

Uganda



URPATA Sahel

This organization, which produces animal-draught implements, mills, thrashers and the like, merits a short description; for, unlike Sismar, which is a commercial operation only, URPATA Sahel is also a development organization. Its name is an acronym for the French version of 'Unit for Research, Production and Assistance for Appropriate Technology Adapted to the Sahel'. It was founded in the early 1990s as a GIE by a group of people who had worked in local NGOs. In addition to manufacturing and selling equipment, it provides training and follow-up services and has received funding from a number of international NGO donors. This enabled it to set up its production plant and create a revolving fund that provides three-year credit to purchasers of its products. The plant was deliberately established in a village – N'guekhokh, about an hour's drive from Dakar – where it has created about a hundred jobs. The operation is now commercially viable, with a turnover of CFAF 418 million in 1995, CFAF 496 million in 1996, and an estimated CFAF 600 million in 1997.

Sorex-Chim

This is one of two or three small companies in and around Dakar that manufacture and sell hand implements such as hoes, shovels, pick-axes, and manure forks copied from European models.

The hoes seen at Sorex-Chim's sales outlet were long-handled but, instead of having the flat blade for a horizontal push-pull action like the *hilaire*, they had a blade set more or less at right angles to the handle. The user chops downwards into the soil and pulls the hoe towards him/herself. These were lightweight hoes and made of new, good-quality material, but they cost more than twice as much as a *hilaire* produced by a blacksmith.

According to a Sorex-Chim interviewee, the hoes have only been on the market in quite recent years, and so far they have not been bought by farmers directly – most sales having been to NGOs which, in turn, distribute them. However, none of these hoes were encountered during field work for the study.

Blacksmiths

Blacksmiths in Senegal fall into two broad categories: those working where electricity is available and who have been able to buy an arc welder, and those in the more remote villages who have only a forge and hand tools. The former can and do produce animal-traction implements and forge hand tools, but the latter are confined to making only hand tools.

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. 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.

The blacksmiths generally use scrap material for the implements, although some, working within the context of the French-supported project based in Thies, are reportedly using new material.

The animal-draught implements are generally copies of those built by Sismar, but with considerable variation.

“People in the south-west look upon cattle like the Hindus in India. It would be an insult to use them to pull a plough!”

Comment by member of field research team

“For a man, a crop means income. For a woman, a crop means food. Whenever cash is involved, men also become involved.”

Comment by member of field research team

“Men only wait for the end results [of our work] – food at the dining table!”

Comment by a women’s discussion group in Mubende

B. What Women and Men Farmers Say

The Practices and Perceptions of Rural People Regarding Production Technology

Some of the factual information that came out of the FGDs has been combined with information from interviews and available literature to provide the foregoing general descriptions of the agricultural production and social scene in rural Senegal. In addition, the following specific points emerged from the group discussions:

Time Spent by Women Working in the Field

Differences in Tools Used by Women and Men

The only tool used generally by women in the fields is the *hilaire* hoe, although a few may use the *ngos-ngos*, the traditional African hoe. A few men still use the *sokh-sokh*, but the squatting position needed for it is generally seen as being uncomfortable and tiring, hence its tendency to disappear.

It was difficult to obtain a coherent picture of the situation regarding the use of animal traction by women. Some interviewees among government staff stated that women made extensive use of animal traction, but the contrary was stated in group

"In the days when we used an A-H² seeder for planting, weeding was easy and the yields were higher."

Comment during a women's discussion group,

Soroti

discussions with women and men farmers. Indeed, the discussions showed that animal traction was the exclusive preserve of men, but with boys also using it for inter-row weeding. It is possible, however, that the situation varies in different regions of the country.

Discussion groups with men revealed the opinion that animal-traction tools were too heavy for women and that they were not trained in their use. However, the most common hoe, the rigid-tine *houe occidentale*, is in fact quite light. And if boy children can use it, as the consultant and the APO saw for themselves, why not women, too?

A possible interpretation of the opinions expressed by the men is that they want to continue to monopolize animal traction, and/or that for historic and cultural reasons it is seen to be their preserve.

A few group discussions with women showed that they wanted access to animal trac-

2. A-H were the brand initials for an engineering company in Soroti which was mainly concerned with equipment for the cotton ginning industry but which also produced animal-draught implements.

tion, but they repeated the view of the men that the implements were heavy and that they were not trained to use it. When asked for her views on the issue of animal traction for women, a spokeswoman in the Ministry for Women, Children and Family said she thought that women would almost certainly like to use it if given the chance.

