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Oxen−drawn weeders reduce workload

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Long, heavy working days during the weeding season are felt by farmers, particularly the women, to be one of the major problems in agriculture in North Sukumaland, Tanzania. Following participatory surveys by the Lake Zone Farming Systems Research programme in 1992 farmers have successfully tested the use of oxen−drawn weeders to reduce labour constraints.

North Sukumaland in northern Tanzania, southeast of Lake Victoria, has a long tradition in agriculture. With an average annual rainfall of 800−950 mm agriculture is seasonal. Cotton, rice and locally chick pea are the major cash crops and maize, sorghum, rice, cassava and sweet potatoes form the main food crops. The landscape varies from flat to rolling. The variation in soil types is considerable, ranging from exhausted sandy soils on hill tops to fertile heavy clay soils on the bottom of the valley.

Cultivation of these heavy soils started some 40 to 50 years ago following the introduction of the plough. A high portion of the land can be cultivated which has resulted in high population densities, of upto 150 people per km^2.

Cattle play an important role in the Sukuma culture although crop−livestock interaction is largely limited to pulling sledges, carts and ploughs and improving food security. Cattle, owned by half of the households, nowadays compete for scarce resources. Agriculture in this zone is still to a large extent subsistence−oriented. Monetary income of farmers is low and the support they receive in the fields of agricultural extension, marketing of produce and credit facilities is not enough. The use of external inputs is, not surprisingly, very limited.

Farmer Research Groups

The use of oxen−drawn weeders in inter−row cultivators, implies quite a number of changes and new skills. Crops should be sown in rows instead of broadcasting the seed, oxen have to get used to walking between the rows and obeying new orders, a different yoke has to be made, weeders have to be adjusted in depth and width of the weeding operation and farmers have to get used to handling the oxen−drawn weeder. Farmers who participated in the test received training in all these aspects.

With the start of the ox−weeder test a Farmer Research Group (FRG) was formed in each village. The FRG is an informal group of 15−30 men and women farmers participating in research activities, who meet every 1−4 weeks to exchange experiences on the research activities. Most of FRG meetings are attended by the village extension worker. Research staff regularly participates to discuss progress, to evaluate experiments or plan new activities.

Recently the third season of testing has been completed. About sixty households participated by establishing a hand− and an ox−weeded field. Management decisions such as the soil type chosen or the time of sowing and weeding, were left to the farmers. During these three years farmers have well mastered the technology and incorporated it in their farming practices. The size of the ox−weeded fields has increased to an average 0.6−0.8 ha during the last season.

Workload strongly reduced

Farmers considered the time saved through ox−weeding as the biggest advantage. While on average 170−180 person−hours were required to weed a hectare of land by hand hoe, this is reduced by 70−80% if ox−weeded. Roughly half the time in ox−weeding was spent on complementary hand−weeding of weeds growing in the rows where the weeder cannot remove them.

While ox−weeding facilitates timely weeding, it also allows farmers to spent more time on other activities. Women farmers, who traditionally do most of the weeding, expressed strong feelings on the latter point. The time saved allows them to take better care of their "own crops", such as sweet potatoes and cow peas, crops which are mostly grown on ridges where the ox−weeder cannot be used. Furthermore, their workload is reduced at a time of the year when women make extremely long working days.

Sowing in rows

As the work with oxen is traditionally a man's job, most of the ox−weeding was done by men. And although women have shown to be very capable in using the weeder, they do not consider their replacement a problem. Women did, however, carry out much of the complementary hand weeding in the rows. All farmers consider increased crop yields a major advantage of ox−weeding. However, the perceived increase in maize and cotton yields is mainly due to the higher plant densities of crops sown in rows as compared to the customary broadcasting of seed.

Sowing in rows requires more time than broadcasting seed. This resulted in several initiatives of farmers to look for a fast, but good method of sowing in lines. One of the most striking results is a frame with three small seed outlets, made out of a tube and scrap metal, bound together with a rubber string. Pulled by one man, three shallow, parallel furrows are drawn in which the seed is thrown. The implement was used by several farmers with better results than the method proposed from the researchers' side to make shallow furrows using a plough.

Weeding intercropped fields

Following a request from women farmers the use of the weeder in intercropped fields was tested. Women feared that intercropping of maize and sorghum with their food legumes such as cowpeas, groundnuts and green grams, would become difficult with the weeder. The test showed that when sown in the row of the main crop and if weeding is done timely, even the trailing cowpeas can be grown without any difficulty in ox−weeded fields.

Although not ranked as a main advantage of the weeder, farmers said that ox−weeding improves the growing conditions of the crop. Hand−weeding is often done very superficially, allowing fast regrowth of weeds and depending on the soil type, leaving the top soil crusted. According to farmers, ox−weeding improved water infiltration and soil aeration, which resulted in less wilted crops during dry spells.

Spreading the experience

Both men and women farmers have welcomed the weeder as a major improvement in their farming system. The enthusiasm with which the weeder was used resulted over the last two years in a number of spontaneous activities undertaken by the Farmer Research Groups aiming at informing and training other farmers. Farmer Research Groups have responded to requests of farmers from neighbouring villages by organising one−day training events in using the weeder. In most cases this was done by a small delegation of men and women who, with a weeder tied to a bicycle, visited another village to explain and practise the weeding.

Following a request from researchers Farmer Research Groups have successfully trained farmers and technicians from Districts elsewhere in the zone. After one year of testing by farmers, this has already resulted in a demand to buy weeders. Meanwhile, farmers in the research villages have started to buy weeders with the research programme as temporary intermediary.

Experimentation intensified

The successful technology and participatory research approach stimulating the exchange of experiences between FRG participants and between FRGs of different villages, has also stimulated farmers to intensify experimentation. Observed examples of farmer experiments linked to the ox−weeding technology included the making of muzzles to avoid that oxen eat from the crop, sowing techniques, intercropping with food legumes and melons, improved maize seed and increased manure applications.

While in many songs a bright future is depicted for the farmers in Sukumaland once the weeder has been introduced, the actual introduction might be hampered by low farm income and the absence of the weeder on the local market. The recent improvement in cotton marketing following liberalisation of the cotton market in Tanzania may, however, create the favourable conditions for its introduction. Members of the Farmer Research Groups are expected to play an active role in its dissemination.

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