) in India, show that the pigeonpea produces a total of 15 tonnes per hectare of dry biomass composed of two tonnes of grain per hectare; three tonnes of leaf litter per hectare; and one tonne of crop residue left on the field. The scientists in India have demonstrated the crop's usefulness by building a hut of the thin stalks and a fence with the thick stalks.

Alternatives to pesticides

Farmers usually know the plant species in their area that have insecticidal properties. There are about 1,600 plant species known to possess pest-control properties, and encouraging farmers to use indigenous plant materials, rather than chemical pesticides will reduce costs and may be safer. Such plants with insect repelling properties include tobacco, pyrethrum, onion, garlic, chillies, the castor oil plant and the neem tree.

Crop management practices

Rotation: Many traditional agricultural practices rely upon rotation as a method to control insects, weeds and plant diseases.

Intercropping: Intercropping can reduce the spread of pests and disease organisms. By growing non-susceptible crop plants with host plants in the same field, the spread of pest and disease organisms among susceptible crops can be considerably reduced.

Planting date: A change in planting time can help to prevent attack by insects and disease. Insect reproduction cycles are often attuned to the growth of plants. However, if crops are planted a few weeks before or after the normal time, farmers may be able to by-pass the stage of the insect that causes the most damage to the crop. Early maturing varieties may also escape insect attack.

Plant spacing: Modifying the spacing of crop plants by decreasing or increasing plant densities may provide a measure of pest control. For example, densely planted grain crops suffer less from insect attack, whereas narrow-row planting of cotton can discourage boll weevil infestatons.

Sacrificing host crops: If a certain type of crop is preferred by a pest, one way to control the pest is to plant that crop along with the desired crop and sacrificing the alternative crop that serves as a trap to the pest.

Resistant varieties: Some crop varieties are resistant to attack by disease or insects. Local farmers should be asked to identify such varieties and encouraged to plant them.

Mechanical control practices: Sometimes the easiest, least costly and most environmentally sound means of controlling pests on agricultural land is by using mechanical control methods, which might, for example, involve:

- burning a field prior to planting
- flooding the field
- normal tillage practices such as ploughing and harrowing
- killing insects by trapping
- trapping birds in nets
- smoking out or trapping rats

Therefore organic farming has much to offer the smallholder farmer. Most of the techniques are simple and involve no costly inputs. However they may require extra labour which can only be supplied by group effort. It would be wrong to believe that chemical fertilizers are always

dangerous or environmentally unsuitable. Soil erosion for example is at its most dangerous when land is bare. This is often a direct result of infertility which can best be overcome by adding nutrients. Chemicals do have a place but other methods work also.

CONSERVING INDIGENOUS GENETIC RESOURCES

General information

In many African countries food production and rural incomes have been based upon the introduction of new improved or hybrid cultivars in food and cash crops. As a result, traditional crops are being ignored and local crop varieties are rapidly lost.
The conservation and sustained exploitation of indigenous plant genetic resources offers tremendous potential for addressing Africa's problem of food insufficiency. Utilisation of indigenous food crops goes a long way to improve the nutritional quality and food diversification of both rural and urban dwellers. Both modern and traditional cropping systems could be combined to conserve these genetic resources, which in the long run provide insurance against the failure of one dominant crop. This can be done through communities that utilise these resources on a daily basis for their livelihood.

The strength and resistence in indigenous crop cultures should not be underestimated. Though they may not be as productive as the exotic or hybrids in the short run, the long term gains are invaluable. The dependence on external sources of seed or planting material is reduced and the market often offers a premium for local varieties which are considered to be better tasting. Conservation of indigenous crops starts from the seeds, thereby reducing dependance on commercial suppliers of expensive and at times, unsuitable or unreliable seed. Unlike indigenous crop seed, hybrid seed does not reproduce itself and has to be bought each season. Traditional crop seed, by contrast, is harvested on the farm, and except for times of disaster, is always available.

Traditional plants are often suitable to the local environment, making up for lower productivity by being more hardy than the newly introduced improved crop varieties and exotic plant species. Also, high yield hybrids require costly chemical inputs such as fertilisers and pesticides, which rural farmers can ill afford.

There are many problems and challenges farmers will continue to face unless they are made aware of the issues concerning genetic resource conservation and its utilisation. A major issue is that use of hybrid cultivars will continue to undermine the gene pools of indigenous plant species, yet the latter are resistant to disease, are well adapted to the local environment and have a host of many uses ranging from food to fuel, fodder and medicine. The potential of these species will be lost forever unless tapped. Future research in plant breeding will need a source of these older varieties to utilise in breeding experiments.

Although there has been some progress in public awareness of that potential, there is insufficient environmental education in general and genetic resources in particular. Against this background, technical services provided by agricultural and forestry extension workers often promote the introduced species.

However, farmers alone cannot be expected to become guardians of a nation's genetic resources. The attraction of increased yields from new hybrid varieties is very clear to the farmer who is usually aware of the varieties available and the advantages and disadvantages of each. There is a clear need for the National Agricultural Services to be aware of older varieties and preserve a collection. Farmers will usually assist by growing plots of the less popular varieties if encouraged to do so and the need for this genetic preservation is explained. However, no farmer will sacrifice short-term yield increases for the rather hazy notion of genetic preservation.

Indigenous crops

A quarter of Africa's population - more than 100 million people - constantly grapple with food insecurity, a situation which exposes them to serious health risks and famine. Food self-sufficiency can only be achieved if households can produce it, and where they do not farm, are able to buy enough food for an active and healthy life.

