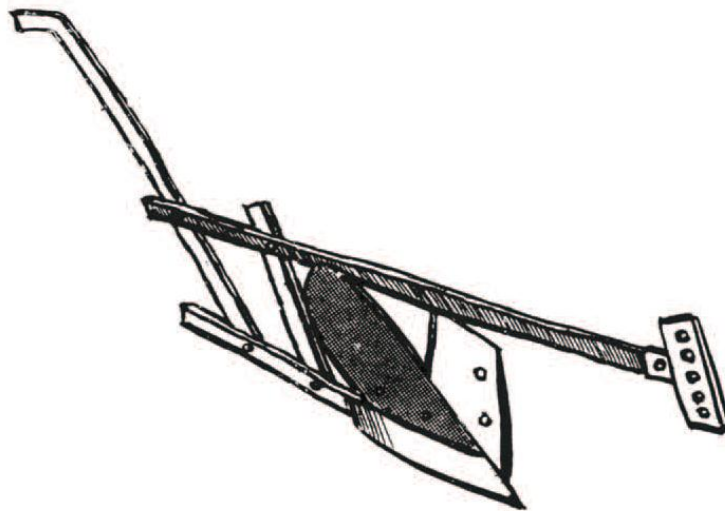




# THE KEBKABIYA PLOUGH

## Introduction

The Kebkabiya Plough has received a great deal of attention due to the success it has achieved in the Kebkabiya area. This plough has been adapted and promoted by Practical Action staff, (formerly ITDG) namely the engineering consultant Mr. Simon Croxton and tile engineer Mohammed Siddig in coordination with a number of local farmers and blacksmiths, who were subsequently trained in manufacturing and maintaining it.

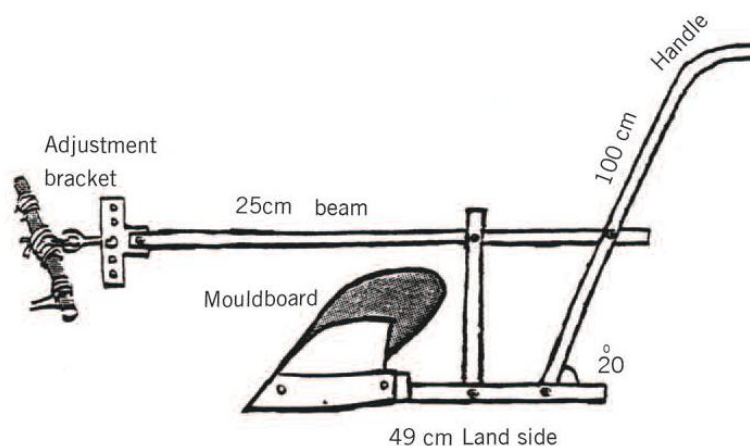


The use of the plough has assisted in increasing the level of productivity. It has also saved time that is now used for other activities that promote development and production.

Practical Action issues this booklet to give farmers a comprehensive account of using the plough effectively as a sustainable agricultural device. It is our objective to render our nation every possible support to enable them to make the best use of the resources available.

## 1. What is the plough?

The plough is an agricultural tool that helps farmers prepare their land by turning the soil, removing weeds whilst reducing the amount of effort required in the process. The plough analyzed in this guide is tile donkey drawn plough.



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technical brief

## 2. The functions of the Kebkabiya Plough

- 2.1. It is used for ploughing which involves the churning of the soil before and during cultivation.
- 2.2. It is also used to remove parasitic, useless" plants more commonly known as weeds.