Time and resources only allowed a short period of orientation and training for the research team in the objectives of the study and in the qualitative research method to be used. Overall, they did a truly outstanding job, but they did not delve sufficiently into the issue of women and the use of animal traction during the FGDs.

Renewal of Tools

The hand tools are generally renewed annually, although handles may break and need replacing more frequently. Rakes were said to last up to ten years. Tools are almost invariably bought from local blacksmiths.

Preference for Industrially- or Blacksmith-Produced Tools

The groups all recognized that the quality of industrially-produced tools was superior, that they performed better and lasted longer, but that they were much more expensive. Furthermore, as mentioned in the earlier section on the social relationships surrounding the blacksmith caste, farmers prefer to buy from blacksmiths in the interests of harmony within the community and follow-up repair and maintenance.

“We women often go out as hired labour to well-to-do neighbours in exchange for borrowed tools instead of cash.”

Statement during women's discussion group in Mubende

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

The only spontaneous change mentioned by the groups was the tendency to fit longer handles to the *ngos-ngos*, and the issue of handle-length was evidently recognized as being of importance in the interests of comfort and reduced fatigue.

New tools that were identified as having been brought in from outside were the *hilaire* hoe and animal draught. The animal-draught seeder was mentioned as having made the greatest difference to the production systems. Some women got up from their groups to demonstrate how, prior to the arrival of the seeders, they had planted by making each hole by hand. They showed the action used with a *ngos-ngos*, but mentioned that there had been a special small planting tool, even smaller than the *ngos-ngos* and known as a *konko*, which had disappeared with the advent and spread of the seeder.

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

No other hand or animal-draught implements were known by the groups, but some mentioned tractors, and ploughs and seed-drills for them, that they had seen elsewhere.

Who Decides What Tools to Buy

“The heavy axes have turned out to be tools only for men. Children, especially, cannot use them.”

Women’s group in Mubende

“Our traditional curved knife used to be given to a girl when she got married, and also to any heir as a blessing. It was believed to increase our harvests.”

Comment during women’s discussion group in Mubende

According to group discussions and to the research team, it is invariably the man who decides on the tools to be bought, and in most cases he buys them. It was said that he may consult his eldest son, but the women are not involved in the decision-making although they may contribute to the cost if they have income from their plots. However, the study team felt it was quite possible that people said this for socio-cultural reasons; for, in their society, it could well be unseemly to state openly that women play a role in decision-making, whereas behind closed doors with their husbands

they may well contribute significantly to the decisions taken. This was declared to be the case in most of the other countries of the study.

Improvements That Women Would Like for Their Tools

Longer handles for the *ngos-ngos* was a common request. These tools are generally bought complete with their handles, and thus to obtain longer ones would call for more dialogue between the producers and their clients. Some groups said that they would like to have wider blades on them, and also on their *hilaires*.

With regard to animal traction, both men and women’s groups identified an improvement they would like in the cultivators/weeders: they would like to be able to alter the working width on the move, as and when the space between the rows becomes narrower or wider, and they would like to be able to do this by simply opening or closing the handles on the implement.

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. Some men’s groups said that they would like women to have access to credit so they could buy better tools.

C. Conclusions

Constraints and Opportunities

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

Socio-Economic Factors

Women’s lack of access to land title, and the fact that most of their work is not

remunerated, gives them very limited cash or possibilities for obtaining credit. In addition, they are seldom part of decision-making processes in the community, and even decisions regarding the farm tools to be used by them seem to be taken mainly by the men.

This situation seems to be so entrenched that it is beyond the ability of individual women to change it. Thus, empowering women through effective groups and GIEs seems to be the only solution. Furthermore, recognized groups obtain access to land even if it is not the best and is not granted for more than one year at a time.

It is important to note, however, that men were found 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 being 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.

"The old hand hoes of the past were not wide enough, had short handles, and caused back pain. That is why most old people from those days have bent backs. Today, you can fit a comfortable handle, and the tools are wider and more effective compared to the old ones."

Comments during a women's discussion group in Soroti

Technical

The only opportunity for improving hand tools lies in the area of quality and handle length. For reasons explained earlier, people prefer to buy their tools from the local blacksmiths and thus these artisans are the key to improvements.

