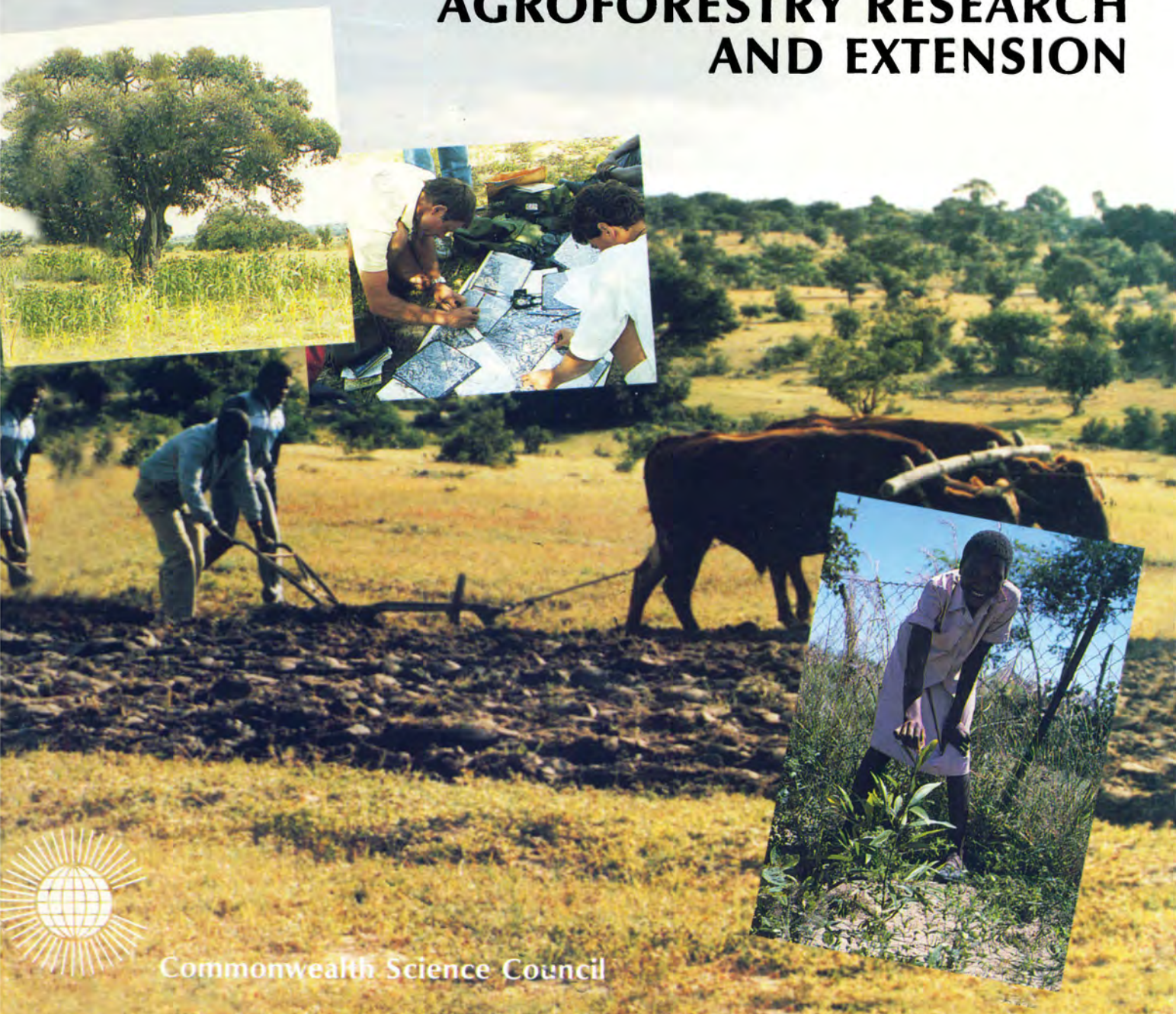
GUIDELINES FOR TRAINING IN RAPID APPRAISAL FOR AGROFORESTRY RESEARCH AND EXTENSION



Commonwealth Science Council

AMELIORATION OF SOIL BY TREES

GUIDELINES FOR TRAINING IN RAPID APPRAISAL FOR AGROFORESTRY RESEARCH AND EXTENSION

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Foreword

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These guidelines are for training research and extension personnel in rapid appraisal methods for development of agroforestry in peasant land use systems. The guidelines are illustrated through reference to a training and research exercise where an agropastoral farming system in Shurugwi Communal Area, Zimbabwe was appraised in 1988.

Four key principles underlie the methods used:

* agroforestry interventions are identified and developed through working with and learning from farmers and the local community, as well as through conventional resource assessment – **"interactive research"**

* interactive research is best learned through real application not lectures or classroom exercises and simulations – **"learning by doing"**

* **"interdisciplinarity"** is a key to successful interactive research

* agroforestry interventions are developed from an understanding of constraints and conflicts existing within the rural community over access to production resources.

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Acknowledgements

The training team, on behalf of the Commonwealth Science Council, thank all the institutions and individuals whose contributions made possible the holding of the training programme in Zimbabwe.

The Forestry Commission of Zimbabwe were the organisers and hosts of the programme within Zimbabwe. Our sincerest appreciation is extended to Dr Yemi Katerere, who committed the Forestry Commission to being the Zimbabwean host institution for the programme. Mr Isaac Makoni was indefatigable in his joint role as administrator and participant.

The Ford Foundation sponsored the programme and Dr Dianne Rocheleau, in particular deserves our thanks for enabling the programme to become a reality.

Within Zimbabwe, many other institutions also played important roles. The Provincial Administrator, Mr C Mutumbike, welcomed us into the Midlands Province, and Mr Mudenge, Shurugwi District Administrator, ensured that we were welcomed into the life of Shurugwi. The Directorate of the Department of Agricultural, Technical and Extension Services also lent their support and that of the organisation's staff to the programme. The Provincial Agricultural Extension Officer, Mr J Zishiri, facilitated the assistance of his staff, and Mr A Mugwagwa, Extension Supervisor for Shurugwi, entered into the spirit of the programme so completely that he gave up his weekends to help us.

The Department of Natural Resources and ENDA-Zimbabwe supported the programme by nominating participants to attend the training course. Many other governmental and non-governmental agencies allowed representatives to attend the three-day workshop in Gweru that followed the five-week training course.

The participants who attended the course came from Zimbabwe, Zambia, Malawi, Tanzania and Kenya. The enthusiasm and motivation everyone displayed ensured that the course was a stimulating experience for us all.

The evaluation team of Dr Louk Box, Dr Yemi Katerere and Mr James Murombedzi are thanked for taking on and performing a difficult task well. We would all have learned less without them. Additionally, Dr Box made useful suggestions before the course which influenced our approach.

The structure and content of the course were strongly influenced by consultations with a group of advisers which included Ms Jeanette Clark, Ms Jo Ann McGregor, Dr Sam Jackson, Mr Andrew Pinney, Mr Ian Scoones, Mr Newton Spicer and Mr Ken Wilson. All of these, except Dr Sam Jackson and Mr Ken Wilson, also participated in the course as trainers and advisers.

These guidelines were typed and edited by Norma Meechem, who gave much valuable advice on layout and style. The diagrams were drawn by Mr Philip Judge.

The rapid appraisal would not have been possible without the translating skills and local knowledge of our research assistants Evelyn Mhaka, Mary and Bernard Rosina.

Finally, warm thanks go the people of Ward 3 Shurugwi Communal Area. Their interest and the time they gave meant that we were able to fulfill the intention of the programme – to train people through working with farmers. We are now more convinced than before that this type of programme is essential if farmers' circumstances and needs are to be catered for in the development of agroforestry practices. It is sincerely hoped that the ongoing Forestry Commission – Ford Foundation community forestry programme in the area will bear abundant trees of the species and in the places that farmers want.

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* These figures illustrate the operation of guidelines; other figures which show the results of the Shurugwi programme are listed under the heading "Examples from the Shurugwi Exercise".

0.
COURSE OUTLINE

0. COURSE OUTLINE

0.1 Introduction

These guidelines are for the training of research and extension personnel in a rapid appraisal methodology for identifying potential agroforestry interventions in peasant land use systems. They are illustrated through reference to a training course carried out in the Shurugwi communal area, Zimbabwe, from 7 March to 8 April 1988. This course was conducted under the aegis of the Commonwealth Science Council and the Forestry Commission, Zimbabwe, and funded by the Ford Foundation. It is the first occasion the particular training methodology outlined here has been implemented, although its form owes much to the existing literature on rapid appraisal and the identification of technical interventions. This is acknowledged in the discussion of methodological issues.

The course consists of five steps (Figure 1):

Step I: Orientation
Step II: Review of Historical and Background Information
Step III: Form of Production and Natural Resource Survey and Analysis
Step IV: Identification of Potential Agroforestry Interventions
Step V: Appraisal of Agroforestry Interventions

Each step is described and illustrated within these guidelines.

0.2 Course Objectives

The general aim of the course is to train graduate scientists, forestry and agricultural extension staff in a rapid appraisal methodology for the development of agroforestry in peasant farming systems.

In the Shurugwi course further specific objectives were to:

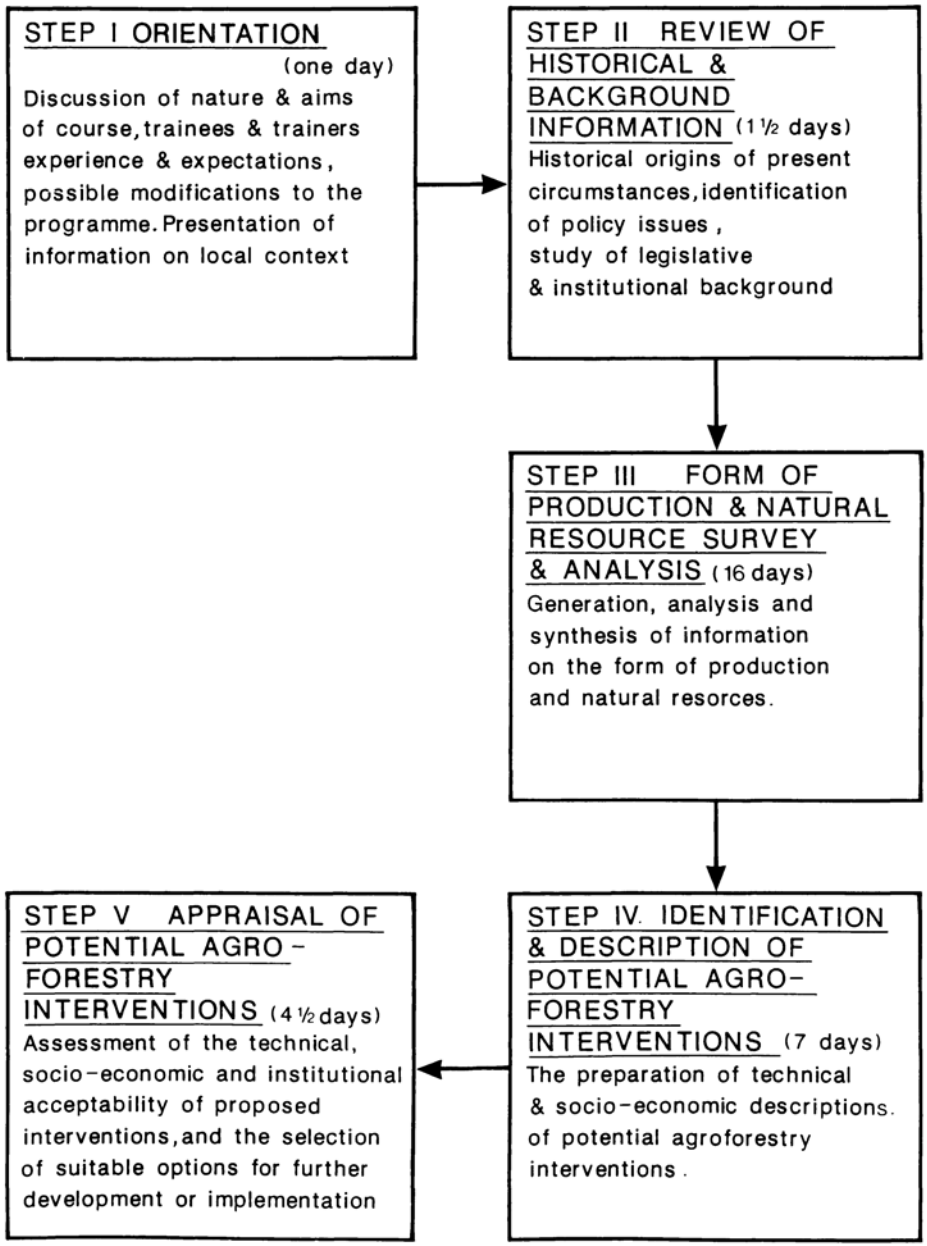
* learn about the production strategies of local farming households and how they are constrained;
* describe and analyse the contribution of trees to household production strategies;
* appreciate the ecological and economic inter-relationships among woody plants, arable production, livestock and other enterprises;
* understand the present roles of trees in soil and water conservation;
* work with local households to develop improved ways of using and managing woody plants;
* identify gaps in knowledge about agroforestry and propose appropriate research and extension activities;
* understand the nature of institutions responsible for planning and implementing agroforestry interventions in order to facilitate these activities and the linkages between institutions.
* identify and appraise potential agroforestry interventions;

The results of the Shurugwi exercise will be published as a research report and contribute to the Commonwealth Science Council 'Amelioration of Soils by Trees' programme of which the course was a component.

0.3 The Organisation and Use of These Guidelines

Figure 1 illustrates the structure and summarises the content of these Guidelines. The training programme begins with the Orientation of the team in Step I, proceeds through the Review of Historical and Background Information (Step II) to the Form of Production and Natural Resource Survey and Analysis (Step III). The

Figure 1. Programme Outline



information from the earlier steps is then synthesised and used in the Identification and Description of Potential Agroforestry Interventions (Step IV). These are subjected to Appraisal in Step V.

The information produced during a step forms the input for the subsequent step, so that data from one step must be analysed and synthesised before the next can begin. In practice, however, the discovery of gaps in the data frequently necessitates a return to earlier steps, so that the research is more iterative than the sequential process suggested by Figure 1.

Each step is divided into:

(i) an introduction which previews and justifies the content;

(ii) a set of objectives and outputs, defining the purposes and specifying the information the steps should produce;

(iii) a list of activities; and

(iv) a description of each activity. These include: plenary sessions and group discussions; interviews with individuals; meetings with groups of farmers; literature reviews; analysis of aerial photographs; briefings on methods; natural resource surveys; meetings to formulate and appraise interventions.

These Guidelines are intended for both trainers and trainees, but we expect they will attach different priorities to the various parts of the Guidelines. Trainers and trainees are likely to want to read sections 0.1 – 0.3. The remaining sub-sections of the Course Outline will probably be of more interest to trainers.

Trainers and trainees will both be concerned with the content of the remainder of the Guidelines. To get an overall impression of structure and purpose, they should read the Introductions and Objectives of each step in sequence. Descriptions of methods are obtained by reading the individual activities.

Detailed illustration of methods in action is obtained by reading the examples from the Shurugwi training exercise. **Such examples are indicated by the presence of a grey shaded strip down the side of the page. Pages which contain both text and examples have a strip down half of the page.**

0.4 Rapid Appraisal Philosophy

The course methodology is based firmly on four principles:

1. training team members should identify potential agroforestry interventions through working with farmers and other local people and by investigation of natural resources (interactive research);

2. interactive research is best learned through application, not lectures;

3. interdisciplinarity is a prerequisite;

4. agroforestry interventions should be developed from an understanding of the constraints and conflicts that exist within rural society over access to production resources.

0.5 Working with Farmers – Some Principles

In working with farmers two principles are especially important:

* we will be imposing upon farmers and should therefore avoid unnecessarily disrupting their activities;

* much rural research, project and extension work is biased in favour of certain categories of people: rural elites (those who are less poor and more influential);

males; users of services and adopters of practices; and active people who are present in the area (i.e. those who are sick, old and migrant are not taken into account).

Principle 1 requires us to be sensitive in how we work with farmers. We should visit them or hold meetings at times which are most convenient.

Principle 2 requires us to adopt sampling and cross-checking methods which overcome biases.

0.6 Group Activities and Discussions

The interactive nature of the training methodology requires group work. There is a danger that group activities or discussions become unfocussed and therefore unproductive. Training groups should therefore agree on clearly defined objectives, methods of working and outputs. In group or plenary discussions there should always be a chairperson and an agreed agenda. The steps in the programme and activities within a step link together as a process. Every step and activity produces an input for use in other steps, and failure to progress in any one step can disrupt others. Participants need to be aware of this because the democracy of any participatory exercise can easily encourage endless debate and indecision rather than coordinated action.

0.7 Institutional Grounding and Course Preparation

The training course needs to be linked closely to national institutions, and should be fully supported by one host institution. The host institution should be involved from the outset, and all those appointed as trainers need to be involved in the preparation for their course.

0.8 Guidelines Style

"Guidelines" is not a prescriptive training manual, for that would run counter to the philosophy of the course. Our approach is learned through application, it relies on iteration, requires flexibility and the direction of the research should not be dictated by a manual.

Several issues central to the methodology were raised during the course. As rapid appraisal relies on learning through experience, we have used our experience to contribute to the discussion of these issues. This discussion follows in the next section.

0.9 Some Methodological Issues

The five week training exercise conducted in the Shurugwi Communal Area was experimental. The training methodology was designed specifically for the course. Nevertheless, we have borrowed from other techniques for training people who work with small-scale farmers. These include:

* literature on Rapid Rural Appraisal (RRA), particularly the 'Proceedings from the 1985 International Conference on Rapid Rural Appraisal' (Khon Kaen, 1987);

* the 'D&D User's Manual', International Council for Research in Agroforestry (ICRAF) 1987, based on their own agroforestry diagnosis and design methodology;

* Conway's (1985) 'Agroecosystem Analysis for Development' prepared with assistance from the Aga Khan Rural Support Programme;

* the Agriplan Training Manual, Overseas Development Group, University of East Anglia, for use in Zambia in 1981 and Nepal in 1985;

* notes and group reports from the 'Workshop on Farmers and Agricultural Research: Complementary Methods', Institute of Development Studies, University of Sussex, 26-31 July 1987.

Much of this literature is recent. Consequently several issues concerning short duration research with farmers, and the training of people to undertake it, remain unresolved. Most issues that generated vigorous debate

during the Shurugwi course have already been recognised in the literature. The following discussion therefore serves two purposes. At a specific level it is designed to inform those implementing similar courses to ours. And more generally it contributes to the wider debate on rapid appraisal.

0.9.1 Course Title

The Shurugwi course was called 'Training in Problem Diagnosis and Project Design for Agroforestry'. This was too narrow a description of what was undertaken. The survey and analysis phase produced much more than a list of diagnosed problems. More important was the understanding gained of the production strategies of households in the study area, the social relations of resource access and control, and farmers' own classification systems for natural resources. Analysis at this fundamental level rather than at the more superficial one of 'problem identification' is necessary for an effective research and extension strategy.

The term 'project design' creates a misconception of the second phase of the training programme. 'Design' implies a finality which was unattainable and undesirable in the time available. Potential interventions were identified, specified and described. These were not fully prepared for implementation but were appraised in terms of their appropriateness.

A process was started in which these interventions were discussed with the farmers and their views obtained. However, in order to implement them it would be necessary to have more long term and repeated discussion with farmers concerning specific technical and management issues related to the interventions. Nevertheless, a range of central research, extension and rural development issues was identified and explored. These require further investigation and work with the rural community.

0.9.2 Farmer and Trainee Involvement

Participation is harder to achieve than is often supposed. Too often what is labelled "participation" is something much less than the democratic ideal. Arnstein's (1969) "ladder" illustrates this (A ladder of citizen participation, *Journal of the American Institute of Planners*, July, pp216-224).

8. Citizen Control	
7. Delegated Power	Degrees of citizens' power
6. Partnership	
5. Placation	
4. Consultation	Degrees of tokenism
3. Informing	
2. Therapy	Non-participation
1. Manipulation	

In a training course a realistic pre-assessment should be made of what level of participation is possible. If full partnership of farmers and trainees cannot be achieved, then a term other than 'participation' should be used. Whatever term is used should be clearly defined in order to avoid raising unattainable expectations amongst trainees. The term 'involvement' is used in these Guidelines.

0.9.2.1 Farmer involvement

Involving farmers in a rapid appraisal exercise may range between imposing an externally-devised programme on them and making them partners in design. In the first extreme trainers decide the course schedule then ask farmers to conform and perform designated roles. Treating farmers in this way reduces the potential for learning through interaction with them.

If more profitable interaction is to take place, farmer leaders should be able to influence the design of the farmer-related activities and the course schedule. It is therefore recommended that members of the training team spend at least a week in the survey area prior to the start of the course. The purpose of the course should be explained to local leaders. If accepted, potential benefits for farmers then need to be negotiated. For example, farmers may feel they will gain sufficient benefit if they receive feedback on potential interventions, or they may wish some guarantee of a definite follow-up taking place.

Another subject that needs discussing with local leaders is the different activities that farmers might be involved in and the amount and distribution of time required. The leaders can identify what farming and household activities farmers will be undertaking while training is taking place, and therefore how best the course activities can be designed and scheduled to fitin. An arrangement could be made for reciprocating the time taken of individuals, for instance, by agreeing to assist them with agricultural tasks.

During these preliminary talks trainers should also discuss with farmer leaders the socio-economic range of household types required for interviews, so tht individuals can be met and their agreement to participate sought in advance of the course's commencement. Finally, the role that local institutions will play needs to be agreed. As well as assisting with the organisation of farmers, members of these will need to be interviewed as part of the research.

0.9.2.2 Trainee involvement

In a rapid appraisal training course there is insufficient time to achieve full democratic participation by trainees. The major decisions regarding course content and struture have to be made in advance by the training team, with some amendment following preparatory discussions with local farmer leaders. The extent of the influence that trainees can have in the nature of the course is thus limited to 'degrees of tokenism'. It is possible for trainees to be involved in day-to-day decisions on the course direction, although they will not be equal partners with the trainers. What does this mean in practice? From the Shurugwi experience we make the following suggestions:

(i) trainees should have the right to discuss methods and activities before carrying them out, so that descriptions of methods should be prepared in advance and presented to trainees for discussion;

(ii) a more difficult dilemma is whether there should be consensus among trainees on an activity or method before undertaking it. If trainers are responsible for making the decisions, then in the event of trainer-trainee conflict, trainers' views necessarily prevail;

(iii) 'learning by doing', discussed below, should involve trainees adequately in the design, execution, analysis and reporting of different activities.

0.9.3 Learning by Doing

A principle of the training philosophy is that a rapid appraisal methodology that emphasises working with farmers can only be learned effectively through application. A fundamental premise of RRA is that in a short but concentrated period of fieldwork researchers can learn progressively. The outputs of one step form the inputs to the next. Issues are identified, linked refined and focused. All taking part in the course have to think each step through, and all field activities must be carried out in practice. They cannot be substituted by lecture room role play sessions, for then the outputs fundamental to the continuity of the procedure are not obtained.

Another premise of RRA that enables rapid and progressive learning is that it is interactive. It relies on 'rapid rounds of field interaction that result in the accumulation of increasingly accurate knowledge' (Khon Kaen, 1987: 6). In the Shurugwi training course there were two main rounds or iterations. The first was the survey and analysis stage, and the second was the identification and

appraisal of potential agroforestry interventions. Within each iteration, information went through a cycle of being generated, detailed and assessed.

0.9.4 Interdisciplinarity

For a training course to be interdisciplinary rather than multi-disciplinary, all activities need to be conceived and executed in an integrated manner. As a negative example, in the Shurugwi course, activities which involved working with farmers were called social survey methods, and were described in a separate step from the surveys of natural resources which did not involve farmers directly. In fact, natural resource information was being generated by working with farmers. This led trainees wrongly to regard the social science and natural resource methods as discrete, even though their work was integrating the two.

For this reason the survey and analysis iteration of the rapid appraisal methodology has been rewritten as one step comprising independent resource surveys and working with farmers. Specific techniques, for example soil sampling, of course belong to a single discipline. Nevertheless, the way soil sampling was used was determined by information obtained from farmers, in particular decisions on which soils to sample and how to apply the results. These are interdisciplinary decisions, rather than the preserve of soil scientists.

Interdisciplinarity does need to be worked at. Even if the survey step is conceived as a whole, breakdown may occur in the synthesis of survey information. In the Shurugwi course this was conducted under socio-economic, soil resource and vegetation headings. However, it is then vital to ensure that the inter-relationships between sectors are identified. Suggested ways of achieving this include the use of flow charts and resource interaction matrices, and identifying resource constraints and opportunities affecting different categories of farmers.

0.9.5 The Status of Information

One of the major debates on RRA is the status of the information produced. Can information approach the quality and depth that may be obtained from longer research studies? As Grandstaff et al (1987) point out: 'Many people feel that rapid studies are automatically less reliable than conventional research' (p. 7). The crux of their counterargument is that 'the iterative nature and multidisciplinary (*sic*) perspective of RRA allows even a new team to gather momentum quickly (p. 7). Information gathered by RRA inevitably suffers in quality and quantity from the rapidity with which it is collected, for example in its bias towards the season and the year in which it is collected. However, when collected by a well organised interdisciplinary group working iteratively and at high intensity, many of the potential problems of quality and quantity can be avoided. To be successful an RRA exercise has to be intense, but this intensity can only be sustained for a short time.

Important principles of RRA can be identified from the Shurugwi course. The first is to draw upon the available literature and first-hand experience of the study area which trainers or trainees might have, to produce an analysis of key historical and background information and issues. This guides the survey step of the RRA.

Second, the range of households included in the sample analysed is critical to the reliability and usefulness of the information gathered. This means the criteria agreed with farmer leaders for the selection of households are crucially important. If a single criterion is used, such as wealth, then others which result in distinct differences between households, such as the gender and age of the head(s) may be inadequately covered in the choice that is made.

Third, the quality of the information obtained depends on the nature of the interaction between researchers and farmers. This might appear obvious but it belies the difficulty of developing mutually rewarding relationships in the brief time available. Discussions in interviews and meetings might be rather superficial and reveal little more than some of the biases of either party. Some

trainees were worried about responses which they felt were inaccurate and insincere.

To cross-check and improve the quality of information the most important methodological principle is that of triangulation (Khon Kaen, 1987: 13-14). In the Shurugwi exercise triangulation of two types was carried out – of people, and of methods.

Triangulation of people means that information received from individuals or groups was checked with others. For instance, information received in a meeting on management by the VIDCOs of communal woodlands was checked in individual interviews. This is not full triangulation, since the information received on the same subject from two different sources is mediated through a third group, the survey team. Full triangulation would involve the bringing together of different local groups known to have conflicting interpretations and the attempt to achieve some reconciliation or clear understanding of these.

The second type of triangulation was that of methods. For instance, information received from farmers in the introductory meetings on their own soil classification was checked by the survey team by two further methods. First, in the company of elders who knew the area well, the survey groups walked transects. This provided an opportunity for the different soil types to be identified by the elders and observed by the survey teams. Further observation was carried out in the informant interviews, leading to a number of questions about the nature of the local classification and the principles on which it was based. After this, formal physical and chemical soil sampling was carried out to complete the examination.

The idea behind triangulation should be taken beyond the simple notion of checking "facts" to include the understanding and testing of alternative world views and belief systems. Members of rural societies view their world from a perspective different to that of outsiders. Only through understanding the coherence of insiders' views can outsiders evaluate the comparative value of these views in explaining and predicting phenomena.

Triangulation provided us with a way of organising the activities carried out in the two iterations of the training course. In the survey and analysis iteration, information is first generated, then detailed, and finally assessed and correlated. In the second iteration – identifying and appraising potential agroforestry interventions – it is the interventions that are in turn generated, detailed and assessed. The way this operates is clarified in the account of Steps III to V.

Our conclusion is that rapid appraisal can provide a valuable complement to longer term research studies. However, as the latter are difficult and expensive, rapid appraisal information should be sufficiently rigorous to stand on its own, and provide a basis for research and extension.

0.9.6 Time

The management of time is crucial in a rapid appraisal exercise. In the Shurugwi course of 5 weeks the scheduled programme was completed, but participants complained of over-work. Six working days were used in a week and the hours were long, though for the participants not extending after their evening meal. Trainers worked a seven day week, usually late into the night.

It has been suggested that workloads could be eased by reducing the course content and substituting role play or lecture sessions for some of the fieldwork. However, the counterargument to this has been stated earlier. First, the Shurugwi course was an experiment with a training methodology that involved farmers. Second, for RRA to work those taking part must be able to learn rapidly and progressively. This requires that outputs from one activity become inputs to the next. No step can be cut out and artificially enacted.

Another option suggested is that for government personnel the course be held in two halves, one iteration at a time. But again, if the intensity of the fieldwork is mitigated by a time-gap the rapid and progressive learning requirement is threatened. In addition the result

is in effect that two courses, instead of one, have to be organised. This may present logistical problems and increase some costs.

Although the above two options have drawbacks, it is not easy to offer other simple solutions for reducing working time. We would rather emphasise that the managing of time is an important aspect of the art of RRA, while the success of any rapid appraisal exercise is dependent on the linkage between activities. If this is managed well, not only will more be learned but time will be saved. Any activity not wholly relevant to the procedure would be omitted. And by the logic of the linkage between activities being clear, participants would require less time to understand and to carry out the next activity.

Another issue is that the information generated must not exceed what can be managed in the available time. There are two points here. Through the exercise key subject areas should be identified and information gathering focussed on these. In this collection, formats should be used whereby the information can be analysed quickly and easily. Summary and analysis of quantitative data was time-consuming and threatened to delay the completion of two steps. Lotus 1-2-3 proved an effective spreadsheet for our data, and we recommend that if trainers have preparation time in the field, one useful task would be to prepare appropriate spreadsheets and formulae beforehand. Ways of achieving these ends are suggested in the subsequent detailed discussion of course activities.