Why are people starving in Africa, a continent that used to be able to feed itself? Among many other reasons, one is that hunger and famine are caused by underuse or misuse of existing food resources. The world contains at least 20,000 edible plant species. However, throughout history mankind has used only a fraction of these for food, and over the centuries the tendency has been to concentrate on fewer and fewer species. Today, most of the world's food comes from a mere 20 crop species.

Growing the almost forgotten indigenous crops would broaden the base of Africa's food supply. Africa, known as the world's "hungriest continent" because of the severity of the food shortage, would benefit greatly by utilising available foods.

In Africa the selection of crops is notably narrow, with many of Africa's major foods - like maize, ground-nuts, sweet potatoes, Irish potatoes and yams - having originated elsewhere. Africa's indigenous knowledge base for food production, especially traditional food crops, is gradually being lost. Traditional food crops are abandoned because they are looked down upon as being inferior to exotic crops or because the farmer has no scientific backing and local varieties are ignored by agricultural researchers. Some food crops are simply viewed as weeds by researchers and thought to be nutritionally inferior by farmers. Because of low demand and subsequent poor prices, commercial farms are not interested in many of these crops.

Though increasingly ignored, these traditional food crops have an advantage over exotic ones in that they are environmentally sound and culturally accepted. Historically, the use of indigenous knowledge in food production has been the basis of a sustainable, agricultural livelihood in Africa. The erosion of that knowledge began during the colonising of the continent in the seventeenth century. Through international trade, new agricultural practices were enforced on indigenous communities who had to meet the demand of the industrialised by growing export crops as well as crops for local consumption of a growing European community based in Africa. Thriving indigenous food systems gradually declined as a result.

Today, also due to international trade, agricultural crops are African countries' main foreign exchange earners. There is a tendency for women to grow less food for family use and men to grow cash crops. Therefore tea and coffee replaced staple foods like sorghum and millet on the

best land. Women spend more time helping men care for the cash crops, leaving the women with less time to cultivate their own plots where they grow food.

The overall result is that less food is grown or is grown on marginal land. Less food grown means less food at the family level, and at the level of the nation it means famine. Rising food prices mean poor families go without food or buy cheaper food which may not be nutritious. The implications for a community which is not able to grow enough food have to be considered where cash cropping is the major agricultural occupation. Women may take initiatives to balance this situation by forming groups to devise ways to improve food supply by setting up kitchen gardens - vegetable plots near their homes. Fruit trees could also be grown in the home compound and farmland.

It can never be over-emphasised that women are central to Africa's food security since most African farmers are women, and increasing their productivity will determine both agricultural performance and rural incomes.

Drought resistant crops

Ye-eb

The "ye-eb" is a small leguminous bush native to the border region between Somalia and Ethiopia. This plant, which produces a nutritious and tasty nut, survives in the Ogaden Desert where rainfall is sometimes as low as 150 millimetres per year. The seeds taste like cashews, hazelnuts or macadamia nuts. With their high level of protein and oil they make highly nutritious and balanced food.

The plant is so hardy that during drought it's seed is sometimes the only food that nomads can find. It is therefore a very important famine food which is largely ignored until drought and famine strike. During the 1984 and 1985 drought years in Sudan many people existed in the western provinces by searching out such foods, to bridge the hunder gap until the rains arrived or aid agencies provided grain.

In the arid hinterland of Somalia, where the ye-eb once grew profusely, the plant is now so reduced by regional droughts, war and refugee concentrations, that it is threatened by extinction. Experimental trees have been planted in other parts of Somalia, in Kenya, Botswana and Israel. Experiment and research may save the plant that may become one of the most valuable of all arid land resources in future.

Tef

The cereal grain tef, which has great tolerance to drought conditions and is the main staple of Ethiopians, is little known outside the country. Tef's potential as human food has been overlooked, though it contains a lot of iron and other nutrients; in a few places it has been successful as fodder. The cereal, an Ethiopian native, is also grown extensively in South Africa where it is cut to make high quality hay.

Tef is a grass, has high potential as a crop for countries with low rainfall or soil problems. Scientists are now only beginning to recognise the nutritional excellence of tef, which is consequently gaining recognition as a potential world crop. A similar crop called 'acha' is also

used in the Jos Plateaux of Nigeria where the harvesting of a local grass provides a welcome addition to the diet.

The Marama bean
This bean is an African desert legume which grows as a wild vine in the Kalahari region of Southern Africa. This savanna plant grows prostrate, sending out long, spindly stems along the soil surface in different directions. Below the ground it produces a tuber often larger than a sugar beet, while above the ground it produces nutritious, tasty seeds.

The vine, found mainly in the savanna is a staple of Africans living in the Kalahari Desert. The seeds are a rich source of protein and energy that nourish people in areas where few conventional crops can survive. After roasting, they have nutty flavour comparable to that of cashew nuts.

The seeds have a protein content almost as high as soya beans, and an oil content twice as high. This puts the marama bean in the same category as the world's premier protein crop. The bean has the advantage of being able to store well and remain edible for years.

The Winged bean
A crop native to South-East Asia, the winged bean has great potential for feeding many in the Third World. The bean is beginning to make its way into Africa.

The popular name for the winged bean is "supermarket on the stalk", since one can eat almost every part of it. The leaf, rich in vitamin A, tastes like spinach; the shoot, like asparagus; the flower, like mushroom. The seed virtually duplicates soyabeans in nutritional value while the tuber contains two to four times the protein of a potato.