In addition to the obvious area of blacksmith training and development, which needs further reinforcement, it would be certainly worth trying to create more technical dialogue between blacksmiths and their customers. (The case of the customer, cited earlier, who had asked a blacksmith to make him an animal-drawn rake, was a rarity because normally there is no significant consultation.)

Development projects – such as the two IFAD projects the team worked with in Senegal – and government extension services could quite easily organize forums in which blacksmiths, farmers and technicians could meet and discuss tools, handle length and the like. Women's groups formed by NGOs and development programmes could be encouraged to enter into discussion with the blacksmiths supplying their tools. This would be the most obvious way to meet the desire for longer handles and wider blades which emerged in the discussion groups.

For women who grow vegetables, lifting water from wells by hand and carrying it in buckets to the plots is time-consuming and tiring. Animal-powered pulley lifts and simple pumps are made in Senegal under the aegis of the French-supported artisan development programme (PAMEC). It should be possible to instal a pipe or channel system to take the lifted water by gravity to the plots. However, the introduction of

such improvements reverts us to the underlying issue of women's access to credit. Once again, it is only women's groups that have formed into GIEs that have any opportunities in this direction; and, even then, there may be serious problems for it is not uncommon to find a group of 100 women who have been allocated one hectare of land. Again, the economic viability is so low that credit would not be granted.

Credit is also the factor that limits women's access to animal traction although, for reasons explained earlier in connection with peanut straw, in practice women would not be able to use horses independently. They would, however, be able to use donkeys.

The groundnut harvest is certainly labour-intensive and tiring for women, as are their hand-gleaning operations. One interviewee stated that he had seen women gleaning in the soil with a tablespoon. The issue was not specifically raised by the groups, but one is forced to wonder whether it would not be possible to develop a hand tool that would make this task easier and quicker.

Furthermore, even if threshing and winnowing is technically a post-harvest activity, and therefore beyond the scope of the present study, this operation is considered to be gruelling for women and enormously time-consuming. Some years ago, a Brazilian machine – similar in some ways to a combine harvester – was imported. After the groundnuts had been lifted in the normal way and allowed to dry, the machine moved along the row, gathering up the groundnuts and their haulms, thrashing and winnowing them and depositing the haulms or straw back on the field. Quite apart from the cost of such a machine, it was not suitable because the peanut straw is so valuable as fodder in Senegal.

What is really needed, but does not exist in Senegal, is a stationary groundnut thrasher that could be bought by groups or contractors.

Appendix

Members of Field Research Team

The coordinator for the study was **Mr Wally Ndiaye**, Technical Director of the IFAD-supported Village Organization and Management Project based in Kaolack. The field researchers named below were drawn from this project and from the IFAD-supported Agro-Forestry Development Project based in Diourbel. All the men in the team were from the project based in Kaolack, while the women were from that in Diourbel.

Mr Balla Moussa Dabo
Ms Arame Fall Dieng
Ms Thioro Ba Fall
Ms Aminata Ndiaye Ka
Mr Babacar Seck Mbaye
Mr Baba Mboup
Ms Fatou Kane Ndiaye
Mr Mamadou Sane

“Weight [of the cultivator] is not a major problem. People just have to be trained properly to use it.”

The Managing Director of SAIMMCO, an expatriate, shortly before a field trial that clearly demonstrated the difficulty, even for men, of lifting the implement to turn on the headland or to clear it of weeds

“If you have nothing, anything is expensive!”

Managing Director of SAIMMCO

A. The Scenario¹

Context of the Study, Its Scope and Methods

The field work for the study was coordinated by the Agricultural Engineering and Appropriate Technology Research Institute (AEATRI), which is part of the National Agricultural Research Organization and the government facilitating body for the FAO/SIDA FARMESA Programme.

The field work for the study in Uganda was conducted in two different parts of the country: the District of Mubende in central Uganda (to the west of Kampala), and the District of Soroti in the north-eastern part of the country.

There are distinct differences in the two areas' farming systems. Mubende is favoured by rainfall throughout most of the year, and by heavy rains in the periods March-April and September-November. The high altitude near the Equator provides a favourable climate, with temperatures in the 23-29°C. range. About three quarters of the population of 580 000 are involved in agriculture, which is mainly at the subsistence level. The soils are generally of medium texture but are also stony in some areas. The morphology of the District is varied: much of it is hilly, with small sloping plots, but other areas are flat. The average size of holdings is about 3 ha.

