TRAINING OF EXTENSION OFFICERS IN KITETO AND KONGWA DISTRICTS ON ANIMAL TRACTION DURING 2016/2017 CROPPING SEASON

1. Introduction

Farm mechanisation has been an essential part of the modernisation of agriculture for millennia. The process has evolved from the use of hand tools such as hoes to animal drawn implements. Following the industrial revolution in Europe, in the 1780's, the shift to engine powered equipment, the tractor being the most common became prominent. In Africa, the use of animal drawn implements also referred to use of animal traction or animal-powered mechanization, and animal draft, is still common.

In general animal traction, describes the use of farm animals and beasts of burden, to pull farm equipment and vehicles. The most common draft animals are cattle, horses and mules, but donkeys, camels, domestic water buffalo, yaks, dogs, reindeer and even elephants are used for traction in some parts of the world. In Africa the most common beast of burden are oxen, donkeys, camels and horses.

1.1 Benefits of animal traction

Increasingly, farm mechanization has become a high priority in developing nations such as Tanzania. It is important, because non-mechanized farming limits the scale and scope of farming further exacerbating food insecurity. Mechanization can support the expansion the land under cultivation by supporting tillage operations, leading to greater harvests. Other general benefits of mechanization include lightened-workloads, better and more regular yields, or an easing of problems caused by short growing seasons or insufficient labour. Mechanization also can help to produce income with which farmers can acquire goods and services. Yet mechanization is not practical or economical for every farmer. New tools are expensive. Acceptance of new techniques increases dependency on outside technical assistance! Thus the farmer who already produces enough food for his family may be reluctant to risk a known harvest (traditional yield) for an uncertain gain in productivity. Government extension services therefore must strive to give farmers tools, information and advice to enable them to increase productivity.

For most resource constrained farmers animal traction is a major part of their farming. Indeed, it is an affordable and sustainable system that is increasingly being used in Tanzania. The benefits of animal traction are summarized in the box 1.

1.2 Choice of draught animals

Animals should be chosen according to the type of work to be performed, the local environment, socio-economic conditions and the availability of local animals. Indigenous breeds tend to be well adapted to the local environments, feed availability, disease resistant and to traditional management systems.

1. Provides smallholder farmers and rural communities with vital farm power and machinery for cultivation and transport. The activities include ploughing, harrowing, planting, ridging, weeding, mowing and harvesting; they can also be used for incorporating manure into soil;
2. Eases transportation of farm produce and persons providing power for pulling waggons, logs etc.;
3. Can be used to drive water-pumps and draw water from wells and rivers for irrigation;
4. In the building industry, they can be used for assisting in earth moving for road works, for carrying bricks, etc.
5. To provide power for the operation of stationary implements such as threshing machines, grain mills and food processing machines.
6. Reduces drudgery associated with farming and relieving women of the burden of transporting water by hand, head or wheel barrow. Animals are easy to use and donkeys, specifically, can be handled by children and women.
7. Used on a small scale, it does not require radical changes in cropping patterns or the role of family or hired labour.
8. Animals and equipment can be supplied locally with less dependence on external resources than tractors and other machinery. Tractors need fossil fuels, spare parts, and maintenance knowhow which duly not be available to farmers.
9. They are affordable technology. Animals and equipment are low in cost compared to tractors. With careful planning and application can pay for itself in a few years. Low-interest loans are often available through government or sponsoring agencies.
10. It creates work opportunities. The use of animal traction can stimulate the development of artisan resources, increasing jobs for local black-smiths, carpentry and leather makers who produce needed equipment. It also creates work in the areas of transport, water-pulling, and tillage on a contract basis. (Farmers can hire out their teams and equipment) Often new opportunities arise in marketing and agro-industry.

Box 1. Selected advantages of animal traction for agriculture.

Donkeys: Donkeys provide power for agriculture and transport at a low cost and adapt well in dry environment. They eat less than cattle and for this reason, are better adapted than cattle to dryer ecologies and in heavily stocked areas. They are also lighter and smaller than cattle. Donkeys can live a long life and can be worked up to 25 years of age. They can carry goods and people on their backs in hilly as well as flat areas, pull carts, turn mills and waterwheels, cultivate fields and can even be used to guard sheep against predators such as jackal and lynx. Waggons can be pulled faster than in the case of oxen, but donkeys are better suited to lighter field work and cannot work for long periods. Women and children can also handle donkeys. The animals are very patient, hard-working and dependable. The common idea among the general public, commercial farmers and extension officers that donkeys are lazy or eat too much is quite unfounded.