The bean has other advantages. It is relatively easy to grow, fast-growing and drought resistant. This crop has nitrogen-fixing capacitities which enable it to make its own fertilizer. It demands little space; one hectare of winged beans produces nourishment equal to five or six hectares of most other crops.

Currently there are known 2,000 varieties of the winged bean, which is a potential money maker. However, the bean will not grow in areas with temperate climate. Although it is mostly pest resistant, it is recommended that farmers grow more than one variety as different species are affected by different pests.

Sorghum
Sorghum, an increasingly undervalued crop, produces a grain of similar food value to maize yet provides a more consistent yield in areas of marginal rainfall.

Sorghum's ability to resist drought is due to a number of factors. Sorghum leaves can recover and function efficiently after wilting. If the main shoot is damaged through prolonged drought, new shoots can grow away from the base when moisture becomes available. The plant's root system occupies the soil more extensively than maize roots, and trials have shown that sorghum will outyield maize not only where moisture is deficient but also where excessively wet conditions exist.

However, there are a number of problems affecting sorghum production. The main problem with sorghum is that there is a universal preference for maize, and throughout Africa farmers try to grow maize where sorghum would be ecologically more suitable. The only solution to this problem can come from breeding, or selecting, improved varieties of sorghum.

AGROFORESTRY AND COMMUNITY FORESTRY

General information

Agroforestry is a relatively new word used to describe all land-use systems and practices in which woody perennials are deliberately grown on the same land as crops and animals. The practices may involve trees with crops, trees with pastures, trees with animals, and trees planted in special places in the landscape. The different components interact biologically and economically. For example, nitrogen-fixing trees may improve crop yields. In fact African farmers have always mixed trees with farming but the new science of agroforestry improves methods and species.

If agroforestry is to serve people's needs in a variety of rural settings, it is important to see it as an 'approach' rather than as a fixed arrangement of plants, or a particular combination of animal and plant species. Balanced land-use should provide useful products that conserve and restore natural resources, and build self-reliance rather than create dependence on expensive imported materials.

Agroforestry practices serve many purposes and supply many products to a wide variety of land users. Trees may provide food, shelter, energy, medicine, cash income and raw materials for handicrafts. Trees may serve as savings or investments and improve the quality of natural resources - including soil, water, vegetation and wildlife.

Indigenous knowledge

In order to be effective, any land-use system should be based on the traditions, knowledge, skills and ongoing experimentation of the rural communities. Currently, many of the succesful traditional systems are being forgotten due mainly to modernisation and increasing demands of growing populations on natural resources.

The challenge is to maintain those agroforestry systems which are now under threat, and to improve and adapt long-standing practices to the changing circumstances. It cannot be stressed often enough that various systems of this kind have in fact sustained people for generations in a variety of African environments. Only recently have efforts been made to systematically record the medicinal uses of trees.

Agroforestry in Africa

Listed below are some of the common locations where agroforestry is practiced in Africa:-

Croplands
Trees, usually permanent and full sized, are often dispersed in croplands either singly or in clumps. Some farmers plant trees to obtain valuable products; to increase production of the surrounding crops; or to improve the soil and water conditions for crop growth. The 'parkland savanna' landscape around Kano, Northern Nigeria is an example where farmers have left valuable trees in fields.

In contrast to dispersed trees in cropland is the arrangement where closely spaced trees are intercropped with annual plants. While this practice is more common in humid areas, it may also occur in the drier zones of Africa in both rainfed and irrigated croplands.

Contour vegetation strips with multipurpose trees and tree crops are usually introduced to prevent soil erosion on sloping croplands, while at the same time providing useful products such as food, fodder or wood. Multipurpose trees, grasses and other herbaceous plants are often combined along the edges and cultivated spaces of soil and water conservation structures, ranging from contour bunds and ditches to bench terraces on cropland. These plant combinations can produce useful items for home use or sale while helping to stabilize and protect conservation structures from direct exposure to rain.

Alley cropping
Alley cropping often consists of dense hedges of multipurpose trees planted in rows between wider strips of annual crops. Branches of the hedges are cut to produce mulch, which is applied to the cropped areas to fertilise and cover the soil. Alley cropping has now become an exact science in many areas with careful choice of species and great attention to detail such as the width of rows.

Fallow cropland
Fallows are croplands left without crops for periods ranging from one season to several years. The objective is to control insect pests, diseases and weeds associated with previous cropping, and to recover depleted soil nutrients. By planting or encouraging the correct tree species the nurient levels can be recharged quickly. Deep rooted trees which are nitrogen fixing are especially important. The case study of gum arabic (Acacia senegal) in Sudan is an illustration of this technique.

Pastures and rangelands
Farming systems combining naturally occuring trees and shrubs of particular value for animal fodder, are widespread throughout sub-Saharan Africa. In addition to high-protein fodder for livestock, the trees may provide building poles, fuelwood, fruit or cash crops. The practice of stall-feeding animals rather than allowing them to roam encourages fodder production off the farm.

Boundaries and border species
Living fences are used throughout Africa to protect people and their dwellings, crops, animals and other property. Boundary markers are different from living fences, as their main purpose is to make boundaries clear. Windbreaks are often located on boundaries between properties and may take various forms, ranging from shelter belts surrounding whole villages to individual windbreak strips for one field or a single homestead.

Stream or river banks
Gardens may be located along the flatter, more stable portions of river and stream banks or on the edges of lakes and ponds. These gardens often include trees, shrubs, and woody vines as well as vegetable crops, medicinal plants, spices and root crops. These sites have a unique production potential because of their access to water and fertile soils.