The main food crops in Mubende District are plantains (for the staple *matoke*), finger millet, maize, sweet potatoes, Irish potatoes and groundnuts. The main cash crops are coffee and tea, although some cotton, vanilla, sunflowers and soya beans are also grown. Although livestock exists, it is not an integral part of the farming system.

The District of Soroti is larger in area than Mubende, but it has a smaller population (about 431 000 according to the 1991 survey). It is generally drier than Mubende, but it also has two rainy seasons – March-May and August-October. The main crops include sorghum, cassava, sweet potatoes, groundnuts and cow peas, with rice and maize as minor crops. Until the late 1970s, cotton was a very important cash crop in the area but its role has declined drastically due to high production costs and poor marketing infrastructure. In recent years, sunflower, soya beans and a number of what used to be traditional food crops have been assuming increas-

ing
cash-
earning
roles.
The
average
size of

Work	Days/year
Land preparation ³	60-90
Planting/Sowing	60-90
Weeding	60-120
Harvesting	40-100

³ It is possible that some of the days for land preparation and for sowing/planting overlap, in the sense that the two operations are, to a certain extent, conducted concurrently.

land holdings in Soroti District is about 8-12 ha, but the amount of land actually under cultivation has declined significantly as a result of internal strife in the area in the years 1986-92. More than 80% of households depend on agriculture, usually at subsistence level, for their livelihood. Livestock has always formed a strong part of the farming system in Soroti District, although during the insurgency of recent years in the north, the cattle population has been seriously depleted through rustling by marauding tribes from neighbouring areas. However, there are still an estimated 77 000 head of cattle in the District.

The field research for the study was conducted with a team of eight people – five women and three men. Two of the team were from AEATRI, two were from the Department of Women's Studies of Makerere University, and the other four were from the extension services in Mubende and Soroti.

Care was taken to choose people who were fluent in the main local languages of the Districts in which the study was to be conducted. However, given the number of languages in Uganda, and the fact that several may be used in one community, problems could have been expected. Fortunately, only two facilitators reported some language difficulties in one group in Mubende and in one in Soroti.

“It is weeding that almost kills women!”
Comment by men's discussion group
in Soroti District

In all, 26 FGDs were conducted and, of these, 17 were with women and nine with men for a total of about 245 people. The participants in the group discussions were always asked to bring their production tools to the meeting.

The Agricultural Production System and Women's Role Within It

The agricultural production system varies considerably across Uganda's different regions. For example, animal traction, first introduced in Tororo District in the eastern part of the country in 1909, spread from there into the northern regions around Soroti. However, it was subsequently prevented from spreading further west by the tsetse fly and by the shortage of bovines, which were not part of the farming system further west. In the extreme south-west of the country, cattle are so highly prized and regarded that to use them for draught tillage would be considered unseemly.

Recently, there has been a draft proposal to FAO to create an animal traction development centre in the country. This proposal states that only about 27% of Uganda's arable land is under cultivation, and that almost 90% of the cultivated land is worked by human labour with hand tools. Only 8% is tilled with animal power and 2% with tractor power.

“We buy the same hoes and tools and, when they get worn, we pass them on to the women.”

Comments by men during discussion groups
in Soroti

In most parts of the country, the men play an active role in the clearing of land before primary tillage and, if they have draught animals, they usually do the ploughing. They also help out with most operations

“Our men never know or learn of our [farm] needs.”

Women's group in Mubende

“We have seen pictures of animal traction in our children’s school books, but that is all we know about it.”

“We do not know about draught animals. We have never seen them or the implements, and we cannot say how useful they might be to lighten our work.”

Comments during women’s discussion groups in Mubende District

“Where animal-draught power is available, there is food: there is no famine!”

Comment by women’s group in Soroti

for labour-intensive crops such as potatoes. Although women may also participate in land clearing, it is usually after this operation that they become fully involved and, indeed, often take a leading role.

In Mubende District, planting in rows is not common. For example, groundnuts are planted randomly and millet is broadcast, which naturally means that weeding can only be done with hand-hoes. Nor is planting in rows universally applied in Soroti District; but where it is, inter-cropping is quite common, which again complicates the control of weeds.

