Zambia

ling it while it is working.) Despite the complaints about the heaviness of SAIMMCO implements, they are highly regarded for their quality and performance. Indeed, when one project bought a batch of ploughs from SAIMMCO and imported a similar number from India, there was difficulty in selling the Indian ones.

In the past, the price of an ox-plough was about the same as that of an ox, but the shortage of cattle in the area has brought the price of an ox well above that of a plough. Even so, the plough, costing about UGX 115 000 (US$ 105), is beyond the reach of many farmers.

B. What Women and Men Farmers Say

The Practices and Perceptions of Rural People Regarding Production Technology

In addition to the foregoing general information, the FGDs produced the following specific information:

Time Spent by Women Working in the Field

The two cropping cycles in both Mubende and Soroti made this information more difficult to obtain than in countries with a single rainy season, and there were wide variations in the figures that the groups came up with. The information provided below is based on an attempt to reach some sort of average indication, for which the more extreme figures – on one occasion totalling more days than there are in a year – have been discarded.

Mubende District – two cropping cycles

1. The introductory and descriptive opening sections of this report are based on information gathered during training sessions in qualitative research methods with the national staff who were to conduct the study (all of whom had a thorough knowledge of the rural situation), on information collected during individual interviews, and on available literature. The latter included briefing material prepared by Mr Martin Bwalya, Director of the Palabana Farm Power and Mechanization Centre. Some general information has also been lifted from the results of the FGDs with rural people when it was considered that it would best fit in these sections.

Soroti District

Figures provided by groups in Soroti were often for the number of days for a **group** of people rather than individuals. For example, they stated for cultivation: group work (11 persons), seven days; and, for weeding millet, group work (12 persons), seven days. Extrapolating from this information shows that the figures do not vary significantly from those obtained in Mubende District, with the exception that when animal traction is available there is a significant reduction in the time taken for land preparation (primary tillage). For example, after considering the time taken for land preparation, one group stated that it took one person 60 days and that she might 'even fail to finish and abandon part of the plot', whereas, with an ox-drawn plough, 'it would take three days'.

Women's Hardest and Most Tiring Tasks in the Field

The majority of interviewees in both Mubende and Soroti Districts stated that, if using hand tools, land preparation prior to seeding was their hardest task, mainly because of the large tough grasses, such as couch, that had to be removed. A commonly-expressed opinion was that, when animal traction was available, there was major relief in the drudgery of land preparation.

> "In our tradition, men were not allowed to be involved in weeding groundnuts. It was said that if a man became involved, the crop would develop a lot of pop, and that would seriously affect the yield."
> Women in Chibombo

Weeding the crops was identified as the next most arduous job, although harvesting, especially of cereals, was also rated by many groups as being about as tiring and time-consuming. Many men's groups mentioned weeding as being particularly hard on the women.

Differences in Tools Used by Women and Men

The men generally made greater use of axes and pangas (machetes) than women because of their responsibility for land clearing. In Mubende District, there were no significant differences in the hoes used by men and women, although children generally use hoes that have become smaller through wear. In Soroti, there was a marked tendency for women to use smaller, lighter hoes, and men generally stated that women should have lighter tools. An exception, and a minority opinion, appeared in one men's group which did not support the need for any difference between women's and men's tools, saying that it would double the expense for the men, who buy the tools.

In Mubende District, people knew very little about animal traction although there was much interest in learning more about it and in seeing it in practice. Some groups expressed doubts about the possible effectiveness of animal traction on their stony land.

In the Soroti area, a significant proportion of women are already involved in animal traction. All groups were positive about it, saying, for example, that it allowed larger areas to be opened up; it was faster; it reduced women's workload by transferring the effort to the animals; it needed fewer people and therefore saved human

labour; it turned the soil well and deep; it increased production, and so on.

Many groups reported shortages of suitably trained oxen for animal traction, which made it necessary to carry out many farm operations by hand. People said they could not wait to hire the few oxen available; they had to work by hand to catch the rainy seasons properly for their crops.

One women's group identified fear of oxen as a limitation they must overcome. Many groups expressed the need for planters and cultivators/weeders in addition to ploughs.

"Men just marry more women to have more free labour on the land. Women are used as income-generating resources."

"Men don't really appreciate all the work that women do, even when it is increasing all the time. It is normal, traditional and expected, just like a dog is expected to bark and is not appreciated any more if it barks more!"

"Men don't let women use fertilizer because they are afraid they will steal some of it for their own plots or gardens instead of applying it to the family plot."