It is likely that the better time is managed and linkages between activities established, the more participants will learn and the less they will complain of overwork. We do not guarantee it, however – and do not believe either that trainers themselves, if they are to mount a successful course, can avoid long and hard hours.

0.9.7 Composition of the Training Team

The training team in Shurugwi comprised 13 trainees, four technical and local advisers, one organiser, and four trainers. This number of trainers and advisers is necessary to obtain the necessary disciplinary spread. It would be possible, however, to increase the number of trainees by another five persons without jeopardising the quality of the course so long as enough transport and facilities were available.

All participants were graduate scientists – three social scientists and ten natural scientists – and a few had Masters degrees. This educational level is appropriate for the approach used. The social scientists benefitted from exposure to natural science methods, while contributing professionally to the social science aspects and vice versa. The trainees came from Kenya, Malawi, Tanzania, Zambia and Zimbabwe, and worked for a variety of research and extension institutions, government and non-governmental. The mixing of researchers with extension staff proved particularly fruitful in the formulation of agroforestry interventions.

The trainers, advisers and course organiser included: a rural sociologist; a soil scientist; an agroforestry extension officer; a forestry research officer; an agroforestry research scientist; a specialist in tropical forestry and agroforestry; a plant scientist; and two range ecologists/livestock production specialists.

Our experience showed a good typist with word processing skills should be a member of any future team: we found it difficult to keep up with the production of teaching materials relying on our own typing.

0.9.8 Equipment

Access to reliable transport is a major factor in the success of this kind of programme. Hired transport was used – one four-wheel drive pick-up, two stationwagons and a saloon. Other equipment which proved important included:

two Zenith portable computers with printers
Wordstar program
Lotus 1-2-3 spreadsheet ▶

one photocopier
time series aerial photographs
stereoscopes
compasses
surveyor's chains
tape measures
overhead projector and accessories
flip chart and accessories
detailed typographic maps
chinagraph pencils
soil augers
spades
Munsell soil colour chart
abney level

A Background to Shurugwi Communal Land Area of Zimbabwe
A Summary

The History of the Communal Areas

The present-day Communal Land Areas of Zimbabwe originated as the "Native Reserves", the residual land not taken by the white settlers as they occupied "Rhodesia". Demarcated as "Tribal Trust Land" by the racial Land Apportionment Act of 1930, the indigenous population, comprising around 94% of the total, was allocated just over 40% of the land area. Settlers, 6% of the people, received half the total land area. Three quarters of the Tribal Trust Lands are in agroecological zones III, IV and V, where agricultural potential is low. The Commercial (settler) Farming areas are better endowed climatically and with good soils.

Independence was secured in 1980. By 1982, 56% of the population (now much larger) still lived in these same reserves, renamed 'Communal Areas'. Apart from land which is being acquired very slowly in the Commercial Farming Areas through resettlement schemes, this land resource is fixed. Thus, more and more pressure is being placed on its productive capacity as the population increases. For instance, in 1969 there were 25,000 people in Shurugwi Communal Area but by 1987 this number had almost doubled to 49,000, a density of 50 people/sq km.

The pressure on the land which is already poor in resources, precludes use of traditional shifting cultivation or any system of fallow rotation. The combination of these factors has led, in many communal areas, to deforestation, inadequate food and fodder, and, it is claimed, to land degradation.

The Organisation of Shurugwi Communal Area

Shurugwi Communal Area comprises 5 wards of 6000 people each. This training and research exercise took place in Ward 3 which is divided into five villages.

Three 'training groups' worked in one village each. These were called Matamba, Mavedzenge and Makandire. Each village has its own Village Development Committee (VIDCO). This is set up to manage the affairs of the village. The VIDCO is composed of the following:

(i) members elected by the villagers - 4
(ii) members who represent youth - 1
(iii) member who represents the Women's organisation -1

A VIDCO Chairperson and Secretary are elected by the VIDCO to represent the village at ward level. The training team worked with the VIDCO as well as with farmer groups.

STEP 1:
ORIENTATION

STEP I: ORIENTATION

Duration: One day

Introduction

In the training programme participants may come from different countries and a variety of institutions, have diverse professional backgrounds, and consequently varying expectations of the course. Yet during the course people shall be working in groups and will frequently need to reach consensuses. The orientation step is an opportunity for all to introduce themselves and to achieve agreement and mutual understanding on how to proceed. It also enables participants to familiarise themselves with the area and meet local officials.

Objectives

* **To discuss the nature and aims of the course.**
* **To find out from trainees their own experience in agroforestry, what they hope to gain from the course, and how they would use the training in their future work. (Note: This list of trainees' expectations can be used in an evaluation of the course).**
* **To modify the programme, if necessary, to suit trainees' needs.**
* **To learn about the local context.**
* **To discuss the extent to which trainees will be involved in decisions on the selection and design of methods and other matters affecting course content.**

List of Activities

1. Introductory briefing and discussion session.
2. Introductory talk on agroforestry.
3. Briefing session on local background.
4. Introduction to staff from government and other local organisations.
5. Field reconnaissance.

Activity 1. Introductory Briefing and Discussion

Trainers and any additional advisers introduce themselves, describe their backgrounds, their agroforestry experience, and give their views on the nature and aims of the programme.

Trainees respond and introduce themselves.

Issues raised are discussed.

The views of the meeting are synthesised and agreement reached on modifications to the programme.

Activity 2. Introductory Talk on Agroforestry

Definition and brief discussion of some agroforestry systems and practices.

Activity 3. Briefing Session on Local Background

A combination of external and internal speakers provide information on the political, social and environmental context of the study area. Government and local institutions are described, current land use policies explained, and other major socio-economic and environmental issues and trends summarised.

Activity 4. Introduction to Government Staff

The most important staff to be introduced are those belonging to institutions which will be involved actively

in the training programme. These may range from field extension workers to the District Administrator.

Activity 5. Field Reconnaissance

The intention of this activity is for participants to familiarise themselves with the geography of the study area and its key issues. Trainers plan the route and choose the issues beforehand. It is preferable for them to be accompanied by one or more local extension officials or farmers, so that the trainers may find out about the history and significance of what they see.

Example I(i) below is the outline provided for the field reconnaissance trip undertaken on the second day of the Shurugwi training course.

Dr Jonathon Okafor, forester, demonstrates identification of Miombo tree species

Example I(1) - Activity 5

Themes for Reconnaissance Trip

Method

The training team will visit predetermined sites within Ward 3, Shurugwi Communal Area. Each site illustrates a particular issue or set of issues. These will be introduced by one or more of the trainers. There will be time for a brief discussion and observation. Lunch will be provided at Donga. After lunch we will return to the Chitukuko for a plenary discussion. Participants should keep notes of their questions and observations for use in the plenary session and later.

Stop 1. *Miombo Woodland*

Themes: Ecology of *miombo* vegetation
Tree identification

Stop 2. *Transition from Commercial to Communal Farming Area*

Themes: Land tenure and its effect on land use patterns, land use intensity, and implications for woodland management and Communal Area production systems.

Stop 3. *Guvi* (vlei)

Themes: Soil type, soil erosion and hydrology
History of land use
Importance for livestock

Stop 4. *Woodlot*

Themes: Woodlot establishment. Growth rates and vigour of indigenous and exotic species. Soil erosion. Intensity of management and use.

Stop 5. *Dwala*

Themes: Hydrology
Tree identification

Stop 6. *Groundnut drying*

Themes: Use of wood for drying
Winter ploughing, infiltration and early planting

Stop 7. *Termite mound*

Themes: Exploitation of soil properties of termite mounds in arable production

Stop 8. *Trees in fields*

Themes: Use and effects of indigenous species in farmers' fields

STEP II:
REVIEW OF HISTORICAL AND BACKGROUND INFORMATION

STEP II: REVIEW OF HISTORICAL AND BACKGROUND INFORMATION

Duration: One and a half days

Introduction

In many studies of rural problems historical circumstances are scarcely considered, and if they are, they are treated as a descriptive list of events in a past which is quite distinct from the present. The present is, however, part of a continuous – though uneven – process of environmental and social change. We are 'in the middle of a film' rather than at the beginning or end. What people do next in time can only proceed from what they are doing now and have done in previous years. Thus present constraints and problems have historical origins, and causes cannot be understood without an appreciation of history.

Historical documents should be assembled prior to the training programme. More detailed historical information can be collected from key informants during the survey step of the course.

In addition to the historical understanding, if a rapid appraisal exercise is to be conducted efficiently and yield new insights on current problems, full use needs to be made of all available secondary information.

Objectives and Outputs

* **To understand how historical processes have shaped current environmental, social and economic conditions, as well as people's attitudes and responses.**

* **To produce briefing notes on socio-economic and environmental changes and current issues.**

* **To produce briefing notes on key policies and legislation affecting the study area.**

List of Activities

1. Analysis of social and environmental changes.

2. Review of secondary information.

Activity 1. Analysis of Social and Environmental Changes

The training team is divided into groups. Each has a specific task. These could cover the temporal analysis of agrarian and forestry policies from the secondary material available. Issues covered could include land tenure, land use, destocking, conservation, population change, and the effects of these on rural incomes. Each group will produce briefing notes to be delivered to the plenary session.

A second type of task is the analysis of land-cover changes using time-series aerial photographs. One method would be to locate transects across aerial photographs of the study area. If the area is large a point frame could be used for sampling. If the point frame is used then hits on arable land, grazing land, cattle kraal, village, track/road, erosion gully, drainage channel, shrub/sapling, canopy tree etc. is recorded. Otherwise land use change along the transect would simply be described and compared for the two (or more) sets of aerial photographs. Results may be compared with the chronology of agrarian change produced by the other groups, and presented in plenary session.

The plenary session synthesises the issues, and historical trends. During the survey step (Step III) corroboration and detailing of these would be sought from local people (see Examples II(1) and (2)).

Activity 2. Review of Secondary Information

The training team is divided into groups. Each is

allocated a task and given a set of related documents and maps. The working session should begin with each group agreeing on what information should be sought and how it will be collated and presented. Groups need to prepare briefing notes for subsequent reference. Summaries of these are presented in plenary for mutual briefing and discussion.

A working group

Example II(1) - Activities 1 and 2

Activities 1 and 2: Briefing Sheet

These activities are run concurrently in this exercise because they use the same literature. The objectives of this exercise are:

1. To describe social and environmental change in the communal areas in general and in Shurugwi where possible.

2. To describe the climatic, soil, arable, pasture, tree and water resources of Shurugwi, and its human population.

3. To identify the key policy issues for the communal areas.

The output from this exercise will be briefing documents in note form which will be presented in plenary session at 1500 hours, and subsequently placed in the library as a resource for the whole training team. They will form a background for our agroforestry diagnosis and design work in Shurugwi and should therefore be explicitly linked to agroforestry issues.

The work will be carried out by three groups and is divided into two parts:

i) literature review, and
(ii) analysis of aerial photographs.

(i) In the first part each of the three groups will prepare information for its sector, drawing upon a specific set of reports and papers. The sectors are:

- forestry, deforestation and energy;
- land tenure, land use and population;
- soils, soil erosion and climate.

Human population increase and its relation to resource use are relevant to each sector and demographic information should therefore be drawn upon by all groups.

(ii) The second part of the work is an analysis of aerial photographs of Shurugwi taken in 1965 and 1985. Each group will analyse the aerial photographs in turn, assessing changes in woodland cover, roads and tracks, arable and grazing land, the frequency of erosion gullies and the density of settlements. The results of each group will be pooled for all to use, but each group should extract from the aerial photographic data information particularly relevant to its sector.

Example II(2) – Activities 1 and 2

Historical Chart – Land Tenure, Land Use and Population: 1900-1988

	1900	1914-15	1920	1930	
LAND USE	Scattered settlement, vlei and river bank cultivation. Toplands and some vleis used for grazing.			1929 Centralisation piloted in Shurugwi	Toplands are now allocated for arable cultivation
LAND TENURE	Selukwe Reserve set at 64,326 ha	Reserve reduced to 63,496 ha by Carter Land Commission		Land Apportionment Act	

MILESTONE EVENTS			1918 End of WW1 'Flu epidemic	1922 Drought maize on credit	1927/8 First agric. demonstrations under Alvord	1929 'Lantern lectures'		1936 Influx of people to Shurugwi	1939 Hitler's war

HUMAN POPULATION	Country: 712,000 Shurugwi C.A.: 4,500		5,000				1.4 million 13,000	1934 Mines/farms opened up	
					Chibharo	People moved off farms into reserves			

LIVESTOCK	Cattle						24,000		
		Low livestock populations			Dipping starts				
	Goats						22,000		
	Donkeys					Donkey start arriving	2,000		
	Sheep								

WOODLAND					1925 4 acres of gums planted	Firewood collected from white farms			

RAINFALL	Droughts (<600 mm)			21/22 *	23/24 *	26/27 *			
	Good rains (>1250 mm)	14/15 *		22/23 *	24/25 *	28/29 *		34/35 *	38/39 *

Example II(2) - Activities 1 and 2

Historical Chart - Land Tenure, Land Use and Population: 1900-1988 Cont'd

	1940	1950	1960	
LAND USE / TENURE	1941 Natural resources Act lead to further restrictions on vlei cultivation.	Separation of land uses reinforced. Arable land surveyed and reallocated 'mabeacans' introduced	More expansion of arable land area. Area: 80,625 ha	1969 Land Tenure Act
MILESTONE EVENTS	1944 Godlonton Commission report sets scene for Good Husbandry Act	1951 Native Land Husbandry Act	Nationalist politics: NDP	1962 Land husbandry is abandoned. The reserves become tribal trust lands. Land authority reverts back to the chiefs
HUMAN POPULATION	Country:			1969 5.1 million
	Shurugwi C.A.:			31,850
	1945 Whites return from war: ranches opened up. More blacks to reserves	Post war boom - employment rises	Union power grows - wages rise	
LIVESTOCK	1944	1945	1951	1955
	Cattle: 23,181	First destocking	21,104	12,600
	Goats: 8,750		60% of households own cattle	1,000
	Donkeys: 2,320			500
	Sheep: 650			221
				Second destocking 24% of households own cattle
	First unfenced grazing schemes			68/69 Cold: cattle deaths
WOODLAND	30m streambank cultivation rule enforced under NLHA*	53/54 Gum plantations established under the ADF**		
RAINFALL	Droughts (<600 mm) 41/42 * 46/47 *			67/68 *
	Good rains (>1250 mm) 42/43 *	52/53 * 54/55 * 57/58 *		

* Native Land Husbandry Act; **Agricultural Development Fund

Example II(2) - Activities 1 and 2

Historical Chart - Land Tenure, Land Use and Population: 1900-1988 Cont'd

	1970	1980		
LAND USE	War period Expansion of arable into grazing areas.	1982 District Councils Act		Resettlement schemes and cooperatives started
LAND TENURE	'macouncils'			
MILESTONE EVENTS		Independence		
HUMAN POPULATION	Young join struggle Comrades arrive	Country: Shurugwi C.A.:	1982 7.5 million 41,717	1987 8.5 million 48,975
LIVESTOCK	Grazing schemes revived	Cattle: 43,000 Goats: 1,800 Donkeys: 1,250 Sheep:	82-84 Drought: Livestock deaths. Use of resettlement areas for grazing	86-87 Drought: More livestock die. Grazing schemes promoted again.
WOODLAND	Council woodlots	Shurugwi - a wood deficit area 8.1m³/family/year.	Rural Afforestation Programme (1982). Individuals, schools, and groups plant 51% of woodlot area.	84/85 Natural resource usage by-laws
RAINFALL	Drought (<600 mm) 72/73 * 73/74 * 74/75 * 77/78 * Good rains (>1250 mm) 80/81 * 81/82 * 82/83 * 84/85 * 86/87 *			

STEP III:
FORM OF PRODUCTION AND NATURAL RESOURCES – SURVEY AND ANALYSIS

STEP III: FORM OF PRODUCTION AND NATURAL RESOURCES – SURVEY AND ANALYSIS

Duration: Sixteen days

Introduction

The aim of this step is to generate and analyse information on the form of production and the natural resources of the study area.

The order of the survey activities (Figure 2) is designed to lead to a progressive improvement in the depth and accuracy of the information.

*(i) The first stage of the survey is a generative one. The training team is divided into survey groups. Group members use their experience, and the historical and background information from Step I, to formulate questions for farmers in group meetings and individual interviews. In the meetings and interviews issues, themes and resource information are **generated** in response to the questions;*

*(ii) In the **detailing** stage of the survey (Figure 2), this initial information is followed up in further interviews, informal discussions and resource survey work;*

*(iii) More formal natural resource survey techniques are then used to **correlate** and **assess** (Figure 2) the resource information collected and analysed in the generative and detailing stages. The questions asked in natural resource survey activities are generated by the research with farmers in groups or individual interviews (Figure 3).*

Through this process the relevance and reliability of information is improved through cross-checking and its focusing on key areas and issues.

As explained in the earlier discussion of methodological issues, triangulation of human sources and of techniques is an important tool in the rapid improvement of the quality of information. Triangulation helps ensure the survey groups are conscious of the range of farmer categories and interest groups that exist at the local level and that representatives from all of these are included in the survey.

To conclude the survey step the form of production and natural resource information is analysed and then synthesised from information collated on completion of each activity.

Form of Production

The form of production of an area is the aggregate of farmers' production systems. It consists of two elements:

(i) a set of production activities and the resources and management methods required to sustain them;

(ii) the relations of production, comprising the flows of production resources, outputs and information, the forms of these resource exchanges and the power relationships involved.

An analysis of the form of production provides a means of identifying different categories of farmer, each characterised by a general level of resource access, production output and household security. Relationships between these categories should also be revealed, for example, through land tenure, labour and livestock transactions, and degrees of influence on local institutions. This analysis enables the researcher to appreciate the role and relative importance of a particular resource, such as fuelwood, browse or manure, within the production strategies of different types of household. On this basis the utility to respective categories of

proposed agroforestry interventions can be predicted. At a more abstract level, the form of production is a concept which integrates social, economic, political and environmental processes, permitting and promoting interdisciplinarity.

The Role of Natural Resources

Step III aims to provide an understanding of the role of natural resources within the form of production (Figure 2). Interviews and meetings elicit farmers' perceptions of the demand for resources, their access and management, and constraints and opportunities for their use (Figure 3).

The issues raised during Step II (Review of Historical and Background Information) are introduced to farmers in the generative phase of Step III for their comments and expansion (Figure 2, Step III). These preliminary meetings are also used to generate further themes for discussion. The farmers' own classifications of resources are discussed in the generative and detailing phases to gain an understanding of the criteria they employ and their priorities. Activities that combine discussion and field work are also employed to further the links between the social and environmental investigations (Figure 2, Step III).

In these ways natural resource issues become focused and the farmer's perception of constraints and opportunities, within the context of the form of production, emerges (Figure 3).

The assessment phase follows. It aims to describe, using conventional resource assessment methods (such as soil and vegetation survey (Figure 2)), the resources and processes identified by the farmer and to validate the farmer's own description and classification. This phase is used to obtain technical information in the conventional form needed to establish communication between researchers and farmers. It is also a means of correlating ("triangulating") the farmers' information. The important difference between this approach and conventional resource assessments is not the assessment methods used, but the way in which information from farmers determines the type of resource data collected and the way it is subsequently used.

Objectives and Outputs

By the end of the form of production and natural resource survey and analysis, understanding should have been gained of:

* **a classification of farmers based on variations in household resource access, production outputs and income levels;**
* **how the resource endowment of different categories of household influences the nature of their production activities;**
* **the strategies farmers use to overcome specific resource constraints;**
* **a classification of selected natural resources and their uses;**
* **the farmer's perception of the constraints and opportunities associated with the natural resources;**
* **correlations between land types and land use, including categories of woodland resources;**
* **how the production, management and consumption of woodland resources forms part of household production systems;**
* **what conflicts occur over access to resources and how successful different groups are in securing access;**
* **how local institutions attempt to manage and regulate access to woodland resources, and their level of effectiveness;**
* **the effectiveness of external agencies, e.g. extension**

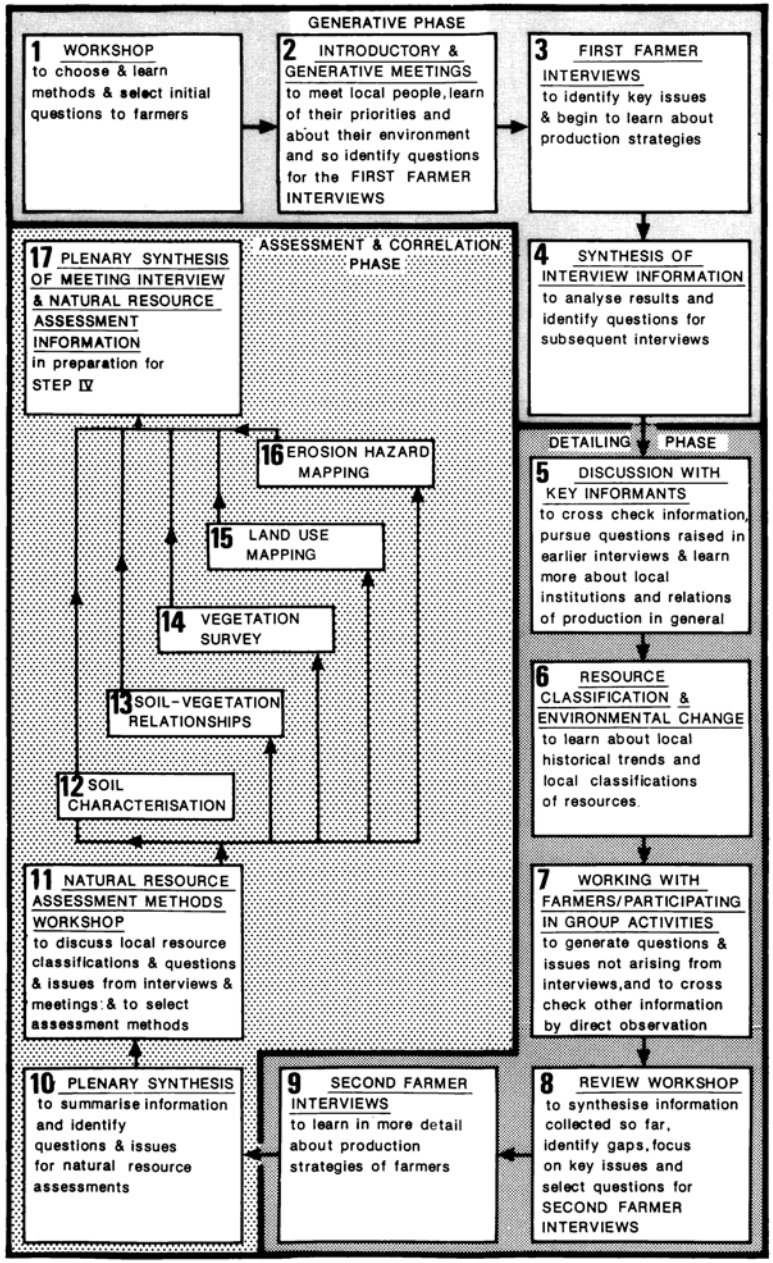
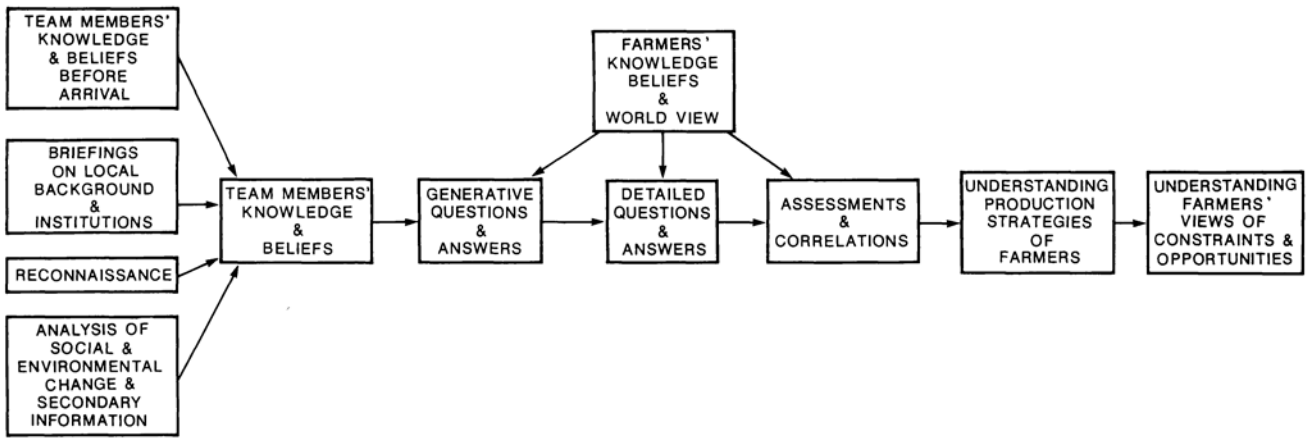


Figure 2
Step III, Activities 1–17: Form of Production and Natural Resource Survey and Analysis

Figure 3
Synthesis of Views of Farmers and Training Team



agencies, in providing appropriate advice on specified resource constraints and production issues (including agroforestry).

List of Activities

Generative:
Activity 1 - Workshop on rapid appraisal methods of researching with farmers
Activity 2 - Introductory and generative meetings
Activity 3 - First interviews
Activity 4 - Summarising interview information

Detailing:
Activity 5 - Informal discussions with key informants
Activity 6 - Resource classification and environmental change
Activity 7 - Working with farmers/participating in group activities
Activity 8 - Workshop
Activity 9 - Second farmer interviews
Activity 10 - Plenary synthesis of meetings and interviews

Assessing:
Activity 11 - Natural resource assessment methods workshop
Activity 12 - Soil characterisation
Activity 13 - Soil-vegetation relationships
Activity 14 - Vegetation survey
Activity 15 - Land use mapping
Activity 16 - Erosion hazard mapping
Activity 17 - Plenary synthesis of meeting, interview and natural resource survey information

Activity 1. Workshop on Rapid Appraisal Methods of Researching with Farmers

(i) Introduction

The aim of this activity is to prepare for:

(i) the introductory meetings of survey groups with local people (in our case from the VIDCO areas or farmer group areas in which the survey groups were working);

(ii) the first informant farmer interviews which sub-groups of 2-3 people will be conducting.

Figure 3 illustrates the process by which team members learn to understand farmers' views of their constraints and opportunities. Discussing this is a useful opening for the workshop.

(ii) Literature on RRA

The references listed below were handed to the participants in the Shurugwi training course. Notes on key features of RRA and research methods were extracted from these references and listed next.

References

Box, L. (1987) **Experimenting cultivators: A methodology for adaptive agricultural research.** Overseas Development Institute, Agricultural Administration Unit, Discussion Paper 23.

Chambers, R. (1987) **Notes and reflections on the workshop on farmers and agricultural research: Complementary methods.** Institute of Development Studies, University of Sussex.

Farrington, J. and Martin, A. (1987) **Farmer participatory research: A review of concepts and practices.** Overseas Development Institute, Agricultural Administration Unit, Discussion Paper No. 19.

Khon Kaen University (1987) **Proceedings from the 1985 International Conference on Rapid Rural Appraisal.** Khon Kaen, Thailand, Rural Systems Research and Farming Systems Research Projects.

Institute of Development Studies Conference (July 1987):
Lightfoot, C. and Thrupp, L.A. **Research Methods**

Edwards, R. and Kean, S. **Informal Research and Development**
Norman, D. **Using farmer groups**
Mathema and Verma, **Team interaction.**

Raintree, J.B. (1987) The state of the art of agroforestry diagnosis and design, **Agroforestry Systems,** 5, 219-50.

Raintree, J.B. and Rocheleau, D.E. (1987) Case study example of the D & D learning process. **D & D User's Guide: An Introduction to Agroforestry Diagnosis and Design.** ICRAF: Nairobi.

Wilson, K. (ed.) **Seminars with farmers:**
(i) Mapanzure, Runde Communal Area, March 1987
(ii) Mutoti, Mazvihwa Communal Area, March 1987.

(iii) Key features of RRA

These features of RRA were discussed and used in the workshop:

* RRA is an iterative process. In this methodology two iterations are involved:

  1. Survey
  2. Identification and appraisal of potential interventions.

* RRA emphasises rapid and progressive learning by researchers through interaction with farmers.

* Interdisciplinarity

* A flexible approach is required in the scheduling of activities and choice of methods.

* Central to RRA is an intense period of fieldwork.

* Plenary sessions are needed to analyse what has been done, to agree on what has been learned and on what is still unclear.

* Need for timeliness.

* RRA is **not** designed to produce the last word on particular resource issues or general development problems.

* An RRA frequently results in as many new questions as answers.

(iv) Research methods: Lightfoot and Thrupp (1987). See also Farrington and Martin (1987).

These aspects of applied research were covered in the workshop:

* Chain of interviews: links from farmers to local interest groups and institutions to government agencies.

* Ethnohistories (see also Box, Louk **Experimenting Cultivators** and his reference to 'key questions').

* Informal and semi-structured interviews.

* Formal surveys and in-depth interviews.

* Group discussions.

* Implications of research for gender and community.

Cross cutting the use and potential of methods are two other dimensions (see Chambers, 1987).

(i) biases and balance of gender and person (see case study in Farrington and Martin, 1987);

(ii) quality of interaction between farmers and scientists (see two case studies of group meetings, Wilson, 1987).

'Only when scientists have more freedom of

movement and of action, and can use complementary methods in support of and in collaboration with, resource poor farmers, will they be able to serve them best: and that only when resource-poor farmers receive such encouragement and support will they in turn be able to raise production and reduce risk more effectively' (Chambers, 1987, p. 11).

(v) Brainstorming sessions

Two "brainstorming" sessions were held during the workshop – the "Do's" and "Don'ts" of:

(i) Working in teams;
(ii) Conducting meetings and interviews with farmers.

These sessions are a way of introducing survey group members to each other, and they require group members to agree on basic principles for working with each other and farmers. Approximately half an hour is required per session and another for each plenary.

The examples given below from the Shurugwi course were compiled in plenary from the outputs of the three survey groups.

