INSTITUTE OF TERRESTRIAL ECOLOGY
(NATURAL ENVIRONMENT RESEARCH COUNCIL)

DfID / NERC Contract ZF0094

PROJECT INITIATION WORKSHOP
ZF0094 - PRUNING EFFECTS ON ROOT FUNCTION

Kabale, Uganda 19th - 21st January 1999

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EXECUTIVE SUMMARY

A project initiation workshop was held in Kabale, Uganda 19th - 21st January 1999, to refine the objectives of ZF0094 in conjunction with project collaborators, target institutions and other beneficiaries.

Strong support for the project was given by the workshop participants. After formal and informal discussion and field visits, and bearing in mind John Palmer's (Forestry Research Programme Manager) December 1998 comments, it was agreed to amend the original proposal to:

- crown pruning: increase the emphasis on extreme crown pruning, and reduce the inputs on lesser crown pruning treatments *(priority issue 1, 2, 4 and 5 - see page 12);*
- root pruning: increase the inputs *(priority issue 3 & 5);*
- pruning to improve timber quality: remove this objective *(priority issue 7);*
- to strengthen on-farm work by appointing a new member of staff for FORI, dedicated to this work in the Kabale region of Uganda *(priority issue 6)*;
- run 'farmer days' at Kifu, Uganda and Siaya, Kenya, and produce an extra pruning bulletin early in the project *(priority issue 6)*.

INTRODUCTION

This workshop was held as part of the startup process for project ZF0094 'Pruning to improve spatial complementarity in utilization of below ground resources'. The objectives were:

- to agree the project objectives with representatives of target institutions, other clients for the research outputs, and other collaborators
- to agree the logical framework and quarterly milestones with target institutions and other collaborators
- to assign responsibilities among collaborators
- to ensure that project resources are efficiently partitioned among collaborators
- to develop mechanisms for accounting, coordination and communication among collaborators
- to outline dissemination, uptake and adoption pathways, including the involvement of target institutions and other clients.

WORKSHOP PROGRAMME

In order to meet these objectives a workshop was organised in Kabale, Uganda to which collaborators, target institutions, and other beneficiaries were invited. The meeting was chaired by Prof. J. Baranga, Mbarara University, Institute for Tropical Forestry Research Uganda, who acted as an independent chairperson. A combination of presentation, discussion and field visit / demonstration was used to open up the subject and elicit feedback. In addition to the formal discussion and feedback sessions, each of the presentations was thrown open for discussion. An experienced farmer pruner from the Embu region of Kenya was present at the meeting, who participated in the discussion and demonstrated pruning techniques during a farm visit. The use of 'Sandvik' pruning saws was also demonstrated. Individuals and organisations represented at the meeting are listed in Appendix I.

19th January 1999

09.00 Welcome address by JFO Esegu on behalf of J Aluma, Director of FORI
09.15 Introduction by the chairman - J Baranga, Mbarara University
09.30 Objectives of the workshop and background to the project - J Wilson, ITE
09.45 How do trees and crops compete with each other and how can we reduce competition? - JD Deans ITE
10.15 Pruning trees - experience from other countries - CK Ong, ICRAF
10.45 Discussion
11.15 Agroforestry competition in Uganda - J Okorio, FORI
11.45 Farmers tree pruning practices in Embu and Siaya, Kenya, report on rapid group survey - A Tekwebalem, University of Nairobi
12.15 Experience with tree pruning in Uganda - N Wajja-Musukwe, FORI

14.00 AFRENA trials in Uganda - T Raussen, ICRAF AFRENA
14.30 Outline objectives of the new project, - J Wilson, ITE
14.45 Discussion and feedback
16.00 Perceptions of pruning needs, benefits, problems
Two Wings Agroforestry
Rwere Women's Group
Ugandan National Farmers' Association
Kabale Dairy Farmers' Association
Vi Agroforestry Project
District Forestry Extension Officer
Forestry Research Institute, Uganda

Kenya Forestry Research Institute
Africare
Africa 2000

20th January 1999

08.30 Field visits -
Buhara Farm, on farm trials of Alnus, Eucalyptus, Cedrela
Demonstration of crown pruning L Kanga, Embu, Kenya
Demonstration of use of 'Sandvik' saws for pruning, JD Deans, ITE
Demonstration of root pruning, CK Ong, ICRAF
tools available for active participation