Home compounds
Agroforestry practices in home gardens range from a few trees and shrubs in a small vegetable garden to a dense plot of fruits, vegetables, herbs and cash crops trees planted for timber, fuelwood and fodder. The home garden may serve as a specialised plot within a larger production system, or it may represent the main cultivated plot and major source of food and cash income for the family with little arable land. Improved varieties of fruit trees are very important for these gardens.

Public and shared places
The use of woody plants in public places may range from a single tree of religious or cultural significance or as shelter. Trees that provide shade, fruit or fodder may be planted in sites such as market places, or close to wells, clinics, places of workshop or meeting places.

Public planting may be in woodlots, plantations or gardens, which combine trees with shrubs. Roadside planting may be used to demonstrate agroforestry species and practices; this has worked well in parts of India with trees also planted along irrigation canals. People may harvest the grasses or cultivate annual crops in these tree-lined strips of public land.

Woodlots involve more intensive management of trees and other plants in a smaller area. Permanent woodlots may be sited almost anywhere in the landscape, from cropland to pastures, and are very important in the protection of watershed areas. It is now recognised that protecting the year round flow of any river needs good vegetative cover throughout the catchment. Often this may require the reafforestation of hill slopes which have been added. The Save catchment of Zimbabwe is being treated in this way following the silting of the river, and damage to dams.

Agroforestry plays a part in this and can make wooded areas more useful by protecting and improving soil and water resources, by increasing the production of tree products or by adding new plants and animals. This may involve the selective cutting and protection of existing forest plants, or it may extend to the introduction of multipurpose trees, crops or livestock.

Where trees are planted to prevent, or reverse erosion in forest clearings, they may be combined with soil and water conservation structures, as well as plants for ground cover.

Women and agroforestry

Women who live in an area and use its resources possess valuable knowledge about the land and its uses. Often they can identify useful species and areas where one can get high quality plants and seeds. For any given species they may know the plant habitat, growth rate, methods of propagation, compatibilty with other plants and interaction with animals and insects. The women

also have a wealth of information on what pest and diseases attack specific trees, as well as the uses, management and ownership of trees. Such knowledge - even where local plant species are not used directly in agroforestry systems - can help in choosing new species and combinations which may be compatible with the chosen planting site. The women's past experience, traditional knowledge, judgement, and skills make a significant contribution.
Women's involvement through active local participation, will help ensure that new practices in agroforestry are widely adopted. Throughout Africa, women engage in agroforestry mainly through their home gardens. Although these gardens may be managed by either sex, they are most often managed by women, whose mobility is limited by custom, and responsibilities of child care, food processing and preparation.

Home gardens provide land where women can cultivate agricultural crops and they are often seen by women as an extension of the home. The gardens make it possible for women to practice farming even in a small way.

Women and fuelwood

Wood and charcoal have become the mainstay fuel for nearly half the people in the world. But wood is in short supply and the situation is rapidly worsening. The poor are worst affected, with women bearing the largest burden.

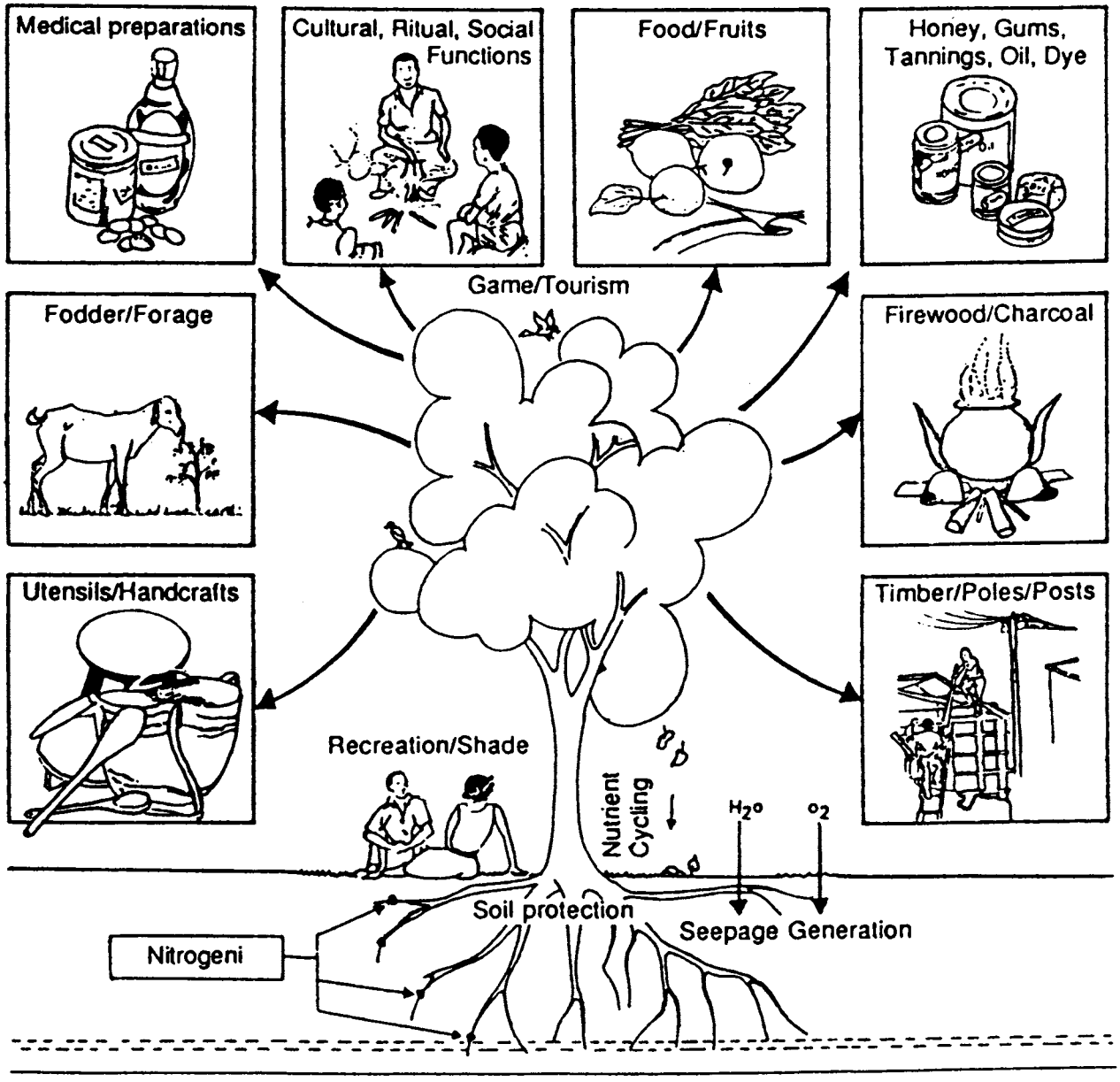
Women throughout Africa spend a substantial part of their day gathering wood, and are forced to walk further and further to fetch the dwindling supplies as the fuelwood situation worsens. The weight causes them to suffer from back and head pains. Some women may hope to spend one whole day collecting a wood supply to last them three days. Journeys of more than 25 km are common in Niger.