(vi) Establishment of questions and procedures for introductory and generative meetings

During the workshop survey groups decide on the generative questions to put to farmers at the introductory meetings. These are discussed in a plenary presentation. Each group may arrive at a different format for recording questions and answers. For example, in the Shurugwi programme two groups used table formats, the third used a check list of key questions, recording the meeting verbatim, and structuring the results afterwards. Thus variation is the result of participants following their own ideas, in keeping with the participatory philosophy of the programme. One advantage of this is that participants consider and evaluate a range of approaches, each with particular benefits and problems. However, it is crucially important that data from different survey groups proves compatible during later syntheses. It is therefore recommended that a standard format is employed, built during a plenary session from the best features of the various methods developed by the sub-groups.

Example III(3) shows a table format used in Shurugwi for direct recording of answers to questions put at an Introductory and Generative Meeting.

Example III(1) – Activity 1

Working in Teams – Do's and Dont's

Synthesis of Brainstorming Sessions

DO:

- Agree on objectives and methods for meetings and tasks and reach mutually agreed decisions and conclusions
- Be prepared to listen to others
- Be resourceful and flexible
- Participate and share
- Be considerate
- Deal positively and quickly with conflict
- Have an agreed mode of operation

DON'T:

- Shout at or embarrass each other
- Personalise issues
- Be arrogant, obsessive, dogmatic or domineering
- Be late
- Conceal information
- Be complacent, indifferent or passive
- Interrupt rudely or have sub-discussions within a group

Example III(2) - Activity 1

Meetings and Interviews with Farmers - Do's and Dont's

Synthesis of Group Brainstorming Sessions

DO:

- Follow local greetings and etiquette
- Adopt a clearly agreed but flexible procedure beforehand and explain this to farmers as well as the objectives and the role of the interpreters
- Be patient and polite
- Create an open and relaxed atmosphere to encourage participation and dialogue
- Use observation to support your understanding
- Be supportive of each other
- Be aware of conflict and gender issues
- Use appropriate language
- Start slowly and build up
- Explain the purpose of any equipment and get consent to use it

DON'T:

- Be authoritarian or condescending, i.e. a 'chef'
- Allow individuals to dominate a conversation
- Be afraid to ask probing questions in interviews
- Ask leading or very controversial/sensitive questions in group meetings
- Make false promises
- Conflict with or embarrass each other or farmers
- Try to teach farmers
- Align ourselves with factions
- Be rude or careless

(vii) Training on informant interviewing

RRA relies on semi-structured interviews not formal questionnaires. There is a need in such interviews to establish rapport with the interviewee and at different times both to follow and steer the flow of the conversation, rather than asking questions in a formal and stilted manner. Answers to questions or statements made by respondents should not always be passively accepted by the interviewers. Some probing is required as well as checking where possible by direct observation. These points mean that some interview training for course participants is required in the workshop. One method of doing this would be through role play followed by trainees practicing on each other.

Activity 2. Introductory and Generative Meetings

The meetings held in the Shurugwi exercise were designated VIDCO area meetings, although in fact attendance was usually limited to people from the areas of the farmer groups from which informant households were drawn. The meetings have two aims:

(i) to introduce the survey team members to local people. This introduction needs to include a clear explanation of the purpose of the training exercise, what the outputs will be and how farmers might contribute and benefit. These points should all have been explained to and agreed with farmer group leaders in the setting up phase of the training course;

(ii) to ask questions which generate further questions, identify key issues, and obtain preliminary information on natural resources. Asking generative questions means that the survey group members are immediately exposed to farmers' own classification of resources, the way they use them and their major concerns. This information thus helps to open the training course participants from the outset to the perspective farmers have of their world. The relative success of the meetings

influences the nature of the first informal farmer interviews that follow.

Other points to note about the conduct of meetings are:

(i) Prior decisions have to be made on who will speak for the survey group. In our Shurugwi exercise only a third of the members of each survey group were Shona speaking. If they had been the sole speakers, the flow of the meetings would have been improved. If non-Shona speakers had played a role, they would have required an interpreter.

(ii) For non-Shona speakers to understand what is happening there are three options:

(a) one interpreter translates publicly, so that Shona and English are alternated. The flow is impeded but note-taking is improved;

(b) Shona speakers in the survey group other than the overall spokesperson provide simultaneous translations for non-Shona speakers sitting alongside them. Speech flow is improved, but the background whispering of the translations is distracting, and note-taking more difficult;

(c) the Shona speakers transcribe what is being said and provide a translation afterwards for non-Shona speakers.

All of these methods were used by survey groups. On balance two groups favoured (b) as it encouraged less inhibited audience participation, and one group used (a) as they could take better notes.

An example of the write-up of one of the Shurugwi introductory and generative meetings is shown below (Example III(3)).

An introductory VIDCO area meeting in Shurugwi

Example III(3) - Activity 2

Group 3: Introductory and Generative Meeting (Mavedzenge VIDCO Area)

Preamble:

* To introduce the survey group, our objectives and what we are going to be doing and how.
* Gain local interest and confidence.
* Establish general baseline environmental data for the VIDCO.
* Identify range of opinions and identify some key informants.
* Meet farmers selected for generative and detailed interviews.

Proposed Questions:

* What type of crops are grown?
* What are the names of the soils they are grown on?
* Which soil type does crop X do best on? (develop crop/soil matrix)
* Describe soil type X, Y, Z.
  Checklist: drainage, colour, texture, fertility and management
* Where do you find these soil types, position in landscape/ slope (catena)?
* What land use is connected with these soils? (develop soil/ land use matrix)
* For each land use/soil type which trees are found?
* What are the uses of these trees? (develop tree matrix)
* Trees at home? Uses/selectively left/planted.
* Trees in fields?
* Older people - Long back where did you get firewood from and now where do you get it?
* Plantations: Do you have any here, names? where? how big? how old? who controls?
* Has any individual planted trees? Who? Where? What?
* Opportunity for questions from the VIDCO:
  expectations
  contradictions.

Example III(3) - Activity 2

Group 3: Results of Introductory and Generative Meeting (Mavedzenge VIDCO Area)

Notes on Meeting

There was misunderstanding about the meeting time and the selection of households. Meeting started at 11.00 am.

Attendance at start - 19 females, 23 males, total 42 adults.

Attendance increased with late arrivals to 33 females and 30 males, total 63 adults

Age range - 75% aged 45 yrs+

The meeting began with a prayer, followed by talks by Agritex and VIDCO representatives.

Questions & Answers: 50 mins.

Questions and comments by the gathering (answers to survey group questions are on next page):

- What is the possibility of getting soil tests done to assess fertiliser requirements?
- how to protect gum tree plantation?
- more woodlots are wanted.

Agritex closes meeting - prayer: Time 12.09

Team Assessment

Good participation, got more information than expected; the speed of answers led to difficulties with translation/transcription.

General Observations

Some answers affected by presence of Agritex/Natural Resources Board, e.g. gardens in vleis; fertiliser use; early domination of floor by a few individuals, but general consensus apparent; no-one looked bored.

Example III(3) – Activity 2

Group 3: Results of Introductory and Generative Meeting (Mavedzenge VIDCO Area) Cont'd

SOILS	LANDSCAPE	TEXTURE	COLOUR	MANAGEMENT	WATER
Musheche	Toplands Crest Plains –	Light sandy non-sticky	Whitish	Apply a lot of fertiliser/ manure	Doesn't hold water
Jehechehe	Bottom slopes sandy	Light coarse	Whitish	Apply a lot of fertiliser/ manure	Doesn't hold water
Norubvuka	Vlei plains	Sandy loam slightly sticky	Darkish	Less fertiliser needed	Holds water
Chidhaka	Vlei footslopes	Clay sticky	Grey	Fertile	Holds water during wet season but cracks in dry season

Notes:

1. Gombo = virgin soils
2. Rotation – maize, rapoko, groundnuts
3. Difficulty of ploughing increases along the sequence musheche, jehechehe, norubvuka, chidhaka.

Group 3: Results of Introductory and Generative Meeting (Mavedzenge VIDCO Area) Cont'd

SOILS	CROPS	NATURAL VEGETATION*	LANDUSE	TREE USES
Musheche	Maize Rapoko Bambara nuts Groundnuts	Musasa Mushuku Muchakata Mutondo Mutamba Mutohwe Musekesa	Arable and natural wood-land strips	)Fruit trees))Fuelwood))Construction))Rope/string)
Jehechehe	Maize Rapoko Bambara nuts Groundnuts Bullrush millet	Mushuku Mushuku	"	
Norubvuka	Maize Rice Groundnuts	Mukuti Muchakata Musekesa Muvonde Mushave	"	Fruit trees, thatching grass fuelwood and construction
Chidhaka	Vegetables Grazing	Acacia spp Mupfute Mopani	Grazing	Fencing Brushwood Construction

* See glossary of tree names at end of Guidelines.

Activity 3. First Farmer Interviews

Two major decisions have to be taken regarding the first farmer interviews:

(i) what range of farmers or households should be included?

(ii) what type of questions should be asked and in what format?

(i) As already stated, the selection of informant households needs to be undertaken in advance of the training course. The method used in the Shurugwi exercise proved in principle appropriate. Farmer group leaders were approached before the course and asked to choose eight farmer households from their areas who would be prepared to be interviewed. Leaders were asked to select farmers according to the following criteria:

* socio-economic range;
* household structure (e.g. female headed household, household where both husband and wife

Example III(3) - Activity 2

Group 3: Results of Introductory and Generative Meeting (Mavedzenge VIDCO Area) Cont'd

TREES AT HOMESTEAD (H); FIELDS (F)

TREES*	H/F	PLANTINGS (*)/ **CUTTINGS (C)**	USES **FRUIT (F)/ SHADE (S)**	TREES **PROMOTE CROP GROWTH**
Mango	H	*	FS	
Guava	H	*	FS	
Apple	H	*	FS	
Lemon	H	*	FS	
Orange	H	*	FS	
Naartjies	H	*	FS	
Mulberry	H	*	FS	
Avocado	H	*	FS	
Paw Paw	H	*	FS	
Gum trees	HF	*	Constr.	
Mubvumira	H	*C	S	
Mugan'acha	H	*C	S	
Muchakata	HF	*C	FS	*
Muwonde	HF	-	FS	*
Mutohwe	HF	*	FS	
Mutamba	HF	-	F(S)	
Mununguru	H	-	F	
Musumha	HF	-	FS	
Mushuku	HF	*	FS	
Dzvirin'gombe	F	-	F	
Mupfura	F	*C	FS	*
Mutsubvu	F	-	FS	

Fuelwood:

In the old days people used Mubhondo (*Combretum molle*); Mutondo (*Julbernadia*); Mukuti (*Syzigium* spp.); Mupfuti (*Brachystegia boehmii*); Musasa (*B. spiciformis*). Used to have woodpiles then.

Nowadays people use any tree, and there are no woodpiles.

Trees in fields: Fruit trees don't suppress crops.

Plantation: Pre 1980 - government plantation managed by Sabhuku (a "traditional" leader). Supply of seed depends on management of plantation.

Since 1986 the VIDCO has been involved in plantation management.

* See tree name glossary at end of Guidelines.

live at home, household where male head is a migrant worker);
* members/non-members of farmer groups;
* arable soil types.

The criteria need to be clear and simple. In the Shurugwi exercise we wanted a range of farmers, selection of which was influenced by the prior experience of some trainers. Categories included farmers who sell crops every year, those who sell in good seasons and those who rarely sell anything. We also wanted a range of household structures and households whose fields were located on different soil types. In practice we were insufficiently clear about the criteria for poorer farmers: that they should be families with few or no cattle, and in most cases not be members of farmer groups. To ensure that we had farmers in this category we had to increase the number of informant households after the initial selection by the farmer group leaders. It should be noted that selecting a reasonable representation of types of households is assisted both by the experience of training team members and by discussion of the subject with local leaders. Selection of households should not occur publicly if any of the criteria being used are sensitive - for instance, wealth.

(ii) After the introductory and generative meetings the team must decide how the first farmer interviews should be conducted. In the first farmer interviews on the Shurugwi course, information was collected on production systems, resource access and the utilisation and production of woodland resources. Table formats, as illustrated, were used by most survey groups (example III(4)). These allowed interviewers to summarise information as they collected it. The intention was too that the format would encourage a conversational flow, rather than a rigid question-and-answer relationship.

Finally, interviewers need to be trained in the art of triangulation within interviews - checking on information that is given by probing further and, where feasible, through direct observation.

Activity 4. Summarising Interview Information

An important requirement of RRA is the collation of information immediately after it has been collected into a manageable format. This facilitates the use of the information in the activities to follow. It also ensures the information can be referred to when the final synthesis of survey material is carried out.

In Activity 4, survey groups summarise the information collected so far, and identify questions and issues for discussion in subsequent interviews. Results are discussed in a plenary session. Example III(5) shows the summary sheets used by one survey group, and III(6) gives the actual results of an interview summary by another survey group using a different format. These formats were not incompatible, but lack of standardisation can pose problems later.

First farmer meeting (note tree used as shade)

Example III(4) - Activity 3

Group 3: Format for First Farmer Interviews
(Mavedzenge VIDCO Area)

ARABLE LAND TYPES

Household _____ Category _____ Farmer Group? _____

	Homefield	Mainfields	Garden
Area/location			
Soils			
Fertiliser/ manure			
Crops(s) grown			
Inputs (seed)			
Crop/nutrient management			
Crop rotation			
General Comments/Observations/Historical Changes in activity since previous season?			
Grazing areas			

Example III(5) - Activity 4

Group 2: Format for Summarising First Farmer Interviews (Makandire VIDCO Area)

(1) Household Resources

Household _____ Category _____

HOUSEHOLD LABOUR	LIVESTOCK	OUTPUT AND MARKETING	INVESTMENT IN AGRICULTURE
No. of permanent labourers during season?	Draught power: own, hired, borrowed? grazing area?	Crop output? Crops marketed past 2 seasons?	Sources? (e.g. remittances, crop sales, veg/fruit
No. of temporary workers (e.g. school children?)	Supplementary feed? Water?	Buyer - local, GMB? Prices? Profits?	sales. Other income earning activities).
Location of household head?			
Hire of labour (permanent & temporary)?			

GENERAL COMMENTS

Exchange of resources/cooperation/communal resources?

Example III(5) – Activity 4

Group 2: Format for Summarising First Farmer Interviews (Makandire VIDCO Area)

(iii) Woodland Production

Household _____ Category _____

	Trees on Farm	Woodlot
When planted		
Species		
Numbers		
Methods of planting		
Use		
Income		

Example III(5) - Activity 4

Group 2: Format for Summarising First Farmer Interviews
(Makandire VIDCO Area)

(ii) Woodland Utilisation

Household _____ Category _____

Location	Homestead	Arable Areas	Grazing Areas	Woodlot	Other
Species					
Use					
Frequency of collection/ purchase?					
Labour					

Summary Sheet for First Farmer Interview (Mavedzenge VIDCO Area)

Mrs. A.

Land

Moved to their home in 1959.
Paid £38 for their homestead & field.

Land Use

	Homefield	*Mainfield*	*Garden*
Soils:	Jecha well drained	Nhorubvuka quickly absorbs water: prone to waterlogging.	Nhorubvuka
Fertility Management:	put manure and antheap on in 1982	1984/85 antheap on one contour 1986/87 manure on part of one contour	compost in 1977 Manure in 1987/88
Crops:	sunflowers watermelons sweet potatoes nyemba beans	sunflowers/ nyemba intercrop nyemba watermelons	maize vegetables

Inputs: All seed from 1986/87 (incl. maize R215)

Output: 1986/87: 20 bags maize – all consumed at home.

Woodland change: Now difficult to get wood for poles and fuel as there are fewer big trees now; only shrubs.

Woodland production: homestead

Exotic fruits: guavas, peaches, mangoes, apples, mulberry
Others: cypress, eucalyptus, mututi (live fence), mukondo
Management: protect trees when young; mulch; protect against lightning; digging and watering around plants; straightening of young plants.

Summary Sheet for First Farmer Interview (Mavedzenge VIDCO Area) Cont'd

Mrs. A.

Household structure (Labour)	*Draught power*	*Agricultural investment*
Husband – does not contribute to agricultural labour (works intermittently for DDF).	2 head of cattle: 1 bull and 1 cow	Maize and sunflower seed from previous season.
Permanent labour: herself and one son	1 bull combined with 1 ox of relatives for the draught power of both families. Her son herds the animals.	Outstanding loan of $108 from 1985/86.
Temp: 2 school-children and one daughter-in-law	3 goats	[1986/87: used $110 from previous season's maize sales – $200 of loan repaid].

Woodland Utilisation

Major uses

Firewood:	Mutondo, musasa, mususu. Now difficult to get; obtained from grazing area or near main field. Collects twice a week.
Construction poles: (note: permit req. from District Council)	Mukcarati, muzeze, mususu, mutondo, musasa (affected by borers). Collected from grazing area every year for repairing the cattle pen.
Bark rope:	Mupfuti, mutondo – collected when they collect for construction or firewood.
Fencing: (no permit req.)	Thorny trees – muunga, mupumbu, muchecheni, mupangare: carried out every year.
Browse:	Mutondo, mususa – the early leaves.
Fruits:	5 exotic and 7 indigenous species grown in homefield area.
Trees in fields:	Mushuku (crops do poorly under these) and mushavi (crops do well – low branches lopped).
Medicinal:	Mutamba – unripe fruit juice used for treating cataracts in eyes of cattle.

Activity 5. Informal Discussions with Key Informants

Informal discussions with selected informants are a way of checking information emerging from the generative interviews. In addition they enable survey groups to build up a more complete picture of both the form of production and natural resources, concentrating on issues arising from the generative phase. Discussions can be either planned or opportunistic. Examples of the former are discussions with:

(i) VIDCO and farmer leaders about the management of woodland resources and the institutions responsible;

(ii) local agricultural extension or forestry staff to understand current extension practices and messages;

(iii) traditional village heads to understand their present role and with older members of the community about historical trends, both social and environmental.

Examples III(7), (8) and (9) illustrate the kinds of historical and institutional information obtained in this way.

Examples III(7) - Activity 5

Key Informant Interview: Mr M., born 1921

Local History

Pre-colonial: The local people lived in the hills fearing raids by Lobengula's armies. Farming was in the hills, where finger millet (*rukweza*) was grown and in the *vleis* (*makuvi*). Local people used to make hoes from chrome they had mined. They farmed the vleis using a *mipanje* ridging system.

The Rozvi were the original inhabitants. They were removed by the Shona Chiefs. These were Gare and Nhema who came from Swaziland originally. When Gare arrived in Chibi he fell ill and his colleagues returned to Swaziland. He was admitted to the Chibi family and given a wife. Gare settled at Bongwe in Shurugwi. Nhema arrived later and requested an area from Masiviza. He wanted Svika hill but the Rozvi were still settled there. Gare and Mavedzenge went to fight the Rozvi and Nhema soon settled there. When Gare and Masiviza came the land was empty; they just marked the trees to stake their claim to land. Gare used to own the land from Bongwe to Chorowande to the Tokwe river. He is the descendent of Gare's people. The land gradually became more settled as people moved in to marry the sons of Gare.

Early colonial period: 1910-1940

- There were serious droughts in the early 1920's. The year of the locusts came in the early 1930's. The mine at Selukwe was opened in the 1920's - they took the elders to work there who knew how to mine chrome. The informant worked in the mine in 1935-6, he was pulling trolleys underground for 25/- a month. He bought his first cattle then for 10/- each.

- During the droughts of this period (e.g. 1937) the people here did not suffer. The *huridza* (agricultural "barons") had surplus maize and they sold it to people from Gutu, Chivi and all districts around in exchange for cattle. 2 bags maize = 1 head of cattle.

- The lines (consolidated settlements) came in 1932. The demonstrators Malamsi and Mulambo ordered people to live in the lines, as if in a compound. Before that settlements were scattered.

- Before the lines the fields were given by the chiefs. After that they were iven the new fields with contours by the agricultural demonstrators. The *sabhuku* (village head) would get 10-12 acres, others 6-8 acres and bachelors 1 acre. Women were no longer given fields.

Colonial history after 1940

- The European farms were mostly created at the time of Hilter's war 1939-45. After that African people were expelled and made to join the "lines"*. It was at this time that the land became very crowded. People arrived from many areas - Chivi, Buhera etc.

* "lines" = linear settlements imposed by the colonial government following land use zoning.

(i)

(ii)

Key informants, often (i) women's groups and (ii) elders of the community

Examples III(7) - Activity 5

Key Informant Interview: Mr M., born 1921 Cont'd

- People were stopped from farming vleis at the time of the contours. (Some years after the "lines" (1932)). The people could no longer be allowed to have rice. The demonstrators said that the farming of vleis caused erosion but the people did not notice any as there was a lot of grass and many big trees.

- Destocking (stock cards) came first after this. The Europeans came to take their cattle.

- 1947: Kenya drought: they bought yellow maize from the mills and later planted it.

Production system changes

Pre-colonial:
Hill farming (*rukweza*); vlei farming - ridge system - *shezha* (sweet potato) and rice. Few cattle.

Early colonial - up to 1932:
Vlei farming - rice, "Karanga" maize, *rukweza* etc. Also some dryland fields with coming of plough. Cattle increased, but grazing plentiful and scattered. Important cattle-grain exchange at regional level. Fertility maintained through manure, *churu* (antheap).

Later colonial - present:
Wetland cultivation banned. Arable and grazing divided. Grazing land gradually reduced due to increasing population. Crops - maize (increasing), plus millets. Reduced cattle holdings after destocking. Fewer *humwe* (cooperative work parties). Fertility a real problem - increasing fertiliser use.

Environmental change

Early period - Erosion was very rare. There was a lot of grass and trees to hold the soil. The grass was abundant because the rains were plentiful.

Later period - Increasing population resulted in reduction of woodland cover and so more erosion. The contours halted some erosion but if they are poorly kept it increases. The lines and concentrated settlement caused erosion and more paths.

Local institutional history

- The rain has reduced because the *mitoro* (rain-making ceremony) is not held properly these days. They no longer send *nyusas* (Mwari cult messengers) to Zame as they did before (Mwari is the High God). The Marangwe people hold the *mitoro* in this area under a big *muchakata* (*Parinari curatellifolia*) tree.

- There used to be a *jiri* (sacred forest) at Chatokwe and locally. In the Jiri forest if you pick up the *mushuku* (*Uapaca krihiana* fruit) first from the ground and it is already bitten you must drop it and not say a word. If you pick it up you will lose your way in the forest. The *jiri* is the home of the *vadzimu* (ancestral spirits) and the *mushuku* fruit their food. The area is a graveyard of the ancestors - either the Rozvi or the descendants of the Gare people. You must not cut trees there but you can collect dead wood or browse cattle, but with respect.

- he large trees were destroyed around the time of the "lines". Later restrictions were imposed by the government (Europeans) and then the VIDCO's.

- The elders protected certain trees. They were not allowed to be cut. These were: *Mubvumira, Mupfura, Muonde, Musuma, Mushavi, Muchakata*. If you were found cutting you would be taken to the Chief's court. They were protected because they are fruit tres. *Mubvumira* is protected because it is found on rocky hills - the places where the ancestors stay.

- The big trees were protected because the *vadzimu* rested there in forests.

- Now the elders' rules have been replaced by the new police, but they have never seen the police so the young people do not fear cutting and the young trees do not grow up into the big trees as they once did.

Example III(8) - Activity 5

Key Informant Interview with Mr N., VIDCO Committee Member and "Tree Policeman"

Introduction

We specifically interviewed Mr. N. because we heard from one of the farmers that he was the VIDCO's 'Tree Policeman' and we wanted to learn more from him of this role. He is also a VIDCO committee member. We tracked him down in a roadworking gang ('Food for Work') and he was pleased to take some time off and sit and talk to us in the shade.

Training

Background

He told us that he had been elected by the villagers from VIDCO 3 to attend an Agritex course with 4 representatives from the other VIDCOs in Ward 3. The purpose of the course was to train one person from each VIDCO to look after/conserve trees and boreholes in their area. The Ward Councillor attended the course to help the 5 trainees understand it. Teachers on the course were from Agritex, Forestry Commission and the Water Division.

What did he learn?

* Villagers in every village should plant exotic fruit trees and eucalyptus.
* Wild fruit trees, e.g. Mutohwe (*Azanza*) should not be cut down because their fruits can be eaten by cattle herders.
* Clearing the land of trees causes erosion.
* Trees should not be cut down at random but care should be taken in cutting appropriate trees.

His duties

He started his duty as 'tree policeman' in 1984.

Helping to assess needs for wood and its availability

e.g. A village member wants to build a kraal. Mr. N. meets with the whole village to determine whether the member really needs a kraal. If Mr. N. disagrees with the Village Council then 2 villagers accompany him to the applicant's house to confirm a decision.

The decision is based upon:

* the need for a kraal
* the availability of construction wood.

In case of illegal tree cutting

If someone is caught cutting down a tree illegally then Mr. N. takes him to the VIDCO where he receives a fine. The size of the tree cut down determines the size of the fine.

e.g. large - Mushuku (*Uapaca*) - $60 fine
small - Mutamba (*Strychnos*) - $20 fine

In each village, there are 2 elected members whose job it is to help him find villagers breaking the tree-cutting laws. They report the crime to Mr. N. who then books the criminal.

Although there is no punishment for taking tree parts for medicine, it is forbidden to take fibre without permission. During a drought it is prohibited to cut leaves for fodder at all - whether or not permission is asked.

How to decide which trees are available

* Trees which coppice/regenerate, e.g. Muunga (*Acacia*) can be cut more readily than those which don't.
* For firewood a sick tree is usually sought.
* For poles: villagers are asked to select one tree each from varied spots but NEVER to clear one whole area. Small trees are preferred to large ones for poles because the removal of large ones results in a greater change. However, it is preferred to take a few stems from a many-stemmed large tree than to cut down several one-stemmed trees.
* Poles from Mupangare (*Dichrostachys*) which is in short supply last 5 years, while poles from Mususu (*Terminalia*) last only 2 years. A request for poles will consider the local infestation by termites. Mususu is very short-lasting when there are lots of termites but Mupangare is much more resistant. In such a case, Mr. N. may suggest mixing Mususu and Mupangare poles for building a kraal.
* In times of tree scarcity, trees can be requested from another village or a resettlement area.

Implementation of cutting laws

* Fines deter many people from cutting illegally and many people understand the importance of tree conservation so cause no problems.
* Some more ignorant people try to beat him up if he tries to stop them cutting down trees.

▶

Example III(8) – Activity 5

Key Informant Interview with Mr N., VIDCO Committee Member and "Tree Policeman" Cont'd

Tree Planting

In Tongogara there are no trees. Mr. N. would like to recommend that Mupangare seeds should be collected and planted in the treeless areas. Tongogara villagers should ask the District Council for a plot of land to fence off for planting of indigenous trees.

Comments by Interviewers

This interview illustrates the utility of "triangulation" – his perceptions of his role and effectiveness differed strongly from those of other key informants. Mr. N. said fines deter people from illegal tree-cutting, but Mr S. (schoolteacher) said there is a lot of tree-stealing because fines aren't enforced. Mrs G. (VIDCO committee member) said she can only think of one fine being imposed since 1982, although should said many people were caught and rebuked, but not fined. She also said only a small number of people request permission to cut, compared with those who 'steal' trees. Mr. P.N., acting chairman of the VIDCO, said he hadn't heard that Mr. N. was the "tree policeman".

These differences indicate a need for further investigation of the tree policeman's status and effectiveness.

Example III(9) – Activity 5

Summary of Information from Key Informants, Matamba VIDCO (VIDCO 3)

Names of Key Informants

Mr. N. – 'Tree Policeman'/Youth Representative on VIDCO
Mrs. G. – VIDCO Member
Mr. S. – School teacher/old traditional leader (sabhuku)
Mr. C. – Medicine man/old traditional leader (sabhuku)
Mr. P.N. – Acting VIDCO Chairman
Mrs. C. – VIDCO member/active in women's group
Mr. M. – Sabhuku

Political structure of VIDCO 3

VIDCO 3 is divided into 5 villages – Changunduma, Matamba, Tobayo, Dera and Kangengoni.

(i) The VIDCO committee consists of:

1 chairman
1 secretary
1 youth representative
1 women's representative
2 'ordinary' members

On the committee there is one representative from each village and an extra one from Tubayo.

(ii) Each village also has a Party committee and elects to it its own Party Chairman who is not a member of the VIDCO committee. In some matters, however (e.g. over tree cutting and land purchase), a village member must submit a request to the Village Party Committee which will report and discuss the issue with the VIDCO.

(iii) In addition, the old traditional leaders (sabhuku) of each village are still respected as such by older village members. Within some villages, conflict exists between the new party chairman and sabhuku. In some cases, sabhuku are seen as collaborators against independence, while the Party Chairman is normally someone who was active in the war. The VIDCO 3 power structure is further confused because the Village Development Committee has not yet established its role.

Table I shows leading political figures in VIDCO 3.

Example III(9) – Activity 5

Summary of Information from Key Informants, Matamba VIDCO (VIDCO 3) Cont'd

Table I

Village	Party Chairman	Sabhuku	VIDCO Member
Changunduma	Mr. P.C.	Mr. M.C.	Mrs. A.C.
Matamba	Mr. J.M.	Mr. A.M.	Mr. P.N.
Tubayo	Mr. E.N.	Mr. S.	Mr. N. Mrs. G.
Dera		Mr. D.	Mr. P.M.
Kangengoni	Mr. C.T.	Mr. K.	Mrs. R.

Each village has a party committee and a party chair who is elected by the village.

Community Projects

There are several women's group projects in bread making, soap making and sewing of uniforms – all are sold for cash. There have been attempts at planting of Eucalyptus woodlots but due to lack of cohesiveness of individuals in the VIDCO these have been unsuccessful. In VIDCO 3 there are no community projects. However the VIDCO is currently proposing three projects:

(i) gum tree plantation in Matamba grazing area;
(ii) dam in Tubayo in vlei;
(iii) fencing of the VIDCO grazing area.