Kachwekana District Farm Institute, AFRENA trials

15.00 Feedback session
Reactions to pruning demonstrations
Extension
Priority issues for the project

21st January 1999

(FORI, ICRAF and ITE)
Reactions to workshop
Revisions to project
Financial matters

Report

Welcome address - JFO Esegu
Speaking on behalf of the Director of FORI, Mr Esegu, welcomed the development of this collaborative project between FORI, ICRAF and ITE and referred to the timeliness of the project - there has been a substantial amount of tree planting by farmers in the Kabale area over the last 10 years, stimulated by the AFRENA project. There is now a need to alert farmers to methods of controlling trees so that competition does not become a problem. Both the AFRENA project and this new project fit within the Agroforestry Programme of FORI which includes in its mandate the development of sustainable agroforestry systems in Uganda.

Participants at the workshop were invited to introduce themselves and indicate their activities and interests in the project.

Introduction - J Baranga
Professor Baranga formally opened the proceedings, briefly outlined the objectives of the workshop and emphasized the opportunity this gave participants to shape the project.

Objectives of the workshop and background to the project - J Wilson
Julia Wilson outlined the programme and defined the objectives of each part. She introduced the idea of competition between trees and crops for resources (light, nutrients and water) and pointed out that below ground competition was often not appreciated - roots were not visible and shade was often, erroneously, considered to be the main cause of crop loss.

The previous DfID project (R6321) in semi-arid Kenya had shown substantial competition between trees and crops for below-ground resources, which started from an early age. Studies indicated that although differences in tree root architecture and hence zones of exploitation might exist, these were likely to be over-ridden by the ability of trees to switch their zones of root activity according to where soil conditions were most favourable, which would be in the crop rooting zone during the growing season. Trade-offs between trees and crops in terms of labour requirements and products needed to be considered by farmers. Where intercrop yield was important farmers would need to control their trees.

The previous project had been research station based and had been directed at understanding how trees and crops interacted below ground. The objective of this new project was to transform this understanding of the interactions into practical approaches for controlling trees and assessing, with farmers, how well these approaches worked. The work would be carried out at different sites so that responses under different conditions of soil moisture could be determined. This workshop offers collaborators, NARS, NGOs and farmers the opportunity to say what they consider to be important, their views will be considered and taken into account in producing the final work programme.

How do trees and crops compete with each other and how can we reduce competition? - JD Deans ITE

Through pictures, Douglas Deans showed how trees and crops interact and the different effects on crop growth - both positive and negative, that can be observed. He developed the discussion relating to competition for below ground resources and showed the effects that removal of demand for water (through reducing leaf area) can have. Various types and severities of crown pruning were shown and the idea of root pruning as a means of controlling zones of water uptake, either on its own or in combination with crown pruning, was introduced. The influence of crown pruning techniques upon wood quality was also discussed.

Pruning trees - experience from other countries - CK Ong, ICRAF

Early feedback during the workshop indicated that participants were aware of some types of crown pruning, although they did not necessarily practice it. However, for most participants, root pruning was a new concept and there was a certain degree of scepticism about its benefits and practicality.

Consequently, during this session, Chin Ong concentrated on describing the experience of root pruning young trees in Bangladesh (Hocking 1998), the ease with which it was reported to be done, its effects in reducing competition even in wet areas and the increase in tree planting which had resulted. He pointed out that although root pruning reduced tree - crop competition, it (like other sorts of pruning) slowed tree growth rates.

Discussion

JD Deans' talk on competition and CK Ong's descriptions of root pruning provoked lively discussion. Several of the groups represented at the workshop requested copies of Deans' overheads for their own use in explaining tree-crop interactions. There was very positive feedback about the ideas of managing trees and the opportunities this offered for increasing tree stocking density without reducing crop yield. The discussion centred on

- who does the pruning
- incentives for pruning

pruning techniques and diseases.

Who prunes in Kabale?

Men, women and children were all involved in pruning. Women concentrated on pruning the parts of trees which could be easily reached. If they wanted the crowns pruned they either got a male member of their family to do it or a neighbour's son did it in exchange for the prunings. Women did much of the cutting in zero grazing systems.