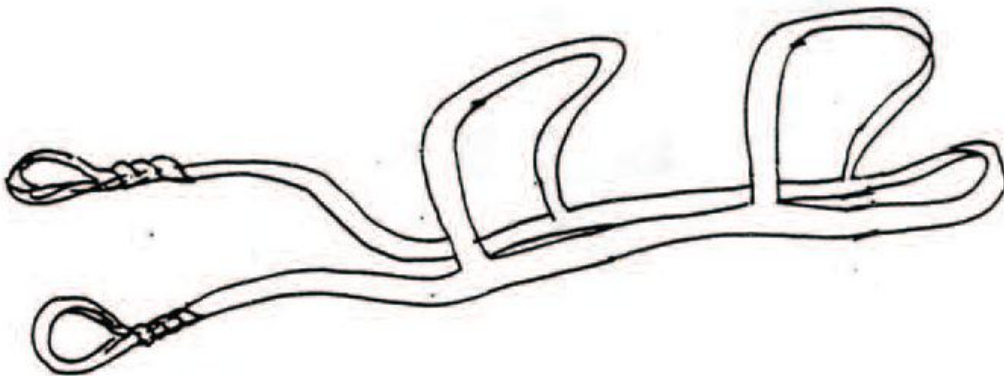
## 3. Harness Preparation

It is important that the harness is the right size for the donkey. Different local materials can be used to make the harness including tanned skin, ropes and canvas.

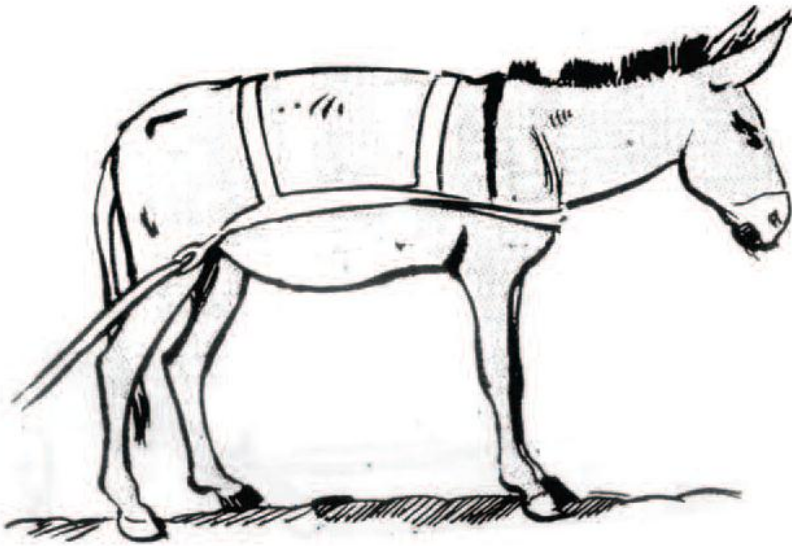
- 3.1. Begin by tying the donkey chest with the harness so that it is able to pass freely either side of the donkey.



- 3.2. Leave additional length on the fringes of the harness, so that it can be sewn easily without affecting the overall length and tie knots at the end for fastening rope.

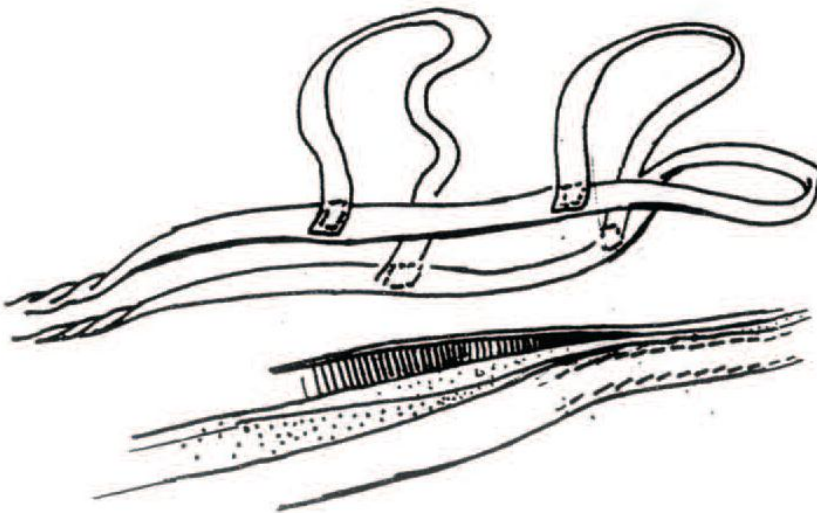


- 3.3. Add two extra belts one around the back ending with the front legs, and the other around the middle of the back.