Cattle: Oxen are some of the most powerful draught animals currently used in Tanzania. They are however slow and labour intensive. They are generally used for heavy work where speed is not essential such as when ploughing and pulling heavy carts and wagons. Cows can also be used where the work is light and infrequent (planting and cultivating). Bulls are not commonly used due to insufficient docility.

1.3 Training draught animals

Animals kept for draught purposes can be easily trained if the correct procedures are followed. Animals to be trained should be properly selected and should not be younger than two years. If animals are treated with humanely i.e. with kindness and patience, and are firmly disciplined, they are easy to train and use. People training animals should really like animals. They should never be afraid of them, as their fear will be sensed immediately by the animal and satisfactory training might then not be impossible. Young animals are more easily trained with older ones that have already been trained. Each animal should be given a simple, clear-sounding name and should be fed by hand so that it gets used to people, in particular its handler.

- Animals should be taught one task at a time so that they do not get confused. They should be trained for short periods at a time but on a regular daily basis.
- In the first week of training the animal should get used to the harness by walking around with it for about one hour in the morning and one hour in the afternoon.
- When used to the harness it can be given commands. Soft but firm words and gentle whistles are the best commands. Beating animals should be avoided at all costs and one should never lose one's temper with an animal.
- Ploughing is the most difficult task, so once the animals can plough it is easy to train them for other tasks. Start with shallow ploughing and gradually go deeper. Teach the animals to walk in furrows so that the whole land is ploughed evenly.
- Always try to end each session on a good note and reward good performance with a small quantity of food.

1.4 Procurement of draught animals

Draught animals should be bought in the district where the farmers live as they are used to the local environment, the weather and will be resistant to local diseases. It is important to be careful when you buying animals—people often sell animals that are in sick or weak. Its is important to investigate why the animal seller is disposing it off. Some of the critical things to do include: (i) Examine the animals to make sure that they are healthy, If the animal's coat is dull, it may be sick; (ii) Check for lameness; (iii) A skin disease is often an indication that the animal has not received proper care. (iv) examine the animal's breathing and conformation (shape) to ensure that it is strong and suitable for draught work, and: (v) The back and legs should be straight and the legs not bowed or turned in when viewed from the front (F) or back (B)

1.5 CARE FOR DRAUGHT ANIMALS

- Do not overwork your animals. Rest them frequently during work.
- The load on the carts should never be too heavy for the animal.
- Make sure that the brakes on carts and wagons work properly.
- Grass only may not be enough feed for the animals. Supplement the feed with other food that can be bought from a local milling machines and oil extraction machines.(Maize bran and oil seed cakes).
- Do not feed the animals from the ground as they might get worms. Rather use a feed trough, bucket or empty drum.
- Always provide enough fresh drinking water.
- Get advice from a veterinary officer if your draught animal has worms or any other sickness.
- Never mend a harness with wire because it may hurt the animal.
- Remember to check the animals' feet for stones regularly.
- Always check the ears, face, tail and between the legs for ticks. If there are too many ticks get advice on dipping from a vet or the local stock inspector.
- Provide a good shelter for your animals.

