

# Farmers' informal knowledge in animal traction: case studies from the Southern Highlands of Tanzania

by

E Kwiligwa<sup>1</sup>, J Rock<sup>1</sup>, M Massunga<sup>2</sup> and M Sizya<sup>2</sup>

1) Ileje Food Crop Production Project (IFCPP), PO Box 160, Itumba, Ileje, Mbeya, Tanzania

2) Oxenisation Extension and Training Services (OXETS), PO Box 873, Mbeya, Tanzania

## Abstract

The Ileje Food Crop Production Project (IFCPP) is a Coopibo (Belgian Organisation for International Cooperation) supported project operating in Ileje District of Tanzania. Oxenisation Extension and Training Services (OXETS) is a business organisation based in Mbeya but operating throughout Tanzania. The two organisations are working together to promote animal traction in Bulambya Division, Ileje District.

Both organisations believe in the participatory process as an important tool to improve farmers' self-confidence and strengthen their ability to take development into their own hands. The participatory rural appraisal (PRA) approach is used, whereby farmers are mobilised to analyse problems, seek possible solutions, experiment, and then evaluate the results according to their preferences. During the process valuable knowledge and experience of farmers are utilised as well as formal technical knowledge.

This paper describes two case studies that show how farmers are involved in developing solutions to their own problems. The problem in the first study is that ox carts are too expensive in the area; the solution has been to develop an improved four-wheeled sledge, with bush bearings made from used tins, a raised platform and wheels lined with rubber from used car tyres. In the second study farmers have identified some medicinal plants for treating draft animals. For example, utupa or fish poison (*Tephrosia vogelli*) is used to control ticks in livestock. The medicinal plants selected have been sent to the Tropical Pest Research Institute (TPRI) for identification and further work on classification, active ingredients, toxicity, dosage and alternative uses.

## Characteristics of Ileje District

Ileje is one of eight districts in Mbeya Region in the Southern Highlands of Tanzania. It is located between latitudes 9° 15' and 9° 38' south and longitudes 32° 50' and 33° 45' east along the Tanzania–Malawi border. Ileje District has two

divisions, with distinct agro-ecological zones. Bundali Division is in the highlands: it covers about 1000 km<sup>2</sup> in the south-west part of Tanzania, and much of the area is dissected escarpment with slopes generally exceeding 30% at altitudes between about 1200 and 2000 m above sea level (Kwiligwa, Ley and Mfanga, 1994). Bulambya Division is in the lowlands, at altitudes ranging from 1200 to 1700 m. The Songwe river passes through Bulambya Division, giving it a high potential for irrigation.

Bundali Division has a cool climate with annual rainfall of 1500–2000 mm: rain falls through most of the year (with only a two-month dry season). Bulambya Division is relatively dry with distinct dry and rainy seasons. Rainfall is erratic and rather unreliable, spread over six months (November to April). The low rainfall in the 1993/94 season led to drought and hence a serious food shortage

According to the 1988 census Ileje District had a population of 88,580 people (52% female) with a density of 40 persons/km<sup>2</sup> in Bulambya Division and 100 persons/km<sup>2</sup> in Bundali: the average population density over the whole country is only 26 persons/km<sup>2</sup>. As a result land is scarce, especially in Bundali Division.

## The farming systems

Agriculture (including livestock) is the chief source of income in the area: even the urban community is actively engaged in this sector. The major cash crops in Bundali Division are coffee, cardamom and bananas; the important food crops are maize, beans, sweet potatoes and bananas. Bulambya Division has no specific cash crop: the major food crops – maize, beans and sweet potatoes – are sold as cash crops when there is surplus production. Production of some traditional crops such as finger millet, groundnuts, sunflowers and cassava is increasing. Sunflowers and rice are

potential cash crops in Bulambya Division and their production is increasing rapidly because there is a promising market. Ridge cultivation, mixed cropping and agropastoralism are important components of the farming system in Ileje district. In 1982 the Rural Integrated Development Project (RIDEP) in Mbeya showed that only about 13% of the total land area in Ileje was cultivated by oxen (RIDEP, 1982).

The district has the lowest animal population in Mbeya Region (about 3% of the regional population). The most common animals reared in the district are cattle (zebu), pigs, chicken, goats and sheep. Most of the animals, especially zebu cattle, can be found in Bulambya Division where animal traction is an important technology.

