Chapter 1

Main Findings

Differences Between the Countries Reviewed: General Observations

There were significant differences in the levels and types of tools and implements used in the five countries reviewed. Although there were strong similarities among the axes, harvesting sickles and slashers, some tools were not available in all the countries. For example, no wheelbarrowers were seen in Senegal; and there were no rakes or multiple-tined forks for composting in Burkina Faso although it was the only country which had a simple home-made row marker – like a large rake with three spikes set at the desired row-width – that could be pulled across the field by hand before planting. In countries of eastern and southern Africa, row-planting by hand is achieved with the much more cumbersome technique of stretching a marking wire or cord across the plot; and, in Uganda, women have adopted a flexible steel strip, normally used to tie roof timbers together, as a tool for weeding millet.

With the exception of the very practical row marker, the lowest end of the production technology scale was found in the Central Plateau of Burkina Faso. Most of the country's population live in that area, but conditions are so difficult that few farmers have anything but a hand-hoe as their main production tool. The few animal-draught implements seen in the Central Plateau area were built by blacksmiths and were usually fitted with a duckfoot tine for inter-row planting. No industrially-produced implements were found in the area of the study in Burkina Faso, probably because such items cost about twice as much as those built by blacksmiths and no credit is available to buy them. Indeed, credit organizations that previously provided five-year loans for animal traction packages no longer do so on the grounds that this is no longer viable in the Central Plateau.

"In the past we used ox-drawn implements, but not any more. The implements are 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 Zambia

In Senegal, many animal-draught implements are still in use today thanks to major government/donor efforts to promote animal traction from the mid-1960s through the end of the 1970s. However, the credit schemes that made this expansion possible collapsed in 1980, and thus most of the implements are old and show signs of repeated repair. Even so, and as an example of the degree to which animal traction has taken over, hand-planting of crops has virtually disappeared in the study area. Old, single-row planters – usually horse-drawn – still serve their purpose, and women demonstrated how they used to plant with hand-hoes in the past. At the time of the study, plans were afoot to re-launch agricultural credit schemes which, with a repayment period of up to five years, would once again allow for the purchase of industrially-produced animal-draught implements. From 1980 to 1997, almost all new implements were built by blacksmiths.

In Uganda, animal traction is confined to the northern and eastern parts of the country. The reasons for this relate to history, culture and the presence of tsetse fly in other areas, although this pest is well on the way to being eradicated. Hoe farm-

ing is still the norm in central Uganda, where conditions for agriculture are very favourable. But there is growing interest in animal traction, and a factory in Soroti is producing animal-draught implements.

The hand-hoe also predominates in Zambia. The spread of animal traction in the country has been impeded by several factors, including high import duties on raw materials that make it virtually impossible for the manufacturers to survive. The factories that existed in the country have collapsed over the last few years, and implements now have to be imported from Zimbabwe where both exports and steel are subsidized. In recent years, the tick-borne Corridor Disease has decimated the cattle population, including draught oxen, and as Zambia has no significant donkey population, these animals have to be imported from Zimbabwe or Botswana.

Of all the countries covered by this study, Zimbabwe has the highest level of farm production technology. Animal traction, mainly with oxen but also donkeys in some areas, is very widespread. One reason for this is the presence in Bulawayo of an impressive manufacturing facility for animal-draught implements, which has been in existence in one form or another since 1929. In addition, the general level of the Zimbabwean agricultural economy is superior to that of the other countries reviewed, and this obviously facilitates investment in tools and implements.

There is an interesting difference in the cultivation practices followed in the countries reviewed, particularly between those in West Africa, which are Sahelian countries, and those in eastern and southern Africa. Where animal traction is used in Burkina Faso and Senegal, mouldboard ploughs are hardly ever used, although they are the norm in Uganda, Zambia and Zimbabwe. In Burkina Faso and Senegal, a cultivator is usually run over the surface of the field, immediately followed by the mechanical or hand-planter. This difference is probably due to climate and soil types: during the dry season in the Sahel, the hard soils make it difficult to use the mouldboard ploughs and, given the very limited rainfall and short cropping season, planting must be done as soon as the first rains fall and soften-up the surface. A cultivator quickly loosens up the top few centimetres of soil so that the planter can be used, and thus it can be said that 'necessity is the mother' of decisions regarding low-till or no-till in the Sahel. Deeper primary tillage is used only for groundnuts and maize so as to retain more soil moisture in areas where the rainfall is barely sufficient for this purpose.