The shortage of firewood supplies have affected the urban poor also, as the price hikes correspond with the increased demand for the commodity. Scarcity may force women to prepare foods that cook quickly, which may be less nutritious. In the rural areas, substitute fuel from animal dung, and agricultural residues means that these are no longer available to fertilize the soil, so crop yields drop.

The only energy most people can afford is what nature provides, and that usually means the few plants and trees around their homes. For decades to come, before African countries can afford geothermal, wind and solar energy, wood will still remain the main fuel. So trees and woodlots must be cared for today.

People are beginning to recognise the importance of the link between women and fuelwood. Reafforestation projects now consider the involvement of women who start the seedbeds and tend the young plants. As the main gathers of wood, women are well placed to be its guardians. Fuel for cooking and heating is a concern closer to women than to men, therefore it is in the interest of the women to protect forests from being cleared. Women have accumulated knowledge about indigenous trees and plants, as well as problems of introducing new species; tapping into this pool of information can save both time and money.

Figure 19 - Trees provide many products and services
Source: ICRAF



What kind of trees should be planted? Fruit, fuel, fodder? If women are expected to provide the fuel for the community, it is essential that their requirements for cooking be taken into account. A cooking stove which uses less fuel, does not emit eye-stinging smoke and noxious fumes, can also make a woman's life more pleasant. Also, if the stove can be adapted, or a communal one constructed which allows her and her neighbours to smoke fish for sale in the market for instance, then new horizons begin to open up.

Case study: fuel efficient stoves in Togo

Cooking fires account for much of the wood consumed in Africa where the majority or rural women cook their family meals over an open fire, often with the cooking pot balanced on three stones. With this method only some of the heat warms the cooking pot; the rest escapes into the air. Environmentalists believe trees can be saved if women used more fuel-efficient stoves to cook. There are many types of these stoves, but the principle is the same with all of them; if heat is concentrated in the stove instead of being allowed to escape, less fuel is needed to cook a meal.

Women in Togo now benefit from such a stove, which is nothing more than a cooking pot resting on three stones over a fire with a mud wall built tightly around it to hold heat. This simple technology was introduced in Kara region of Northern Togo by the Centre for Appropriate Technology and is being promoted by the Ministry of Public Health, Social and Women's Affairs.

The Ministry's programme to teach farmers about the stove is simple and includes training many women who are illitrate. Once the trainers have been taught, they gather their neighbours together for instruction. Since the stove takes only a few hours to make, it costs next to nothing and is constructed from local materials, at the end of the training session each woman is ready to build her own stove. So popular has the stove become that the village of Koumonde alone already has over 2000 of the new stoves.

A government study covering Kara region found that over 95 per cent of the new stove users were satisfied with the savings of wood they had achieved. The study found that the savings varied with the size of the stoves. While small ones used 20 to 30 per cent less wood than regular stoves, larger ones achieved savings of 40 to 50 per cent.

The new stove is of great benefit to the women users in Togo, where cooking accounts for 87 per cent of total wood use, and consequently, wood supplies are becoming scarcer and dearer. Some women are forced to walk up to 10 kilometres to gather enough wood. Kuomonde women are delighted with the amount of time they can save with the new stoves. Not only do they gather wood half as often as they used to, but they have time for their work both around the home and beyond it. Besides, the fire in these cooking stoves is under control, so there is no risk of anything being set on fire. Also, children do not get burnt as easily, with these stove.

While this stove is gaining popularity in rural area, Togolese women in the towns prefer a metal charcoal stove designed by researchers at the University of Benin in Lome. According to its

designers, this stove, which is under further modifications to improve its efficiency, allows a fuel savings of 30 to 40 per cent. This is a boon to low-income urban families, who sometimes spend more than a quarter of their income buying fuel.