"Men think women are spendthrifts and, if they go into town, they will spend money on silly things like having their hair plaited. And they might also pick up bad town habits!"

Comments by members of research team during training sessions

Overall, women want to become more involved with animal traction. This is supported by the men in the area, who stress the need to train women in animal-draught power. However, some men also felt that this proposal should not come directly from them, for the women might take it as an attempt to get them to do even more work. Men's and women's groups also felt that women should not use animal traction when they are pregnant or when there are tree stumps in the ground, because they might be injured. Support for using donkeys as opposed to oxen was also expressed.

Renewal of Tools

In the Mubende area, about half the groups stated that they bought new hoes every year. The other half said they did so every one-and-a-half to three years. New pangas were generally bought every four-to-five years. Smaller tools such as knives tended to get lost and were replaced every one-to-two years.

The situation in Soroti District was very similar, but the groups were more specific in saying that, after the one-to-three years' initial use of a hand-hoe, it was worn to the point where it became a weeding hoe.

With regard to the animal-traction implements, the soil-engaging points of the ploughs have a relatively short life; shares and landsides may need to be replaced every one-to-three months, and even the land wheel may need replacing as frequently. Some groups said such items lasted a year or so, depending on soil type.

The ploughs have no rear wheel to help transport them to and from the field, which may be a considerable distance away. Farmers cannot hold the plough in a raised position for long periods, so they lay the plough over to the right and it simply drags along. This rapidly wears out the right handle. Government extension agents have recently started to promote the transporting of ploughs on wooden

sledges to avoid this problem.

Where Tools are Purchased and at What Cost

Tools are usually purchased at the stores or markets in the nearest town. Their costs are as set out in the table below.

Preference for Industrially- or Blacksmith-Produced Tools

As most communities in Mubende District had no blacksmith, all the tools were industrially-produced or imported. In those that did have blacksmiths, it was stated that they only made knives which were inferior to the imported goods. Only one group expressed a preference for locally-produced knives because the imported items were too expensive.

In Soroti District, more tools are produced by blacksmiths but people had a strong preference for the imported ones. In the case of hoes, they said that those made by blacksmiths often had parts that were riveted together. The heads of rivets snagged grass and, in addition, they often broke.

"No matter what size of handle there is on a hoe, what matters is the hoe blade as it's the one that does the work.''
Women's group in Keembe

"Hoes with short handles make weeding easier and faster, but they give us backache. There is nothing we can do about that, because if we just complain and don't work we'll starve! If the day comes when different tools are brought here, we'll throw our hoes away!"
Women's group in Muswishi

"With short handles, a person gets tired faster but weeding is done nicely."
Women's group in Keembe

Hand Tools

Animal Draught

Changes That Have Taken Place in Hand Tools and Implements in Past Decades

In the past, hoe blades were tied to the handle using rawhide thongs, sisal or old banana fronds. The locally-made hoes had a long tang so that they could be affixed to the handle in this way. Many groups mentioned the improvement brought by today's eye-ring or socket fittings and the firmly-fixed handles that result. Curiously, Uganda was the only country where no hoes were seen that were fixed to the handle by burning a hole through it for the tang, although axes built on this principle were previously quite common in some parts of the country. Perhaps the relatively few numbers of village blacksmiths have limited this method of fixing the steel part of implements to their handles.

"A wife is a foreigner in her husband's family."
Comment by a field worker during qualitative research training session

Some groups mentioned that knapsack sprayers had been introduced in recent years.

These sprayers are still rather expensive and few in number and they are generally used by men. Wheelbarrows were also mentioned as an innovation of fairly recent times, with people saying that they made transport work much easier and quicker than in the days of using traditional baskets carried on the head.

Other Tools and Implements Known by Groups but Seldom Owned by Group Members

Although people in Mubende District had some knowledge of animal traction and expressed serious interest in it, they were not using it at all. In the five countries covered by the study, this was the most significant case of an appropriate production technology that was known but was not being used. For the rest, people usually mentioned tractors, sprayers, and watering cans as items they knew of but did not use themselves.

Who Decides What Tools to Buy

The final authority for making decisions about the purchase of tools generally rests with the head of the household, regardless of whether that person is a man or a woman. However, since the head of the household is usually a man, men tend to lead in the decision-making. In a majority of groups, it was stated that the wife would make suggestions about what to buy, but it was the man as the head of the household who made the final decision. In any event, it is usually the man who actually buys the tools. In the case of buying animal-draught implements, it is the man who normally takes the decision, for men dominate the animal traction scene.