The Role of Women in Agriculture

In recent years, much has been written about the role of rural women in Africa. This being the case, the present report provides only the salient points that emerged from the study, placed in the context of how they relate to production technology used by women[1].

The agricultural systems and women's role therein were found to be similar in the

1. A complete picture of the situation of rural women in Africa and elsewhere can be obtained from such publications as: *IFAD's Strategies for the Economic Advancement of Poor Rural Women*, 1991; *The State of Rural Poverty*, IFAD, 1992; and *Household Food Security; Implications for Policy and Action for Rural Poverty Alleviation and Nutrition*, IFAD 1996. *Rural Women and Food Security: Current Situation and Perspectives*, FAO, 1997.

"If a woman starts to earn too much cash from her garden (plot) she will get into trouble with her husband."
Comment by member of field research team, Zimbabwe

"Women work their individual plots very early in the morning or late in the afternoon, when they don't have other tasks such as cooking and when they are freed by their husbands."
Conclusions of research team, Burkina Faso

"Women do the work; men are in charge!"
Extension worker and field researcher, Burkina Faso

five countries covered by the study. There is usually a family plot of land, typically ranging from 2 to 5 ha which is assigned to the male head of the family by the village leaders or local authorities. The man allocates a small piece of the land – usually about 1 000-5 000 m^2 – to his wife or to each of his wives, polygamy being very common in the countries concerned.

The principal cash crops are grown on the family plot; but in predominantly subsistence situations, such as in Burkina Faso, the staple family cereals are also grown there and the wife is responsible for producing items such as vegetables, pulses, groundnuts, etc., for home consumption and, to a limited extent, for sale.

The family plot takes absolute priority. The women are allowed to work their individual plots only very early in the morning or once their husbands free them after the day's work on the family plot is over.

In the past, there was a clear distinction between men's and women's role in agriculture. For example, in most countries, the men took care of clearing or tilling the land prior to planting, using ox-power when they had it. Where a mechanical planter was available, the men would also undertake that operation, otherwise the women and children would do the planting by hand. Thereafter, all the weeding and most of the harvesting operations were usually done by the women. Today, these distinctions have become blurred. Many men have left the land to work in the towns or neighbouring countries. The phenomenon is so marked in some areas that, according to reports available in Burkina Faso, women sometimes represent as much as 80% or more of the adult rural population. In these circumstances, women have been forced to take on tasks that were traditionally handled by men, over and above their own duties of hand-planting, weeding and harvesting. In the area of livestock, the men usually look after the cattle, but the women are responsible for the milking and for small ruminants and poultry.

Even when they spend most of their time working in town, men are still considered to be the main decision-makers about farming. In addition, they control all sales of farm produce and the family's finances.

Tools

The hand-hoe was seen to be the main farm implement in all the countries covered by the study. Uganda may be an extreme case, but in 1997, it was estimated that almost 90% of the farmers in that country used only hand tools and human labour to work their lands, and that animal-draught power and tractors were used on only 8% and 2%, respectively, of the cultivated land.

The hoe comes in various forms in Africa but invariably it is of the traditional chop-down-and-pull type, except for the long-handled push-pull hoe found in Senegal that cuts the weeds just below the surface of the soil (similar to the so-called Dutch hoe used in Europe). This hoe, which can be used while standing upright, was introduced into Senegal in the mid-1930s and is known locally as the *hilaire*. It is always used for weeding in central Senegal, displacing the more traditional hoes.

The way the hoe's blade is fitted to the handle varies from country to country, but there are three basic methods: (i) the tang fitting, where a steel point, or tang, is burned through the bulbous end of a handle; (ii) the socket fitting, where the steel at the top of the blade is bent into a circular-shaped socket; and (iii) the eye-ring fitting, where the handle is inserted into a forged ring at the top of the blade. The tang and socket fittings can be made easily by blacksmiths, but an eye-ring fitting is usually a sign that the hoe has been produced industrially. Hoes with socket fittings are generally sold without handles, which the buyer makes from wood, whereas the tang-fitting version is usually sold complete with handle because the tang has to be heated and burned through the wooden handle. In some countries (e.g., Senegal), handle-making is the preserve of a certain ethnic group or caste which cooperate with the blacksmiths, another caste, in producing complete tools.