Mr. S. thought that there was not a good prospect for community action in tree planting because of the lack of concern and understanding that most people had for the disappearance of trees and the future. e.g. One of the reasons for no communal woodlots being planted was that people steal the wood.

Labour Sharing/Hire

Work parties have existed since early colonial times at least, and still operate today. If one was behind in work, an invitation to the community to come and help would be responded to, and the farmer being assisted would be expected to provide the food and drink for the day. The Seventh Day Adventists in the community commonly call upon the congregation to help each other.

Task sharing between households is common, up to 10-15 households may cooperate, usually friends or relatives. At the village level, group projects have included gully reclamation; while at VIDCO level 'Food for Work' programmes exist mainly during drought years mainly for road building.

Land Share/Hire

Past: There used to be illegal selling of land before independence, e.g. Mrs. X. bought land from someone who left for 15 pounds in 1967.

Present: If land is not being used by the family it is allocated to, (e.g. if the family has left the area, or do not have enough money for inputs) another farmer can arrange to use it, but will be expected to pay the "land tax" which is due to the District Council (further info required).

Land is often lent for 1-2 years. Some people were of the opinion that the VIDCO *should* reallocate land from those with idle/plentiful land to those who are in need. Others said that if a farmer has impoverished land, he sometimes goes to another communal land area, and the abandoned land reverts to the VIDCO.

If parents die, eldest son inherits all land and house by custom and it is up to him to share it with siblings.

Livestock Lending/Hiring

Past: Prior to centralisation, people lived in extended family units and family members were able to borrow livestock for ploughing. Poorer families with no cattle were lent enough beasts to plough and kept them until they produced the same number of offspring. The offspring would be kept and the borrowed beasts returned.

Present: Some hire and pay, others lend to relatives and friends who feed and look after the stock. If a woman's husband dies, his male relatives claim the cattle if there is no boy child. The relatives may or may not help the cattleless widow with ploughing etc.

Women's Groups

One successful and active women's group exists – they all live close to the Matamba Meeting Hall. They make and sell school uniforms, bread and soap. However, in other villages there are no formal groups and it is not clear why not, the only suggestion being no formal meeting place. Even so, the women here do gather in small informal groups of 3-4 or so to talk. One informant suggested that important functions of women's groups should be to grow vegetables or keep fowl, but not to plant woodlots. Although she agreed that firewood was a problem for women in particular – too far to walk and scarce – she considered that

▶

Example III(9) - Activity 5

Summary of Information from Key Informants, Matamba VIDCO (VIDCO 3) Cont'd

the village council should be responsible for woodlots.

One reason may be the difficulty in obtaining funds to set up a project. Women in a Women's Group usually have to supply funds themselves in order to start up a project which has been approved.

Female-Headed Households

If husband works in town then the female head of household often has labour problems during the rains. In particular, she can't plough. Sometimes friends help out.

In most cases where the husband dies, the wife loses the cattle to his male relatives unless she has a son. Often they don't contribute to her ploughing. She feels that this is wrong but unless laws to the contrary came from Provincial or District Council level such customs will not change.

Role of the Traditional Leaders

Past: The sabhuku was the traditional leader at the village level, above whom was a 'small chief' (*sadhunu*, or ward head) and then a 'big chief'. The *sabhuku* was responsible for land allocation in the village, and would arbitrate in land disputes. If there was an issue that could not be resolved by the sabhuku, it would be passed on the line of command of the chiefs. If it was still unresolved, then the matter would be referred to the civil court. *Sabhuku* used to have all of the land, and people paid the sabhuku for land. The buyer's name was written in a book, and taken to the Sadhunu (Ward Head) and there was a charge for a stamp.

Present: After independence the present structures of elected local government were set up, to replace the sabhukus and chiefs. At the village level, the Party Chairperson is responsible for organising meetings and is a link between the people and the VIDCOs. The present role of the sabhukus varies from area to area. In some areas they are now VIDCO members, but in other areas they are now powerless. We spoke to two such individuals, who are not in the VIDCO, and are bitter about their loss of power. They said that tree cutting byelaws are not being effectively enforced by the VIDCOs and suggested that in this area particularly there is a gap in power structures. They claim that since independence, tree cutting has increased enormously and that people come from as far away as Tongogara with scotch carts to cut wood for sale. The members of the new structure tend to be younger, and may have had experience in the 'Struggle'. Although the sabhuku's role is much diminished, often complaints from the villagers go to the sabhuku but he then refers the issue to the VIDCO.

Present: VIDCO writes a letter to the Sadhunu before proceeding with community projects.

Grazing Areas

Normally cattle spend January-April in the communal grazing area and then return to the arable areas for grazing. This year, however, forage ran out in the communal grazing area after 2 months, so cattle were returned to arable areas for 1 month before going back to the communal grazing area. The decision to move cattle in or out of the communal grazing area is made by the village committee. If crops are eaten by cattle then fines are imposed, or compensation agreed. VIDCO 3 wants an Agritex grazing scheme to keep cattle from other VIDCOs out. VIDCO 3 also wants paddocks for introduction of short duration grazing to provide more grass (and therefore better cattle prices) and to save labour in herding. Agritex have been approached for help but the scheme must be authorised first by the VIDCO, then by the WADCO, and then the District Council.

Tree Cutting

Cutting down of fruit trees has always been forbidden by traditional laws. Council byelaws prohibit any tree-cutting without permission. Written permission must be sought from a VIDCO committee member through a petition to the Village Council and permission from the village chair. A tree 'policeman' is supposed to enforce these laws but many people are not even aware of his existence although he does catch a number of illegal tree cutters. When someone is caught cutting a tree down illegally he is supposed to receive a fine, but usually he is not fined because he has good reasons for cutting down the trees. Stricter enforcement of fines may reduce illegal tree cutting as maybe would a full-time paid tree 'policeman'. However, people still need wood and there is an acute shortage of firewood and construction wood. On the other hand, people won't plant and look after communal woodlots while they can easily 'steal' wood from the communal woodland. Even if a tree policeman was paid and fines enforced, outsiders may still get away with illegal tree cutting. One key informant suggested that the government should supply rural electrification so that people wouldn't need to cut down trees for firewood.

Note: See interview with Mr. N. for detailed tree cutting information.

Example III(9) - Activity 5

Summary of Information from Key Informants, Matamba VIDCO (VIDCO 3) Cont'd

Tree Planting

Although there is depletion of indigenous fruit trees in the woodland, farmers much prefer to plant an exotic tree (oranges or mangoes) than an indigenous tree. It was suggested that there is more malnutrition today as a result of the depletion of fruit trees. Some farmers would like to plant more trees but lack the knowhow and resources. One of the key informants, a traditional healer/farmer has planted 400 gum trees on an abandoned field and thought that this practice was spreading in the south of Shurugwi. He was also planting tree species of medicinal use at home to avoid travelling too far for medicines (Afzelia quanzenzis and Kigelia africana).

It was noted by another informant that gum trees are inferior to indigenous trees for firewood but a vast majority of people cannot accept the need to plant indigenous trees.

Example III(9) - Activity 5

Issues and Questions Arising from Key Informants - To Follow Up

Tree Cutting

* Confusion concerning Mr. N.'s role as tree policeman - how effective?
* Is a tree guard the answer? Paid vs volunteer?
* Perceptions of tree loss and scope for community action - are enough people worried? Why/why not?
* Insufficient back-up from higher authorities in enforcing tree cutting byelaws.
* Since independence there has been increased tree cutting, some of which includes cutting for wood sale to neighbouring areas by young people.
* Is the loss of power of sabhukus leading to anarchy with respect to tree cutting - new leaders unable to enforce rules?
* To what extent at village-level is there agreement on rules for cutting -and can this be built on (problem of outsider 'stealing')?

Tree Planting

* *Training* is required for villagers in planting and caring for trees.
* At present, no one plants trees on contours but they are often left there if growing naturally - scope for planting?
* People's preference for fruit - indigenous vs exotic?
* Consider growing indigenous trees from other areas with medicinal (or alternative) value.
* Planting trees on abandoned, wasted land?

Communal Schemes

* Find out more about planning for 3 proposed projects
  - Dam
  - Gum woodlot
  - Grazing scheme
* If grazing scheme implemented, could include woodland protection - does community want?
* Probe further on potential for women's groups to carry out forestry projects.
* Could traditional leaders still have a role in implementation and management of community projects? Conflicts with new institutions?

Tree Regeneration

* Centralisation led to tree loss. Therefore it may be possible to assess growth rates from abandoned arable land, e.g. Mr Sitlatlha knows of such sites in Dera and Kanengoni.
* Some say there are few young trees because people cut them and others because goats do - check on this.

Erosion

* Contours *may* promote gully formation.

Activity 6. Resource Classification and Environmental Change

This activity is an extension of Activity 5 in that it uses key informants to combine social and environmental survey and to understand historical trends.

One of the best methods is to walk a transect across the survey area in the company of one or two well-informed locals who can discuss both environmental and historical aspects (Conway, 1985: 29). The route of the transect should be selected to cross a range of land use types, land units, vegetation types and soils, ideally following a catenary sequence. The route can be chosen using aerial photographs and/or previous field observations. In addition to taking field notes and questioning accompanying informants, local people encountered on the route may provide useful information and opinions. Example III(10) shows the results of a transect undertaken by one survey subgroup. This demonstrates how such an exercise can link discussion and field observation of natural resources, as well as provide a preliminary reconnaissance for the natural resource assessment phase.

Aerial photo being used to plan route for walking transect

A well-informed local volunteers to walk the transect

Activity 7. Working with Farmers/Participating in Group Activities

One of the best ways to learn about farmers' activities is to accompany and assist them in their work. This may be arranged in the pre-survey stage in some form of reciprocal agreement. For example, the survey groups may provide 1-2 hours of labour in return for farmers' time given for interview. Alternatively the arrangement may be more informal or spontaneous. The exercise is valuable in generating questions and issues which may not arise in a more structured interview, and in checking farmers' information by observation. Examples of activities include herding, wood collection, harvesting or weeding.

Experience in Shurugwi has shown it is necessary to make prior arrangements with farmers if the intention is to accompany them in other than household chores. Farmers tend to make plans to stay at the home for

interview purposes and so may sacrifice valuable labour time and give little opportunity for assistance. The reciprocal agreement may compensate for time loss or at least make more efficient use of time.

Activity 8. Review Workshop

The purpose of this workshop is (i) to review and synthesise the information collected so far; (ii) to further focus the issues that arose during the generative phase; (iii) to identify gaps in factual information; and (iv) to prepare questions for the second informant interviews. Exchange of information between survey groups will also be of value at this stage to compare and contrast data and issues specific to VIDCO areas, and to ensure that all groups are using compatible methods.

Although data synthesis should follow each activity as a continuous process, an overall review is considered necessary before preparing questions for the second farmer interviews that follow.

Activity 9. Second Farmer Interviews

The dates of the interviews should be arranged beforehand, probably at the end of the first interviews. Informants should be visited by the same survey group members who visited them previously.

The approach in these interviews will depend on the outcome of the first informant interview. Where the first interviews had more of a generative role, there will be a lack of factual information about the form of production and resource classification which needs to be gathered in these second interviews. However, where the first interviews progressed into detailed information on the form of production and natural resource interview, these second interviews will become assessment interviews.

Whether a detailed or assessment interview is conducted will be determined in the workshop in Activity 8, as will the questions and themes.

If assessment interviews are held some synthesis and preliminary discussion of the form of production and

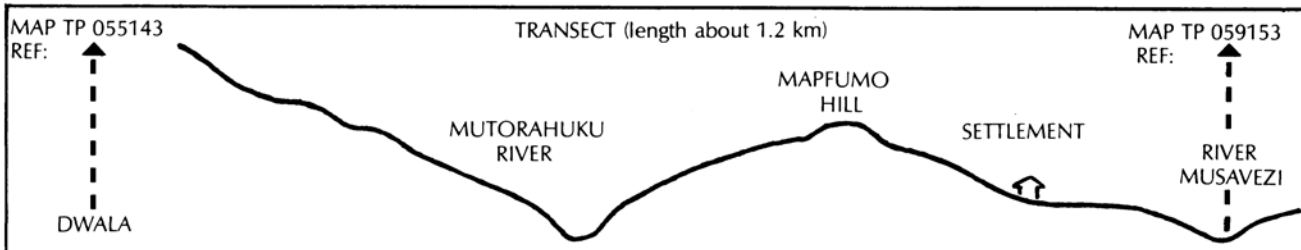
A view of the transect route from a kopje through miombo woodland and arable land

natural resource information will need to have taken place. The aim of the interviews is to present some of this synthesised information back to the informant farmers for their comments. Emphasis should be on exploring their views and validating the information rather than gathering additional data. Tentative proposals for agroforestry interventions could be discussed and early responses gauged.

Example III(11) shows a Second Farmer Interview summary sheet.

Discussion and field observation of tree crop interactions

Example III(10) - Activity 6



LAND USE	Grazing	Arable	Grazing	Grazing vlei	Bush Fallow	Grazing Browse F'wood	Fallow land	Crop	Settlement cropping & fruit trees	Gardens Kraals Brick-making	Grazing
SOILS	Chidhaka & Norubvuka (waterlogged)		Stony, boulders	Norubvuka Chidhaka waterlogged	High water table Rocky	Rocky		Nutrient deficiency		Norubvuka	Mucheche (chidhaka) Nhokure Grass indicator
VEGN	Miombo		Miombo Mixed Large Ficus	Few shrubs Musekesa Mususu	Masambara Mubondo Mubvumura Manwahuti	Mususu Muchecheni Muchukata Mumaradzi Tuzvidzembwa		Digitaria spp Natal Red Top C. dactylon		Shrubs: Muzeze Musumadombo Chijuja Muchako chiyana	Muduru
HISTORICAL			Ruins - old home site	Cultivated with rice until 1943			Buriel site. Large trees removed		Lines 1932	Pre-1930s farmed rice/ maize/ millet. Gardens post-1933	Siltation of pools. Flow always seasonal
L'STOCK				Vlei grazing			Dry season grazing, browsing			Garden residues used for livestock feed	
COMMENTS	Norubvuka soil: Dry year - plough early and it yields well. Wet year - waterlogs but still performs well if nutrients applied			Fallowed: - lack of seed - no draught power - "laziness"	Eroded along pathway Granite outcrops	Important patch for fuelwood & grazing - cutting prohibited - "sacred" area Trees on contours for owner to utilise		Ficus spp. in field - effects: Wet year - waterlogging Dry year - conserves water Average year - no impact. Roots 23 cm. Leaf litter - garden		Shortage of Acacia for garden fencing. 1 tonne wood = $25-30 to make 40,000 bricks Mutondo, Mubondho from resettlement Erosion	

Scientists helping farmers' group plough, in preparation to plant fruit tree seedlings

Scientists helping farmer harvest groundnuts during interview

Example III(11) - Activity 9

Second Farmer Interview Summary Sheet
(Mavedzenge VIDCO Area)

Mrs K. - 19/3/88

Home area

Planted spp.	*D.O.P.*	*Location*	*Uses*					
			Fe	*Fw*	*P*	*Fr*	*M*	*Br*	*Other*
Cypress (13)	1987/88	along fenceline			✓				
Gum trees (15)	1986/87	" "			✓				
Mulberry (2)	>1959	near home				✓		✓	
Guava (11)	1963	" "				✓		✓	
Lemon (1)	1971	" "				✓			
Mangoes (7)	seedlings	" "				✓			
Apples (15)	Feb 1988	" "				✓			
Mukondo (2)	1987	" "							prevent lightning
Mutiti (?)	1985	" "	✓						
Ipwadzagudo (1)	1985	" "	✓						

Unplanted spp.

Muzeze		along boundary	✓		✓				
Musekesa		near lower boundary		✓	✓				
Musasa		near boundaries and in a run-off course	✓	✓	✓				
Mususu		near/along boundary	✓	✓	✓				yokes
Musvanyoka (*Cassia*)		mainly on antheap							
Mutondo		near boundary		✓	✓				
Muchakata		near boundary		✓		✓			
Mushozhowa		near boundary			✓				
Mudziyavashe		near boundary		✓	✓				
Mubvumanopa		near boundary			✓		✓		
Muzhumwi		near boundary				✓			
Mutamba		edge of field				✓			
Mubhondo		edge of field		✓	✓				
Mutzvombsusho			✓		✓	✓			
Mukamasani			✓	✓	✓		✓		
Mupendashambo									
Mupangare									
Muskmadombo									garden fencing
Muhwezha				✓	✓	✓			
Munhuhwambwa				✓	✓		✓		
Musumu				✓		✓			
Munhudugwa							✓		
Mugan'acha				✓	✓	✓			
Musvadzambudzi									

Example III(11) - Activity 9

Second Farmer Interview Summary Sheet
(Mavedzenge VIDCO Area) Cont'd

Tree Interaction - Crops

Species	*Location*	*Effects*
Mushuku	In mainfield	Crops grow well underneath, but the tree does not add fertility to the soil.
Musasa) Mutondo) Mukarati)	Between fields	Provide browse for cattle. Leaves can be added to compost, but trees do not benefit crops if left in fields.

Livestock (browse)

Browse spp.	*Location*	*Seasonal Importance* *Period*	*Comments*
Mutondo	Fields & g.a.	Sept.	Most important when young leaves come out.
Musasa	Fields & g.a.	Sept.	Most important when young leaves come out.
Guava	Home area	Oct. & Nov.	Have young leaves in these months
Mulberry	Home area	Sept.	Period of new leaves, when other grazing is short.

Drought livestock strategy

Drinking:	Holes (mufuta) dug in the river sand to enable the cattle to reach water.
Fodder:	Animals obtained some forage from vleis where there was still a little grass. Maize stover given to animals in mornings and evenings. No food purchased.

Manuring

Manure:	Last used in 1986/87 on part of contour. Bulked up with antheap, grass and maize stover.
Antheap:	(*churu*) also added to fields. Some in 1986/87 and in 1984/85.
Compost:	(incl. Musasa leaf litter) used in garden.
Green Manure:	Mrs K. was intercropping *nyemba* (cowpeas) with sunflowers so that the nyemba leaves would act as a green manure to replace some of the N removed by the sunflowers.

Example III(11) - Activity 9

Second Farmer Interview Summary Sheet
(Mavedzenge VIDCO Area) Cont'd

Questions:	*Ideas*
Soil fertility:	Use manure, antheap
Conservation:	Dig and when necessary repair contour ridges
Management of trees:	(a) In grazing area: People should only cut trees when given permission (b) In plantations: These should be protected by the government
Further planting of trees:	Trees like *mutohwe, mushuku, mugan'acha,* which grow easily from seeds and are useful, can be planted. *Mutiti* can also be planted as a live fence.
Information required:	Other uses of fruit trees.

Scientists accompany farmer to her field and make detailed observations of trees and their locations

All tree uses are considered - such as the wood used to construct the Kraal shown here

Activity 10. Plenary Synthesis of Meetings and Interviews

The final activity in the detailed phase will be a review and synthesis of information which incorporates the additional information from Activity 9. Survey groups should summarise the information they have, and, in a plenary presentation, outline what information they feel needs validating and further detailing through natural resource surveys.

Activity 11. Natural Resource Assessment Methods Workshop

The aim of this workshop is to discuss methods of natural resource assessment and classification which can be used to gain more information about the main issues arising from previous activities.

The range of natural resource issues should be focused and selection of techniques made considering available time and resources, capabilities of participants as well as equipment requirements. In Shurugwi the results of earlier activities suggested the need for soil characterisation (Activity 12), an analysis of soil-vegetation associations (Activity 13), vegetation survey (Activity 14), land use mapping (Activity 15), and erosion hazard mapping (Activity 16). These may not arise as key issues in rapid appraisals in other communal areas.

Activity 12. Soil Characterisation

In the Step II activities participants reviewed background information and environmental trends using secondary data and aerial photographs. This review raised issues which were further explored in discussions with farmers. Earlier in Step III farmers identified and described major soil types, their distribution and associated use and management.

In this activity the farmers' classification and perception of soil opportunities and constraints will be assessed using recognised field techniques of soil/site description and soil sampling. This activity enables us to validate what farmers have told us and to some extent quantify the constraints and opportunities they have exposed. Soil characterisation can be undertaken using a range of techniques depending on which variables are to be investigated. This in turn is determined by what issues arise in the generative activities. The approach taken will also depend on the availability of information from previous soils work in the area. In Shurugwi this was limited to the 1:1 million National Provisional Soil Map.

In soil characterisation both physical and chemical assessments can be made.

Physical Assessment

Physical assessment of the soil involves profile description of modal soil types. The aim is to describe the soil types identified by the farmer using conventional terminology and in particular to note those physical characteristics that influence soil management.

The range of soils occurring within the study area has been discussed with farmers and observed during interview and transect activities. In addition, the associated land units and land uses have been observed on aerial photographs. A soil pit is dug in each soil type identified by farmers. These pits must be representative of the modal soil types described by farmers and so should be located with their assistance. Observed catenary sequences and aerial photograph land units can also be used in the selection of pit sites.

It is recommended that soil profile and site description should follow standard procedures and formats as set out in FAO Guidelines for Soil Profile Description or national soil survey texts. Relationships between soils and land units/position on slope or potential 'agroforestry niches' should be explored.

The table below shows the major soil types in Shurugwi Ward 3 and their observed properties.

Although standard soil profile and site description will

Example III(12) - Activity 12

Soil Characterisation

Soil (Local Name)	Physical Characteristics	Chemical Characteristics	Associated Vegetation	Limitations and Management
Jehechehe (Jecha, Mucheche)	Yellowish brown/ brown medium-coarse sand to sandy loam becoming coarser, more gravelly and more orange/yellow with depth. Parent material appears from 80-180 cm. Excessively drained but water table over granite at 95 cm in one instance. Distinct A horizon but diffuse boundary between subsoil horizons.	Strongly-slightly acid. Organic matter content and percentage total nitrogen very low. Available phosphorus deficient-acutely deficient. Exchangeable potassium deficient. Infertile.	*Brachystegia spiciformis* *Pavetta schumanniana* *Albizzia amara* *Combretum molle* *Peltophorum africanum* *Dichrostachys cinerea* *Julbernardia globiflora* *Paranari curatellifolia* *Burkea africana*	Inherently infertile. Coarse sandy texture means soil is subject to leaching and has low AWC, low organic matter content makes soil structurally unstable, unable to retain nutrients and moisture. Manure and antheap applied.
Rusenya	Greyish yellow over light yellow sand; uniform profile; mottled with gravels at 70 cm and >1m deep.	Strong-medium acid; very low organic matter, acutely deficient available phosphorus and deficient exchangeable potassium. Infertile.	*Brachystegia* spp.	Inherently infertile low organic matter, low AWC, excessively drained. Requires manure and antheap.
Norubvuka	Brown medium sandy loam. Temporary water table over granite at depth creates favourable moisture characteristics. Distinct A horizon. Greyer than Jehechehe.	Strongly-medium acid. Very low % organic carbon and % total nitrogen. Acutely deficient available phosphorus and marginal exchangeable potassium. Infertile.	Mfuti mumikuti	Inherently infertile but favourable moisture characteristics. Low organic matter and low AWC. Early ploughing to conserve moisture. Manure applied.

Example III(12) - Activity 12

Soil Characterisation Cont'd

Soil (Local Name)	Physical Characteristics	Chemical Characteristics	Associated Vegetation	Limitations and Management
Chidhaka	Brown medium sandy loam relatively organic rich topsoil over yellowish brown coarse sandy clay subject to seasonal water-logging, mottled >1m deep.	Topsoil medium acid, subsoil alkaline; organic matter relatively higher in topsoil but marginal - adequate in subsoil.	*Terminalia* spp. *Acacia* *Piliostigma thonningii*	Infertile but not subject to leaching. Good AWC but seasonally waterlogged. Plough early. Manure added but not anthill.
Chinamwa	Dark grey medium sandy loam over dark grey sandy clay. Poorly drained, mottling and high water table. Vlei position.	Strongly acid throughout; low organic matter (low % organic carbon and % total nitrogen) acutely deficient available phosphorus and marginal exchangeable potassium. Infertile.	Grass	Infertile and low organic matter but high AWC, poorly drained. Response to fertiliser should be good.
Chimhamhari	Olive/yellowish brown medium sand, over brown impermeable sandy clay pan at 30-50 cm. Impermeable pan causes ponding of water in wet season and hardens in dry season to form compact layer.	Strong-medium acid topsoil, alkaline subsoil; low organic matter throughout profile; acutely deficient available phosphorus, deficient exchangeable potassium. Infertile.	*Brachystegia* spp. *Albizzia amara* *Acacia karoo* *Dichrostachys cinerea* *Ficus* spp.	Infertile and low organic matter, alkaline subsoil. Impermeable clay pan subject to compaction.
Chivobvu	Medium sandy loam over coarse sandy clay loam over coarse sandy clay reddish brown throughout. Parent material at 62 cm. Stony throughout and shallow in crest position.	Medium acid throughout low organic matter, acutely deficient available phosphorus marginal-adequate exchangeable potassium.	*Lannea discolor* *Terminalia* spp. *Crotallaria* spp. *Piliostigma thonningii* *Scleracarya caffra* *Brachystegia bohemii*	Infertile with low organic matter but high AWC. Shallow and stony. Response to fertiliser should be good.

cover most physical variables, it may be necessary to assess additional characteristics. These will be determined by the issues that have arisen from the earlier activities. For example, where soil moisture availability is limiting, available water capacity assessments may be undertaken. Similarly, some information on infiltration rates or bulk density may be required.

Chemical Assessment

Soil sampling

From discussions with farmers in Shurugwi the constraints of soil fertility arose as an issue in the generative/ detailing activities. Soil sampling for analysis was therefore undertaken to gain some impression of nutrient status. In other circumstances other chemical conditions such as toxicity, salinity or nutrient deficiency may be explored. Soil sampling for analysis is rarely a feasible component of rapid appraisal as results are often not available in time to influence recommendations. However, in the Shurugwi exercise the facility for speedy analysis was available and the results particularly useful, given the lack of baseline information on soils in Shurugwi. Where sampling is feasible, representative soils can be sampled using techniques discussed in the research report. Interpretation of results must be done with care and the soil management history always considered.

Range and distribution

As mentioned, an assessment of soil distribution in terms of position on slope or associated land unit should accompany soil characterisation. This can be explored further by assessing the extent of soil types and their variability using auger observations. Some boundary delineation may be possible and reference to any earlier distinction of land units on aerial photographs should be made at this point.

It was not the intention in the Shurugwi exercise to prepare a soil map. Although this might be considered appropriate to other investigations, there is a danger that mapping is carried out for its own sake rather than for any contribution a map might make to the development of agroforestry interventions.

Activity 13. Soil-Vegetation Relationships

In this activity relationships between soil and natural vegetation are explored. The intention is to investigate links between soil and vegetation distribution and explore the role of certain tree species in fertility maintenance, both issues having arisen during generative and detailed discussions and observations.

In Shurugwi this activity consisted of the detailed study of the effects of two particular species on the maize crop and soil beneath their canopies as compared to outside the canopy. The method employed is described in the research report.

Investigations within this activity are determined by issues arising out of the earlier stages, and by what is considered practical within the time available and disciplinary composition of the team.

Any studies undertaken in this activity should be directly relevant to the identification of potential agroforestry interventions. For example, the soil and site requirements of certain species might be determined, or as in Shurugwi, the positive effects of certain tree species on crop growth.

Activity 14. Vegetation Survey

In the generative and detailed stages the role of trees in arable and communal areas, their preferred uses and their distribution were discussed. Changes in woodland cover and composition were also explored by discussions with farmers, review of secondary information and from aerial photographs.

In this activity the intention is to investigate present tree species composition and distribution, woodland structure and use in an attempt to quantify and validate the information derived from farmers.

Example III(13) - Activity 14

Vegetation Survey Form

VIDCO: Mankadire Transect No: 4 Transect Location: To river Length: 100m

Species: *Brachystegia spiciformis*

C = Mainstem cut < 30 cm from ground level
P = Mainstem cut > 30 cm from ground level
L = Lopped (branches cut)
N = Not cut

Height Class (m)
I = 0 - 0.5
II = 0.51 - 2.0
III = 2.1 - 3.0
IV = 3.1 - 6.0
V = 6.1+

Stem Diameter (cm)				
0 - 2.0	2.1 - 5.0	5.1 - 15.0	15.1 - 30.0	30+
CIN, CIN, CIN, CIIN	CIIIN, NIII, CIIIL, CIVN, CIIN, CIIN	NIII, CIVL, CIVL	PIVL	

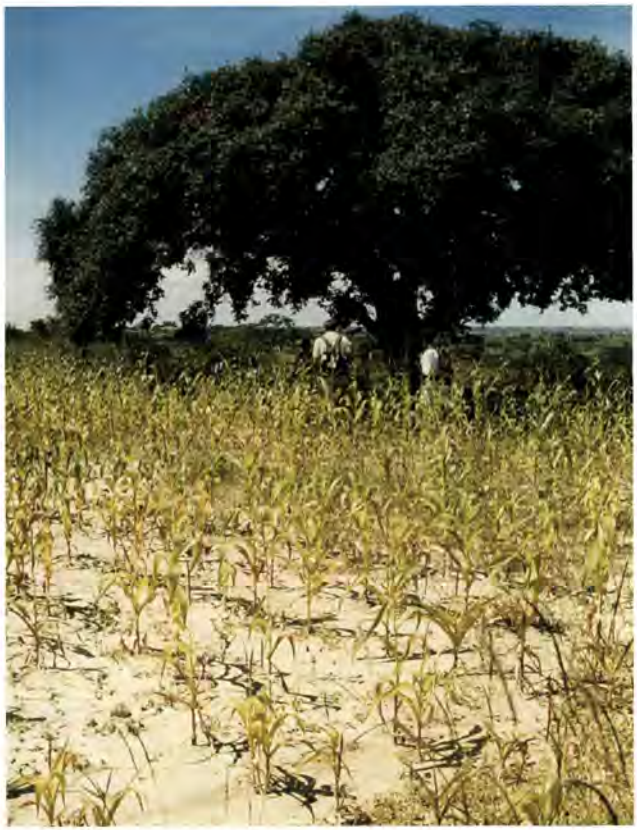
Explanation

The description for each stem is separated by a comma, e.g.:

(a) 'CIIIN,' is a single uncut stem growing from a mainstem which was itself cut below 30 cm above ground level. The diameter amd height of the coppiced mainstem are not recorded. The uncut regrowth is between 2.1 m and 3.0 m tall, and between 2.1 cm and 5.0 cm in diameter. Other stems growing from the coppiced mainstem are recorded separately.