3.4. The two belts should be fastened by either stitching, or mobile implements (button [looks]).

3.5. The harness must be padded with cloth or sponge so as to absorb sweat and to avoid injuring the donkeys body.



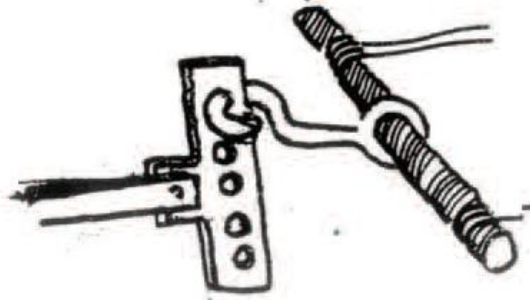
#### 4. Plough Adjustment

An ability to adjust the plough facilitates good and efficient ploughing. Adjustment and balancing is done according to the donkey's height and the required depth of ploughing together with soil humidity and wetness.

There are four or five adjustment holes on the front bar of the plough which allows for the required adjustment. The plough is then tied to the donkey with a rope on both sides and the plough is attached to one of the five adjustment holes.



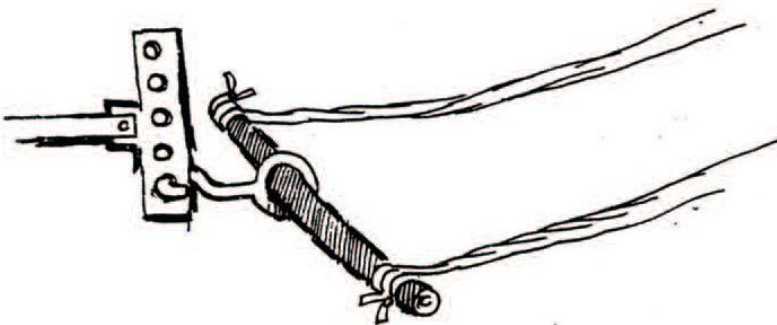
4.1. The hook is connected to the hole furthest along the bar if deep ploughing is required.



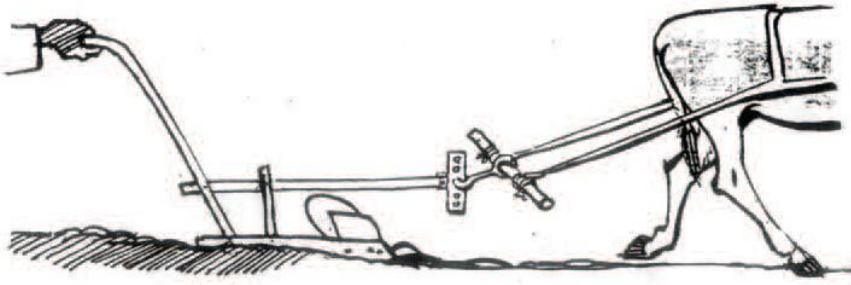
4.2. If medium (moderate) depth ploughing



4.3. When the donkey is tired and soil humidity is low the hook should be connected to the lowest hole.

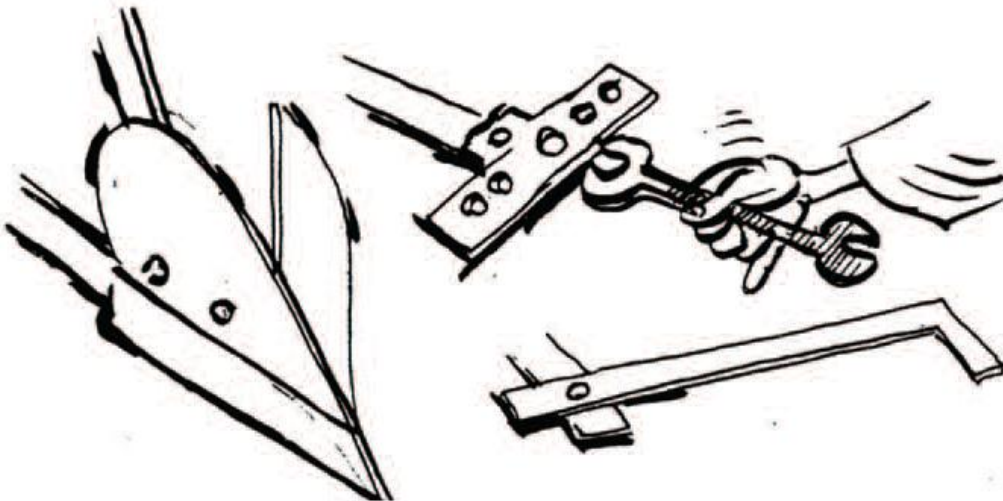


Control of the plough adjustment can be obtained by either increasing or decreasing the rope length between the plough and donkey or by moving the main bar upward or downwards.