Typically in Uganda, there is a *family plot* of land, controlled by the head of the household,

on which all the members of the family contribute their labour as a priority. In addition, women normally have smaller individual plots allocated to them by their husbands on which they grow produce for home consumption and sale. Women are also responsible for most of the poultry and small ruminants normally kept by the family. They also assist with cutting and carrying forage for zero-grazing. The men are generally responsible for selling farm produce.

Women’s groups have been forming in quite recent years. They may borrow land, but they have to pay for it. On occasion, they are granted government land. A feature of women’s groups in Uganda, and a difference compared with some other countries, is that they usually include a few men. This is generally a positive step because the men become involved in the group, know what is going on, and can plead the group’s causes with other men in the community. In addition, it may open the door to credit for the group, in that men may be persuaded to put up their land as collateral.

The Production Tools Encountered and Their Use

Photographs of the tools encountered are provided in Annex 6.

Animal-Traction Implements

No animal-traction implements were found in the Mubene District, but in Soroti they were fairly widespread. Some were imported from India or Brazil. The country’s factory producing animal-traction implements, the Soroti Agricultural Implements and Machinery Manufacturing Company (SAIMMCO), founded in 1990, is now the main source.

Animal traction is mainly limited to ploughing, with relatively little use of animal-drawn planters or cultivators/weeders. Some groups mentioned that there were some broken-down planters, weeders and ploughs imported from Brazil in the area but that no spare parts were available to repair them.

Hand Tools

The hoes encountered were all of basically the same, traditional, chop-down-and-pull type. Curiously, there were few made by local artisans for it seems that, in Uganda, blacksmiths are relatively rare in the rural areas compared with other countries. The majority of hoes seen had been imported from China – the Cock brand. Some others seen – Crocodile brand – were made in a plant at Jinja owned by Chillington of the United Kingdom.

The Cock brand Chinese hoe has an industrially forged eye-ring fitting for the handle, and comes in at least two different weights: 2.5 and 3 lb. There may be additional weights in the range, but these were the only variations actually found. People generally do not know that different weights exist: they simply buy what they find available at their local store or market. In general, the Cock brand hoes were well thought of, although a number of damaged and broken ones were brought to the discussion groups.

It was stated by one interviewee that there were as many as five ‘fake’ Cock brand

Tool	UGX⁴	Tool	UGX
Cock brand hoe (China)	3 000-4 000	Local hoes (Soroti)	2 000-2 500
Forked-type of hoe	5 000	Pangas (machetes)	2 500-3 000
Crocodile brand, Chillington		Axe	2 500
Bought in shop/market	3 000-3 500	Small weeding hoe	
As distributed by Magric Ltd.	2 800	(locally made)	500-800
Bought at factory gate – 3 lb.	2 300	Hoe-handle – hard wood	400
-ditto- – 2 lb.	2 000		
-ditto- – 1 lb.	1 800		

hoes sold in Uganda and that these were not as good as the originals. One of these ‘fakes’, or ‘duplicates’ as they are more politely termed, is said to be made also in China and another is thought to be made in India. The appearance of them all is

Type	Source	UGX
Plough	SAIMMCO	115 000
Toolbar tillage system	-ditto-	175 000
Dimond spike harrow	-ditto-	17 500

dized price. This tool has a socket fitting for the handle, created by folding the same steel plate that forms the blade. It does not look like the product of industrial production techniques, which mainly turn out hoes with forged ring fittings. However, the Finland hoe was particularly appreciated for the quality of its steel, and many groups commented that they were sorry it was no longer available. They particularly liked it because it was light yet robust, and maintained a sharp cutting edge over

4. US\$ 1 = UGX 1 100 approximately (September 1997).

time.

Some tools that were shaped like a hoe, but had three or more teeth in place of the hoe blade, were seen. These were said to be excellent for some weeding operations, particularly where there were infestations of couch grass; but they were also expensive. Such 'fork-hoes' are quite often lent, or in effect hired out, from one family to another.

Handles for tools are either made by the men of the family or bought from specialist handle-makers. Tools are very seldom bought complete. The handle length is dictated by personal preference but, in general, handles tend to be of medium length.

Small weeding hoes with very short handles were found in some communities, especially in Soroti District. In addition, for the fine task of weeding millet, the commonly-used tool is a strip of flexible steel normally used as a strap for fixing roofing timbers together. It is about 18-20 cm long and about 2-3 cm wide, and can be bent into whatever shape is required for scratching around the millet plants. Some groups mentioned that, in the extreme north of Uganda, specially-shaped pointed sticks are used for this tedious and back-breaking task.