In Burkina Faso and Senegal, very few imported or industrially-produced hoes exist; almost all these tools are made by local blacksmiths from poor-quality scrap. In Zimbabwe, too, most of the hoes are produced by blacksmiths but, here, good-quality steel from old ploughshares or tractor-drawn implements is used. In Uganda, the hoes are almost always of the eye-ring type, and are either imported or made on an industrial scale within the country. In Zambia, there is a mixture of imported and locally-produced hoes, with the latter predominating, at least in the areas where the study was conducted. As in Zimbabwe, the steel used by blacksmiths in Zambia is often recovered from old ploughshares or tractor-drawn implements.

Burkina Faso was the only country where a special planting tool was seen. Known as the *pioche* (pick), this tool looks like a small, short-handled hoe with a narrow blade made from a car spring. In other countries, small hoes, or worn-down larger hoes, were used for hand planting.

In Burkina Faso, the farmers use a tool for marking the rows in the soil prior to planting. This resembles a very large rake with three teeth set at the desired row-width, and it is made either of tree branches (by the farmers) or of steel (by the blacksmiths). Pulling it across the field by hand is a quick way of scratching the row marks in the soil. In no other country was such a tool to be found and, in most places where hand-planting followed by animal-draught inter-row cultivation is common, the planting rows are marked by stretching a wire or cord tightly across the plot.

Various types of cutting and harvesting tools were found in all the countries reviewed, the most common being axes and pangas, or slashers. The axes were usually made by local blacksmiths, but the pangas were produced locally or imported from countries such as Brazil, India and China. Locally-made and/or imported sickles were found in all the countries reviewed. In Uganda, the farmers use a knife fixed to a small

branch for pruning plantains, and women use small strips of flexible steel, normally used for tying roofing timbers together, as a tool for weeding millet.

Locally-made rakes and forks, mainly for compost-making and preparing seed beds in vegetable plots, were found in all the countries reviewed except Burkina Faso. Although compost-making has become quite common in Burkina Faso in recent years, the farmers are forced to use normal hoes – which are certainly not as convenient as rakes and forks – for this task.

Knapsack sprayers were being used for horticultural production in some communities in the eastern and southern African countries covered by the study, as were watering cans, wheelbarrows, ox-carts, etc. In the West African countries, carts were either donkey- or horse-drawn.

No tractors, power tillers, irrigation pumps or similar motor-powered implements were found in any of the countries reviewed.

Working Posture

One would logically suppose that hand-hoes, especially the length of the handles, would have evolved over time depending on local soil conditions, type of work involved and the user's physique. In general, this evolution – if indeed it is an evolution – has led to the use of short-handled tools that oblige users to bend double, thus causing fatigue and backache. Some groups of women expressed the view that, despite the punishing toil involved in using them, the short-handled hoes were more effective and faster than those with long handles, but some groups expressed interest in testing or acquiring longer-handled hoes.

"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!!"
Women's group in Zambia

"The short-handled hoe is for hard workers while the long-handled hoe is for workers on white commercial farms. They don't shake the soil off the weeds, so after a week they will be there again and the workers can go back and weed again and get money for it."

"A woman who cannot bend her back to weed is lazy."
Women during discussion groups, Zimbabwe

The salient fact that emerged from the group discussions was that ideas about the length of the handle and the working posture have become enshrined in people's minds in accordance with their culture, tradition and ethnic group. In the majority of the countries reviewed, it was generally felt that to work standing upright with a long-handled tool was a sign of laziness.

This perception was, however, completely absent in Senegal, where almost everyone uses the long-handled push-pull *hilaire* hoe, and it is becoming less widespread in Uganda. However, in Burkina Faso, Zambia and Zimbabwe, the connection between standing upright to work and laziness is deeply rooted in people's minds.

The Fulani people in the north of Burkina Faso use long-handled hoes. However, they are mainly nomadic herders, and sedentary farmers in many parts of Africa believe that nomads and herders work less than those who till the land.

In the area of the study in Zambia, migration from different parts of the country brought in ethnic groups with different traditions about handle lengths; but even after integrating into a single community and living and working harmoniously together, each ethnic group retains its traditions with regard to the length of its hoe handles.

Some years ago, an attempt was made to introduce jab planters in Burkina Faso. However, of the 1 000 specimens distributed to farmers, 840 had to be taken back. Unfortunately, no attempt was made to determine why the planters were rejected, but it may well have been that since the planter could be used in an upright position, it seemed like a lazy solution.