Improvements That Women Would Like for Their Tools

The issue of the weight of hoes was frequently raised. Basically, women would like to have lighter hoes. Two women's groups stated that they wanted 2 lb. hoes instead of the 3 lb. ones they used at present. (They apparently did not know of the Cock brand 2.5 lb. hoe; the Crocodile brand 1.5 lb. hoe was never mentioned by anyone.) Some groups also said that axes should be made lighter so that women could use them more easily.

In Mubende District, some groups felt that blacksmith technology should be introduced so as to allow them to have tools that better fitted their needs. There was also widespread nostalgia for the Finland hoe. In effect, this means that the people want a lightweight hoe made of high-quality steel.

The issue of quality and the ability of tools to maintain their cutting edge was raised by many groups. A number of groups stated that tools broke easily and did not last as long as they should.

With regard to animal traction, women and men in the Mubende area were greatly interested in it, and wished to know more about it and see it in action. In the Soroti area, greater access to animal traction was desired and it was felt that women should also use it more. For this, and as a first step, women would need training.

Willingness to Pay More for Better Tools

There was a general willingness by groups to pay more for better tools, provided they in fact performed better.

C. Conclusions

Constraints and Opportunities

The determining factors governing improved production technology for women in Uganda fall under two main categories: socio-economic and technical.

Socio-Economic Factors

As is the case elsewhere in Africa, women's lack of access to land rights, and the fact that most of their work is not remunerated, gives them very limited access to cash or credit. In addition, they seldom have any real power in family or community decision-making.

This situation seems to be so entrenched that it is beyond the ability of individual women to make any impact towards changing it. Thus, empowering women through effective groups, which include men so that the door to credit may be opened through using the men's land title as collateral for loans, seems to be the best strategy.

It is important to note, however, that men appeared to be in favour of seeking improvements in the production technology available to women, so any attempts to do so would be working in a favourable environment.

The work already done by projects, NGOs and various institutions in the area of women's groups clearly must be continued and expanded. Women's groups recognize that access to resources, e.g., land and credit, is crucial for their success, as is education to mobilize and empower them and to sensitize men to women's needs and capacities.

Technical

With regard to hand tools found in central Uganda, there is little scope for improvement. Most tools are industrially-produced or imported and are of reasonable quality. On the other hand, the design, quality and durability of tools produced by blacksmiths in other parts of the country, such as Soroti District, certainly could be improved through intensified blacksmith training programmes.

One basic problem is that rural people are not aware of the different models of industrially-produced or imported tools that exist, for the manufacturers or importers seem to make no effort to inform people or even to have all their different models available at sales points. Thus, people are forced to buy what they find; whereas, in fact, lighter hoe models would be more suitable for women to use while weeding and the heavier models would be more suitable for tillage and bund-building. For example, although the Chillington 1.5 lb. hoe is generally unknown, it is being

taken out of production for 'lack of demand'. This contradicts the often repeated request for lighter weeding hoes from the women's groups.

Something valuable certainly could be done to try to better match tools available in the market to women's needs. For example, the manufacturers and importers should be cajoled – and if necessary helped – by government, development projects and NGOs into doing market research. This would allow them to improve their range of tools and their distribution systems so that the tools on offer include weights and sizes best adapted to women's needs.

The need for this is illustrated by what happened after the APO visited the Chillington plant in Jinja. He was given a 1.5 lb. hoe, the model for which the factory staff said there was no demand, and in the following days he showed it to women in the Soroti area. They had not known of its existence before but expressed interest in having it. On the other hand, and to be fair to Chillington, it is also possible that men always buy the heaviest hoe they can find because they think it is better value for money and because they know that, in due course, it will be worn down into a lighter hoe that women can use comfortably. Nevertheless, if more effort had been made to inform people about the various hoe models available, it is hard to believe that there would have been 'no market' for the smallest in the range.

Development and relief programmes are also implicated in this failure to match tools to people's needs. They tend merely to order a large number of, say, hoes of the most common weight. They could improve people's awareness of the range available by working more closely with the local commercial operators in the tool trade and by supplying at least two different weights.

It also would be worth taking advantage of the capacity of Makerere University in ergonomic studies to ascertain the human energy requirements of working with hoes of different weights and of different blade widths in different soils. If, indeed, it was found that there are significant advantages to certain hoe weights and blade widths for women, this could help to define manufacturers' policies, product lines and sales promotion efforts.