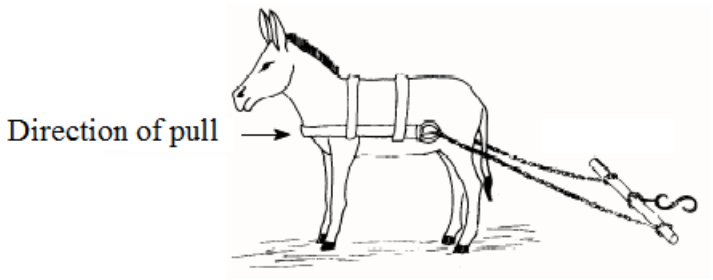
2.0 DRAUGHT ANIMAL HARNESSING

2.1 Background

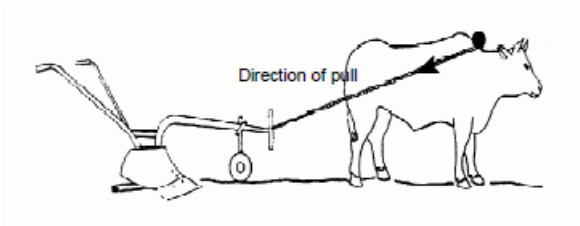
Cattle and donkeys are kept by farmers for many reasons. One of the most important reasons being to provide draught power. They are kept for ploughing, weeding, transporting seed and fertilizer to the farm, manure to the lands and crops to the market. The efficient use of animal traction depends upon the harnessing device, and how well trained and fed the animals are. We have all seen poorly trained animals causing problems when ploughing, or poorly harnessed donkeys with blood running from wounds caused by the traces. Such problems not only stress the animals, but they can also reduce the quality of their work, they also stress the owners. Well trained, well harnessed animals respond to commands, work well and get tired less with little effort from the owner.

The harnessing device is very important as it transfers the power from the animal to the implement, and is more efficient if effort the animal uses results in more power and less tiredness. Optimum draught power is only obtained through an efficient transmission of the animals' effort. Such performance can only be obtained by using the correct Yokes or Harnesses for the task.
You should NOT use a Yoke on a donkey, as donkeys are built differently from Cattle.

1. Donkeys produce all of their power from the chest. (picture)



2. This is very different from cattle, that produce their power from their strong necks and withers. (Picture)

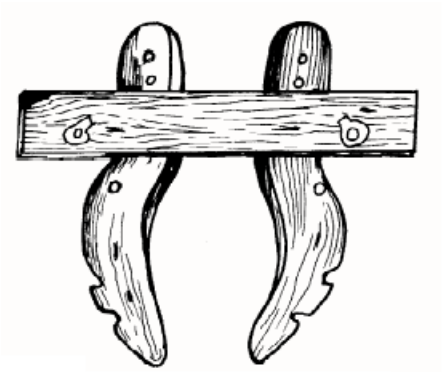


2.1 Harnessing cattle (Oxen and Cows)

2.1.1 Types of yokes

There are two main types of neck yoke that can be used with draught cattle, these are the traditional double neck yoke, which most people use and a single neck yoke. (Pictures)

Double neck yoke

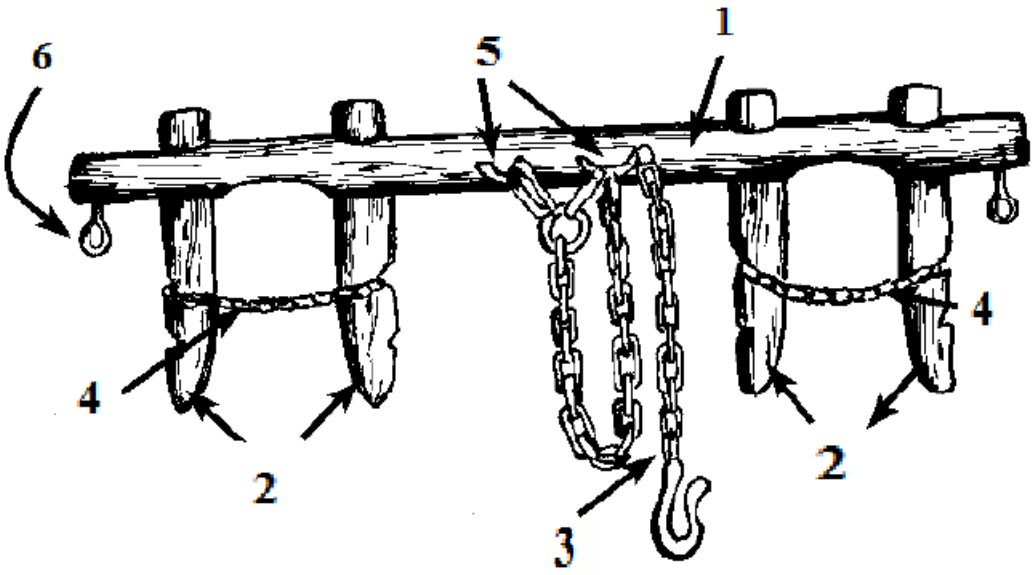


Single neck yoke

Both types of yoke link the animals to the implement to be pulled. However, Yokes should only be used on cattle, and NOT on donkeys!