(b) 'NIII,' describes a single uncut stem, between 2.1 m and 3.0 m tall, and between 5.1 cm and 15 cm in diameter.

(c) 'PIVL' has a mainstem cut more than 30 cm above ground level. The diameter (15.1 cm - 30 cm) measurement is taken on this mainstem. The height measurement - (3.1 m - 6.0 m) is the top height of the whole plant. At least one branch has been lopped.



The effects of trees on crop growth and soil characteristics were investigated.

Transects

Belt transects can be used to collect information on vegetation. In Shurugwi they were selected to run through a range of vegetation types including dense kopje vegetation, degraded woodland, and along contour ridges. The dimensions of the transects should be selected according to the heterogeneity of the vegetation and the purpose of the study. In general, a longer narrower transect copes better with spatial heterogeneity than a shorter and wider one of the same area. The number of transects undertaken is in theory determined by the level of precision required, but in practice will be set by the time available. The range of measurements taken within each transect depends on the purpose of the study.

In Shurugwi transects 100 m to 150 m long were placed in different woodland types by each subgroup. Depending on the density of different sized trees, larger stems were usually recorded within a 3 m, and smaller stems within a 50 cm strip. Woodland structure was assessed in terms of stem frequency by diameter and height for each species, and woodland use by the frequency of coppicing, pollarding and lopping by species and stem diameter. And index of volume was calculated, and a small investigation of regeneration carried out. A specimen survey form is shown below (Example III(13)).

Activity 15. Land Use Mapping

The aim of mapping land use was to show the proportion and distribution of the arable and communal areas and to identify land use units or 'niches' which might be exploited for agroforestry interventions.

This exercise was undertaken using aerial photographs as stereo pairs and mosaics, and field observations for definition of land use classes and ground truthing. The map is shown in the research report.

Activity 16. Erosion Hazard Mapping

In Shurugwi soil erosion arose as an issue in the review of secondary information and environmental trends and in discussions with farmers.

Soil erosion hazard can be quantified and mapped using the Soil Loss Estimation Model for Southern Africa (SLEMSA). The methodology employed at Shurugwi is explained in detail in the research report.

SLEMSA is useful as a tool for estimating gross soil loss values but more importantly for demonstrating the

Participating scientists investigating the composition and regeneration of dwindling miambo woodland

relative hazards under different conditions of vegetation cover, land use, slope length and gradient. Superimposition of the erosion hazard map over the land use map can reveal relationships between land use patterns and erosion hazard. During the formulation of interventions, the model is useful in assessing the effects on erosion rate of shortening slope-lengths by putting grass-and-tree strips between existing bunds, and of improving groun cover. It should be noted that tree canopy *per se* has little beneficial effect on erosion rate.

Alternative methods for assessing erosion can be used. These include the use of aerial photographs to determine the extent of gullying, sheet and streambank erosion. The disadvantages of this are that the identification and distinction of erosion features on aerial photographs is difficult for the untrained eye and does require ground truthing. Although there are no erosion rate predictions, a good picture of current erosion status can be obtained and again related to land use. This approach and SLEMSA can be complementary methods.

Activity 17. Plenary Synthesis of Meeting, Interview and Natural Resource Survey Information

The last phase of Step III is the final stage of the survey iteration and involves a synthesis of all the outputs of Steps II and III. This provides the initial inputs into the following step of identification of potential agroforestry interventions. A full account of methods, results and findings is given in the research report.

This activity assumes there has been continuous analysis and synthesis throughout Steps II and III in the form of summaries of subgroup information and workshop review sessions held to compare and discuss the range of subgroup information. This is essential before a final synthesis can be accomplished.

In Shurugwi an initial synthesis was undertaken within subgroups in brainstorming sessions which produced either flow diagrams, tables or matrices showing interaction between resources (Example III(14)).

Since the aim is to combine and synthesise information from the survey subgroups into an accessible and manageable form, the degree of standardisation between groups is an important consideration. Standardisation of format and method should be agreed prior to survey. This was achieved to some extent by the Shurugwi subgroups and the use of summary tables and matrix formats facilitated the synthesis. For the purposes of training, different group approaches and formats may

help to demonstrate the range of methodologies that can be employed. However the value of some standardisation for the synthesis stage is established.

The method used for synthesis will be determined by the kind of information collected, the extent to which this has already been summarised and the degree of standardisation between subgroups. In Shurugwi synthesis was undertaken by three subgroups looking at soils, vegetation and socio-economic information.

Socio-economic Information

The aim of this synthesis is to combine socio-economic information collected from each household and prepare it in a form which is accessible for the following step. In Shurugwi initial synthesis had resulted in the completion of summary tables and a preliminary farmer classification. The intention at this phase was to combine the farmer category classifications developed by each subgroup. In Shurugwi this was achieved by identifying seven criteria on the basis of which each household could be allocated to one of three categories, poor, middle or leading.

The criteria employed were: land holding; labour; draught power; input levels; sources of investment; level of production output and sales; and degree of household security.

The result of this synthesis was a summary description of each farmer category. Following this a further summary was prepared of the resource constraints and opportunities affecting each category. Summaries of these are shown in Examples III(15) and (16).

Soils

In Shurugwi a preliminary correlation between farmers' descriptions and field observations had already been undertaken by each survey group. It was the aim of this synthesis to compare and correlate the soil information from the survey subgroup areas and prepare a final soil legend in which all soil types are represented (Example III(12)). At this stage any analytical information received should be used to complete the soil characterisation summary.

The first stage in correlation was undertaken in the field. A team of soil scientists representing each subgroup visited the soil pits in the three VIDCO areas to compare soil types and local soil terminology. This enabled the team to identify a range of six soil types, three common to more than one VIDCO.

A soil correlation table was drawn up (Example III(17)), which summarises information on the range and variability of soil properties and management. Finally, this exercise should aim to summarise the particular management constraints and opportunities associated with the range of soil types observed since an understanding of these will form the basis for some agroforestry intervention proposals in the next step. The soils information is now available in an accessible form for Step IV (Example III(18)).

Soil-Vegetation Relationships

In the Shurugwi course this aspect was covered by both the soil and vegetation specialist groups. In addition the soils group were able to reach conclusions using each subgroup's analysis of maize cob measurements from the tree-crop interface studies (see research report).

Vegetation Survey

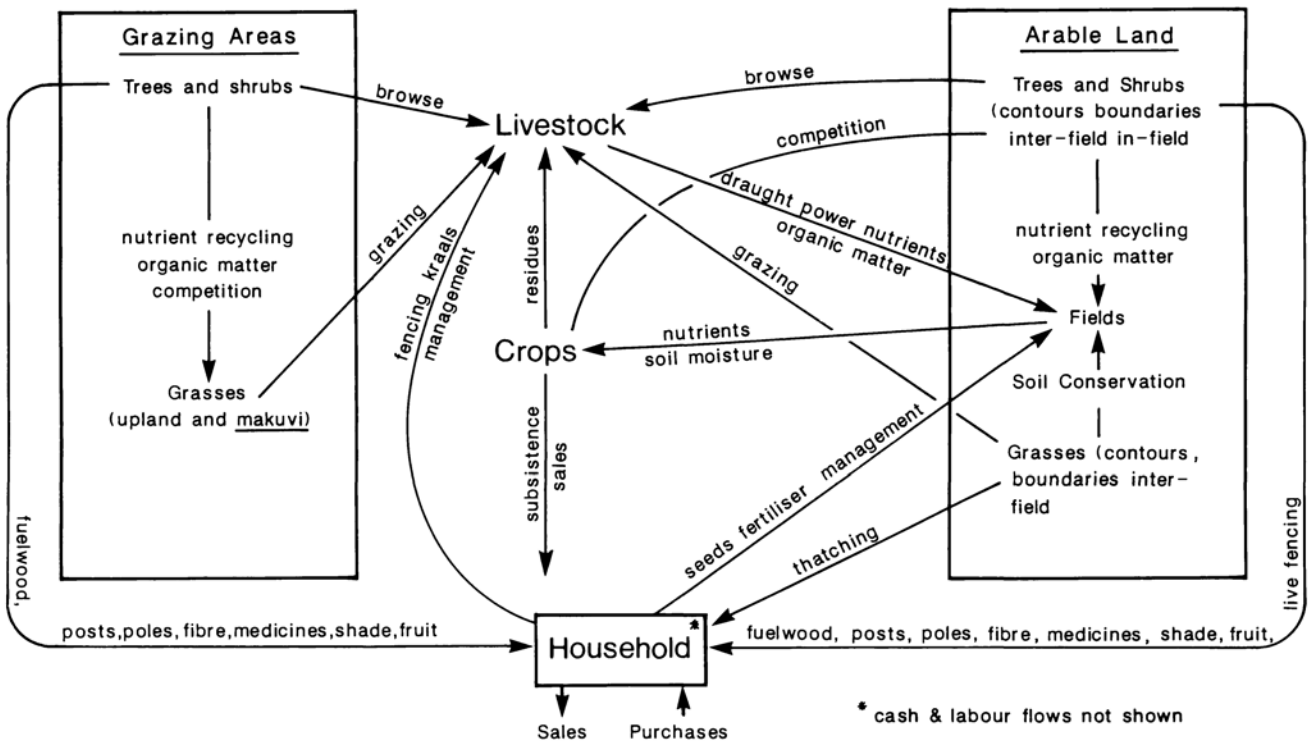
Analysis of the vegetation survey data showed the present structure and species composition of vegetation in the grazing areas and on farms. It also showed current patterns of use. This information was later drawn upon in proposing interventions (Step IV). A sample of the results is shown in Example III(18).

Tree Uses and Locations

Group meetings, interviews and the vegetation surveys on contour bunds and field boundaries produced information on the uses and locations of trees. The results are given in Examples III(19) to (21).

Example III (14) - Activity 17

Interactions Among Resources



Example III(15) - Activity 17

Summary Description of Farmer Categories

FARMER CATEGORY	ARABLE LAND HOLDING	LABOUR	DRAUGHT POWER	FERTILITY MANAGE-MENT	INPUTS (1987/88)	SOURCES OF INVESTMENT INTO AGRICULTURE	PRODUCTION OUTPUT AND SALES
LEADING FARMERS	+3.5 ha (Ave: 4.6 ha) Have greatest ability to acquire more land through purchase or borrowing. Main crop: maize, grown in a rotation based on the use of manure - field manured: maize maize g'nuts rapoko.	Minimum of 3 full-time people, inc. min. 1 hired labourer. Also signif-icant use of part-time labour during peak periods (school children, other relatives, and/or temporary hired).	Self-sufficient Average no. of cattle at home = 13. Some earn income from hiring out draught power. During drought these farmers had to buy supplementary feed to keep their animals alive.	*Organic:* Manure, bulked with antheap, maize (& g'nut) stover, grass and compost. 0.8 - 1 ha manured annually. Field manured every 4-5 yrs. *Inorganic:* Range of use from 11-32 bags of compound D and AN. Ave: 18.6 bags. All maize is fertilised.	Min. 50 kg hybrid maize seed purchased annually.	If leading farmer is a *woman*, husband is remitting money for seed and monthly wage(s) of hired labourer(s). Other inputs obtained from crop sales. If farmer is a *man*, major source of income is crop sales, & veg/ fruit/broiler sales, and partial remit-tances from sons/kin. Farmers have used *AFC loans* in period 1983-87, but most are no longer doing so Farmers now more likely to use *cash groups*.	*1986/87:* Maize sales range: 15-65 bags. Ave. maize sale 4-5 bags. Possibly addit-ional sales of rapoko and groundnuts. Other agric-ultural income: broilers, vegetables, fruit.

Example III(15) - Activity 17

Summary Description of Farmer Categories Cont'd

FARMER CATEGORY	ARABLE LAND HOLDING	LABOUR	DRAUGHT POWER	FERTILITY MANAGE-MENT	INPUTS (1987/88)	SOURCES OF INVESTMENT INTO AGRICULTURE	PRODUCTION OUTPUT AND SALES
MIDDLE FARMERS	Ave: 2.5 ha (Range: 0.5 - 7 ha). Main crop: maize, a manure-based rotation used on some fields only.	2 full-time people, (incl. for a few a hired labourer). Sufficient part-time labour (children and/or temporary hired workers) available for peak periods.	Ave. cattle owned = 8. Some farmers are hiring draught power.	*Organic*: Manure bulked with antheap, stover, etc applied to 0.2 - 0.4 ha. *Inorganic*: Low and declining usage. Range: 0-16 bags. Most: 2 or less bags.	Maize seed. Average usage of hybrid seed: 28 kg. Range: 15-80 kg.	*Women farmers*: Are receiving regular or irregular remittances. *Other sources*: Crop or vege sales, sewing/ knitting. *Men farmers*: Some remit-tances for seed and draught power, or no remit-tances. *Other sources*: Crop sales. Decreasing use of credit loans because of indebtedness.	1986/87: Maize sales range: 0-20 bags. Ave: 7 bags. Farmers sell mainly only in good seasons - leads to a fluctuating cash situation which leads to fluctuations particularly in amount of inorganic fertiliser used.

Example III(15) - Activity 17

Summary Description of Farmer Categories Cont'd

FARMER CATEGORY	ARABLE LAND HOLDING	LABOUR	DRAUGHT POWER	FERTILITY MANAGEMENT	INPUTS (1987/88)	SOURCES OF INVESTMENT INTO AGRICULTURE	PRODUCTION OUTPUT AND SALES
POOR FARMERS	Ave: 2.0 ha Range: 1-3.2 ha. Main crop: maize, but not grown in any especial rotation.	1-2 full-time. Part-time labour varies depending on no. of children. Families cannot afford to hire labour.	Ave. cattle owned: 2 head. Draught power options: combine one animal with a relative's; share relative's cattle; use donkeys; hire.	*Organic:* maize stover compost combined with antheap and manure (incl. goats), if available. Applied to 0.2-0.4 ha, but often irregularly (perhaps once every 2 years). Constraints include shortage of cattle to produce manure, Scotch carts to transport it and labour. *Inorganic* Range: 0-6 bags. If fertiliser is used, often it is only AN topdressing that is applied.	Hybrid maize seed: Most buy some, although this year a few bought none, reusing last season's hybrid seed.	Income for maize seed from relatives (no migrant husbands) or from other income source (e.g. piecework, beer brewing, carving, veg. sales), generally non-agricultural. *Loans:* None used - farmers have had bad experiences if they have used them in the past.	Usually only sell in a good season and then under 15 bags.

Example III(16) - Activity 17

Constraints, Opportunities and Access to Woodland Resources in relation to Farmer Category

	Leading	Middle	Poor
Main constraints	Fodder Land area	Fodder Fertility	Fertility Draught power Cash Labour
Main opportunities	Cash Labour Draught power	As for leading farmers, but less	More likely to pick up off-farm income earning activities to provide cash. Tend to have more fallow land.
Access to woodland resources	Good Labour & Scotch carts available. Cash for purchase	Fluctuating labour. Less cash to buy wood	Poor No spare cash or labour. No Scotch cart. Less land than other categories, but tendency for some to lie fallow due to input shortages.

Example III(17) - Activity 17

Soils Correlation Table

SOIL TYPE	COMMON FEATURES	VARIATIONS	FARMER COMMENTS
SANDY SOILS			
DRY			
Jecha Jehechehe Rusenya	Arable and grazing areas Distinct grey-brown loamy sand topsoil Coarse grained brown to orange brown sandy subsoils matrix becoming heavier with depth. Sand Particles become coarser with depth Exessively drained Subject to capping in grazing areas - sheet and gully erosion common	Texture - medium or coarse grained Depth to weathering parent material Amount, size and distribution of gravels Stone line occurrence Subsoil color - Rusenya paler than Jehechehe	Rusenya identified as less fertile Jecha sometimes referred to as coarse gravelly form of Jehechehe Reserve anthill application to these poorer/coarser sandy soils.
MOIST			
Norubvuka	Sandy soils, greyer than Jehechehe with higher moisture content either because of impermeable granite layer creating a perched water table or because of finer textures Less gravelly than dry sandy soils	Depth to granite variable Perched water table variable	Early ploughing to conserve moisture Described as being darker than Jehechehe
Chivombvu	Red soil with clay subsoil Sandy/fine sandy topsoils which are capped and erodible Generally gravelly in the area with large amount of large quartz stones on surface	Position on slope, observed on crest and lower slope Amount of stones in subsoil Depth to parent material Chivombvu observed elsewhere in country not so gravelly Clay content increases going down the catena	Fertile Good water holding capacity but only in wet years. This advantage lost when shallow and stony.

Example III(17) - Activity 17

Soils Correlation Table Cont'd

SOIL TYPE	COMMON FEATURES	VARIATIONS	FARMER COMMENTS
SOILS WITH CLAY SUBSOILS			
Chidhaka	Occurring at bottom of slope, poorly drained. Typically should have dark organic topsoil (sometimes buried) over heavy grey/ yellow subsoil of mottled clay	Description covers a variety of soil types in vleis/ lower slopes Ploughed early Add manure but no anthill	Fertile Used for making pots Lower positions only
Chinamwa	Refers to clay subsoil horizon (used for making pots) Found towards bottom of slope.	Topsoil variable Drainage variable depending on slope position	Not extensive
Chimhamhari	Similar to above but with a clay pan restricting drainage Prone to compaction Sandy topsoils	Depth to clay pan	Not extensive

Example III(18) - Activity 17

Synthesised Information on Soils

SOIL TYPE	CHARACTERISTICS & SLOPE POSITION	VEGETATION ASSOCIATION	LAND USE	FERTILITY IMPROVEMENT
1. *JECHA*				
(a) Coarse Texture	Poor fertility Poor water holding capacity Light in colour Sandy texture on surface Gravel with increasing depth Good drainage Acidic Deep profiles found on crest and middle part of catena	*Brachystegia spiciformis* *Pavetta schumanniana* *Albizia* *Combretum molle* *Peltophorum africanum* *Dichrostachys cinerea* Mandira grass *Julbernardia globiflora* Muchakata - (*Parinari curatellifolia*)	Grazing Arable	Fertiliser Antheap Kraal manure Green manuring Compost
(b) Finer texture	Fair fertility Better WHC Good drainage Acidic Yellowish red colour (Grey near the river) found on middle and lower part of catena	*Combretum collinum* *Albizia* *Terminalia* spp. *Peltophorum africanum*	Grazing Arable	Fertiliser Antheap Kraal manure Compost Green manuring
2. *CHIDHAKA*				
Sandy clay loam top soil over-lying a heavy clay subsoil	Buried A horizon Good WHC Medium permeability Poor drainage Acidic dark top soil found on lower part of catena and vleis	*Acacia* *Terminalia* *Piliostigma* *Combretum* *Acacia karoo*	Grazing Arable	

Example III(18) - Activity 17

Synthesised Information on Soils Cont'd

SOIL TYPE	CHARACTERISTICS & SLOPE POSITION	VEGETATION ASSOCIATION	LAND USE	FERTILITY IMPROVEMENT
3. *CHIMHAMHARI*				
Sandy top soil overlying clay pan at 35cm	Prone to compaction Relatively impermeable subsoil	*Ficus* spp. *Brachystegia* *Acacia*	Grazing Arable	
depth	Lower position in catena	Sedges Grasses Weeds *Albizia amara* *Acacia karoo* *Dichrostachys cinerea*		
4. *NHORUBVUKA*				
Loamy sand	Fair fertility Well drained Acidic	Cultivated site *Brachystegia boehmii*	Arable	Less fertiliser Early planting to conserve moisture
5. *CHIVOBVU*				
Sandy clay loam top soil overlying sandy clay	Good fertility Acidic WHC good except where stoniness is high and depth shallow Good drainage Heavier texture in lower position of catena	*Lannea discolor* *Terminalia* spp. *Crotalaria* spp. *Piliostigma thonirgii* *Sclerocarya caffra* *Brachystegia boehmii*		Fertiliser Kraal manure Grazing Arable Compost

Example III(19) - Activity 17

Vegetation Transect Summary

Structure and Use of Communal Woodland in Shurugwi
(for species compositon see Examples III(19), (20), (21))

Frequency of stem by diameter and height class

		Number of stems/ha in each diameter class					
		0-2 cm	2-5 cm	5-15 cm	15-30 cm	30+ cm	Totals
Number of stems/ha in each height class	0-0.5 m	8978.2	60.2	15.8	0	0	9054.3
	0.5-2 m	1686.9	839.1	71.3	3.1	0	2600.6
	2-3 m	47.6	393.3	182.3	3.1	0	626.5
	3-6 m	0	157.0	294.9	22.2	0	474.1
	6 m+	0	0	0	9.5	0	9.5
	Totals	10712.8	1449.8	564.5	38.0	0	12765.2

Note: Arithmetic discrepancies are due to rounding.

Example III(19) - Activity 17

Vegetation Transect Summary Cont'd

Structure and Use of Communal Woodland in Shurugwi
(for species compositon see Examples III(19), (20), (21))

Use of stems by diameter class

Use class*		Number of stems/ha in each diameter class 0-2 cm	2-5 cm	5-15 cm	15-30 cm	Totals
n	obs.**	5889.4	388.6	69.7	6.3	6354.2
	exp.**	5338.5	722.5	281.3	11.8	
l	obs.	649.3	141.1	69.7	0	860.3
	exp.	722.7	97.8	38.0	1.6	
c	obs.	3302.6	409.1	109.4	0	3821.2
	exp.	3210.4	434.4	169.1	7.1	
p	obs.	120.5	38.0	23.7	4.7	187.1
	exp.	157.2	21.2	8.2	0.3	
cn	obs.	663.5	361.7	149.0	0	1174.3
	exp.	986.6	133.5	51.9	2.1	
cl	obs.	72.9	71.3	117.3	0	261.7
	exp.	219.8	29.7	11.5	0.4	
pl	obs.	14.2	39.6	25.3	12.6	92
	exp.	77.2	10.4	4.0	0.1	
	Totals	10712.8	1449.8	564.5	23.7	12750.9

* Use class:
- n = stem not used
- l = lopped
- c = main stem cut less than 50 cm above ground
- p = main stem cut more than 50 cm above ground
- cn = main stem cut less than 50 cm above ground, no other use
- cl = main stem cut less than 50 cm above ground, regrowth lopped
- pl = main stem cut more than 50 cm above ground, regrowth lopped
- pn: no stems found in this category

**obs. = number of stems recorded in a category
exp. = number of stems expected in a category if users not selecting by diameter or height class

Note: Arithmetic discrepancies are due to rounding.

Example III(19) - Activity 17

Vegetation Transect Summary Cont'd

Structure and Use of Communal Woodland in Shurugwi
(for species compositon see Examples III(19), (20), (21))

Use of stems by height class

Stem height		Number of stems per ha. in each use class							
		n	l	c	p	cn	cl	pl	Totals
0-0.5 m	obs.**	5205.4	493.8	2869.4	115.8	307.9	47.5	14.2	9054.3
	exp.**	4512.0	610.8	2713.4	132.9	833.9	185.8	65.3	
0.5-2 m	obs.	974.3	287.1	628.2	57.0	507.8	93.6	49.1	2597.5
	exp.	1294.4	175.2	778.4	38.1	239.2	53.3	18.7	
2-3 m	obs.	139.5	44.4	156.9	4.7	203.0	69.7	4.7	623.3
	exp.	310.6	42.0	186.7	9.1	57.4	12.7	4.4	
3-6 m	obs.	34.8	34.9	166.5	4.7	155.4	50.7	23.7	471.0
	exp.	234.7	31.7	141.1	6.9	43.3	9.6	3.3	
6 m+	obs.	0	0	0	4.7	0	0	0	4.7
	exp.	2.3	0.3	1.4	0	0.4	0	0	
Totals		6354.2	860.3	3821.2	187.1	1174.3	261.7	92.0	12750.9

* Use class:
- n = stem not used
- l = lopped
- c = main stem cut less than 50 cm above ground
- p = main stem cut more than 50 cm above ground
- cn = main stem cut less than 50 cm above ground, no other use
- cl = main stem cut less than 50 cm above ground, regrowth lopped
- pl = main stem cut more than 50 cm above ground, regrowth lopped
- pn: no stems found in this category

** obs. = number of stems recorded in a category
exp. = number of stems expected in a category if users not selecting by diameter or height class

Note: Arithmetic discrepancies are due to rounding.

Example III(20) - Activity 17

Indigenous Tree Species by Land Use Locations

	Home Field				Main Field			
Species	Home-stead	Near field	Boun-dary	Cont-our	With-in	Cont-our	Boun-dary	Graz-ing
Acacia karoo					X	X		X
Acacia nilotica								X
Acacia polyacantha								X
Acacia rehmanniana								X
Albizia amara			X			X		X
Albizia antunesiania								X
Antidesma venosum			X			X		X
Azanza garckeana		X	X		X			
Brachystegia boehmii								X
Brachystegia glaucescens								X
Brachystegia spiciformis	X		X					X
Bridelia mollis			X			X		X
Burkea africana								X
Carissa bispinosa			X					X
Carissa edulis								X
Cassia abbreviata								X
Cassia singueana			X			X		X
Combretum hereroense								X
Combretum molle			X			X		X
Combretum zeyheri								X
Cussonia arborea								X
Dichrostachys cinerea			X		X	X		X
Diospyros lycoides			X					
Dovyalis caffra					X			
Erythrina abyssinica		X						
Euclea divinorum								X
Euphorbia matabelensis								X
Ficus natalensis					X			
Ficus sur (Syn. capensis)					X			
Ficus sycomorus								
Flacourtia indica	X							
Gardenia spatulifolia								X
Gardenia volkensii								X
Grewia monticola								X
Julbernardia globiflora	X						X	X
Kirkia acuminata								X
Lannea discolor					X			X
Lopholaena coriifolia								X
Maytenus senegalensis			X					X
Monotes glaber								

Example III(20) - Activity 17

Indigenous Tree Species by Land Use Locations Cont'd

	Home Field				Main Field			
Species	Home-stead	Near field	Boun-dary	Cont-our	With-in	Cont-our	Boun-dary	Graz-ing
Ochna schweinfurthianna								X
Ozoroa paniculosa							X	
Parinari curatellifolia					X			X
Piliostigma thonningii	X	X	X			X		X
Pouzolizia hypoleuca								X
Pseudo. maporuneifolia						X		X
Pterocarpus angolensis								X
Pterocarpus rotundiflolius								X
Rhus chirindensis			X			X		
Rhus lancea			X			X		
Ricinus communis	X							
Rubiaceae								X
Sclerocarya caffra			X					
Securinega virosa			X					
Syzygium guineense								X
Strychnos cocculoides		X	X					X
Swartzia madagascariensis								X
Terminalia sericea		X	X		X	X		
Uapaca kirkiana					X			
Vangueria randii								X
Vangueriopsis lanciflora								X
Vernonia colorata								X
Xeromphis obovata								
Ximenia caffra								X
Ziziphus mucronata						X		X

Example III(21) - Activity 17

Uses of Indigenous Tree Species

Species	Uses							
	Const ruct'	Fuel	Fruit	Medi-cine	rowse	Live Fence	Fence Posts	Others
Acacia karoo					X			
Acacia nilotica	X	X			X			Shade
Acacia polyacantha								
Acacia rehmanniana	X	X					X	
Acacia sieberiana								Handles, Yokes
Albizia amara								Conservation
Albizia antunesiania	X	X						
Antidesma venosum								Conservation, Shade
Azanza garckeana		X	X					
Brachystegia boehmii		X						Fibre
Brachystegia glaucescens		X						Fibre
Brachystegia spiciformis	X	X			X	X		Fibre, Shade
Bridelia mollis								
Burkea africana	X		X			X		Attracts edible caterpillars
Carissa bispinosa								
Carissa edulis								
Cassia abbreviata		X						
Cassia singueana						X		
Combretum hereroense								
Combretum molle	X	X		X	X			Fibre, artifacts
Combretum zeyheri								
Cussonia arborea					X			
Dichrostachys cinerea	X	X			X			
Diospyros lycioides							X	
Dovyalis caffra			X	X				
Erythrina abyssinica		X		X				Ornamental, intercropping
Euclea divinorum								
Euphorbia matabelensis								
Ficus natalensis			X		X			Shade
Ficus capensis		X	X		X			Shade
Ficus sycomorus								
Flacourtia indica			X					
Gardenia spatulifolia	X	X		X			X	Handles, Yokes
Gardenia volkensii								
Grewia monticola							X	
Julbernardia globiflora	X	X		X	X	X	X	Fibre, Conservation
Kirkia acuminata	X	X			X			
Lannea discolor	X		X				X	
Lopholaena coriifolia								

Example III(21) - Activity 17

Uses of Indigenous Tree Species Cont'd

Species	Uses							
	Const ruct'	Fuel	Fruit	Medi-cine	Browse	Live Fence	Fence Posts	Others
Maytenus senegalensis							X	
Monotes glaber							X	
Ochna schweinfurthianna							X	
Ozoroa paniculosa								
Parinari curatellifolia	X	X	X	X	X			Shade, Conservation
Peltophorum africanum	X	X			X			Shade
Piliostigma thonningii	X	X	X		X			Tool Handles, Ornamental
Pouzolizia hypoleuca				X				
Pseudo. maporuneifolia								
Pterocarpus angolensis								
Pterocarpus rotundiflolius								
Rhus chirindensis								
Rhus lancea								
Ricinus communis								
Rubiaceae								
Sclerocarya caffra		X	X	X	X			Shade
Securinega virosa								
Syzygium guineense	X							
Strychnos cocculoides	X						X	
Swartzia madagascariensis							X	
Terminalia sericea	X						X	
Uapaca kirkiana		X	X					
Vangueria randii								
Vangueriopsis lanciflora								
Vernonia colorata								
Xeromphis obovata								
Ximenia caffra			X	X				
Ziziphus mucronata	X		X	X				

Example III(22) - Activity 17

Planted Trees: Uses and Locations

Species	Location				Uses									
	Homestead	Near field	Boundary	Main field	Fruit	Medicine	Poles	Fuelwood	Construct'	Browse	Shade	Live Fence	Other	Notes
Mango	X	X	X		X						X			Farmers
Peaches	X		X		X									want
Guava	X	X	X		X	X								planting
Manihot glaziovii	X													materials and
Oranges			X		X									information
Lemon		X	X		X									on planting
Grapes	X				X									techniques
**Uapaca kirkiana*				X	X									
**Flacourtia indica*	X				X									
**Azanza garckeana*				X	X			X						
Vangueria spp.				X	X									
Lannea edulis				X	X									
Julbernadia globiflora	X							X			X			
**Terminalia sericea*				X				X			X			
**Ficus sur*	X				X			X		X	X			
Pawpaw	X				X									
Naartjies	X		X		X								Windbreak	
Mulberry		X			X									
Apple		X												
Leucaena			X							X	X			
Eucalyptus			X				X	X	X					
Melia azedarach	X							X			X			
Castor bean	X					X							Oil	
Banana	X				X									
Cypress			X				X							
Kirkia abyssinica		X				X						X		
Grass (Ipwadzagudo)		X										X		

* indigenous species

Example III(22) - Activity 17

Planted Trees: Uses and Locations Cont'd

Species	Location				Uses									
	Home-stead	Near field	Boun-dary	Main field	Fruit	Medi-cine	Poles	Fuel-wood	Const ruct'	Browse	Shade	Live Fence	Other	Notes
Mexican apple	X				X									
Avocado	X				X									
Kigelia africana				X	X									
Afzelia quanzensis				X		X								
*Kirkia acuminata			X					X	X					
*Sclerocarya caffra				X	X									
*Rhus lancea		X			X									

Land Use and Erosion Hazard Maps

Other products of Step III that required synthesis in the Shurugwi course are the land use and erosion hazard maps. By superimposition of these two it was possible to determine relationships between land use patterns and degree of erosion hazard. The proportion of low, medium and high erosion hazard map units within each land use type was assessed in an exercise to determine which land use type was at more risk from erosion and would therefore benefit most from agroforestry practices promoting conservation (see research report). The land use mapping, also shown in the research report, identified and indicated the extent of the various 'niches' potentially available for agroforestry interventions. These are listed in Example III(23).