Uganda most certainly needs to make major efforts to improve and expand animal traction. Progress in eradicating control of the tsetse fly means that animal traction may now be possible in much wider areas of Uganda than its traditional homelands in the east and north of the country. But, as shown by this study, even there it needs to be expanded.

> "In the past, we used ox-drawn implements, but not any more. The implements have been worn out and most of our animals have died from tick-borne disease. The hand-hoe is the key to our farming now."
> Women during group discussion in Keembe

There can be no doubt that there is great scope for increasing agricultural production through the use of animal traction; and this study shows that women and men farmers are seriously interested in it and see it as the solution to their farming problems. However, any initiatives to expand animal traction must take account of women's needs, especially in terms of lightweight implements and training. This study has identified land preparation and weeding as the hardest tasks that women do

in the fields. Wider use of animal traction could make a major impact in reducing this drudgery.

Work	Days/year
Land preparation/Planting (with animal traction)	79-30
-ditto- (by hand)	30-90
Weeding	90-120
Harvesting	30-120

However, even if this study has shown the desire among both women and men for the wider use of animal traction by the former, and even if there are no taboos against women using oxen in many parts of Uganda, bovines traditionally belong to men. Some cultural resistance to women's full involvement in – and even taking over of – animal traction with oxen may be expected. Especially important, therefore, would be research into animal traction with donkeys in Ugandan conditions, with special emphasis on lightweight and low-draught cultivators/weeders to reduce the time and effort spent by women with hand-hoes in this operation.

"We punish ourselves to finish weeding a big field in a few days. Most women lose weight during the weeding season."
Women during group discussion in Keembe

Inter-row weeding with an animal-drawn implement naturally implies planting in rows. But, even without row planters, this can be achieved by marking the field prior to sowing or by using a cord. The extension services need to promote row planting as a prerequisite for inter-row weeding with animal traction, and thus take a first step towards reducing women's workload.

With regard to the work of AEATRI, while it is taking a number of praiseworthy initiatives it could also learn from countries in West Africa, particularly Senegal, with a long experience in animal-traction implements. AEATRI could also achieve speedier progress in bringing new implements to the market if it gave almost exclusive emphasis to the copying of successful designs from elsewhere, testing them thoroughly in Ugandan conditions, and only modifying them if necessary.

In respect of feedback from farmers who have been lent implements to use, this evaluation must be done by totally disinterested parties, using qualitative research techniques similar to those used for this study. If not, it will be difficult to obtain the farmers' truthful and reliable assessment of the field performance of the implements, for they might provide information to please the engineers. Serious mistakes could be made on the basis of this information, as has already happened in other countries.

Appendix

Tool	ZMK[2]	Tool	ZMK
Prices in rural areas			
Blacksmith-produced hoe (price depends on size)	2 500-5 000	Imported hoes (N.B. Not all brands available)	7 000
Prices in market, Lusaka			
Cock brand Chinese hoe	7 500-8 500	Malawan hoe	8 500
Zimbabwean hoe	10 500	South Africa hoe	10 500
Locally-made hoe	5 500	Locally-made small weeding hoe	400

Members of Field Research Team

Type	Source	ZMK
Ox plough	Imported from Zimbabwe (Zimplow)	190 000
Ox cultivator	-ditto-	314 000
Plough share	-ditto-	3 000

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2. US$ 1 = ZMK 1 300 approximately.

Mr Ahmed Walugembe
Agricultural Engineer, Mubende District

"As long as hand-hoes are used by human power there can be no increase in production. What we want is hoes powered by batteries or electricity!"

"Improving hoes won't increase production. The only solution is replacing them with ox-drawn tools."

"A hoe is not only a necessity but also an essential evil."

Women during different discussion groups in Keembe and Muswishi

"Some marriages have broken down because women failed while trying to work with the existing and heavy animal-drawn implements."

"Manufacturers should differentiate their implements in the same way they differentiate bicycles for men and women."

Men's group in Muswishi

A. The Scenario[1]

Context of the Study, Its Scope and Methods

The field work for the study was conducted in two separate areas of Chimbombo District – Keembe and Muswishi – in central Zambia, and coordinated by the Palabana Farm Power and Mechanization Centre.