Incentives for pruning
There was concern about the labour involved in pruning and whether the incentives of reduction in competition were sufficient to motivate farmers to prune. At present many farmers did not appreciate the linkages between trees / crop competition / pruning / wood quality, and unless they understood these linkages there was no incentive to manage trees. Most farmers in Kabale work to the more immediate incentive of obtaining fuel wood and poles by pruning, rather than to the longer term incentive of increasing crop yield or the number of trees on the plot. There was resistance to the idea of root pruning (on the basis of work load) and whereas crown pruning could be 'sold' on the dual incentives of obtaining tree products and reducing competition, root pruning only had the latter benefit, which might not be sufficient to motivate people. However, root pruning did not involve tree climbing, was safer and might be more attractive to women farmers.

Pruning techniques
The severity of pruning that is practised should depend upon the number of trees and the desired outcome in gaining tree and crop products. For root pruning there were discussions about the depth, proximity to trunk, timing, frequency, diseases etc. We could base some recommendations on the Bangladesh experience in pruning young trees, but more work was needed to understand what would work best in Uganda and Kenya where both young and older trees might be pruned. We believe that it is pruning in the crop rooting zone that is important, so pruning of major tree roots (not just the fine roots that are disturbed by tillage) in the top 30cm should be sufficient. Because of the difficulty of distinguishing fine tree and crop roots, it would be advisable to prune large tree roots whether fine roots were visible or not.

Farmers were asked if they would consider root pruning if they could accomplish it in ½ - 1 day. Their response was that this depended on the timing of it, if they could do it at the beginning of the cropping season when soil would be soft and they might see a quick response that could be an incentive, but on the other hand, there were conflicting labour demands at this time.

Agroforestry competition in Uganda - J Okorio, FORI

Building upon Douglas Deans' presentation, John Okorio presented results from an agroforestry experiment at Kifu, comparing the competivity of four different tree species with crops. Results so far (of trials which are now 4 years old) indicate that in good rains *Maesopsis eminii* is most competitive, followed by *Casuarina equisetifolia, Markhamia lutea* and *Alnus acuminata*, in decreasing order, while in poor rains, the order of *Casuarina* and *Maesopsis* is reversed. The least competitive tree, Alnus, is also the smallest.

Farmers tree pruning practices in Embu and Siaya, Kenya, report on rapid group survey - A Tekwebalem, University of Nairobi

The results of a rapid group survey for these two areas were summarised. Groups were selected at random, both men and women were interviewed The Embu area has a coffee-based agricultural system, 950 - 1200 mm y^{-1} rainfall, 500 people km^2, a mean farm size of 1.3 ha and a medium fertility deep soil. The Siaya region does not grow coffee and has rainfall of 1200mm, 400 people km^2 and a farm size of 1.4 ha. Farmers in Embu are more prosperous.

Farmers had a wide range of reasons for planting trees, the two most frequent were to produce fuelwood and construction timber. The most widely planted species were: *Grevillea robusta* - Upper Embu; *Melia volkensii* - Lower Embu and *Markhamia lutea* and Eucalyptus in - Siaya. Competition with crops was observed, and was attributed to shading.

In Embu, pruning was undertaken to reduce shade, improve timber quality and obtain fuelwood, side pruning was practised to encourage the development of a straight, knot-free trunk and canopy pruning was practised to enhance diameter increment. In Siaya, coppicing was the main form of pruning. Siaya farmers have access to natural woodland for wood products, whereas Embu farmers are dependent upon their own trees.

Most pruning was done just before crop sowing, to reduce shading and allow regrowth over the rainy season. Pruning commenced when trees were young (1 - 2 years old) and was repeated every 2 - 3 years. Pangas were used for pruning, ladders were used to access tall trees. Women only prune young, accessible trees, young boys were preferred for pruning involving tree climbing.

Fruit trees were usually not pruned. Most pruning was done by family members, and hired labour was occasionally used.

When questioned, farmers commented that they did observe competition by tree roots, but they mostly did nothing about it because of the expense and labour involved. In Siaya, a few farmers cut deep trenches. Farmers reported positive effects of pruning on crops and knew that root pruning improved crop production.

Embu farmers perceived poor soil fertility under trees (based on colour, moisture and crop performance), whereas Siaya farmers considered that fertility below trees was good.

Farmers generally expressed interest in planting more trees, especially fruit trees, constraints to planting were lack of seed or seedlings, pests, competition with crops and labour. Embu farmers had greater access to exotic species and grew more of them.