2.1.2 Double clamp yoke

The double clamp yoke is commonly used because most jobs require the combined power of at least two animals. Below is a diagram showing a complete double clamp yoke with all of the parts:

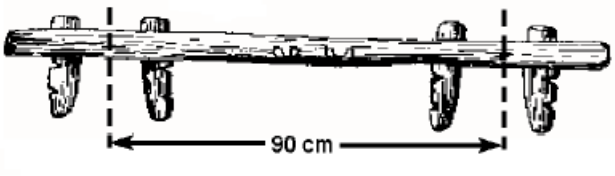


The Trek chain should be at least 3 m long

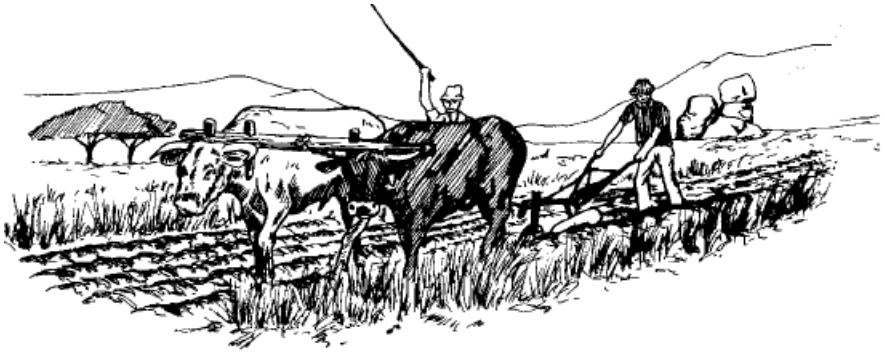
1. Yoke shaft
2. Sky
3. Trek chain
4. Strops
5. Clamps
6. Eyes for steering rope

2.2 Making and using yokes practically on field

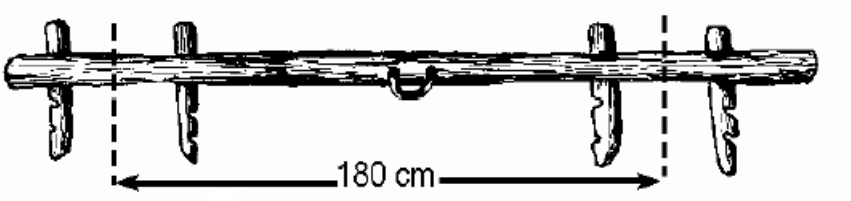
1. The plough yoke can be used for ploughing



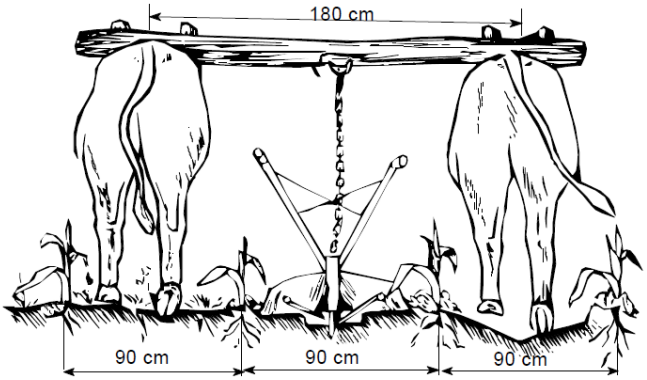
The Plough Yoke



2. OX ridger yoke can be used for ridging, tie ridging, earthing-up, chiselling and for making planting rows.



Yoke for ox-ridging and tie-ridging



2.3 Insitu rainwater harvesting tillage implements

Tillage oxen and tractor mounted implements for preparation of ripping and ridging seedbed.

Plate 1. Tractor mounted ripper

Plate 2. Ox-ripper tillage implement

Plate 3. Ox-ridger tillage implement

Plate 4. Tied ridging prepared using ox-ridger tillage implement at Mlali village during 2013/2014 cropping season