Example III(23) - Activity 17

List of Agroforestry Niches

Arable Zone:	Field boundaries On contour bunds Within fields Drainage lines Sacred areas *Makuvi* (hydromorphic grasslands, *vleis*) Riverine Strips *Chikomo* (inselbergs)
Main Grazing Zone:	Sacred hills *Makuvi* Riverine strips *Chikomo* Hills Other upland grazing

STEP IV: IDENTIFICATION AND DESCRIPTION OF POTENTIAL AGROFORESTRY INTERVENTIONS

STEP IV: IDENTIFICATION AND DESCRIPTION OF POTENTIAL AGROFORESTRY INTERVENTIONS

Duration: 7 days

Introduction

This step involves the identification and description of potential agroforestry interventions which ease the constraints and use the opportunities identified in Step III (Examples III(15) and (16)). This involves provisional selection of interventions, discussions with farmers, and the preparation of detailed descriptions, including research and extension needs. The interactions and complementarities among the potential interventions are also indicated.

Methods for developing on-farm and communal interventions are summarised in Figures 4 and 5. These methods rely on Step III to provide:

* *general descriptions of land and water resources (Step III, Activities 2, 3, 5, 6, 12, 15), and more detailed descriptions of woodland resources, their species composition, structure and utilisation (Step III, Activities 9, 13, 14);*

* *detailed descriptions of soil resources and soil management constraints and opportunities that might be addressed by agroforestry interventions;*

* *interactions, beneficial and adverse among resources and land uses (Step III, Activities 2, 3, 5, 6, 9, 13, 14, 16, 17);*

* *maps of land use, and erosion hazard (Step III, Activities 15, 16);*

* *identification of 'niches' for agroforestry (Step III, Activities 2, 3, 6, 9, 15);*

* *identification of useful indigenous tree species (Step III, Activities 2, 3, 5, 6, 9, 13, 14);*

* *a classification of the range of household categories and the major constraints on the production systems of each category (Step III, Activity 17);*

* *understanding of the type of strategy farmers use to overcome these constraints (Step III, Activities 3, 9);*

* *knowledge of how the resource endowments of different categories of household influences the way they use the environment (Step III, Activities 3, 9);*

* *understanding of how the production, management and use of woodland resources forms part of the household production system (Step III, Activities 3, 9);*

* *knowledge of what conflicts occur over access to resources, particularly woodland resources, and how successful different groups of people are in securing access (Step III, Activities 3, 5, 9);*

* *understanding of how local institutions manage and regulate access to woodland resources (Step III, Activities 3, 5, 9).*

Objectives and Outputs

By the end of this step we aim to have:

(i) encouraged local people to discuss their views on the problems which could be tackled by agroforestry;

(ii) an understanding of the range of views held by farmers from different household types;

(iii) a set of objectives on which to base agroforestry

Figure 4

IDENTIFICATION & DESCRIPTION OF ON-FARM AGROFORESTRY INTERVENTIONS

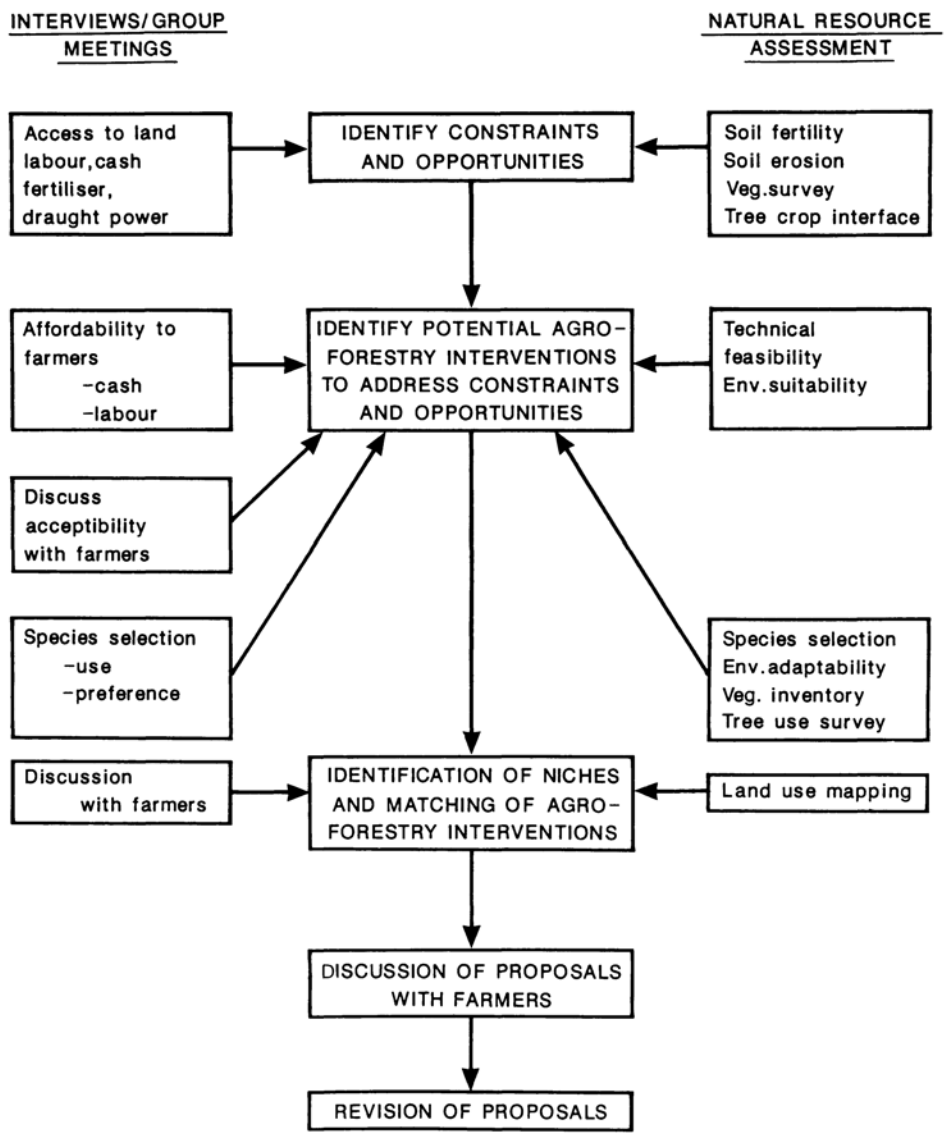
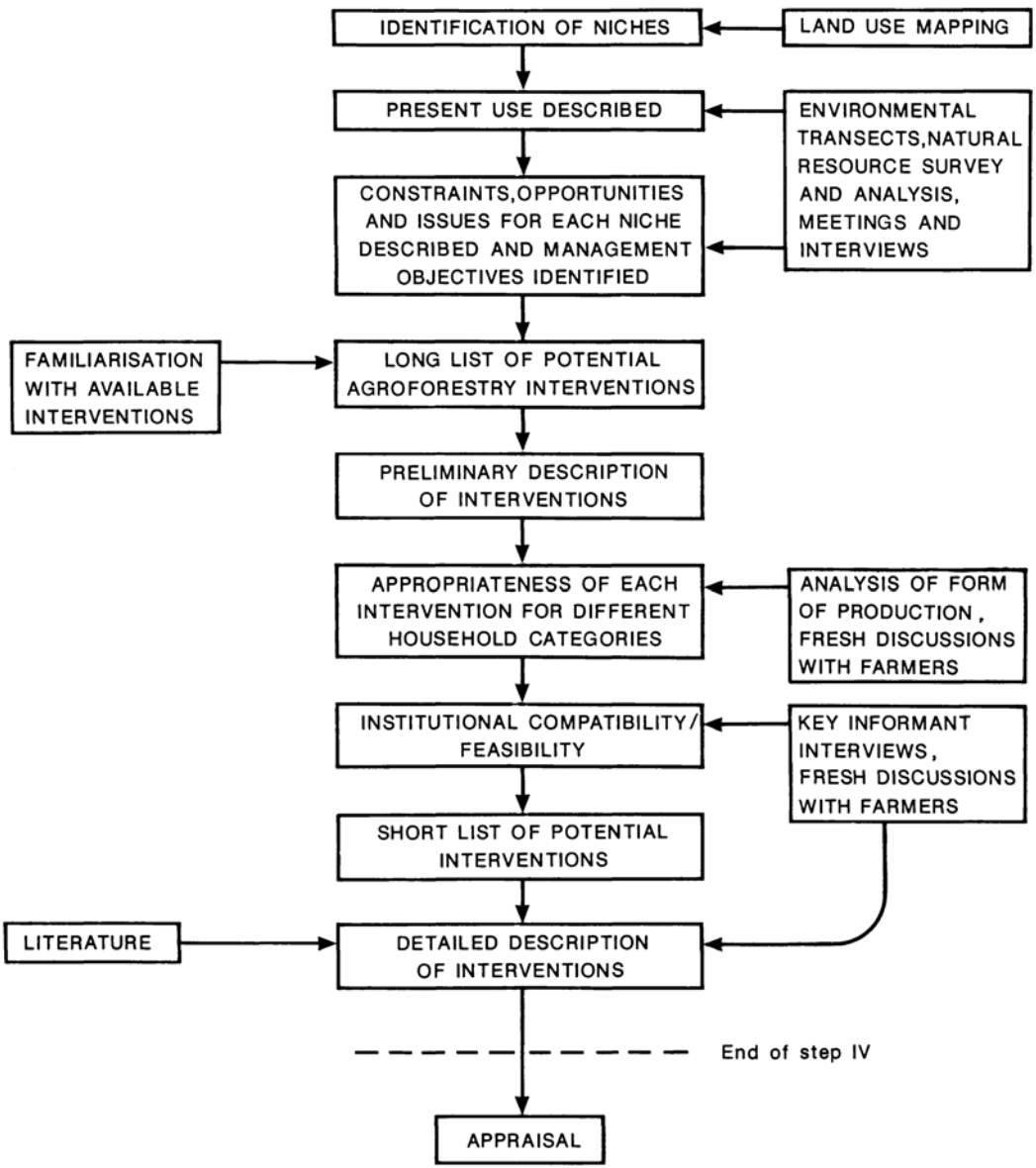


Figure 5

IDENTIFICATION AND DESCRIPTION OF COMMUNAL AGROFORESTRY INTERVENTIONS



interventions, and a set of criteria by which to appraise them;

(iv) identified a set of "best bet" agroforestry interventions;

(v) described technical details, management and implementation of each potential agroforestry intervention;

(vi) identified research and extension requirements of the agroforestry interventions;

(vii) discussed with farmers' groups how the agroforestry interventions could be implemented;

(viii) indicated the complementarity of the potential interventions in an agroforestry strategy.

List of Activities

1. Workshop on selection of potential agroforestry interventions.
2. Informal discussions with individuals and groups.
3. Workshop to modify interventions.
4. Further discussions with individuals and groups.

Activity 1. Workshop on Selection of Potential Agroforestry Interventions

A plenary session is held to explain methods for identification and description of potential agroforestry interventions. In Shurugwi the training team then divided into two groups, one group dealt with communal, the other with on-farm interventions. The workshop ended with another plenary session to present and discuss each group's work. The basis for the activity is the synthesised information from Step III Activity 17. Close attention is paid to the specific constraints and opportunities of particular categories of farmers (Examples III(15) and (16)).

Procedures for Identifying and Describing On-farm Interventions

The following procedure was applied at Shurugwi (Figure 4):

1. an initial briefing on principles and practice of agroforestry, with examples of exotic and indigenous agroforestry components and systems;
2. a review of literature on existing agroforestry practices and systems, using material from Agritex and ICRAF;
3. a review of the synthesised information from Step III to identify constraints and opportunities faced by the three categories of farmer (see Examples III(15) and (16)), and the agroforestry activities currently practiced (fruit trees, live fences, trees on contour bunds, boundary trees, trees in fields and so on) – see Examples III(19), (20) and (21);
4. bearing in mind the opportunities open to each category of farmer, possible agroforestry interventions are sought for each constraint in turn. For example, in Shurugwi leading farmers had more cattle on average, suffered from lack of dry season forage, and would benefit from fodder banks. However, they were relatively well-off in manure, which was a constraint on arable production by poorer farmers who have few cattle and lack cash for inorganic fertiliser. Poorer farmers are therefore likely to benefit from agroforestry measures which enhance soil fertility cheaply – the growing of leguminous trees for example;
5. indigenous shrubs and trees with potential roles in the interventions are identified from the Step III work and Agritex publications; indigenous and exotic species were also sought in ICRAF and Agritex literature. Selection criteria included: palatability and nutritional value for livestock; productivity; growth form; response to browsing, lopping, coppicing and pollarding; seed viability and seedling survival; suitability to local climate and soils;

growth rate at various ages; duration of rotation; suitability for mixed planting; energy value of wood; resistance of wood to termites; suitability as source of posts and poles; productivity as a timber source; suitability as a multi-purpose tree (Examples III(19), (20), (21));

6. a preliminary assessment is made of the technical feasibility of the possible agroforestry interventions identified, and infeasible options discarded. For example, agroforestry development has occurred mainly under more humid climates than that of Shurugwi, consequently many of the practices do not allow for the severe soil moisture constraints affecting arable production;

7. next, 'niches' suitable for agroforestry are identified and matched with the potential interventions. A niche means here a type of land where shrubs and trees can or do grow. Example IV(1) lists the on-farm niches and matches them with a set of potential interventions;

8. current uses of niches are now described, and an alternative, non-agroforestry intervention identified for each. The aim was to assess the opportunity costs of agroforestry interventions;

9. a preliminary description is made of each potential intervention, including information on its purpose, benefits and justification, adoptability by each category of farmer, implementation constraints and potential woody species. The on-farm interventions devised at Shurugwi are summarised in Example IV(1). Research and extension requirements and issues were also reported for each on-farm intervention. These are included in the Research Report;

10. finally, interrelationships among potential on-farm agroforestry interventions are analysed, for example:

    - competition and complementarity over scarce resources – nutrients, soil moisture, land, labour, cash, capital, draught power;
    - input-output relationships, as in the case of nurseries supplying other interventions with seedlings, and other interventions growing seeds for nurseries;
    - training and management requirements;
    - complementarity and overlap in research and extension requirements.

    The purpose is to assess the compatibility of interventions within an agroforestry strategy.

Procedures for Identifying and Describing Communal Interventions

While one group devises its set of on-farm interventions, the other should use a different procedure for developing communal interventions, in this way (Figure 5):

1. familiarisation with indigenous and exotic communal agroforestry practices and systems – for example management and use of planted woodlots, and natural communal woodlands;

2. identification of communal agroforestry 'niches' (Example III(22));

3. drawing on synthesised information from Step III, description of problems and issues for each niche. For example, *makuvi* are key dry season grazing areas, they have a high potential for agroforestry, but cultivation is prohibited by law because of the potentially harmful effects on hydrology;

4. preliminary selection of potential interventions for each niche;

5. identification of likely shrub and tree species for each intervention. Selection criteria were similar to those used in selecting on-farm trees;

6. description of current use, and identification of prospective alternative, non-agroforestry interven-

tions (e.g. rice-growing in *makuvi* – illegal at present). The idea was to assess the opportunity costs of agroforestry interventions;

7. the appropriateness of each intervention for the different household categories is assessed. For example, a communal fodder bank is unlikely to bring great benefits to those with few cattle, but a poor household lacking a Scotch cart, cash and labour for getting fuelwood is likely to benefit from a communal woodlot;

8. the communal organisation and management requirements of each intervention is assessed, and compared with the capabilities of existing institutions such as Farmers' Group, Women's Club, Village Committee, VIDCO, WADCO and District Council;

9. a preliminary assessment of the technical and institutional feasibility of each intervention is made, and infeasible options discarded;

10. a preliminary description is made of each potential intervention, based on the information from 1-9 above, and written up as a brief report for plenary discussion;

11. interrelationships among potential communal agroforestry interventions are analysed to assess their complementarity within an agroforestry strategy;

12. the extension and research requirements of each intervention are assessed.

Plenary Discussion of Potential Agroforestry Interventions

The training team next meets in plenary session to hear and discuss presentations of the sub-group reports. Inter-relationships between the on-farm and communal interventions are analysed at this stage. Improvements are made to the interventions in the light of the discussions, and descriptions modified accordingly.

Activity 2. Informal Discussions with Individuals and Groups

This activity is proposed on the assumption that technical, socio-economic and institutional questions will usually arise from the discussions of potential interventions in Activity 1. The individuals and groups selected will depend on what questions arise, but they might include Forestry Commission or Agritex staff at various levels, NGOs, farmers representing a particular gender or socio-economic category, a VIDCO, WADCO or District Council representative, a Women's Club, Farmers' Group, a Village Development Committee and so on. See Example IV(3).

Activity 3. Workshop to Modify Interventions

The informal discussions are reported in plenary, and modifications made to the interventions as necessary when the sub-groups re-form. The output from this activity should be a set of compatible agroforestry interventions, each described in detail.

Activity 4. Further Discussions with Individuals and Groups

The interventions should again be discussed with farmers individually or in groups, and with relevant government departments, NGOs and local institutions.

Example IV(1) - Activity 1

Summary of Potential On-farm Agroforestry Interventions

Agroforestry Intervention	Niche	Major Function/ Role	Other Benefits	Constraints	Justification	Suitability to Farmer Categories	Existing Practice	Possible Species*
Green manure bank	Along contours field margins field boundaries and between fields	Addition of organic matter to improve soil physical and chemical properties	Potential for fodder supply, fuelwood	Labour availability	Existing fertility levels are low. Non-availability of adequate cash/ manure for sustainable crop yields.	Most applic- to the poor farmer who has limited access to manure and cash for fertilizer.	Use ant-hill soil. Use manure if the farmer has cattle. Some trees left in the arable fields. Application of fertilisers (less or none in the case of the poor farmer).	*Ficus sur* *Parinari curatellifolia* *Ficus natalensis* *Cajanus cajan* *Leucaena leucocephala* *Cassia siamea*
Intercropping *Acacia albida* with maize/ groundnuts/ millet	All arable fields	Improvement of soil fertility through N fixation and leaf fall	Provision of fuelwood and browse for livestock. Will also provide building/ construction materials	Depending on planting pattern, the trees might disrupt ploughing activities	Existing soil fertility levels are low. Also fodder/browse, fuelwood and building/ construction materials are in short supply	Most applic- to the poor & middle farmer	Soil fertility maintenance as above. Fuelwood collected from own fields and grazing areas. Building/ construction wood obtained from own fields or bought	*Acacia albida*

* A number of other indigenous species are also potentially suitable.

Example IV(1) - Activity 1

Summary of Potential On-farm Agroforestry Interventions Cont'd

Agroforestry Intervention	Niche	Major Function/ Role	Other Benefits	Constraints	Justification	Suitability to Farmer Categories	Existing Practice	Possible Species*
Planted fallow	Arable fallow land	Fertility restoration	Fuelwood/ poles	Labour esp. at establish-ment stage.	The reasons for leaving arable land fallow are lack of draught power, labour and/or declined soil fertility. The proposed agroforestry intervention though requiring some labour will help alleviate the soil fert-ility problems while offering other benefits	The poor farm with limited labour and/or cash for fertilisers.	Leaving arable land fallow without further improvements.	*Acacia albida* *Leucaena leucocephala* *Cassia siamea* *Dalbergia sissoo* *Sesbania grandiflora*
Grazing fodder banks	Contour bunds, unused land between fields, fence lines in homefields.	Improve fodder availability and quality.	Restoration/ improvement of nutrient and organic matter status. Improved quality of livestock products. Stabilisation of contour bunds. Firewood, fencing and green manure.	Labour. Land shortage. Scarcity of seedlings.	There is lack of fodder at the moment, esp. during critical periods.	Mainly leading middle and poorer farmers who have livestock.	Cattle fed on stored maize stalks and browse on some trees in the grazing areas and mainfields and some trees on contour bunds.	*Albizia lebbeck* *Leucaena leucocephala* *Sesbania* *Acacia senegal* *Acacia albida* *Acacia galpini* *Gmelina arborea* *Cassia abbreviata* *Cajanus cajan* *Bauhinia galpinii* *Gliricidia sepium*

* A number of other indigenous species are also potentially suitable.

Example IV(1) - Activity 1

Summary of Potential On-farm Agroforestry Interventions Cont'd

Agroforestry Intervention	Niche	Major Function/ Role	Other Benefits	Constraints	Justification	Suitability to Farmer Categories	Existing Practice	Possible Species*
Cut & carry fodder banks	Homefield boundaries, near livestock locations.	Improve fodder availability and quality.	Improved quality and quantity of manure. Green manure. Soil and moisture conservation.	Labour. Land. Scarcity of seedlings.	There is a critical shortage of fodder especially during critical periods – dry season.	All farmers with livestock, but poorer farmers tend to lack labour.	Cattle fed on stored maize stover. Cattle browse on some trees in the grazing areas, main-fields and contour bunds.	Same as above.
Contour planting	Contours	To stabilise and use contour ridges productively.	Stabilise contour bunds. Provide soil cover. Improve adjacent soil fertility. Productive use of contours. Reduce contour maintenance work.	Additional labour required.	Contours if not maintained adequately cause rill and gully erosion.	Suitable to all farmer categories, but those lacking labour are at a dis-advantage.	Some farmers (especially poorer farmers) leave and use trees on their contour ridges which are used and hence generally kept low.	*Acacia albida* *Cassia siamea*
Barrier strips (grass)	Above or below contours, or between contours.	To supplement or partially replace mechanical conservation measures.	Prevent soil erosion. Provide fodder. Mulch.	Use of cropping area. Spreading of roots. Ploughing.	Less heavy labour required than is needed to maintain contour ridges.	To all farmer categories.	Some farmers already leave a strip above or below contours which forms a forage area for cattle	
Barrier hedges	On eroded contour ridges or between contours.	To provide a barrier to run-off and a soil cover.	Mulch. Improve soil fertility.	Competition with crops. Hindrance to ploughing. Labour requirements.	Some contour ridges on steeper slopes may themselves be susceptible to erosion and often much sheet wash occurs between contours.	To farmers with sufficient labour and particular erosion and soil fertility problems.	Not used.	*Cajanus cajan*

* A number of other indigenous species are also potentially suitable.

Example IV(1) - Activity 1

Summary of Potential On-farm Agroforestry Interventions Cont'd

Agroforestry Intervention	Niche	Major Function/ Role	Other Benefits	Constraints	Justification	Suitability to Farmer Categories	Existing Practice	Possible Species*
Windbreak and shelterbelt	South-east to east sides of homesteads & mainfields.	To provide shelter and other productive wood uses.	Reduce soil and leaf evap. and transpiration. Reduces erosion. Provision of wood and leaf resources.	Shading effect on crops. Competition from tree roots. Possible harbouring of pests and diseases.	People need woodlots for various tree uses. This is an additional benefit.	Poorer farmers plant near homestead. Leading farmers home and main-fields.	A few farmers plant single-row gum tree windbreaks. Others talk of trees around the home (e.g. gums, fruit trees) providing wind shelter.	
Live fences	Field perimeters, boundary demarcations Cattle kraals.	To provide fencing which serves other wood uses.	Multiple tree products. Organic matter.	Planting material. Competition with crops.	Wire fencing is expensive.	All farmer categories. Poorer farmers have more difficulty affording construction and replace-ment costs of post and wire fences.	Limited use of live fences noted.	
Woodlots Establishment	Near boundary of homefield and mainfield. Niches unsuitable for cropping. Fallows. Along contour bunds.	Poles and fuelwood supply.	Cash income. Fodder. Depending on species, soil fertility.	Labour. Cash. Scarcity of seedlings.	Shortage of poles and fuelwood. Great necessity for poles and fuelwood for all household categories.	All house-holds can establish woodlots of varying sizes at various locations presently available to them at home-field and mainfield.	Few woodlots exist but fuelwood and poles are collected from nearby wood-lands which are now depleted.	*Eucalyptus* *Leucaena* *Azadirachta indica* *Cassia siamea* *Acacia albida*

* A number of other indigenous species are also potentially suitable.

Example IV(1) - Activity 1

Summary of Potential On-farm Agroforestry Interventions Cont'd

Agroforestry Intervention	Niche	Major Function/ Role	Other Benefits	Constraints	Justification	Suitability to Farmer Categories	Existing Practice	Possible Species*
Fruit trees planting	Homestead. Boundaries of homefield and mainfield. Contour bunds Within homefield and mainfield.	Fruits and cash from sales of fruits.	Provision of shade and shelter. Fodder. Firewood. Beverages and wine.	Limited supply of improved planting materials. Grazing animals. Long gestation before fruiting. Frost and termites. Information on planting & management techniques lacking.	Fruits are needed for balanced diet especially of rural poor. Fruit tree growing is already popular. Fruit trees can be easily fitted into the prevailing household land use types.	Every household category can plant fruit trees as individual trees or as large-scale orchards.	Fruit trees (especially exotic ones) are grown in homesteads. Fruits are collected from farm trees e.g. *Parinari* and *Scleocarya*	Mango Guava Orange Peach *Parinari* *Azanza garckeana*
Household nurseries	Gardens and homefields	Provide cheap sources of planting materials and/or supplement supplies from communal nurseries.	Income generation. Education to the farmer on nursery techniques. Cut down transport costs and time lag between collection and planting of seedlings if obtained from communal nursery.	Labour. Protection. Transport. Cash to purchase inputs. Limited information on propagation techniques of some species.	Inadequate planting materials. Popularity of tree planting is high. Expressed need for diversification of species.	All farmer categories although the level may differ depending on availability of inputs.	Practice of establishing household nurseries is there but on very limited scale.	All species indicated for the agroforestry interventions may be raised - guided by the household preferences.

* A number of other indigenous species are also potentially suitable.

Note: The research and extension requirements for these interventions are set out in detail in the Research Report.