"Standing up is lazy.
The social issues are stronger than the engineering issues!"
Interviewee at the Agricultural Engineering and Soils Department, University of Zimbabwe

In Zimbabwe, some groups claimed that long handles were only used by lazy people, such as prisoners and paid workers on commercial farms. Recent attempts by a German-financed project to introduce a wheeled push-hoe, which is very common in Asia, have been unsuccessful to date and one of the main obstacles to its adoption may be that it can be used in an upright position.

Whatever the reasons for Senegal being the only country of the study where long-handled push-pull hoes are used, it is clear that working posture has implications for any attempts to introduce new tools to Africa in the future.

Without doubt, even though they are back-breaking to use, short-handled weeding hoes have the advantage of allowing the farmers full control of the hoe while he/she works around the plants, leaving the other hand free to pull out the weeds and shake the roots free of soil. In Zimbabwe, the advantages of short-hoes were explained more cogently than in other countries, even if the groups complained about the pain and fatigue they caused. In Burkina Faso, one women's group said that although they would like longer handles on their hoes, their husbands would never allow it.

Other than the above-mentioned cases in Burkina Faso and Zimbabwe, there were no other instances where the rejection of new tools might have been due to cultural conditioning about the working posture. On the other hand, no cases were found of new tools being introduced that involved a change in working posture, with the exception of the *hilaire* hoe in Senegal. However, the Senegalese have been consistent travellers for decades, even if only as members of the French Army, and it could be that this helped to develop an openness to the outside world and a readiness for change. In addition, the relatively light soils in Senegal facilitate the use of push-pull hoes.

Draught Animals for Women

There were considerable differences in women's use of animal traction in the countries covered by the study. In some regions, for example, in parts of Uganda and Zambia, there are taboos against women working with cattle. In other parts of Zambia, women can work with cattle but they are not allowed to fetch them from their *kraal* or fenced compound. But even where taboos do not exist, men tend to

monopolize animal traction when they are present in the community because, traditionally, it is a man's technology. The same applies to animal traction with horses in Senegal, where men justify the prohibition against women by saying that the implements are too heavy and that the women have not been suitably trained. In point of fact, however, the implements for inter-row work are much lighter in Senegal than in other parts of Africa and even small boys use them. It seems, therefore, that the men's arguments are unfounded.

In countries where there has been a high level of rural male exodus, women are fully involved in using draught oxen or donkeys; and there are no taboos against women using donkeys. It is difficult for women to use the ox-drawn implements found in countries of eastern and southern Africa because of the weight of such implements and the height of the handles.

Small Tractors and Other Motorized Equipment

In Zambia, one women's group had lobbied so successfully that they were to be provided with a tractor in the near future. However, it was only in Zimbabwe that there was any serious intention of introducing motorized mechanization for such groups. A development specialist and an NGO working with women felt that the time was ripe to introduce tractor power for women. Their hypothesis was that private entrepreneurs in rural areas should be helped to set up machinery hire services. Staff of FAO/AGSE believe this might be possible in a country such as Zimbabwe because something similar was planned for Tanzania.

"A woman is a foreigner in her husband's family."
Comment by researcher during Focus Group Discussion training in Zambia

Women's Access to Land

According to the research teams, the national legislation of the countries normally specified equal access rights to land for women and men. In practice, however, society does not honour women's rights. Land is assigned almost exclusively to men and, if a husband dies, his male relatives take the land for themselves and force the widow to return to her parents unless she agrees to marry one of her brothers-in-law who has taken over the land. Normally, it is only the older women with adolescent male children who are allowed to continue using their deceased husbands' lands. Divorce may also leave a woman without land. Women's groups can usually obtain the right to use a plot of land but often it is far from the village and of poor quality. Even worse, the group is usually only allowed to use the plot for one, or at most two, seasons because if they use it for three seasons they acquire permanent rights to it.

Credit for Women

Agricultural credit for all small farmers, whether women or men, is in a state of crisis in the countries covered by the study, mainly because of structural adjustment programmes. For women, it is even more problematic because the lending

institutions normally require guarantees in the form of land rights, which women almost never have.

Formally-constituted women's groups are better placed to obtain credit, but there are many obstacles to obtaining it. For example, obtaining a loan usually means lengthy visits to the nearest town which may be several hours' journey away; it means being able to pay for the cost of transport and for accommodation in the town for one or more nights; and men do not look favourably upon women travelling to town. With their heavy workloads and family commitments, it is difficult for most rural women to be absent from their homes for long periods of time although, in the case of a leader of a women's group, the other members might be able to step in and help her out. Finally, women's literacy and numeracy levels are usually much lower than those of men, and thus women may not be able to handle the bureaucratic aspects of obtaining loans.