Case study: protection of forests in India

In the early 1970s rural folk in the northern villages of Uttar Pradesh in India witnessed a remarkable, non-violent ecological movement which is now popularly known as the Chipko Movement. The movement clearly demonstrated as no other movement did before, that women have a deep commitment to preserving their environment.

The first incident in a series that launched the movement took place in March 1973 in Gopeshwar village where 300 ash trees in its vicinity were destined to be cut by a sports good manufacturer, having been authorised by forest officials.

Having decided not to allow a single tree to be cut down, the villagers - mainly women - walked in a procession in which they beat drums and sang traditional songs. They embraced the trees to prevent them being felled, forcing the agents of the sports company to retreat.

The Gopeshwar incident triggered a chain of similar protests, in which the participation of women was very evident. With their newly acquired confidence as a result, they began demanding to be members of village councils to ensure the protection of forests. The women also appointed watch women who received regular wages to supervise the extraction of forest products as well as to plant saplings.

The original purpose of the industries was to improve the quality of rural life; but now commercial interests have become paramount. At another level, there is a clash between men and women over the use of trees. Not only are women doing battle with the authorities over what trees should be planted where, but there husbands also have their own interests. All parties concerned are trying to answer the question:

What kind of trees should be planted?

"Fruit trees", shout the men in Gopeshwar, home of the Chipko movement. "No," the women resist. "The men will take the fruits and sell them by the roadside . The money will only go to buy liquor and tobacco. We want trees for fuel and fodder", the women insist.
In this case both trees are planted, but only because the Chipko movement women have grown strong enough to have their views respected.

Food from trees

In many parts of Africa, tree species providing food grew wild traditionally. A growing number of farmers on the continent are now planting such trees either for commercial purposes or for domestic consumption.

The best known human foods from-trees are fruits, leaves, nuts, seeds, oils and extracts, besides indirect foods like honey and insects. Most of these are only available for certain periods of the year. Trees that provide food for people in the lean period, and fodder for animals in the late dry or very early seasons, can be especially beneficial to farmers and their families. Fruiting periods vary and can occur at different times of the year, lasting for periods of one to six months. Growing a range of fruit trees can ensure a fruit supply for the family throughout the year.

Mangos produce at the beginning of the rains. Citrus such as orange and lime produce mostly at the end of the rains and in the early part of the dry season. Citrus fruit is usually available in large quantities for relatively short periods.

Besides fruits which are directly consumed, some trees provide food which is prepared in a number of ways. The locust bean is a perennial tree legume in Africa. The beans of this savannah species in West Africa mature in the dry season during February and March, and are fermented into a high protein and fat food, "dawa dawa" which is used as a soup ingredient. Dawa dawa stores well.

The baobab and the tamarind may be eaten fresh, but they can also be cooked. Both species are now recognised as having great potential for commercial production of drinks, jams and confectionery. Baobab is an important source of dietary calcium.

The mongongo-tree is a staple food of the Baswara - or Bushmen Kalahari, in Botswana. The mongongo begins fruiting in April at the end of the wet season, and harvesting continues until September. The fruits are prepared by steaming and peeling, and are then cooked to separate the flesh from nuts. The flesh is then eaten, and the nuts roasted and cracked.

Other tree foods are available all year round or can be stored. The oil palm provides fruit which is a valuable source of vitamin A and energy in West Africa. The plant starts to yield three to four years from transplanting and crops throughout the year, reaching a peak in the early rains. Palm wine is also a part of the diet to varying degrees.

Food availability over an extended period can be achieved through the "storage", of some fruits on trees, or picking and drying them for storage in the home. Nuts such as those of the mongongo trees can be stored. Perennial and seasonal tree foods can be relied on in famine or years with poor yields. Fruits, nuts, seeds and berries can all serve this function.

There has been very little emphasis and encouragement on growing indigenous food trees on a farm. Extension workers instead promote the cultivation of exotic species on which husbandry information is available. The workers also prefer exotics for their commercial value which have an established commercial market and provides the farmer with an income.

Nevertheless, the potential for exploitation of indigenous tree foods can be explored.

Case studies

The "miracle tree"

In many languages, Leucaena leucocephala has become known as the "miracle tree". Its products can be eaten, fed to livestock, harvested for fuelwood or charcoal, used for timber, spread as green manure on farmland, and planted to stabilise and enrich soil.

Young pods and seeds can be safely eaten in small quantities, but they contain the poison 'mimosine' which if too much is eaten causes illness and loss of hair. It does not affect ruminants. A most important attribute of the multi-purpose Leucaena is it's nitrogen-fixing capacity, which rates it as an ideal tree for agroforestry. For this reason farmers grow it on an estimated 2 million hectares, in every tropical region in the world. There are 13 species of the genus Leucaena in the extensive family of legumes.

Farmers in South-East Asia have exploited these "living nitrogen factories" for decades by interplanting Leucaenas in their maize fields. Before the maize is planted, the trees are cut and branches are spread on the ground where they shed their leaves which provide fertilizer. The trees are often cut again later to nourish the young plants. After the maize is harvested, the Leucaena is allowed to grow tall to provide wood for fuel and to suppress weed growth.

Leucaena grows quickly during rainy seasons and can survive long drought. While they grow best in areas where annual rainfall is more than 1000 millimetres, they can survive, once well established, with annual rainfall as low as 500 millimetres. Annual yields are commonly reported in the range of 45 to 70 tonnes of fresh wood per hectare if growth conditions are suitable, grouping it among the world's most productive trees. However, it should be mentioned that Leucaena does not tolerate acidic soils; does not grow fast on land that is over 1500 metres above sea level; and has an abundant seed production that has made it a weed in many places.