Example IV(2) – Activity 1

Summary of Agroforestry Interventions Proposed for Communal Land

INTERVENTION	OBJECTIVES	LOCATION	INSTITUTION	LABOUR	INPUTS AND COSTS	BENEFITS AND ACCESS	ISSUES AND RULES
Nursery	Establishment or reinforcing nurseries	Flat land near reliable water source	School Farmer group VIDCO Ward	Free labour for all except Ward level of operation. Intensive periods May to January	Plastic bags, wire, pesticides, water, seeds.	All farmer categories benefit except where nursery developed by farmer group	
Enrichment planting	To provide fuel and timber	Hills	VIDCO	Required during first rains	Seedlings, protection, transport	All	Time of labour conflicts with ploughing
Planting	Erosion control, to provide fuel, timber fencing	Riverine strips	VIDCO	Required during first rains	Protection, ring fences for valuable trees, seedlings.	All	Paths and grazing, fencing upkeep, labour mobilisation
Planting	To provide fruit trees especially	Vleis in arable areas	VIDCO	Community labour required during first rains	As above	All	Agreement on separated grazing "ownership of vleis in arable areas". Ecological impact on vlei
Planting	To provide wood products, browse and fruit	Inter-farm grazing and drainage lines	Individual; VIDCO	Community labour for planting, transport of seedlings. Required during first rains	Transport, seedlings, water	All	No herding during first season. Trees sufficiently large by first dry season to withstand browsing
Planting	As above	Sacred areas	Lineage group project or village	As above	As above + fencing	All	Organisation by elders of the community

Example IV(2) - Activity 1

Summary of Agroforestry Interventions Proposed for Communal Land Cont'd

INTERVENTION	OBJECTIVES	LOCATION	INSTITUTION	LABOUR	INPUTS AND COSTS	BENEFITS AND ACCESS	ISSUES AND RULES
Planting	Provide browse primarily and wood products, fruit	Topland grazing area	VIDCOs (jointly?)	Required at first rains and for weeding	Fencing, transport and watering. High costs $1600/ha	All but especially cattle owners	Choice of area for fencing; mobilisation of labour; fence maintenance, grazing agreements, rights of access, boundary disputes
Cut-and-carry fodder banks	To provide dry season feed	Vlei		Communal labour, intensive period during establishment, then regular management. Leading farmers provide oxen, labour from poorer farmers	Labour, seedlings, fencing?	All but especially livestock owners	Ecological impact, land use legislation. Agreements on labour and access, distribution of benefits
Woodlots	To provide fuel and poles at a convenient source	Homefields and grazing areas	Individual or communal at VIDCO level	Labour for land clearing, pitting, planting, weeding, pruning and thinning	Draught power for land clearing	All	
Upland grazing/ woodland management	To maintain indigenous woodlands for long term benefits	Upland grazing areas	VIDCO because grazing areas controlled at this level. Special committee needs to work out management plan	Communal labour for herding, guarding. Individual labour for collection of wood	Saws, axes fencing, labour	All will benefit from sustainable supply of woodland resources. Benefits from browse to livestock owners	Need locally agreed rules on protected areas; where and what to cut, powers of the guards. Success depends on alternative source of browse and wood during protection, therefore on fodder bank and woodlot establishment

Example IV(2) - Activity 1

Summary of Agroforestry Interventions Proposed for Communal Land Cont'd

INTERVENTION	OBJECTIVES	LOCATION	INSTITUTION	LABOUR	INPUTS AND COSTS	BENEFITS AND ACCESS	ISSUES AND RULES
Tree/crop intercropping	To provide cropping during early establishment of woodlot	River gardens					Shortage of sites creates competition between woodlot and garden; problem of the 100m legislation; ecological impact

Example IV(3) - Activity 2

Informal Discussion of Potential Agroforestry Interventions
Summary of Makandire VIDCO Meeting: 24/3/88

Starting

The meeting was scheduled to start at 10.00, but eventually only got underway at 12.15. The turn-up was very small - only 15 people (10 men, 5 women). The major reason for this was that many people we had spoken with, or who had attended the first VIDCO meeting, were engaged elsewhere. There was a meeting for farmer group chairmen at Donga; a training course run by the Methodist church in Gweru; another women's course at Tongagara.

Thus although scheduling meetings for *chisi* days is convenient and avoids taking farmers' time on working days, it is likely to lead to clashes with other events.

The meeting

The meeting began with a prayer.

We then opened the meeting by reminding people of our objectives and the work we had done so far. We also outlined what we hoped would be the outcomes of our work: firstly, that it would contribute to extension and research initiatives and secondly, that we would be able to identify possible local community and farmer initiatives. A short summary was then presented of some of the constraints we had noted which affect farmers' production systems.

From here the meeting led into a discussion on the strategies farmers use to overcome some of these constraints, their limitations, and further ideas on what might be done about them.

Issue areas discussed

1. Arable land fertilisation

The first resource constraint that was picked up by people was that of the difficulty of maintaining soil fertility in the arable areas. People wanted to know if there was a supplementary method of fertilising that was easier than the labour intensive digging and carting of manure and antheap.

We first led the discussion into the role trees play in contributing to soil fertility.

Those attending said that two main trees contribute to soil fertility in their area - the **muwonde** (*Ficus sur*) and the **muchakata** (*Parinari curatellifolia*). The points noted about each tree were as follows:

muchakata: The roots of the tree present no problem for ploughing as the tree is deep-rooted. However the tree is very slow growing.

muwonde: This tree is better for soil fertility than the muchakata. The muwonde is also faster growing. The major problem of the tree is that its spreading lateral roots are near the surface. However these can be cut, which also aids the tree's growth.

It was stressed that although planting these trees was a good idea, the benefit would be experienced only in the longer term - by our

children, said some of the older men present.

People were therefore interested in trees which could be of benefit in the shorter term. Places where trees could be planted were stated as:

i) on contours;
(ii) along the edges of fields;
(iii) along waterways.

Legumes were mentioned by us as woody plants which could usefully be grown in these places. *Crotalaria* was identified by people as one such local legume. However, it has no Shona name and people currently perceive it as a weed. They said that in fields it affects crops through direct competition, although it does not use much soil moisture.

2. Livestock and grazing

A problem that people identified was the fact that there was currently very little grass, although it was the time of the year when there should be a great deal.

Further points made by people were as follows:

- They do not have enough grazing land for their animals.
- Browse is primarily important from August to October when the young leaves of musasa and mutondo come out.
- Branches of trees such as mulberry and mushavi can be cut and fed to animals in dry periods.
- The most grass for grazing is found around people's main fields. These fields are used as part of a rotational grazing system, i.e. animals use them particularly around planting time and then later in the growing season (from March onwards). If there was more grass on the grazing areas, the grazing around fields would only be used after harvest.
- Some farmers identified the lack of cooperation amongst people in the establishment of grazing schemes as a problem.
- Others claimed some people were taking up too much land for their homestead areas.

3. Homestead areas

Around homes fruit trees can be grown in orchards. Only **peaches** and **mangoes** were mentioned as exotic fruit trees which can be intercropped. The comment was made about mangoes that they take a lot of water from the soil.

Two other trees were mentioned that can be planted around homes: **munzvirum'ombe** and **mutohwe.**

4. Tree planting and nurseries

A lively discussion took place on the subject of nurseries. There was consensus amongst those present that they would like a nursery for indigenous and exotic trees.

The discussion that followed was therefore about at what level was it appropriate for nurseries to be established. Two main suggestions were put forward:

(i) **At VIDCO level.** The advantages given for a nursery to be established at this level were:
- everyone belongs to the VIDCO;
- the VIDCO comes under the council and thus the plan can proceed upwards;
- the VIDCO can plan the nursery and allocate duties to the farmer clubs.

(ii) **At farmer group level.** Advantages given were were:
- people are nearer each other and thus it is easier to organise and manage nurseries.

Conclusion

It does not matter where it is as long as there is a nursery. One farmer group chairman stated that help for a nursery would have to be sought through the VIDCO. This did not mean in his opinion, however, that private nurseries or farmer club nurseries could not also be started.

Additional comments

1. We were underprepared for the response we obtained from people at the meeting. This was that we had been listening to them up till now. We had discussed with them as a group and visited some of them individually. Now that we understood some of their problems, they wished also to learn from us.

2. On this premise, the meeting would have been better carried out later in the design process, when technical aspects of the intervention could have been discussed in more detail.

3. Some ideas we were raising were difficult to communicate, e.g. the concept of a 'legume'. The use of simple posters, or diagrams on tracing paper, would have helped both to communicate ideas and to focus the subsequent discussions on them (instead of much of the discussion being at attempt to explain concepts).

STEP V: APPRAISAL OF POTENTIAL AGROFORESTRY INTERVENTIONS

STEP V: APPRAISAL OF POTENTIAL AGROFORESTRY INTERVENTIONS

Duration: four and a half days

Introduction

Step IV was concerned implicitly with 'appraisal' in that infeasible, unfundable or unwanted options raised and informally discussed during these steps will already have been abandoned. Although a few proposals were rejected during appraisal, this step is not a formal appraisal of a wide range of options as recommended by planning text books. Instead, we assume that the interventions identified in Step IV are in principle acceptable to local people, and that what now has to be done is to assess the suitability of the interventions for various kinds of household, their compatibility with local institutions, their acceptability by Government departments, their complementarity and interactions as part of an agroforestry strategy, and the priority for their implementation.

In appraising activities it is important to remember that if people are to undertake a new activity then they usually have to change what they are already doing. Labour, time, capital and land may have to be reallocated or acquired from elsewhere. People, whether farmers, extension agents or research personnel, will only allocate their resources for new activities if they believe the benefits to be gained from so doing are worthwhile – in other words, if the expected increase in benefits outweighs the opportunity costs.

These considerations mean that for each intervention being appraised, we must be aware of: who might undertake it (men, women, households, schools, labour cooperation group, VIDCO, Agritex, Forestry Commission etc); what scale of change from present activities is required; what additional resources would be required and from what source.

The intended procedure at Shurugwi was for the training team to appraise the proposed agroforestry interventions during a workshop; for survey groups to return to VIDCO areas for informal discussions on the proposals with selected farmers and officials; and finally for a short list of appraised interventions to be discussed more formally in VIDCO meetings. This procedure follows the rapid appraisal phases described in Step III: 'generative', 'detailing' and 'assessment'.

Objectives and Outputs

By the end of this step we should have, for each agroforestry intervention:

* **identified its purpose and those who would be responsible for implementation (e.g. household, community group, government extension or research agency, NGO etc);**
* **assessed resource requirements including capital and recurrent costs, labour requirements, and the need for external resources;**
* **assessed the activity's social or policy acceptability or feasibility;**
* **assessed the environmental and social riskiness of the activity;**
* **continued formal and informal discussions with relevant people and institutions;**
* **assessed whether the agroforestry activity is a compatible component of an agroforestry strategy for the area;**
* **examined the research and extension requirements of each intervention.**

List of Activities

1. Workshop

2. Informal Discussions with Local People

3. Public Meetings

Activity 1. Appraisal Workshop

The aim of this activity is to appraise and modify the proposals for agroforestry interventions that have been made during Step IV (Examples IV(1) and (2)). .The activity is carried out by four groups – technical, research, extension and socio-economic.

After a plenary session to explain the method, the training team divides into the four groups. Each considers the interventions from the perspective of the interest group it represents. Thus the technical group represent technical experts, the research group named research agencies, the extension group extension agencies and the fourth group represented farmers.

Several issues requiring discussion have been identified below. However, each group must set its own agenda, its priorities and, if necessary, add to its brief.

Each group should negotiate with the other interest groups. For example, the extension group needs to be satisfied that the research group is taking into account research-extension and research-farmer links. Likewise the research group itself must be satisfied with research-extension links.

At the end of its discussion each group produces a written appraisal report. This should appraise the interventions, note where agreement has been reached with other groups, and where conflict remains. These reports are presented in plenary session (Examples V(1), V(2), V(3), V(4)). The brief for each appraisal group is given below.

Technical Group

This group should consider the following when appraising the potential agroforestry interventions:

* resource requirements, e.g. land, labour, capital, planting material, technical knowledge;

* environmental implications, including soil erosion, hydrology, microclimate, pests, weeds and diseases;

* technical feasibility;

* non-agroforestry alternatives, i.e. opportunity costs;

* priority for implementation.

Research Group

Research proposals drawn up for each intervention in Step IV should be consulted, and appraised in relation to the following:

* research priorities;

* level of research and proposals for research monitoring;

* research agency/extension links, and research agency/ farmer links;

* research resource requirements;

* environmental impacts;

* non-agroforestry alternatives;

* technical feasibility.

Extension Group

For each intervention or package of interventions this group should consider the following:

* agency responsible for implementation;
* resource requirements;
* policy acceptability;
* acceptability to farmers and social riskiness;
* compatibility of the intervention with current extension strategy;
* research-extension links.

Farmers' Interests Group

For each intervention or package of interventions this group should consider the following:

* resource requirements, costs and benefits;
* social acceptability;
* appropriateness to different categories of farmer;
* social riskiness;
* research and extension links with farmers;
* local institutions and social issues;
* policy and planning issues.

Example V(1) - Activity 1

Report from the Technical Appraisal Group on Proposed Agroforestry Interventions

Introduction

This group listed all the proposed on-farm and communal lands agroforestry interventions, combining proposals where necessary, to yield a total of 8 on-farm and 4 communal land interventions.

1. On-farm Interventions

The potential on-farm interventions include:

1. Live fences.
2. Intercropping *Acacia albida* and/or other multi-purpose trees.
3. Woodlots.
4. Fruit trees.
5. Fodder banks (cut-and-carry and grazing fodder banks were merged).
6. Barrier hedges. This includes contour planting for bund-stabilisation.
7. Planted fallow and green manuring. These were merged because of similarity of function.
8. Household nurseries.

The technical group considered all 8 on-farm interventions were important and technically feasible. However, lack of time meant that only two were appraised in detail - live fences, and woodlots. This choice does not reflect the priority for implementation - for example, fodder banks should probably have a higher priority than live fences. The editors have not completed the appraisal, as we intend the examples used to be an accurate reflection of the work achieved during the training programme.

a. Appraisal of live fences

Resource requirements

Land is not a problem because of the small area required. Planting material should include thorny species, e.g. *Acacia spp, Dichrostachys cinerea, Erythrina abyssinica, Bougainvillea spectabilis, Sisal sisal*. Costs are affordable by most households. Labour requirement will depend on length of live fence, and can be provided by the household without affecting farming activities if establishment is undertaken on "chisi" days. Capital will also be minimal except when barbed wire is used. Local knowledge is available on live fence establishment and maintenance.

Example V(1) – Activity 1

Report from the Technical Appraisal Group on Proposed Agroforestry Interventions Cont'd

Environmental implications

Positive effects on soil fertility if species used can be pruned and utilised as green manure. Live fences can also reduce soil erosion, and ameliorate microclimates to the benefit of humans and livestock. Live fences may compete with crops if too close, tall or wide. Live fences could be a source of fodder.

Technical feasibility and priority

Simple to establish and manage with low resource inputs. Adoptable by all categories of household. Given high priority in view of its multipurpose function including security, supply of fodder, fibre, green manure, fuelwood, fencing posts and boundary demarcation.

Alternative non-agroforestry intervention

Apart from dead fences (woody or grass or both) other alternatives are various forms of wire which do not compete with crops but are very expensive, require replacement periodically, and do not produce the fertility, erosion control, green manure, microclimatic or fodder benefits of live fences.

Complementarity to other agroforestry interventions

This intervention complements fodder banks and green manuring.

b. Appraisal of Woodlots

Resource requirements

Land could be allocated on contour bunds, on fallows (with reservations), along field boundaries and in inter-field areas. Planting material of recommended species (exotic and indigenous) could be obtained from village or VIDCO nurseries or from nearest school or Forestry Commission. Establishment of these is a pre-condition for success. Labour may be a limiting factor, except for leading farmers, especially during the establishment phase. Capital costs comprise cost of seedlings, fencing, additional working tools, manuring, pesticides. The intervention would therefore tend to be more relevant to leading farmers. Technical knowhow is available on *Eucalyptus* spp., much less so for indigenous and other exotic species.

Environmental implications

Can check soil erosion if correct choice of species is made and if proper management techniques are adopted to encourage ground vegetation cover.

Technical feasibility and priority

The intervention is feasible for all farmer categories but scale may have to vary. It is of high priority in view of the shortage of wood.

Alternative non-agroforestry interventions

There are no affordable substitutes for firewood or poles.

Complementarity

Can complement other agroforestry interventions in terms of soil fertility maintenance, fodder production (depending on species), windbreaks and shelter belts, and barrier hedges for erosion control.

2. Communal Land Interventions

Potential agroforestry interventions on communal land include nurseries, woodlots, woodland management and enrichment planting, and fodder banks.

a. Appraisal of nurseries

Resources

Land should be selected where there is permanent water supply and flat terrain. Labour might be provided through a variety of communal institutions, for example WADCO, VIDCO, Farmer Group, School. For the Ward nursery, a worker has to be employed. Capital will be required for purchases such as planting materials, and wire for protection. Recurrent costs include pesticides, fertiliser, payment of labour. Total capital and recurrent costs (see Step V) were considered to be obtainable by a communal institution. Seeds could be obtained from local collections and through the Forestry Commission and Agritex.

Technical knowledge

Training is needed for at least a few farmers. Forestry Commission and Agritex might assist.

Example V(1) - Activity 1

Report from the Technical Appraisal Group on Proposed Agroforestry Interventions Cont'd

Environmental implications

Pollution from pesticides and the introduction of pests, diseases and noxious weeds during seed importation or local procurement are potential negative impacts.

Technical feasibility

This intervention is feasible and important for production of planting material to support other interventions such as fodder banks, woodlots and enrichment planting. The levels of nurseries recommended are VIDCO, farmers group and school, as these are more likely to succeed owing to greater sense of ownership, cheap labour and promotion of self reliance among members.

Non-agroforestry interventions

Seedlings might be procured from other outside nurseries but this would entail higher costs of seedlings and transport, and offer a limited range of available seedlings.

b. Appraisal of communal woodlots

Resource requirements and technical knowledge

Similar to nurseries.

Environmental implications

Reduction of soil erosion rates, and the enhancement of soil fertility depending on species used. Woodlots should be correctly sited to avoid adverse effects on ground water table and streamflow.

Technical feasibility and priority

Important and feasible. However, it would be difficult to manage a woodlot and share its products under communal tenure. The effect on ground cover (grass etc) required as forage is crucial.

Non-agroforestry interventions

The alternative sources of fuelwood are crop residues and cow dung, use of which can adversely affect soil fertility. Others are kerosene which is expensive, and natural woodland, which is in need of protection.

Complementarity

Will increase fodder supply if browse species are used. Will also complement the intervention on woodland management and enrichment planting.

c. Appraisal of woodland management and enrichment planting

The woodland management component of this intervention was not recommended for early implementation because of its complexity and the associated requirements for better technical and socio-economic information, and for more research. However, the enrichment planting component was regarded as a useful starting point for the more complex programme, and therefore worthy of early implementation.

Resources required

Land is available in the main grazing area and on poorly stocked sites within woodlands. Indigenous species are to be used and these can be collected locally. Techniques for germination and field establishment will however require investigation. Labour should be available from the community for all operations. Funds will be required for fencing, seed collection and seedling production.

Technical knowledge

Should be available with Forestry Commission and Agritex.

Environmental implications

Good potential for on-site conservation of indigenous species and rehabilitation of degraded woodland.

Technical feasibility

Feasible if carried out on a small scale on selected sites, but the protection of newly established areas has to be effective. Protection would provide an opportunity for existing woodland to grow above browsing height and thus initiate in a simple way the early stage of the more complex management programme.

Example V(1) - Activity 1

Report from the Technical Appraisal Group on Proposed Agroforestry Interventions Cont'd

Non-agroforestry interventions

The alternative is to allow the woodland to regenerate naturally. This is not satisfactory, in view of slow rate of regeneration, poor stocking/ structure, high rate of deforestation, and appreciable land degradation of the *miombo* woodland. The intervention is considered therefore to be a top priority.

d. Appraisal of fodder banks

Resources

The design indicated that this intervention will be sited on the *makuvi* (vleis) but did not specify further. The technical group recommends that the siting should be on the *margin*. Planting materials included exotic and indigenous species. Labour will be provided by the community. Capital cost will comprise cost of planting materials, manure and fencing.

Environmental implications

May have positive effect on fertility depending on the species. May also prevent and control erosion. Will have adverse effect on the hydrology depending on siting and density of trees.

Technical feasibility and priority

Planting of trees on vleis has the attendant danger of silting them up. Although the intervention appears technically feasible the danger to water tables should be carefully borne in mind. Besides there is also a problem of management and utilisation owing to communal ownership. Equitable sharing of fodder to all categories of farmers will be difficult. The leading farmer will have advantage over others because of his greater access to labour, transport and cash. For these reasons, the intervention is not recommended.

Non-agroforestry alternative

More research is needed to determine the role the vleis play as the key grazing resource and their response to different management systems other than grazing.

Example V(2) - Activity 1

Report from the Research Appraisal Group on Proposed Agroforestry Interventions

1. On-farm Interventions

a. Introduction

This group appraised three of the proposed On-farm Interventions in detail - Green Manure and Fodder Banks, and Barrier Hedges (Example IV(1)). The proposal was to plant shrubs and trees along contour bunds and field boundaries for the Green Manure and Fodder Banks, and on eroded contour bunds or between contour bunds in the case of Barrier Hedges. This group felt that the capital cost of protecting linear plantings with diamond mesh wire would be excessive even for better off farmers. These interventions might be adoptable, however, in cases where homefields are already fenced effectively. Other interventions considered in less detail by the Research Appraisal Group included Contour Planting, Live Fences, Windbreaks and Fruit Trees.

b. A Research Strategy for On-farm Interventions

(i) General Objectives

The group outlined a research strategy for the development of the above interventions. The general objectives were to:

* improve knowledge of indigenous species and agroforestry systems;
* improve knowledge of exotic species and agroforestry systems and integrate these where appropriate with local practice;
* test the interventions on-farm using realistic levels of inputs, management and labour, but with some control by researchers;
* investigate the interventions in Natural Regions IV and V, in line with the priorities of the Ministry of Lands, Agriculture and Rural Resettlement;
* integrate the agronomic and forestry investigations and species trials with a socio-economic study of the acceptability of the intervention to various categories of farmer;
* integrate the research into an extension strategy by promoting the development of a network of farmer-experimenters;

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Example V(2) - Activity 1

Report from the Research Appraisal Group on Proposed Agroforestry Interventions Cont'd

* evolve a variety of technical options (rather than a single inflexible package) for extension by Agritex.

(ii) Specific Objectives

Research into **Fodder Banks** should provide information on:

* production per unit area compared with animals' needs, and in relation to input requirements, bearing in mind the target group is middle-to-leading farmers;
* establishment methods;
* nutritional value and palatability over the season;
* interactions between shrubs/trees and arable crops;
* the appropriateness of various management options - cut-and-carry, direct browsing, response to browsing and cutting, storage, time of use and so on.

Answers required from research into **Green Manuring** interventions are:

* production per unit area in relation to the input requirements, bearing in mind the target-group is middle-to-poor farmers;
* nutrient content over time, decomposition rates, immobilisation properties and effects on crop yield of the mulch;
* interactions of the shrubs/trees with arable crops;
* management requirements, including establishment and pruning.

Studies of **Barrier Hedges** should aim to show the effects of:

* interactions between the woody plants and arable crops, root studies being particularly relevant;
* hedges on soil fertility;
* hedges on soil erosion rates.

Investigations of **Fruit Trees, Planting on Contours, Live Fencing** and **Windbreak** establishment should attempt to:

* identify suitable exotic and indigenous species;
* investigate methods of propagation and sources of planting material;
* monitor current on-farm practices using rapid appraisal methods - contour planting, live fencing, windbreaks and orchards - and feed findings and questions back into research;
* establish a network of farmer-experimenters.

(iii) Identification of Suitable Species

Successful development of each of these interventions relies on the identification of suitable exotic and indigenous species. Experience from Malawi shows the following procedure to be rapid and effective, with a preliminary identification of likely species after 18 months:

Step 1: seed germination trials to screen out poorly-germinating species, including pre-germination treatment requirements;

Step 2: seedling survival trials;

Step 3: planting on a range of soil types, possibly along catenas; monitoring of growth and survival rates, noting fungal and insect problems at six monthly intervals;

Step 4: plant sufficient replicates so that management treatments can be tested later.

The Forestry Commission is the institution most likely to undertake the screening.

(iv) Integration of Findings

For each of these proposed interventions it is expected that studies of their acceptability to farmers, and their socio-economic and environmental impacts will be integrated with the technical and on-farm research.

(v) Research Resources

It is envisaged that a network of volunteer farmer-experimenters will be built up. They would use inputs supplied by researchers. Other resource requirements of the research include:

Example V(2) - Activity 1

Report from the Research Appraisal Group on Proposed Agroforestry Interventions Cont'd

- for literature research, support from ICRAF plus one researcher working for three months;
- for screening trials, research station facilities for two years;
- for on-farm trials and socio-economic studies: one agronomist, one social scientist, each for three years; planting material, fencing, fertilisers, and other inputs: funds for paying farmers;
- farmer-experimenters: the same agronomist and social scientist identified above, extension workers, and inputs.

(vi) Research-Extension Linkages

The main means of integrating research results into an extension strategy for these on-farm interventions is through the inclusion of farmer-experimenters in the research process, so that the research output is extension-oriented.

The source of research questions is a crucial issue. In this case they derived from the Analysis of Form of Production and the Natural Resource Assessment. In other instances they could originate from Agritex's extension work, perhaps assisted by rapid appraisal methods incorporated more formally into Agritex's programme.

2. Communal Interventions

The Research Appraisal Group at Shurugwi restricted comments on potential communal interventions to Nurseries, Woodlots and Upland Woodland Management Example IV(2)).

a. Research strategy for the Communal Nurseries

- rapid screening of indigenous and exotic species by the Forestry Commission;
- nurseries established by the Forestry Commission, 2 or 3 per district perhaps, using indigenous and exotic species;
- monitoring of germination and survival rates, disease and insect problems in the Commission's nurseries;
- recommendations for specific local conditions;
- linkages established between Forestry Commission, Agritex and NGOs;
- Communal Nurseries established, using research experience, by Schools, Association of Women's Clubs, VIDCOs, WADCOs;
- technical, economic and institutional experiences of these various kinds of Communal Nursery monitored and fed back as questions and information into research.

b. Research Strategy for Communal Woodlots

From their appraisal of the **Communal Woodlots**, the Research Appraisal Group devised the following research strategy:

- further rapid appraisal work to assess feasibility and acceptability, paying particular attention to institutional aspects (Forestry Commission, Research and Specialist Services, VIDCO and WADCO);
- review of existing knowledge (Forestry Commission, Research and Specialist Services);
- rapid screening of indigenous and exotic species by the Forestry Commission as described above (Forestry Commission);
- researcher-managed trials under communal area conditions;
- demonstration, extension and implementation of tested systems (Agritex/Forestry Commission);
- establishment of monitored "community-experimenter" networks (Agritex/Forestry Commission);
- development of extension recommendations (Agritex/Forestry Commission).

c. Research Strategy for the Development of an Upland Woodland Management Scheme

- further rapid appraisal work to assess feasibility and acceptability, again paying particular attention to institutional problems and possibilities (Forestry Commission, Research and Specialist Services);
- the use of comparative surveys and formal experiments (Research

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Example V(2) - Activity 1

Report from the Research Appraisal Group on Proposed Agroforestry Interventions Cont'd

and Specialist Services, Forestry Commission) to assess:

- relationships between woodland structure and the type and quantity of resource produced (browse, grass, posts, poles, fuelwood, etc);
- seasonal variations in quantity and quality of browse and grass;
- possibilities of manipulating woody structure and species composition to improve the supply of grass and/or browse;

* implementation of pilot schemes (Forestry Commission, Agritex, NGOs) in woodland management to examine:
  - enrichment planting - methods of planting and protection, and survival rates;
  - methods of protecting existing woodland - "tree policemen", movable fences, herding etc;
  - thinning and selective clearance;
  - growth and harvesting rates;
  - production of woodland resources under various management practices;
  - fodder preferences of livestock;
  - issues concerning local institutions, organisation and management, and local political economy.

Example V(3) - Activity 1

Report from the Extension Appraisal Group on Proposed Agroforestry Interventions

a. Present Circumstances

Agritex is the national agency responsible for agricultural extension. All of the interventions covered therefore fall within the bounds of Agritex responsibility.

The majority of agriculturalists in Zimbabwe have been taught that all trees must be removed from arable lands to maximise arable production; and that trees should be selectively cleared from pastures to increase grass production. Agroforestry is further discouraged by formal conventions such as the requirement that Master Farmer trainees remove all trees from their fields. It is people trained in this way and operating within this institutional system that we are now expecting to promote agroforestry.

The agencies responsible for agroforestry-type extension at present are primarily the Forestry Commission and Agritex. Extension contact with farmers is the responsibility of the local Agritex Extension Worker, who receives technical support from Agritex as well as the Forestry Commission. However, Forest Rangers, who are responsible at district level for technical support for Agritex's Extension Workers, are too few in number to provide an effective service. Extension workers in their turn not only have a full programme of arable and livestock extension, but in addition tend to be biased by their training and by past policy which did not favour agroforestry.

In Midlands Province, Agritex does not carry out agroforestry extension. Forestry extension is limited to advice on the planting of eucalyptus in woodlots, and to a lesser extent, the planting of fruit trees. There has been very little research carried out on agroforestry in Zimbabwe. This lacuna of research and extension means that little can at present be offered to farmers. Nevertheless, there are agroforestry interventions carried out by farmers in the absence of formal technical advice. Many farmers intercrop fruit trees (particularly guavas or peaches) with maize, beans or other vegetables. Some make use of existing live trees for fencing, or in a more limited way, plant live fences. A very few have planted rows of eucalyptus trees as windbreaks, or speak of planted fruit trees providing the same function. Other farmers are carrying out activities which, with suitable extension, could lead to the practice of agroforestry. The use of contour structures and the areas above and below them for grazing and browsing purposes is one such

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Example V(3) - Activity 1

Report from the Extension Appraisal Group on Proposed Agroforestry Interventions Cont'd

activity; green manuring through intercropping *Nyemba* (cow peas) with maize or sunflowers, is another.

Conventional agroforestry extension promotion can be carried out for practices where information is already available, or as research and rapid appraisal produces new information. Practices currently available for such promotion are orchard planting, live fence planting and woodlot/windbreak planting. However these areas too need further research, e.g. the potential for intercropping crops with trees in the period whilst the trees are being established (*taungya*), and trials of trees which could serve both as windbreaks and in woodlots.

In general, Agritex messages need to be made appropriate for the differing resource access levels of differing categories of farmers. For instance, for farmers without cattle, fodder bank production is not required, whilst green manure is.

b. Improving Agroforestry Extension

There was no systematic assessment by the Extension Appraisal Group of the proposed on-farm interventions. The emphasis was instead on measures for improving current extension practices.

Normally Agritex passes on to farmers technical recommendations developed on research stations. However, Agritex itself recognises that technical messages derived in this way are inappropriate for most peasant farmers. Therefore Agritex is trying to develop an improved rapid appraisal capacity by training AEO's to carry out diagnostic work with farmers. There are a number of key areas in farmers' production systems where rapid appraisal methods would be valuable. Three such areas are soil conservation, soil fertility and fodder production.

(i) Supplements and alternatives to current soil conservation recommendations

Mechanical conservation measures have been used for the prevention of erosion in Zimbabwe's communal areas for the last fifty years. The high labour and draught power costs, the tendency for diverted water to initiate gullies, and the continuing sheet erosion between contour bunds all suggest that supplementary, if not replacement, soil conservation methods are long overdue. One possibility is to plant trees or low barrier hedges (serving also green manure or fodder bank purposes) on the top of contours. Fodder grasses could also be planted on the ridges and extended beyond the ridges as barrier strips. However, the most effective way of reducing rates of erosion is through improved soil cover, to which agroforestry can best contribute by providing mulch from cut foliage.