Axes/Cutting Tools

Various sizes of axes are used for cutting shrubs and clearing fields before planting. The axes tended to be very heavy and were used mainly by men. Pangas, or machetes, were also found: the best were said to be those imported from China while those from India were considered to be of lower quality. The Chillington plant in Jinja also makes machetes but they cannot compete on price with the Chinese imports.

Traditional curved knives and modern straight-bladed knives were seen. The curved type is a multi-purpose tool that is used for various agricultural practices and for basket-weaving. Today, however, it is being replaced by modern straight-bladed knives, many of which are made locally.

"I have never yet seen a woman
in a shop or the market buying a hoe!"
Man during discussion group in Soroti

Pruning Tools for Plantains

The tool for cutting old fronds from plantain and banana stems is usually improvised by cutting a small branch from a tree, making a slit through it near one end, pushing a knife through the slit so that the blade protrudes at a right angle to one side, and tying it in place. Reaching up with the stick, the worker places the blade of the knife on the top side of the frond, close to the main stem, and, by pulling downwards, cuts it off. The tool can also be assembled so that it cuts when pushed upwards against the base of the frond. Locally-made tools for this task do exist, but very few were seen.

Tools for Removing Suckers from Plantains and Bananas

Hoes are generally used for this task which, curiously, was never mentioned as a

time-consuming and tiring chore during group discussions. It was only later, when the study had been completed in Uganda, that FAO's Sub-Regional Representative for Southern and Eastern Africa based in Harare (Ms. Victoria Sekitoleko, a Ugandan) mentioned that this operation was tedious and that a special hand tool existed for it in Australia.

Harvesting Tools

A variety of knives and sickles were seen; and for harvesting sweet potatoes and yams, a variety of pointed sticks and old spear points fixed to handles were encountered. The traditional hand-hoe is also an important tool for the harvesting of tubers and root crops.

Miscellaneous

A few of the groups had rakes, but they were not common.

"If the hoe is too heavy, you try to fix a lighter handle to it."

"If the hoe is too heavy, you give it to the man to use first."

"In the old days, if you prepared a local brew, and a man bought it on credit with a view to paying for it by digging, you gave him a heavy hoe so that when he used it, its weight would be reduced in the process."

Comments during women's discussion groups, Soroti

"If you have two hoes, one heavy and the other light, the woman will always want the light one."

Man during discussion group, Soroti

Cultural and Socio-Economic Considerations

Working Posture

Uganda does not have the profound cultural conditioning that is found in some countries, to the effect that work can only be done properly with a short-handled implement and while bent double. Indeed, although no-one actually works upright in the areas of the study, it was generally found that people do in fact choose handle lengths that they believe will be the most appropriate for them and for the task to be done. This has not always been so, for in the Soroti area, groups commented that, in the past, hoes always had short handles. Even so, there is a generalized feeling that women should work with shorter handles than men but there was no rational explanation of why this should be so, and the opinion is probably based on cultural conditioning.

In the north of Uganda, the Langi tribe are reported to use long-handled push-pull hoes. Opinions about these hoes varied between the groups in the Soroti area. Some stated they would like to have them but that they were not available in their area. Most were less positive, however, saying they were not used to such hoes and that the handles would be difficult to maintain.

Land Tenure and Credit

Women have virtually no access to land rights, although in theory they can inherit land. Since land rights are the usual collateral requested by credit institutions, the result is that individual women cannot obtain loans for investment in agricul-

tural production technology. Once again, this confirms the importance of the women's group approach; and, with the Ugandan practice of including some men in the groups, there does appear to be at least some opportunity for obtaining credit by offering the men's land rights as guarantees.

Draught Animals for Women

In much of western Uganda, there are taboos against women working with cattle, and thus they would be automatically debarred from using animal traction with oxen. In the Soroti area, where animal traction is relatively common but is mostly used by men, there is no bar against women using it. The main constraint here seems to be the weight of current animal-drawn implements which are too heavy for the average woman. For this reason, AEATRI has initiated work on implements which are light enough for women to use, and with draught requirements that can be met by the small East African Zebu and by donkeys.

Institutional Aspects

AEATRI has been in operation for just over two years. Its overall work programme is determined by a task force of nine people appointed by the Director-General of the National Agricultural Research Organization. Staff of AEATRI have visited similar institutions in Eastern and Southern Africa, Egypt, India and The Philippines in order to gain ideas for their own work. They have not, however, been to Senegal, which could provide interesting examples of implements and of strategies for their development.