Gum arabic in Sudan

The Acacia senegal has a most interesting drought defence system; to avoid dehydration when the wind, animals or insects damage its trunk, it secretes a thick liquid known as gum arabic. The tree's rough thick bark protects it from the heat. Its main roots can descend one metre, and its secondary roots are long and supple and can spread out through the sand so the strong winds from the desert cannot uproot the tree.

The six metre tree, with its low thorny branches, is well adapted to the Sahelian climatic conditions. In Mauritania, northern Senegal, Niger and Mali, shepherds and nomads collect the gum when they go in search of new pastures for their flocks and herds. The gum tree is specially enjoyed by goats, cattle and above all - camels. People have long harvested gum arabic as something rare and precious. It is used for glue, sweets, pills and lozenges; it stabilizes wine and fizzy drinks; it is a fixative for paintings and ceramics; and people use it for starching their traditional costumes, for cooking, and for medicine. Both pastoralists and farmers tap the trees but there is now little export demand for the gum, and incomes from gum arabic are reduced despite having local use.

Sudan is the most important of the gum arabic producing countries, with 80% of the market. The Sudanese farmer grows millet for five years on her/his land then plants gum trees. They help to

refertilize the land as the gum tree is leguminous and fixes atmospheric nitrogen in the soil. This fallow period lasts about 15 years during which the farmer gets profit from the land by harvesting the gum, and at the same time enriches the soil. At the end of the period when the trees are no longer productive, millet can be grown again for five to six years. A further advantage of this system is that the gum can be collected during the dry season when other agricultural activity is minimal.

Doum

The livelihood of rural folk in sixteen villages in one area in Mali is increasingly tied up with the doum palm. Like the coconut palm, wherever it is grown, every part of the doum has some use for the Malian villagers living near the doum palm forest Tarabe, which is an area along a tributary of the River Niger in N'Gouma district, of Douertza Region.

The villagers around the forest, use doum palm leaves to make mats, baskets, ropes, brooms and thatching. The stems provide timber, firewood and high quality charcoal. Parts of the doum go into the manufacture of dye. The fruit is edible and so is the pith, which is also a source of medicine.

The doum tree is currently under threat due to the mounting demand for the raw materials which the trees supply. Population pressure, coupled with a drop in cereal and animal production levels, make the local populace increasingly dependant on the palm as a source of income and food. Tarabe has also absorbed many migrants - mainly women - from northern Mali where the effects of drought and over-exploitation of the doum are more severe.

Traditionally, doums were not regarded as the property of either an individual or one village, but rather as a communal resources to which everyone had unlimited access. Since the colonial era the forest has been State property. However, due to few resources being available for government forestry services, forestry management is limited to little more than granting permits to cut wood and imposing a fine for unlicensed cutting.

So far, the State system of permits and fines has not managed to curb over-use of palms, which may lead to extinction. Under these circumstances, the local community have not fought against illegal cutting since they have no power to challenge anyone holding an official permit.

The situation raises the question as to what the most appropriate management technique the locals or the State could adopt to safeguard the precious palms. To find solutions certain factors have to be taken into account. One is that the over-exploitation of the doum palm is only one aspect of wider economic crises evident in cereal deficits and loss of livestock. Attempts to conserve the doum should therefore be part of an attempt to stabilise agricultural production as a whole. In the same vein, the doum palm forests should be seen as an integral part of Mali's forestry resources in general, all of which need conserving.

Case study: conservation among pastoralists in Kenya

Turkana pastoralists in northern Kenya have a long tradition of making the best of a harsh environment. They are able to adapt quickly to changing circumstances by applying indigenous knowledge. The pastoralists of Turkana district who occupy the northern part of Kenya's rift valley, have survived on what is largely arid and semi-arid land and continue to do so through evolving - over long periods of time - land and resource management strategies in keeping with their culture and environment.

Many of the land management strategies revolve around trees, making trees vital to the Turkana way of life. Indeed, the woody vegetation constitutes one of the most valuable resources the district has. Because of the relative importance of trees and other vegetation, the Turkana living in the district often possess very detailed and extensive knowledge about trees and bushes. This knowledge reflects the life style of the pastoralists, who attach great value to trees and will rarely cut down a valuable tree. Trees are used on a sustained conservation basis. Thus important ones are not cut because of their relevance to the survival of people and livestock, while the less important trees and bushes may be cut without permission from the elders.
During the dry season small branches will be pruned and pods harvested from trees for livestock feed from specific trees like Acacia tortilis and Acacia albida. The only woody species that are actually cut are the less useful bush species which are used for fencing homesteads and livestock enclosures. With reference to woodland management it has been found that there is no evidence of deforestation or other forms of environmental abuse in South Turkana in the recent past because the people have adapted their lifestyle to the ecosystem. Consequently the vegetation survives better, for longer periods, and often continues yielding during the dry season while retaining fodder quality.

As pastoralists the Turkana have tried to manage their environment to the optimum, and getting the most out of it in terms of livestock production without destroying the rangelands in the process. They still apply a traditional method, where grazing is carried out under a co-operative grazing community known as "adakar" which represents a semi-permanent cluster of homesteads which come together in the wet season.

Though stock tend to move seasonally, goats, sheep and camels usually forage in the vicinity of the homestead. Cattle are grazed near the homestead in wet seasons. When it gets drier, stock will gradually move to the hills where they will graze during most of the dry season. This system makes optimal use of the flush of annual grass and bushes in the lowland, while giving the vegetation a chance to set seed.