Rapid appraisal work by Agritex staff could be used to discover the farmers' ideas for soil conservation measures. Interventions could be tested by demonstration trials or by encouraging farmers with different types of resource access to act as farmer experimenters. Rapid appraisal work of this nature would provide a valuable supplement to formal research.

(ii) Soil fertility enhancement

In current fertilisation recommendations, organic manure is only considered as a supplement or partial replacement for inorganic fertiliser. This means that the full benefits and irreplaceable functions of organic manure are not being taken into account.

In Shurugwi the naturally infertile sandy loams (*jecha*) present two main problems depending on their location:

- if freely draining, the soils are prone to leaching and erosion;
- if underlain by an impermeable layer the soils may be prone to waterlogging or compacting and crusting.

The role of manure in coping with these problems needs to be better understood. If farmers have sufficient draught power to be able to manure 0.4 ha or more of arable land annually, they will base their crop rotations on a 4-5 year cycle of manuring.

All farmers bulk cattle manure using ant heap, goat manure, maize and groundnut stover, cut grass and leaf litter. However, households with no or few animals, without scotch carts and with insufficient labour for the demanding activities of digging, carting and spreading manure/ antheap, are unable to use sufficient organic manure to maintain soil fertility.

Additional interventions which can be tried using demonstration trials and farmer-experimenters are green manuring, and possibly combined with this a form of conservation tillage. Other options are the use of green manure intercrops or barrier hedges which are nitrogen-fixing and not overly competitive with maize. *Acacia albida* might be used for the former option, pigeon peas for either.

The opportunity costs of such fertility enhancement measures are currently unknown and thus rapid appraisal of this issue is needed.

Example V(3) - Activity 1

Report from the Extension Appraisal Group on Proposed Agroforestry Interventions Cont'd

(iii) Fodder production

Many communal areas, not least Shurugwi, have grazing areas which are totally inadequate for the maintenance of sufficient livestock to serve households' draught power, organic manure and transport needs. Farmers are therefore having to increase forage production. In Shurugwi many richer farmers are beginning to leave some of their arable land fallow in order to provide additional fodder. Already in some VIDCO areas the majority of grazing is provided within and between arable fields and not from the communal grazing areas.

For this reason farmers support the idea of intensifying grass and ground legume production on and above or below contours. The concept of growing and managing trees as fodder banks is however alien to them, and so again rapid appraisal could be valuable.

c. Communal Interventions

The proposed interventions included Communal Woodlots, Fodder Banks, and Nurseries (Table 4.2). Each was appraised under these headings: agency responsible, compatibility with policy, acceptability to farmers, and compatibility with existing extension practices.

Communal Woodlots are being provided by Forestry Commission, Agritex and NGOs. The policy of the Commission has been to train local organisations in *Eucalyptus* woodlot establishment and management, and it has run courses for, among others, the Association of Women's Clubs and the National Farmers Association. The Commission has recognised that this is a way of using its small extension staff effectively.

In terms of compatibility with existing policy, *Eucalyptus* woodlots are already promoted. However, their acceptability to farmers is limited by the inferiority of *Eucalyptus* as fuelwood, poor survival, high costs of protection, high labour requirements for weeding and the negative effects on neighbouring crops. Some of these problems could be met by use of other tree species.

Communal Fodder Banks were proposed for establishment within *vleis* (*makuvi*). Institutions involved would be Agritex, with technical support from the Forestry Commission, Department of Research and Specialist Services and probably the University of Zimbabwe, as well as NGOs and Local Government, including VIDCOs and WADCOs, together with Farmers Groups, Women's Clubs and so on.

The proposed Fodder Banks are incompatible with current land use policy and legislation in that cultivation of *makuvi* is prohibited. However, the technical justification of the prohibition (soil and water conservation) is questionable and requires further investigation.

The acceptability of fodder banks to farmers will depend upon the:

* productivity of the fodder bank compared with that of the grass it replaces;
* nutritional value at critical seasons compared with natural grass;
* costs of production, including labour costs, and the time of peak labour requirements;
* solution of institutional problems, including organisation and management, equity of costs and benefits.

Communal Nurseries are already established at District Level by the Forestry Commission, and the Commission and Agritex both support group (and private) nurseries. There is therefore no problem of compatibility with existing policy or practice. The acceptability to farmers, however, would be enhanced by the use of a wider variety of species as discussed for Communal Woodlots above. There is also a need for more financial support, and for better linkages between the Commission's District level nurseries and the smaller local nurseries.

Example V(4) - Activity 1

Report from the Farmers' Interests Appraisal Group on Proposed Agroforestry Interventions

1. On-farm Interventions

a. General comments

Fodder banks:

Most appropriate for leading farmers and to a lesser extent middle farmers. However, cost of establishment on contours in mainfields would be comparatively high because of fencing requirements.

Thus farmers could not be expected to adopt the practice without more information on productivity.

Green manure banks and intercropping

These are most appropriate for poorer farmers, but they would not be able to afford protective fencing. Thus the intercropping of herbaceous legumes (e.g. cow peas) might be a better alternative for them.

For middle and leading farmers, fodder is probably more important than green manure.

Planted fallow

Only worthwhile for middle farmers with largish land allocations plus labour and capital constraints who could use planted fallow for browse and soil fertility restoration. Leading farmers do not usually have fallow land.

Woodlots

Woodlots are appropriate for all farmers in homefield areas because of the need for initial protection. Leading farmers could also afford to protect a woodlot (doubling as a windbreak) near a mainfield.

Fruit trees

Useful for all farmers on non-arable homestead areas. Economic returns too low to provide an alternative to cropping in fields, except possibly for citrus.

b. Need for extension

The following extension advice would be needed:

* establishment methods (planting material, nursery establishment and maintenance, transplanting);
* species selection, e.g. for woodlots, fodder banks, live fences;
* biological and other pest control;
* specific benefits (i.e. in terms of expected production) of fodder banks, green manure banks, woodlots/windbreaks and so on.

If this information cannot be provided by the extension agency then it is required from research agencies.

c. Social riskiness

Leading farmers are particularly likely to be prepared to try interventions which do not require them to give up arable land. Middle farmers are likely to be similarly inclined, but to a lesser extent. Poorer farmers are less likely to have the means to undertake some of these interventions, although planting trees in their homefield area is already something many of them do.

Altogether this means that the most acceptable niches to all farmers are likely to be in the non-arable parts of their homefield area, along contour ridges, and in non-cultivated parts of their mainfield area.

If farmers are to be persuaded to use any of their actual cropping area for planting trees the potential benefits as compared with cropping would need to be convincingly demonstrated.

These notes are expanded in the attached tables. ▶

Example V(4) - Activity 1

Appraisal of On-farm Agroforestry Interventions
By Farmers' Interest Appraisal Group

Intervention	Resource Requirements	Capital Affordability	Appropriateness
Grazing fodder banks:			
Leading farmers	Land not used for arable cultivation, eg contours between fields, homefield boundaries. Labour: establishment of fencing Fencing Seedlings	Homefields are already fenced therefore no fencing cost. Mainfield (if not fenced) - farmers could fence one contour at a time until the bank established (fence then moves).	Farmers are already cutting and carrying maize stover, but in the drought of 1987 were forced to buy supplementary feeds.
Middle farmers	-- do --	If homefields fenced farmers can plant fodder here with minimal cost. However if homefields not fenced, the capital cost may be prohibitive. If homefields fenced, farmers may be able to fence a small section of contour at a time.	More appropriate for middle farmers with more cattle and who have sufficient capital to afford fencing. Also appropriate for farmers with homefields already fenced.
Poorer farmers	-- do --	Fencing costs will be prohibitive.	Farmers require minimal or no fodder, and cannot afford intervention anyway, so it is not appropriate.
Note: Technical information required on fodder bank yields and amount of land required to feed one animal/month.			
Cut-and-carry fodder banks:			
Leading, Middle and Poorer Farmers	Same as grazing fodder banks except for labour requirement which is higher because of cutting and carrying	Same as in grazing fodder bank	Same as in grazing fodder bank

Example V(4) - Activity 1

Appraisal of On-farm Agroforestry Interventions By Farmers' Interest Appraisal Group Cont'd

Intervention	Resource Requirements	Capital Affordability	Appropriateness
Green manuring:			
Leading farmers	Land: contours, field boundaries	Fencing costs not worth investment as manure production sufficient.	Not generally appropriate as these farmers have cattle manure and fodder production is a higher priority.
Middle farmers	-- do --	Affordable if farmers have fenced homefield areas.	Only appropriate if farmers have few cattle and a fenced homefield, so the need for manure is high and costs relatively low.
Poorer farmers	-- do --	Cannot afford fencing costs.	Appropriate if costs are lowered.
Planted fallow:			
Leading farmers	Land: part of field	Capital costs not high.	Unlikely to be appropriate as leading farmers tend to be short of land relative to their access to labour, capital, cash, dung and draught power.
Middle farmers	-- do --	Probably affordable.	Appropriate if land area too large for available labour, dung, draught or commercial fertiliser.
Poorer farmers	-- do --	Possibly affordable.	-- do --

Example V(4) - Activity 1

Appraisal of On-farm Agroforestry Interventions By Farmers' Interest Appraisal Group Cont'd

Intervention	Resource Requirements	Capital Affordability	Appropriateness
Intercropping:			
Leading farmers	Land: part of field	Affordable	Depends on need for arable land, and effect of inter-cropping on maize output. Intercropping (of trees) may be a less efficient means of fertility maintenance than current methods.
Middle farmers	-- do --	-- do --	Crop legumes probably best.
Poorer farmers	-- do --	-- do --	-- do --
Contour Planting:			
Leading, Middle and Poorer farmers	Land: only contours Labour Demand: Minimal labour required for establishment and management Inputs: Seedlings	Very low input required	Very appropriate since are already an important source of firewood.
Woodlots/windbreaks:			
Leading farmers	Land: Near boundaries of home-field and mainfield; fallow land Labour Demand: Establishment and management Inputs: Fencing during establishment Seedlings	Farmers can afford to protect them. Planting near homefield areas lands already protected.	Very appropriate especially as regards pole supply.

Example V(4) - Activity 1

Appraisal of On-farm Agroforestry Interventions
By Farmers' Interest Appraisal Group Cont'd

Intervention	Resource Requirements	Capital Affordability	Appropriateness
Middle farmers	-- do --	Likely to plant near home-field boundary.	Appropriate if farmers have fenced land available.
Poorer farmers	-- do --	Fencing not affordable - will need to take their chances. Good nursery extension will assist towards woodlot establishment.	Appropriate but will need extension on tree establishment
Note: There is an obvious need for extension advice for planting methods and appropriate species.			
Fruit Trees: Leading farmers	Land: Homestead Boundaries of homefield mainfield Contour bunds Labour: for establishment, watering and protecting against animals and frost Inputs: seedlings, compost manure/fertiliser/humus	Affordable if not arable land.	Appropriate for non-arable areas. Returns for planting in the field do not justify (except possibly citrus).
Middle farmers	-- do --	-- do --	-- do --
Poorer farmers	-- do --	-- do --	-- do --

Example V(4) - Activity 1

Report from the Farmers' Interests Appraisal Group on Proposed Agroforestry Interventions Cont'd

2. Communal Interventions

a. Nurseries

All farmers want nurseries. A major problem in establishing them is the provision of institutional support for supervision and management. Some farmers doubt that indigenous trees can be established and managed, so that research and extension advice is needed.

b. Fodder banks

Most enthusiasm for fodder banks is from leading and middle farmers who own more cattle. Problems would be in use of key resource areas (riverine strips, *makuvi*) and the fear that it is a "new thing".

c. Woodlots

Generally acceptable, the problems of woodlots lie in fencing, technical advice, choice of tree species, and establishment and management methods.

d. Woodland management

General agreement among people that communal woodlands need protection and management, but the potential local political conflicts make it a difficult intervention. Extensive community participation would be required and specific projects would have to be tailored towards local social situations.

e. Research and extension links with farmers

(1) Nurseries: technical advice needed on planting and management of various species.
(2) Fodder banks: species selection, establishment methods and quantities of fodder that can be expected. General advice on *makuvi* use.
(3) Woodlots: advice on choice of species for different uses and establishment of management methods.
(4) Woodland management: extensive social and technical research still required.

f. Policy, planning and implementation issues

(1) Natural resources restrictions on *makuvi* and riverine strips.
(2) The formal institutions, VIDCO and WADCO, are often not the most appropriate for planning and implementation. For widespread acceptance extension and groundwork are required at a level lower than the VIDCO.

Activity 2. Informal Discussions with Local People

During the appraisal stage it is necessary to return to the survey areas to discuss specific issues with farmers individually or in small groups. The aim is to collect opinions on the feasibility of particular aspects of the proposed interventions, and their acceptability to the various socio-economic categories of farmer. It is of course necessary to take account of the particular biases of the individuals involved, and avoid over-generalising their views, but this can be an opportunity to test the suitability of interventions for specific groups, such as the poorest, female-headed households and women in general.

The opinions of officials and government technical staff should also be sought at this stage. They can provide local knowledge, official views, technical knowledge and expertise which the training team may lack.

These kinds of consultation were insufficient during the Shurugwi programme for three reasons. First because of the difficulty of meeting farmers over the Easter period (which coincided with this step). Secondly, some team members were reluctant to discuss proposed interventions with farmers because of the fear of misleading them into expecting funds and implementation. Finally, some members of the team felt it was wrong to take up any more of the farmers' time. No consensus was reached, and only one out of three survey groups held an appraisal meeting with a group of farmers (Example V(5)). It did become clear, however, that farmers wanted to hear from the training team about practical technical possibilities, and were dissatisfied with evasive or over-

generalised answers to specific questions. On balance, the Shurugwi experience suggests full and detailed appraisal consultations with farmers should be carried out provided the real likelihood of funding and technical support and the nature of any other follow-up activities are made clear.

Activity 3. Public Meeting(s)

A vital step in the appraisal process should be to have farmers themselves appraise the proposed agroforestry interventions at a public meeting. Such a meeting might be held in circumstances where funding and follow-up activities are likely. Alternatively, there may be no such expectation. When funding and follow-up are expected, the aim of the meeting would be to describe the interventions in detail, discuss implementation priorities and scheduling, identify responsibilities and responsible persons, discuss modifications, and identify if possible potential conflicts and factional interests. Our impression, gained from the experience of offering funds for a small community project in Shurugwi (Example V(5)), is that personal and factional interests tend to displace community ones as hypothetical proposals change into funded possibilities, and the training team must be even more cautious than previously in detecting and allowing for bias. The question of when the existence of funds should be revealed to farmers is highly contentious: if announced at the outset factional competition is likely to result. If the existence of funds is kept secret until near the end, as in the Shurugwi exercise, people's stated opinions change when the possibility of material benefits is revealed.

In circumstances where funding and follow-up activities are unlikely, this should have been made clear from the outset of the training exercise. Our impression was that farmers may be satisfied with the discussion of their opportunities and constraints, and the swapping of technical information with the training team.

Example V(5) – Activity 2

Discussion of Some Proposed Agroforestry Interventions at a Farmers' Group Meeting at Matamba VIDCO Meeting House

(7 women	Isaac Makoni
(4 men	Roslyn Prinsley
Ward Councillor	Bernard Rosina
	Nick Abel

1. Woodland Management Scheme

Nick suggested and described the woodland management scheme (Example IV(2)). This proposal required the subdivision of a tract of communal woodland into blocks. Each would be protected at different times in a rotational sequence from browsing and cutting to allow regrowth. Stems would however be thinned selectively. The feasibility of the proposal would depend, among other things, upon the prior establishment of a communal fodder bank and woodlot to supply the feed and fuel no longer available from the woodland block then under protection.

After explaining the proposal with a diagram, Nick asked:

"Can I have your comments/would protection be preferable by wire or people?"

The scheme was accepted in principle but serious concern raised by farmers over possibilities for protection.

Nick said that animals would be kraaled at night. He asked if farmers thought some animals could wear bells, and 1 or 2 'wood guards' employed. The farmers were amused at the use of bells for every cow but Nick said that only 1 or 2 animals in each herd require a bell. He suggested that protection was only needed in the dry season because in the wet season, animals would prefer to graze rather than browse.

He suggested the use of a smaller fence and rehabilitation of smaller areas at one time as an alternative to the protection of a larger block of woodland.

The farmers pondered over this and referred to the Ward Councillor.

He thought it a good idea but could not understand how it differed from a rotational grazing scheme.

Nick said that we were concerned with trees rather than grass, that the

▶

Example V(5) - Activity 2

Discussion of Some Proposed Agroforestry Interventions at a Farmers' Group Meeting at Matamba VIDCO Meeting House Cont'd

rotation here is much longer, but that a rotational grazing scheme and the woodland management scheme could be run together, and using the same fences for both would make it cheaper. The Councillor asked whether it was practical to keep moving the fence and wondered how the trees would be protected after the fence was moved. Nick explained that the fence would only be moved when enough shoots had grown sufficiently tall to prevent animals browsing the leaders.

The farmers protested that human beings are a bigger problem than animals. They will not be detered by wire and will cut down protected trees when they need them. Nick suggested that people are only destructive because they are desperate for wood. Therefore before there can be any woodland protection, alternative sources of wood must be supplied by woodlots.

The Councillor agreed with the farmers *but* described how in some areas the people have accepted protection laws and in these once deforested areas forests are growing. He encouraged his community to follow the example of these other areas.

Nick wondered whether if the whole community agreed together that protection laws are good if it would be more difficult for any one person to break these laws. The meeting agreed that this was so.

Nick reiterated the timing of the scheme:

Year 1	Nursery establishment	
2)	Fodder bank establishment	) woodlot
3)	in *makuvi*	) establishment
4)		
5)	protection	
6)		
etc		

2. Fodder Banks

Nick suggested that fodder banks could be planted in makuvi because that is where moisture is found in the dry season. He said that a mixture of fodder grasses and trees could be planted. He suggested Gliricidia sepium as an evergreen fodder tree which could also be used for firewood. He reiterated that success of the scheme would depend on community needs, acceptance and management.

The farmers were very keen on fodder banks but insisted that the problems of protection applied here too and asked where fencing would come from.

Nick asked whether it would be possible to employ a guard rather than buy wire fencing because for the price of wire you could employ a guard for a long time. The farmers protested that one person could not protect the fodder bank. However, they enthusiastically agreed that if they had wire they would start a fodder bank next month!

Nick suggested that wire is not essential but that perhaps a rota of farmers could be formed to protect the fodder banks during the dry season. He reminded them that protection would probably not be necessary in the wet season. The farmers agreed that this would be possible for a limited number of people to implement but the idea must be heard from a traditional leader or the Ward Councillor to obtain maximum consensus from the community. Without agreement from all the project would not succeed. The Councillor said that he would do what the majority wished. Roslyn asked why all people would not agree to a fodder bank if it provides wood and fodder.

The farmers responded that many people are ignorant and don't like change.
Roslyn suggested starting with a small group and small project to show by example how useful a fodder bank could be. They agreed to this idea. The Councillor encouraged them to set such an example to the more ignorant farmers.

The farmers asked for more information because they felt they did not have enough.

Nick said that fodder banks in *makuvi* would be intended to provide more fodder of a higher quality in the dry season than is currently available.

He explained that, in addition, if some grazing land was planted with woodlots, pressure would be taken off the woodlands and woodland degradation would be reduced. This would be better for future generations. He warned them that if they did none of these things the woodlands would continue to decline.

3. Nurseries

In a previous discussion with the same farmers they had expressed a strong desire to plant trees and nurseries of indigenous species. Isaac asked them now how they would go about planting indigenous trees. The farmers responded that if they were given seeds and provided with technical advice on *how* to raise indigenous tree species then they would plant nurseries in each village almost immediately.

Example V(5) - Activity 2

Discussion of Some Proposed Agroforestry Interventions at a Farmers' Group Meeting at Matamba VIDCO Meeting House Cont'd

Isaac observed that there are 25 species of local trees which have been successfully raised from seed and that this information could be made available to the farmers. He asked them where they would start a nursery. They responded that only a small space was required which was near water and moist soil. They asked where they would get seeds from. Isaac said that although they could buy exotic seeds, they could gather indigenous seeds themselves from grazing areas.

The Councillor asked which indigenous species Isaac would plant. Isaac replied that for firewood, poles and fodder some of the following could be planted - Mudombo, Munanga, Mupumbu, Musuma, Muchakata, Muwonde, Mubondo. He agreed that Forestry Commission could provide technical assistance in obtaining and planting seeds.

Isaac asked them how they would protect a nursery. The farmers replied that they could use muunga (*Acacia*) brushwood if no wire fencing was available. They suggested that nursery establishment should be organised and managed at VIDCO level by keen VIDCO members, or at school level.

4. Orchards

Isaac asked if farmers would be interested in planting orchards. The farmers said this would depend on whether he was suggesting orchards containing muchakata (*Parinari curatellifolia*), which was in plentiful supply or other fruit trees. Isaac replied that he was also referring to mangoes and other exotics.

The farmers responded that they knew how to plant fruit trees but that they required good planting stock. Isaac asked them at what level they would prefer to plant orchards - individual, communal or school? They suggested first at village level and then at VIDCO level but that schools would have other interests.

Isaac asked who would care for the orchard if it was managed at village level. The farmers responded that the village people would care for and provide protection for the orchard. Roslyn asked why the farmers found no problem with protection of an orchard but saw protection of fodder banks and woodlots as a problem. They responded that the difference was in the size.

Roslyn asked them what size orchard they were speaking of. They said that a 1 acre orchard could be fenced with muunga.

Roslyn then asked them if they were given a choice between a 1 acre orchard, a 1 acre fodder bank and a 1 acre woodlot, which would they choose? The farmers responded that all were needed badly but that most people would choose orchards of mangoes even if poles were needed. They felt that if the more ignorant farmers become accustomed to the idea of growing fruit trees then the acceptance of planting and protection of other trees would follow.

Roslyn then explained that money was available for a project involving trees and asked them what it should be used for. They responded that a nursery for gum trees would be very useful. Isaac suggested that they could plant fruit trees and gum trees in the nursery.

The farmers responded that they needed poles more than they needed fruits - lack of poles comprise the most serious problem. They said that communal woodlots are required where they can harvest poles for themselves because poles from Government woodlots are too expensive.

The Ward Councillor suggested a second meeting with all VIDCO Chairmen and other interested farmers for the following day where they could discuss the project further.

Follow-up meeting

It was decided that one nursery in each of the 3 villages where we had been working should be planted. It should be planted with various species - fruit trees, trees for poles or fodder etc depending on the needs of the village.

Follow up to training exercise - Frank Matose of the Forestry Commission of Zimbabwe points to *Parkinsonia aculata* seedling from nursery (as above) on field boundary

Glossary of some Latin – Shona Tree Names

Note: Not all the Shona names given in interviews and meetings were positively identified.

Acacia karoo	*Muvunga*
Acacia nilotica	*Muunga*
Acacia polyacantha	*Mukaya*
Acacia rehmanniana	*Muvunga*
Albizia amara	*Muora*
Albizia antunesiania	*Mugaramyenza*
Azanza garckeana	*Mutohwe*
Brachystesia boehmii	*Mupfuti*
Brachystegia glaucescens	*Mubuzhe, Muuzhe*
Brachystegia spiciformis	*Musasa*
Bridelia mollis	*Tuzvidzembwa*
Burkea africana	*Mukarati*
Carissa edulis	*Muruguru*
Cassia abbreviata	*Munmanyama*
Cassia singueana	*Munzungungunzungu*
Combretum hereroense	*Mutechani*
Combretum molle	*Mubhondo*
Cussonia arborea	*Mufenje*
Dichrostachys cinerea	*Mupangare*
Diospyros lycoides	*Musumshadombo*
Dovyalis caffra	*Muruguru*
Erythrina abyssinica	*Mutiti*
Euclea divinorum	*Muchekesani*
Euphorbia matabelensis	*Chsimboti*
Ficus natalensis	*Mutsamvi*
Ficus sur	*Muonde*
Ficus sycomorus	*Musvita*
Flacourtia indica	*Mununguru*
Gardenia spatulifolia	*Mutarara*
Grewis monticola	*Mutehwa*
Julbernardia globiflora	*Mutondo*
Kirkia Acuminata	*Mubvumira*
Lannea discolor	*Mugan'acha*
Maytenus senegalensis	*Chijuju*
Monotes glaber	*Munyunya*
Parinari curatellifolia	*Muchakata*
Peltophorum africanum	*Muzeze*
Piliostigma thonningii	*Mudhombo*
Pouzolzia hypoleuca	*Mununzva*
Pseudolachnostylis maporuneifolia	*Mushozhowa*
Pterocarpus angolensis	*Mubvamaropa, Mubvamakabva*
Pterocarpus rotundifolius	*Mupontanzou*
Rhus chirindensis	*Muchokochiani*
Rhus lancea	*Muchokochiani*
Ricinus communis	*Mupfute*
Sclerocarya caffra	*Mupfura*
Sizygium guineense	*Mukuti*
Strychnos cocculoides	*Mutamba*
Swartzia madagascarensis	*Mukonashanu*
Terminalia sericea	*Mususu*
Uapaca kirkiana	*Mushuku*
Vangueriopsis lanciflora	*Mutufu*
Ximenia caffra	*Munengenai*
Ziziphus mucronata	*Muchecheni*

Guidelines for Training in Rapid Appraisal for Agroforestry Research and Extension

These guidelines are for training research and extension personnel in rapid appraisal methods for development of agroforestry in peasant land use systems. The guidelines are illustrated through reference to a training and research exercise where an agropastoral farming system in Shurugwi Communal Area, Zimbabwe was appraised in 1988.

Four key principles underlie the methods used:

* agroforestry interventions are identified and developed through working with and learning from farmers and the local community, as well as through conventional resource assessment – **"interactive research"**
* interactive research is best learned through real application not lectures or classroom exercises and simulations –**"learning by doing"**
* **"interdisciplinarity"** is a key to successful interactive research
* agroforestry interventions are developed from an understanding of constraints and conflicts existing within the rural community over access to production resources.

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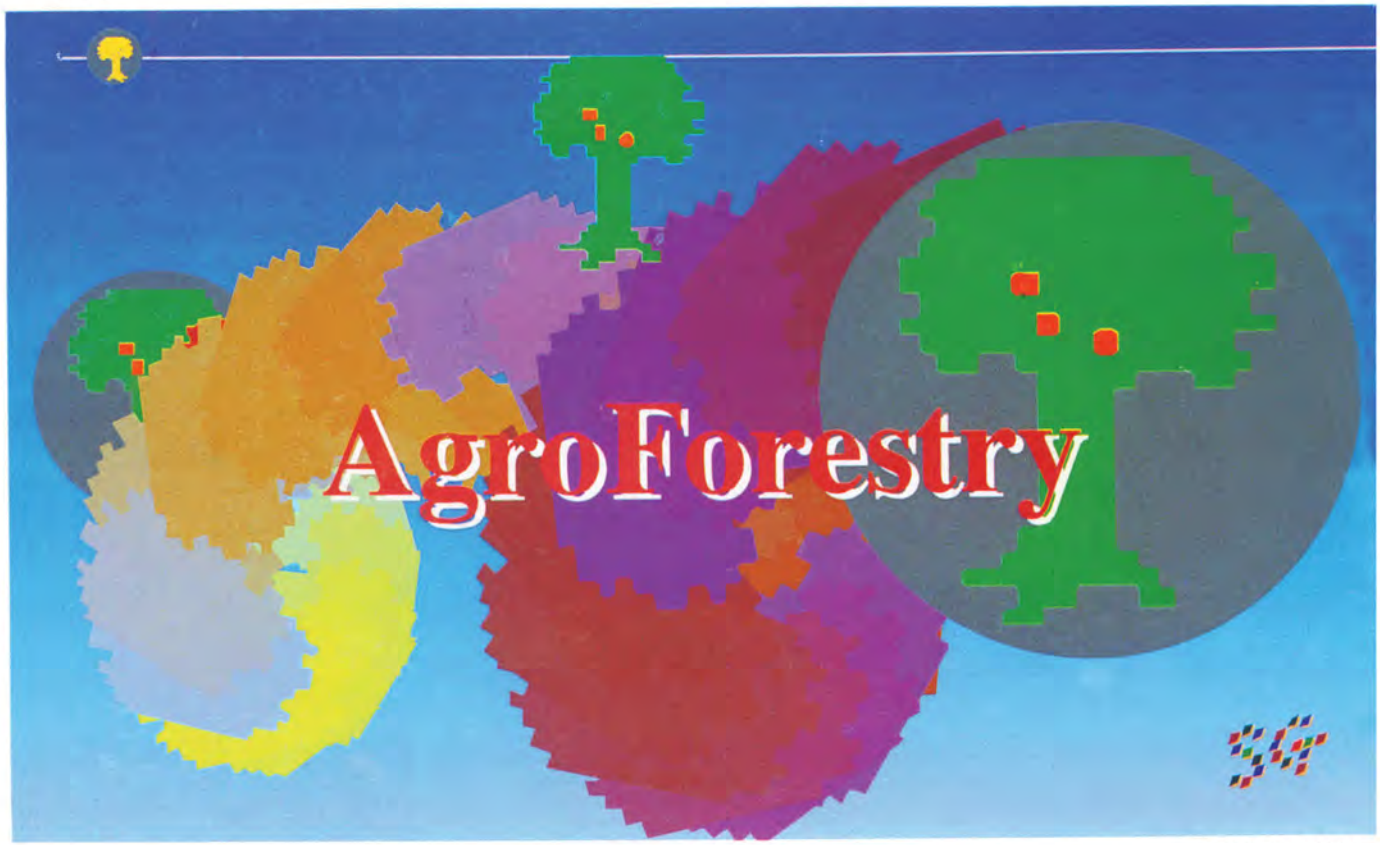

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