Discussion

Further questions were asked about how pruning was done in Embu, and how the techniques had been learned. Mr Kanga, the Embu farmer, replied that he had learned the techniques of side-pruning as he grew up. Pruning was done in the dry season - when trunks were not slippery, when there was no risk of damaging the crop, and when there was the opportunity to reduce competition in the following wet season. The leaves were used as a mulch for coffee, or as animal fodder. Reduction in competition was seen as particularly important as land holdings got smaller.

The role of indigenous vs exotic species was raised. In Siaya, where the focus was on indigenous species, farmers considered some exotic species to be 'evil', and also more competitive than indigenous species. However, there was a strong interest in exotic fruit trees because of their products. Some Kabale farmers also considered that indigenous species were less competitive.

The predominance of certain species in an area may also be related to people's knowledge of production and management methods.

Experience with tree pruning in Uganda - N Wajja-Musukwe, FORI

Results from a pruning experiment at Kifu were presented in which tree species x pruning intensity

interactions on crop performance and biomass production were examined. Three species were studied: *Cordia africana, Grevillea robusta* and *Senna spectabilis* .

22 months after establishment, crop yield was reduced by 50 % or more by unpruned trees, with Cordia being most competitive. Pruning treatments were applied when the crown diameter reached 2 m, when the bottom 1/3, 2/3 or all of the crown were removed (pollarding). Complete crown pruning was most effective in reducing competition, although crop yields were still reduced by 30 - 50 %. 2/3 crown pruning was slightly more effective than 1/3.

AFRENA trials in Uganda - T Raussen, ICRAF AFRENA

Old AFRENA trials, planted 8 years ago have the potential to be used for investigations of tree responses to pruning. The original multilocational trials were planted in lines on boundaries or at the top or bottom of terraces, 7 trees per species were planted together at 2m spacing, and managed for poles or firewood. These trials assessed wood production and competition with crops, and were reported upon. At the final assessment (about 4 years ago), the 5 trees in the middle of the row were cut for biomass assessments.

Survival rate of the trees in the different trials and regrowth from the coppice stumps was described. Markhamia had grown unexpectedly badly. Most species had coppiced well and Alnus, Eucalyptus and Grevillea showed good growth.

Outline objectives of the new project, - J Wilson, ITE

The objectives of the new project, as given in the November 1998 version of the proposal were outlined, and discussion invited as to the emphasis and direction of the work.

There was extensive discussion on pruning. Farmers reiterated their interest in crown pruning to control trees and obtain products directly. Although in some areas (e.g. northern Uganda), pruning was not conducted because there was ample firewood available on common land. Members of the Vi Agroforestry Project, based in Masaka explained that they had conducted pollarding of some species and had also attempted root pruning, but were unsure of how to do it and they also had reservations about the labour requirements. At present they were working with 15 farmers who were pruning the roots of young trees with pointed pangas.

Views on competivity of different species were aired: *Markhamia, Erythrina* and *Ficus* were described as non-competitive, although the dense shade of Ficus was a problem. One farmer considered that all trees planted in crops should be pruned, while others said that they allowed some trees (particularly fruit trees) to grow because of their products. It was recognised in Kenya that *Grevillea* depressed crop yield, but the benefits from growing it outweighed that disadvantages. In some extreme cases, farmers in Kenya were concentrating on tree production rather than crop production because of the valuable products and the lower labour requirements.

Farmers recognised that in some areas it did not always pay to grow crops, which were also at risk from theft. However, neighbours objected to tree planting. Mr Kanga from Embu stated that in his locality, farmers did not plant trees on the boundary, neighbours agreed to remain 1 m from the boundary.

Discussions on pruning to improve timber quality focussed on where branches were cut. The Vi project said that they cut about 2.5 cm from the main stem, they did not cut closer because of the risks of damage. Many farmers cut further away - when using a panga several cuts are necessary and there are risks of causing damage to the trunk if they cut closer. Many farmers cleared the stem for a distance to yield timber and then allowed the crown to grow to yield firewood.

Perceptions of pruning needs, benefits, problems

Two Wings Agroforestry - Kabale women's group
Women had found the seminar very helpful, they have been practising pruning without realising its purpose. Root pruning would be welcome to them.

Kabale Dairy Farmers' Association and Rwere Women's Group
Trees are very important in this area. The land is exhausted and difficult to farm and trees have helped

to reduce run off and soil erosion. However, extra knowledge on pruning to safeguard trees and crop yields is needed. Pruning would be useful to many farmers, but many lack the knowledge of how to do it, or do it badly and farmers lack pruning equipment.
To achieve more, the following actions are needed:

- let farmers learn what is going on outside their district
- encourage competition among farmers
- let field staff reach farmers at the grass roots
- agricultural NGOs should work with the government to look at means of protecting land through byelaws.