The objective of this paper is to highlight the animal traction activities carried out by the Ileje Food Crop Production Project in collaboration with OXETS (Oxenisation Extension and Training Services). Two case studies are described to show how the projects participate with farmers in technological development.

### Ileje Food Crop Production Project

The Ileje Food Crop Production Project (IFCPP) is a tripartite organisation receiving personnel and financial support from Coopibo (the Belgian Organisation for International Cooperation), CDTF (Community Development Trust Fund) and Ileje District Council.

IFCPP was established in 1989 and has an overall objective of increasing the living standards of the smallholder farmers of Ileje through promoting food crop production. The intervention aims include: irrigation potential tapped, extension services improved, labour productivity increased through the application of animal traction and farmers organised so as to empower them. IFCPP uses Objective Oriented Planning in its planning processes. The project believes in the participatory process as an important tool to boost the self-confidence of farmers (both men and women), and strengthen their ability to take development into their own hands. The Participatory Rural Appraisal approach is used, whereby farmers are mobilised to analyse a problem, seek possible solutions, experiment and then evaluate the results according to their preferences.

During the process valuable knowledge of farmers is utilised either directly or with some modification. More often than not, animal traction activities at IFCPP are subcontracted to (ie done in collaboration with) OXETS, based in Mbeya. OXETS is a privately owned business organisation which originated in the Mbeya Oxenization Project with an idea of sustaining project services. The services provided or offered by OXETS include:

- three-week courses on draft animal technology suitable for rural development workers, coordinators, supervisors and farmer trainers
- one- to two-week problem-solving-oriented training courses/seminars for oxen users
- Participatory Rural Appraisal surveys related to animal traction
- animal traction related studies, for example, impact studies, feasibility studies, etc
- extension related animal traction activities, such as giving demonstrations of different technologies (eg, ox weeding), organising competitions, and designing and producing leaflets, manuals and other promotional materials.

### Animal traction programme

A monitoring exercise in 1995 estimated the number of oxen in Bulambya Division at 18,; most of them in Chitete Ward. There are nearly 250 oxen users, 65% of whom hire animals (mainly from Mbozi District). The cultivated area is about 2840 ha. Assuming that a pair of oxen can plow about 4 ha per season, only about 13% of the land is worked by oxen.

The original strategy of the project was to establish a farm service centre where ox mechanisation could be one of the services rendered by training farmers and their animals and distributing animal-drawn implements. However, very few farmers came to the centre for training. An impact study carried out in 1993 showed that even without major effort from the project (except for distribution of animal-drawn implements), the use of oxen for plowing had increased from 14% in 1989 to 20% in 1993 (IFCPP, 1993). It was then realised that there is substantial networking and knowledge exchange among farmers. The project decided to change its approach and started devoting more effort to catalysing and enhancing farmer-to-farmer exchange of knowledge.

### Village ox mechanisation trainers

In each village ox users select two of their number to be trained as ox mechanisation trainers. These trainers are then supposed to train an agreed number of farmers and their animals each year. The terms and conditions of the training programme are agreed mutually by the trainer and trainees without any influence by the project. The training activities are monitored by IFCPP and OXETS to determine constraints and opportunities.

### Demonstrations and competitions

Demonstrations and competitions are held annually in collaboration with OXETS in pilot villages. Winners in the competitions (gender specific) are rewarded with animal-drawn implements and spare parts. At these occasions farmers exchange knowledge and evaluate the performance of their trainers. They also identify and elect the traditional healers who receive training in modern veterinary techniques (Massunga and Sizya, 1995).

### Case studies

A problem analysis exercise undertaken by a group of farmers in 1993 identified two serious constraints to ox mechanisation:

- they could not afford to buy ox carts, which posed a major transport problem
- they could not afford to buy modern veterinary medicines, which presented a major challenge to draft animal health.

Under the guidance of the project (through follow-up surveys and a workshop), the farmers themselves sought solutions to these problems.

### Case study on traditional sledges

As a follow-up to the problem analysis exercise, IFCPP conducted a survey to investigate the extent to which the rural communities are tackling the problem of unaffordability of ox carts. The survey revealed that several designs of traditional sledges, with and without wheels, are being used (Mbepera and Rock, 1994).