"Men think women are spendthrifts and may believe that, if they go into town, they will spend money on silly things such as having their hair plaited. And they might also pick up bad town habits."
Member of field research team in Zambia

"Men worry that if women go to town alone they will spend money on petty or frivolous things, or elope with another man."
Member of field research team in Zimbabwe

The Role of Women's Groups

Women's groups or clubs existed in all the countries reviewed, and indeed they were considered to be a priority area by government services and projects. The policies and practices relating to women's groups were not, however, the same in all countries. For example, in West Africa, the thrust of creating and supporting women's groups tends to be to the exclusion of men. In Uganda, the policy is to include a few men in the women's groups so that they can act as spokesmen and advocates for other male members of the community, and even put up land rights as collateral for group credit. In Zambia, too, some women's groups include men. In Zimbabwe, the emphasis on support to women was so strong in the 1980s that it provoked a backlash of resentment from men. Today, therefore, the focus for support is on the family as a unit. A similar backlash may occur in Senegal, where the men feel that women are being 'privileged' by the development policies of government and the donor community.

"We women will win against you men and we'll bury you!"
Women member of research team in Senegal to male colleagues during training in Focus Group Discussion techniques

Women's groups are of fundamental importance in all the countries covered by the study. Pending a drastic change in men's attitudes and behaviour towards women in rural Africa, groups represent the only avenue for their empowerment and advancement and for giving them access to, and management of, the means of production they need.

The Institutional Sector

Many interviewees recognized the importance of doing much more in terms of the gender aspects of agricultural engineering. However, in the countries reviewed,

no government institutions or universities engaged in research or services such as extension appeared to be giving particular attention to the specific needs of women as far as farm production technology was concerned. Furthermore, the agricultural extension services do not appear to have done much to inform farmers about the tools and implements now available.

Ergonomic Studies

Ergonomic research has been carried out in a number of countries, especially in Asia, to ascertain the energy requirements of hand tools. As a general rule, this is achieved by measuring the oxygen uptake of a person while he/she is working and relating it to the area of ground covered and the quality of the work done. Makerere University in Uganda – the only country covered by the study where there was any experience of this type of work – has undertaken research on people's work capacity in relation to their diet. The University would be interested in resuming ergonomic studies on the use of hand tools if it were provided with the means to do so.

The NGO Sector

Few of the NGOs working with rural women had done, or were doing, much in the area of production technology, despite their awareness of its importance. One NGO in Zambia was planning to import donkeys and implements for the use of women's groups, but this was the most advanced example found in the NGO sector.

Blacksmiths

Blacksmiths are much more numerous and active in Burkina Faso and Senegal than in the other countries covered by the study. One reason may be that the early colonial regime in southern Africa imposed a ban on village blacksmiths because, apart from simple farm implements, they also made arms. The village blacksmith trade has never truly recovered from that ban. However, in West Africa, although the blacksmiths produced arms and farm tools that were dangerously competitive to their colonisers, the more cohesive social structures in the area made repression against blacksmiths less effective. Or, again, it may be that the particularly strong commercial and trading nature of British colonialism caused the blacksmiths to lose out against industrial interests, just as they did in Europe.

Whatever the historical background, today, the blacksmiths in Burkina Faso and Senegal are central to the rural economy, as they make a variety of tools and build animal-traction implements. As part of a caste system that distinguishes certain trades and occupations, the blacksmiths are at the very bottom of the social order. This lowly status appears to create social cohesion among them, with the result that they often work together as groups in the villages, sharing forges and cooperating rather than competing. This gives them a certain degree of power in their relations with the other villagers, who prefer to buy their tools from the blacksmiths rather than from outsiders. This not only promotes social harmony, but it also makes it easier to obtain follow-up repairs and maintenance.

The blacksmiths' level of technical competence varies considerably. Some who have attended blacksmith training programmes seem to work no better than those with more experience and a family tradition. All the blacksmiths interviewed in West Africa complained that it was difficult to obtain scrap steel for their work and that what they did find was of low quality. In the other countries covered by the study, there appeared to be more availability of spare parts from old ploughshares and tractor-drawn implements.