Ugandan National Farmers' Association
Shoot pruning is the common form of pruning. Most people know that they need good quality poles. Some trees e.g. Ficus, are pruned to reduce weight. Root pruning sounds new but it would be taken up if people were informed about it. People need to see how things are done, not just be informed of the theory. This would be a good project for farmers as everyone is growing trees.

Vi Agroforestry Project
Some farmers are resistant to tree planting at present because they are worried about competition. This project would fit very well in providing necessary background information to encourage pruning. If farmers are trained in pruning and understand it they will participate more in tree planting. But most agroforestry activities are carried out by women, who are already extremely busy, so additional tasks might be unwelcome.

An agroforestry demonstration centre, and tours between farmers would be very valuable.

District Forestry Extension Officer
The project will be important because it increases the options for management as land availability declines. There are many problems with boundary planting in this area, creating conflicts between neighbours. The District Council is drafting a byelaw to force farmers to leave a distance between trees and their boundary. This distance has not yet been decided, but 5 m has been mentioned, which if implemented will severely limit planting on terraces. This project could help enormously in advising farmers and councils of the management options.

One problem in introducing pruning may be that people are currently paid to prune trees on government land. Unless they see the benefits very clearly they may not consider it worthwhile doing it, unpaid, on their own land.

There is also a need to inform people of suitable species for planting, 90% of the tree planting is currently Eucalyptus.

Forestry Research Institute, Uganda
In Uganda, farmers have been encouraged to plant trees over the last 5 - 10 years and they have seen the benefits of this. However, they do not know how to manage trees. This project will fit very well with the Vi, Africare, AFRENA and MBIFICT projects which are all working on tree planting. FORI's own work had clearly demonstrated the problems of competition and that it needs to be resolved. Results of field experiments and demonstrations are needed.

Priority species should include *Cordia*.
Any means of resolving boundary disputes was important. The concept of joint, or alternate ownership of trees on boundaries had been tried but did not work.

Kenya Forestry Research Institute

KEFRI is placing increasing emphasis on farm forestry, which is now their biggest programme. Tree management will therefore be very important.

Boundary issues were also important in Kenya. With root pruning, some farmers had the impression that they had to take the roots out of the ground. They should be clearly informed that this is not the case, unless they want the biomass. Techniques need to be clearly explained - sharp tools, oblique cuts to allow water drainage etc.

Farmers also need to be advised of the other benefits of planting trees.

Africare
Africare explained that they had only just started tree planting in the locality, so they had little experience so far, however, speaking from personal experience, neighbours were often unhappy about trees planted close to boundaries. If tree pruning resulted in better crop yields for farmers, then this would be an easy message to sell.

Obtaining byproducts from pruning would be an incentive. Firewood is so short in the Kabale area that people collect very small twigs. If root pruning was to be recommended then it should be linked to other cultivation activities.

Africa 2000
Root pruning was a new concept. The only sort that has been practiced before is that in nurseries. Farmers need to see immediate short-term benefits. Demonstrations will be very important. Gender issues cannot be ignored, trees are grown for men.

Embu farmer
The dual benefits of pruning need to be explained - as a management technique to control competition and as a means of obtaining better products such as firewood and poles.

Various ways of informing farmers about how pruning could help control trees were discussed. The idea that a simple brochure should be drafted, with diagrams and text in different languages, met with approval, as did the organisation of visits between farmers and visits of farmers to demonstration plots.

Field visits
Buhara Farm, on- farm trials of Alnus, Eucalyptus, Cedrela

This is one of the host farms in the Katuna valley for a 35 farm trial of *Eucalyptus, Alnus* and *Cedrela* (referred to in the presentation by Thomas Raussen). Trees are now 5 years old and have been planted along the upper or lower parts of terraces. Growth has been monitored and some measurements have been made of competition. This varies between locations, but is particularly evident with *Alnus.* Survival of *Cedrela* has been poor, it appears to be easily damaged during weeding. Alnus and Grevillea have reached similar heights, but the former has greater diameter. The trial has been pruned 4 times in 5 years, most recently 3 months ago. The trees are now ready for some harvesting. This season, some poles will be cut and the best will be left to produce timber.