AEATRI is developing a range of new hand- and animal-drawn tools for tilling and sowing and for weeding in paddy fields. Staff state that their designs are adaptations from promising technologies seen during their visits to other countries. However, to an outside observer, it appears that quite a lot of original design work is in progress, involving time and effort that could probably be avoided by closer copying and subsequent modification, if necessary, of equipment from other countries.

The Institute has one woman engineer who is to initiate attention to gender matters in designs. Initial field testing of equipment is conducted in conjunction with other institutions in the country and, if the results are positive, the equipment is then passed to farmers in different areas for trial and appraisal. Limited resources often hamper the production and distribution of sufficient numbers of the prototypes for farmer evaluation.

Possibilities for Conducting Ergonomic Tests on Hand Tools

Uganda is the only country covered by the study that has the capacity to conduct ergonomic tests on people while they are actually working. In the early 1980s, the Agricultural Engineering Department of Makerere University did precisely this to determine men's and women's energy output in relation to their diet. To this end, oxygen uptake was measured during hoeing in the field. The Department would be willing and able to resume such work, provided it were provided with the necessary resources – mainly equipment. Since it is a training institution, it would be able to continue the research, without further assistance, once it had been set up to begin. It would be extremely worthwhile to have data on, for example, the difference in energy expenditure with different weights of hoe, and relate them also to job performance.

Mechanization Policy

An interviewee from the Agricultural Engineering Department of Makerere University stated that his Department had not so far paid any specific attention to women's needs. However, he stressed the importance of those needs being taken into account, especially by manufacturers. He said that the national agricultural mechanization strategy now in preparation did include gender issues, but that manufacturers would need to be influenced in the right direction. This might be done by the Ministry of Agriculture, or through such existing bodies as the National Council of Science and Technology, or by creating a national task force on agricultural mechanization that would include manufacturers.

The same interviewee mentioned that the Ministry of Agriculture and its extension services had hitherto downplayed mechanization; but that when they had taken any initiatives in that area, they had been focused on tractors rather than taking a broader perspective that included animal draught and hand tools. Since more than 80% of all farming operations are still carried out with hand tools, this should be a priority area. Research geared directly towards women's needs was also lacking. The interviewee stated that current designs of implements and tools were not based on ergonomic principles, and that research in this area would be important.

Producers/Importers of Agricultural Production Tools

Chillington of Jinja (Crocodile Brand)

The Chillington plant in Jinja that makes the Crocodile brand of hand tools is up for sale. It is possible that a consortium, including Zimplow of Zimbabwe and Magric (Uganda) Ltd., will buy it. The plant has closed down one of its production lines but the remaining line can produce 5 000-6 000 hoes per day in two shifts. Normal production, however, is about 3 000 per day.

The hoe range produced by the Chillington plant includes 1.5, 2.5 and 3 lb. models. The staff of the plant stated that there was no market for the smallest of these tools and that they intended to discontinue production. This is curious because most women's groups said that they would like lighter hoes for weeding.

SAIMMCO (Soroti Agricultural Implements and Machinery Manufacturing Company)

This company was originally founded in 1990, and a full programme of rehabilitation and development of its plant was begun in 1993 with support from the United Nations Development Programme (UNDP)/UN Capital Development Fund (UNCDF). At present, it is owned by the Government and UNCDF, but it is up for sale as part of the Government's privatization programme. A Dutch development project working in the Soroti area was a potential buyer, but the Government would prefer a commercial venture to take it over.

SAIMMCO's production consists of ox-drawn ploughs, a tool bar system which allows for the interchange of plough or cultivator bodies, ridgers, harrows, ox-carts, etc.

SAIMMCO has no system of direct contacts with farmers: its distributors throughout the country and for export are Magric (Uganda) Ltd. The majority of implement sales are to NGOs, development agencies and projects. These buyers pass them on to farmers, usually under special credit arrangements.

Many farmers complained that the SAIMMCO cultivator was too heavy, a view not shared by SAIMMCO's Managing Director. Neither did he agree that lighter implements were necessary for women, saying that it was only lack of training that prevented the women from using them. When they were trained, he added, they were often better at steering them than men. (The authors wish to emphasize, however, that the main problem is turning the implement on the headland, not control-