None of the countries reviewed had any tradition for, or regular practice, of consultation between blacksmiths and their clients with a view to improving the tools they made. Very few cases were found of farmers requesting modifications to the normal line of tools and implements produced by blacksmiths.

The Commercial and Industrial Sectors

Importers and manufacturers are potential providers of tools and implements that really meet women's needs. Unfortunately, none of those interviewed had ever paid much attention to the fact that women are now by far the largest users of their products. These enterprises do no market research into women's needs; they do little, if anything, to provide information on the various models of tools and implements they import or make; and they do nothing to ensure that the full range of their goods is available at sales points. In the main, farmers have to buy whatever they can find.

"The weight [of the cultivator] is not a major problem. People just have to be trained properly to use it."
The expatriate Managing Director of SAIMMCO 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

This problem is illustrated by the experience of one member of the study team who visited a major tool factory in Uganda (Chillington of Jinja) producing a range of hoes of different weights, including a light 1.5 lb. version. The management of the factory stated that it was going to drop that particular model from its range because 'there was no market for it'. Since this contradicted the information emerging from the FGDs, where women repeatedly stated that they wanted a lighter hoe for weeding, the study team member took one of the 1.5 lb. hoes to the countryside and showed it to a group of women. Although they had never seen it before, and had not known of its existence, the women were interested in obtaining this particular model.

The situation is similar with the Chinese hoes (Cock brand), a vast number of which have been imported into countries of eastern and southern Africa. Several weights of this hoe exist, but the farmers are unaware of it and buy whatever they find at their local sales point. In the area of Zambia covered by the study, people previously bought the Cock brand hoes from a local Chinese rice development project; but, when the project closed down, so did the sales point for the hoes. People said they were very good and that they would like to be able to buy them again: they did not know that they were easily available in Lusaka, about 70 km away.

In Uganda, the SAIMMCO factory in Soroti produces animal-draught implements that are generally very good but too heavy for women to use comfortably,

especially the cultivator. The general manager of the plant dismissed the problem as being only a matter of proper training.

The most important manufacturer of draught implements and other tools in Southern Africa is Zimplow Ltd. of Bulawayo. According to the management of the factory, it made no distinction between men and women farmers. Zimplow's main product line – especially the five-tine cultivator – is too heavy for women. The company also makes a lightweight three-tine cultivator and recently launched a donkey plough. However, since these implements were never mentioned in the discussion groups, it may well be that no one even knew they existed. The donkey plough was not launched with women in mind: it was only after the serious droughts of the last few years killed huge numbers of cattlej that Zimplow thought such a plough could put the country's donkey resources to good use.

"We don't normally bring gender issues into our business. We just look at the farmer as such."

"We are just manufacturers. We don't have animals or our own farms."

Remarks by Zimplow management team

"Most tools for farming were originally meant for men, but circumstances now force women to use them."

Men's discussion group in Zimbabwe

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

Men's discussion group in Zambia

It is almost as if Zimplow (which has existed for almost half a century) and other manufacturers, too, are unaware of the changes that have taken place in African farming. They do not appear to realise that it is now women who do by far the most work on the land. It cannot be said that it is the manufacturers' *market* that has changed because, in effect, it is usually the men who buy tools and implements. Even if the men *say* that their women need lighter tools and implements, when it comes to buying them, they decide on the implements they have always known, regardless of the fact that they may be too heavy for their wives.

What is certain, however, is that none of the manufacturers or importers have any systematic contact with their clients or undertake any real market research. The study team found only one exception to this, the company known as URPATA Sahel in Senegal which grew out of a development NGO. The name is an acronym for the French version of 'Unit for Research, Production and Assistance for Appropriate Technology Adapted to the Sahel'. It has established regular links with farmers, discusses its implement designs with them, and ensures that its new products meet farmers' needs.

Going back to the issue of the weight of implements: to be fair, the manufacturers are doubtless concerned with the strength and durability of their products. It is also true that, to make them lighter and durable, they need higher-quality steel. This is the problem that Zimplow has run into with its new donkey plough: to make it light yet strong calls for a beam made of imported high-carbon steel, and thus it is almost as expensive as the traditional ox-plough. As a result, it has not sold well so far and the management of Zimplow does not seem overly interested in promoting it.

The point of most concern, however, is that the commercial and industrial sectors dealing with farm tools and implements appear to be out of touch with their clients. As a general rule, they do not appear to recognize that almost all farming operations are done by women today and that women have special needs with regard to the tools and implements they use.