Pruning demonstration
Linus Kanga, from Kenya, demonstrated the Embu method of pruning *Grevillea*, which produces clear lengths of trunk for quality timber, and leaves some branches for regrowth and to provide access for repruning. A 7 m tree was climbed and pruning (with a panga) commenced from the top. The apex of

the tree was cut off diagonally at about 2 cm diameter. The topmost remaining branches were cut to 15 cm from the stem, and would be left to resprout. Below that about 2 m of trunk was cut as cleanly as possible, then some more branches were left as 15 cm stumps, to aid climbing and produce twigs. The remaining length of trunk (2 m) was cleared of branches as cleanly as possible to produce a second length of timber.

This severe pruning yielded a substantial amount of firewood. The pruning took about 30 minutes. Pruning would have been quicker and neater with a sharper panga.

JD Deans then tried the same approach, using a Sandvik saw. The saw cuts were much neater, less effort was needed and the whole tree was pruned in about 20 minutes.

The use of saws and pangas was compared by many of the participants. Members of FORI and KEFRI also tried pruning in this manner.

CK Ong then initiated a root pruning demonstration around *Alnus* and *Grevillea* trees, using an axe and cutting to about 20 cm depth. Participants, men and women, were struck by the ease with which it could be accomplished.

Kachwekana District Farm Institute, AFRENA trials
Various trials were visited including a repeat plot of the 35 farm trial, Competition was clearly evident.

Feedback session
Reactions to pruning demonstrations
FORI
Pruning, especially of roots, will have a great impact on crop production. Pruning of crowns and roots together would seem to be very promising. However, top pruning might be culturally difficult for women. Economic benefits of pruning need to be quantified. What are the impacts of the Embu style pruning on tree diameter? Farmer groups need to be closely involved.

Almaz Tekwebalem
In Kenya, some women do climb trees to prune. In Siaya they are not allowed to prune for firewood because the trees are men's property. Instead they collect from the ground in woodlands.

Linus Kanga
In his village in Embu, women only prune where they can reach.

Two Wings Agroforestry Group
They had seen new techniques today, which they would tell their women about. This was the first time they had seen trees having all their branches removed, they had not known before that *Alnus* could be coppiced, and they had never seen root pruning. In the earlier parts of the workshop, they had been very afraid of mobilising women to prune roots, however they now think that it might be the best method for women to use. When pruning branches they often hire expert boys from the village, who are paid in branches. One of the trees pruned today yielded sufficient pruning to fuel an improved cooking stove for more than one week. With these techniques they will be able to plan to increase tree density.

More information is needed on these techniques. Local councils could be important for mobilising people to prune and for dissemination. It could be possible to pull together local labour to tackle large tasks.

Kabale Dairy Farmers' Association

The pruning demonstration had been impressive. Before seeing it demonstrated it had seemed that root pruning would be a big job, but now it seemed easy. The demonstrations and workshop presentations would stimulate more pruning. Farmers should be closely involved in the experimentation.

Vi
Climbing to the top of the tree and working down was a new method, and quicker. Kanga's system was impressive and a good amount of work could be done in a day.

FORI
10 years ago when tree planting was being encouraged, the question which was frequently asked was 'which tree species?', now the questions are 'how do we manage the trees?

AFRENA
A good way of spreading the message would be to send some farmer representatives to Embu to see for themselves what could be done. Additionally, a simple video would be extremely useful.

There was discussion about methods of root pruning and it was agreed that at present insufficient was known to provide 'prescriptions'. The need for well illustrated extension bulletins was again raised.

Costs of saws were discussed. Was a 15000 /- saw a good investment, would people buy? There was a mixed reaction, some said yes, some said that they might buy as a group, or maybe hire. If the price was 10000 /- saws would be much more attractive.

Priority issues for the project - arising from the workshop discussions
Of the different types of pruning, severe crown pruning and root pruning were the most interesting. Although there was interest in the ideas of pruning for wood quality, this was not highlighted by workshop participants as a priority area for the project.

Within this context, the issues raised were:

- Need to show that crown pruning does reduce competition on research plots and in farmer's fields.
- Need to determine whether Embu-style pruning works for many tree species (main experience is with *Grevillea*).
- Need to determine effects of root pruning on competition.
- Need to determine crown pruning effects on tree diameter increment.
- Need to determine economic effects of pruning.
- Need to increase farmer involvement and disseminate information widely to farmers, local councils etc, through use of bulletins, farmer visits (and videos).