Within this grazing pattern, the Turkana set aside varying amounts of land for reserve grazing. This usually takes the form of hills reserved and guarded, and may cover thousands of hectares. The reserve grazing is used, at the discretion of elders, during the dry season or drought years.

NOTES FOR TRAINERS

This section of the manual is designed primarily as a reference, to show readers the range of conservation field techniques available, and to direct interested users to sources of further information. A trainer would do best to take training participants to the field to see the techniques in place, and to hear from the local rural women how they developed these methods. There are also several exercises which trainers could use to stimulate interest in the local conservation techniques practised by women and men of the area.

Exercise 7: Traditional knowledge acknowledged

Background
In many rural areas, women and men have been using their own conservation measures for years. It is all too easy to ignore these traditions while seeking for new answers and techniques. This exercise is a means of reminding participants of the body of knowledge, beliefs and practical measures which rural people make use of in their agriculture.

Method
Ask the participants to think of some things they have seen in their fieldwork which they found intriguing or interesting - traditional agricultural practices which the farmers use, beliefs about the relationship between humankind and nature, local terms for particular natural resources, and so on. Allow the participants to think over this request and report back the next morning. Often it proves difficult to jog people's memories on these traditions, but once a few are identified, it becomes much easier. Be ready with a couple of your own examples, to start off the process if necessary. Make a list of each practice or belief identified. Below is the result of a brainstorming session by a group of soil and water conservation officers in Kenya.

Box 15: Farmers' beliefs and practices reported by participants at a Rapid Rural Appraisal workshop in Kenya as intriguing, unusual or untested.

1. Grevillea planted with coffee reduces pests on coffee;
2. Cutting the sacred fig tree leads to landslides;
3. Insert 4-5 nails into the trunk of citrus to help bear fruit;
4. Insert nails into trunk of coconut to prevent leaves from falling;
5. Mix maize flour with cement to control rats;
6. Planting Croton too near the house will lead to the roots spreading to the house, causing a series of deaths, beginning with the husband, wife and the children;

continued ..

Box 15 continued

7. Married women cannot harvest banana;

8. Insert a stick in the trunk of a papaya to change the sex from male to female;

9. A landslide was caused when an uncle snatched a farm from a son who had inherited it following the death of his father. The son left for Nairobi, and the farm thought - I cannot be farmed by anyone except for my family, so it jumped into the river;

10. If soil is placed into the top of a young coconut, then if it is attacked by Rhinocerus beetle the soil will become lodged between the head and the carapace and thus the beetle will die.

Source: Pretty, J.N. 1990. Rapid Catchment Analysis for Extension Agents: Notes on the Kericho Training Workshop for the Ministry of Agriculture, Kenya. IIED, London.

Exercise 8: Do-it-yourself case studies

Background

A brief exercise encouraging participants to place conservation measures in the context of the local cultural environment. This exercise can also add to the trainer's repertoire of local case studies, for future training activities. Ideally, this work would be done following a field trip to look at local conservation measures.

Method

Ask the participants to identify a particular conservation measure which is important in the area with which they are familiar. If there are many participants ask them to divide into groups of 3 or 4, each group to write up a brief case-study of the use of one measure. Try and get a range of measures, perhaps one from each of the main headings in this section of the manual, i.e. soil conservation, water conservation, organic farming, agroforestry and indigenous crops. Ask the participants to include details on who is responsible for the conservation measure (introduced from outside or an indigenous practice; done by women or men) and what level of labour is required for undertaking the work.

Finally, ask each group to read their case study to the other groups.

NETWORKS AND NGOs CONCERNED WITH ENVIRONMENTAL CONSERVATION AND AGRICULTURE

1. Kweng Rural Development Association (KADA)
   Private Bag 7
   Molepolole
   BOTSWANA

2. Association for the Advancement of Agricultural Sciences in Africa
   P O Box 30087
   Addis Ababa
   ETHIOPIA

3. Ethiopia Service of Documentation and Communication Development
   P O Box 5788
   Addis Ababa
   ETHIOPIA

4. Ghana Assembly of Women
   P O Box 459
   Accra
   GHANA

5. Duksfofu Habsbs
   P O Box 200
   Kpando
   Volta Region
   GHANA

6. African Network for the Development of Ecological Agriculture (ANDEA)
   P O Box 444
   Mamprobi-Accra
   GHANA

7. African NGOs Environment Network
   P O Box 53844
   Nairobi
   KENYA

8. International Council for Research in Agroforestry (ICRAF)
   P O Box 30677
   Nairobi
   KENYA

9. Green Belt Movement
P O Box 67545
Nairobi
KENYA

10. Environment Liaison Centre International
P O Box 72461
Nairobi
KENYA

11. Kenya Energy and Environment Organisation (KENFO)
P O Box 48197
Nairobi
KENYA

12. Materi Girls Centre
P O Box 194
Meru
KENYA

13. Mokhatlo oa Thero ea Malapa Lesotho
P O Box 340
Maseru
LESOTHO

14. Khau ea Khosona Mohato
P O Box MS 6
Maseru 100
LESOTHO

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ZIMBABWE

27. Regional Network of Environmental Experts (ZERO)
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Harare
ZIMBABWE

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P O Box 8263
Causeway
Harare
ZIMBABWE

29. Biomass User's Network (BUN)
African Region
Private Bag 7768
Causeway
Harare
ZIMBABWE

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