In March 1995 the project organised a workshop for all farmers using sledges for farm transport. The aim was to cross-check the survey results, assess the limitations of sledge designs and propose improvements to make them a more efficient and reliable means of transport. The

farmers analysed the problem of sledges currently in use, and built a problem tree.

Solutions to the problems were discussed. It was agreed that the wheeled sledge is the best option, and that the following modifications would make sledges stronger and increase their reliability:

- provision of plain (bush) bearings (made of galvanised iron pipe or rolled sheet of tin)
- use of tapered scrap-iron bars to join the frame structure
- raising the platform to distribute the load evenly over the wheels
- lining the wheels with rubber from used car tyres to increase cushioning of the sledge
- using harder wood
- more frequent greasing
- avoiding overloading (maximum load 300 kg).

Two farmers were nominated to fabricate the new prototype, and IFCPP supplied the required tools and some of the materials. A farmer in Msia village has already made one of the improved sledges and is now assessing its performance.

### Case study on ethnoveterinary medicine

The same 1993/94 problem analysis exercise, referred to above, identified unaffordability of modern veterinary medicines as a major challenge to draft animal health.

IFCPP's follow-up animal health survey investigated the traditional medicines used by farmers to control the various animal diseases and pests (ectoparasites and endoparasites) common in Bulambya Division. The objective of the March 1995 workshop (attended by users of traditional medicines) was to translate the outcome of the survey into a concrete plan of action (Kwilligwa, Mbepera and Rock, 1995). The basis for this plan was a problem tree developed from discussion of the problems faced by users of ethnoveterinary medicines in the area.

The traditional healers felt that most of the problems could be solved by enhancing knowledge among healers within and outside the project working area. Six of the most important and widely used medicinal plants (*Nanjoka*, *Nandete*, *Namatusi*, *Ikukulemba*, *Pembambuzi* and *Ntelembe*) were selected for further research. Samples of these have been sent to the Tropical Pests Research Institute (TPRI) in Arusha for

classification, identification of active ingredients, and studies on toxicity, dosage and alternative uses.

In the meantime IFCPP is promoting the use of *utupa* or fish poison (*Tephrosia vogelli*) to control ticks on draft animals. To make a spraying solution, freshly picked green *utupa* leaves are dried in the sun for one day and then pounded and mixed with water (1 kg of dried leaves in 10 litres of water) and a small piece of neutral soap (to make the spray stick to the animal's skin). The mixture is stirred overnight. Then it is filtered and ready for spraying. The oxen at the project have been sprayed once a week for more than one year, and no ticks can be found on them.

### Conclusions

External knowledge and farmers' knowledge should complement each other in order to achieve a more sustainable agricultural development. The two case studies at IFCPP give a practical example of integrating formal and informal knowledge in a participatory development process. It is crucial that both the project workers and farmers involved

should play their role effectively so as to avoid frustrating the other party.

### References

- Kwiligwa E, Ley G and Mfanga B, 1994. *A rapid rural appraisal of Bundali Division, Ileje District*. IFCPP (Ileje Food Crop Production Project), Itumba, Ileje, Mbeya, Tanzania.
- Kwiligwa E, Mbepera A J and Rock J, 1995. *Ethnoveterinary medicines and improved traditional ox-carts in Ileje, Tanzania*. Proceedings of a workshop organized by Ileje FCPP 15–19 March 1994. IFCPP (Ileje Food Crop Production Project), Itumba, Ileje, Mbeya, Tanzania.
- IFCPP, 1993. *Preliminary report of impact study: February to March 1993*. IFCPP (Ileje Food Crop Production Project), Itumba, Ileje, Mbeya, Tanzania.
- Mbepera A J and Rock J, 1994. *Report on survey of traditional sledges and ethnoveterinary medicines in Chitete ward Ileje District*. IFCPP (Ileje Food Crop Production Project), Itumba, Ileje, Mbeya, Tanzania.
- Massunga M and Sizya M A, 1995. *Consultancy report on ox weeding training for ox mechanisation trainers*. Report prepared for IFCPP, March 1995. OXTETS (Oxenisation Extension and Training Services), Mbeya, Tanzania.
- RIDEP, 1982. *Proposal for an indicative development strategy for Mbeya Region, 1982 to 2000*. Volume 1. Report 49. RIDEP (Rural Integrated Development Project), Mbeya, Tanzania.