Revisions to project

Following the feedback from the open sessions of the workshop, and the December 1998 comments from John Palmer, Forestry Research Programme Manager, revisions to the workplan were discussed in the context of the need to keep within the existing budget. It was agreed:

- crown pruning: increase the emphasis on extreme crown pruning, and reduce the inputs on lesser crown pruning treatments *(priority issue 1, 2, 4 and 5);*
- root pruning: increase the inputs *(priority issue 3 & 5);*
- pruning to improve timber quality: remove this objective *(priority issue 7);*
- to strengthen on-farm work by appointing a new member of staff for FORI, dedicated to this work in the Kabale region of Uganda *(priority issue 6)*;
- run 'farmer days' at Kifu, Uganda and Siaya, Kenya, and produce an extra pruning bulletin early in the project *(priority issue 6)*.

The logical framework, project activities (with assigned institutional responsibilities) and work calendar were revised and the project was rebudgetted (see revised programme). Financial matters were discussed at the workshop, and subsequently. Subject to final approval by FORI, it is probable that ICRAF will hold FORI money on the project's behalf and disburse it as necessary.

Appendix I: Participants at Workshop

Organisation	Representative	Designation	Specialism	Address	Tel/Fax/email
Africa 2000 / UNDP	Polly Mubangiu	Programme assistant	Sustainable agriculture	PO Box 1094, Kabale, Uganda	Tel: Kabale 24231
Africare	Kakuru Adison	Soil and Water Conservation Officer	Agroforestry and soil conservation	PO Box 403, Kabale, Uganda	Tel: (0486) 24227 Fax: (0486) 24880
Mgahinga and Bwindi Impenetrable Forests Conservation Trust	Paddy Bahurwa	Community Project Officer	Forestry	PO Box 1064, Kabale, Uganda	Tel: Kabale 24120 Fax: Kabale 24122
Vi Agroforestry Project	Andrew Thomas Bagoole	Training and education officer		PO Box 1732, Masaka, Uganda	Tel: 0481 20946 Fax: 0481 20940 email:viafp@starcom.co.ug
Vi Agroforestry Project	Patrick Kakeeto	Zonal Manager	Forestry (agroforestry)	PO Box 1732, Masaka, Uganda	Tel: 0481 20946 Fax: 0481 20940 email:viafp@starcom.co.ug
Two Wings Agroforestry, Kabale	Mrs Bertha Babunkiza	Vice chairperson		PO Box 56, Kabale, Uganda	
Rwere Women's Group	Mrs Dinah Mafara	Chairperson		PO Box 259, Kabale, Uganda	
Two Wings Agroforestry, Rwene	Mrs Peace Turyatemba	Chairperson	Nursery beds and tree planting	c/o Rwene, PO Box 223, Kabale	
Ugandan National Farmers Association / KADFA	Michael Betonde	District Agricultural Adviser	Extension in agricultural production	PO Box 228, Kabale, Uganda	Tel: 0486 23948
Dept. Agriculture	James Kasimbazi	District Agricultural	Soil and water	PO Box 6, Kabale, Uganda	

		Officer	conservation		
Dept. Forestry	Adios Kyomukama	District Forestry Extension Officer		PO Box 9, Kabale, Uganda	Tel: 0486 22123
Kabale District, Local Government	Sunday Mumbara	Coordinator, Production	Agricultural Production and marketing extension services	PO Box 6, Kabale, Uganda	
Farmer Muko	Mrs Rose Bateibuka	Farmer		Ahabutobere PO, Murole	
Farmer Muyanje	Mrs Joll Mateeka	Chairperson		PO Box 3, Kabale	
Rwene Bakyara Kweterana	Mr Rwampigi Benrogers	Organiser	Farming and tree planting	c/o Rwene PO Box 223, Kabale	
	William Gracie Timbimwebwa	Farmer	Zero grazing farmer	Kasheregyenyi Kamuganguzi, Kabale District, PO Box 138, Uganda	
	Linus Mutegi Kanga	Farmer		Embu, Kenya	
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Kenya Forestry Research Institute	Jackson Mulatya		agroforestry		
Kenya Forestry Research Institute	Daniel Mugendi				

University of Nairobi	Almaz Tekleberhan Tefere				
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