Chibombo District, which covers about 10 000 km^2, is bisected by the main road and the railway that join the capital with the Copper Belt to the north. The Lukanga swamps lie along the north-west boundary of the District, while the Mulungushi dam forms part of the north-eastern boundary. To the west of the railway line, the District is relatively flat; to the east of the railway, it is undulating; and the south-west part is hilly. The whole District has been affected by deforestation. The soils in the Muswishi area are mainly sandy, while those in Keembe are sandy loam.

Climatic conditions in Chibombo District make it the part of Zambia with the highest potential for arable farming. Rainfall ranges from 800 mm to 1000 mm per annum, mainly falling in the period October-April/May. However, in recent years, rainfall patterns have departed significantly from the norm and there have been serious droughts.

Although the Lenje people are said to be the original inhabitants of the District, its fertile and abundant land and reliable rainfall attracted many other tribes in the past. Most of the tribes that moved into Chibombo come from the south. Many of these are pastoralists and one of the reasons they moved was to escape from the drought and cattle diseases which have even more seriously affected the southern part of Zambia. But in the Chibombo area, too, soil fertility and reliable rainfall are in decline today.

The mixture of different tribes living in the area was evident from the very first FGD, because in that and later discussions as many as three languages were being used. However, this was not the major problem one might have expected, for normal social intercourse in the District is multilingual and almost everybody understands the various common languages, even if they often prefer to express themselves in their own.

The field research team was composed of eight women and one man. One of the women was from the Palabana Farm Power and Mechanization Centre, while the other researchers were field staff from various institutions working in Chibombo District.

In all, 33 FGDs were conducted. Of these, 25 were with women and eight were with men, for a total of about 340 persons. The participants in the group discussions were always asked to bring their production tools to the meetings.

The Agricultural Production System and Women's Role Within It

There are large-scale commercial farmers in the District, but the study was conducted in traditional-subsistence and smallholder-commercial areas, where maize is still the most widely grown crop. However, even if maize is the staple food, farmers are tending to grow less of it here and elsewhere in Zambia because of the low prices it commands and its high demand for fertilizer. Some traditional white maize is being replaced with yellow maize – or 'pop corn' maize as it is known – because, according

to the farmers, it fetches a higher price and requires less fertilizer; and traditional maize is being replaced with more cotton, sunflower, tobacco and groundnuts than were grown in the past. In the Muswishi area, there is a network of perennial streams that allow widespread gardening to produce fruit and vegetables. Normally, a household will have access to more land than it can cultivate.

Small farmers are typically agro-pastoralists but, in very recent years, tickborne (Corridor) disease has killed off very high numbers of cattle – as many as 60% of the cattle population, according to one informant in the Keembe area. However, judging from the information that emerged from the group discussions, the loss of livestock could be even higher because many participants mentioned that animal traction had virtually disappeared from their communities because the cattle had been wiped out. Thus, they had been forced back to farming exclusively with hand-hoes.

Women play an increasing role in all aspects of agricultural production. Some verbal estimates were heard to the effect that women now do as much as 80-90% of the work on the land, and that about 60% of all Zambian farmers are women. However, among the farming operations, destumping and land clearing remain largely men's work. Where animal traction is available, the men tend to do most of the ploughing as well; and planting is done at the same time, with women and children dropping seed into the furrow bottom behind the plough.

However, even where animal traction is available, its use is mainly confined to ploughing and harrowing. Cultivators/weeders, ridgers and planters are more rarely found.

The land available to a household is normally divided into men's, women's and children's plots. The children's plots are often collective but, as they get older, they may be allocated individual plots. The men's plots are mainly given over to cash crops, whereas the women's main concern is for the family's food crops. However, groundnuts are regarded as a woman's crop and all the income from it usually goes to them. Cassava, too, is considered to be a woman's crop.

Work on all the plots is normally done collectively but, after the harvest, the produce goes to the 'owner'; and even if there is often some consultation, it is the 'owner' who decides what to do with it or with any income it provides.

When animal traction is available in a household, a man is generally willing to use it to plough the women's and children's plots. However, in practice, this often fails to work out, for once the man's plot or plots have been tilled, it is quite often too late to do the others in time to make best use of the rains. Rather than wait, the women and children have to resort to hand-hoes. Overall, the hand-hoe remains the basic cultivation tool in the area.

Despite the generally low socio-economic level of women, they are becoming increasingly important in the District, not only in agricultural production as their husbands seek off-farm work but also in local leadership. Each village has a head person and, of the seven encountered during the study, three were women. In fact, people in the District have become more gender conscious in recent years, often deliberately choosing women for leadership roles. Nevertheless, many of the tradi-