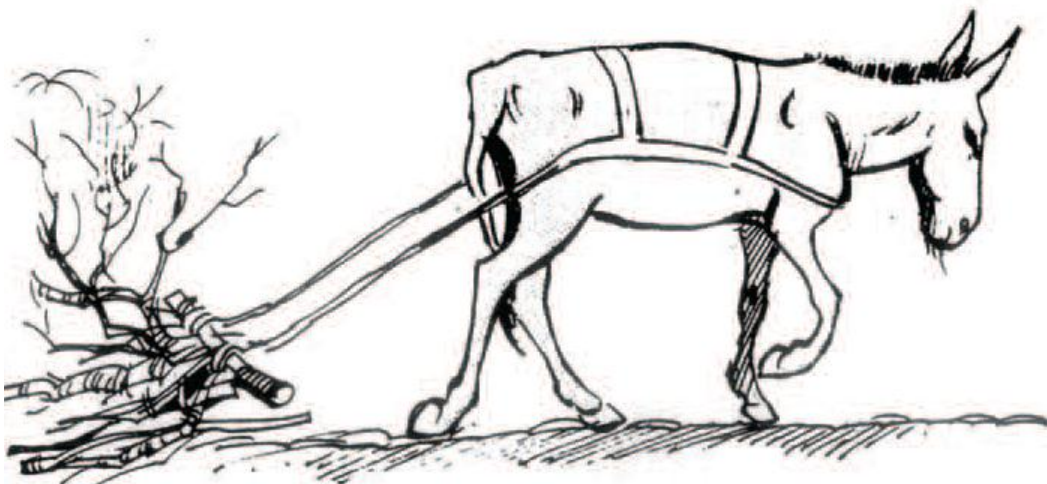


5. Training the Donkey

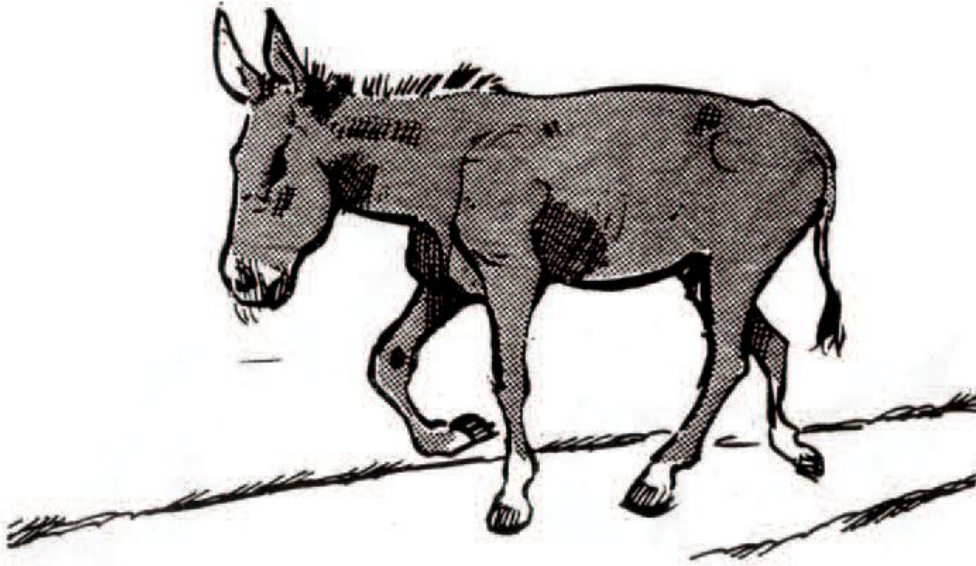
5.1. Make sure that all plough components are fixed and securely connected.



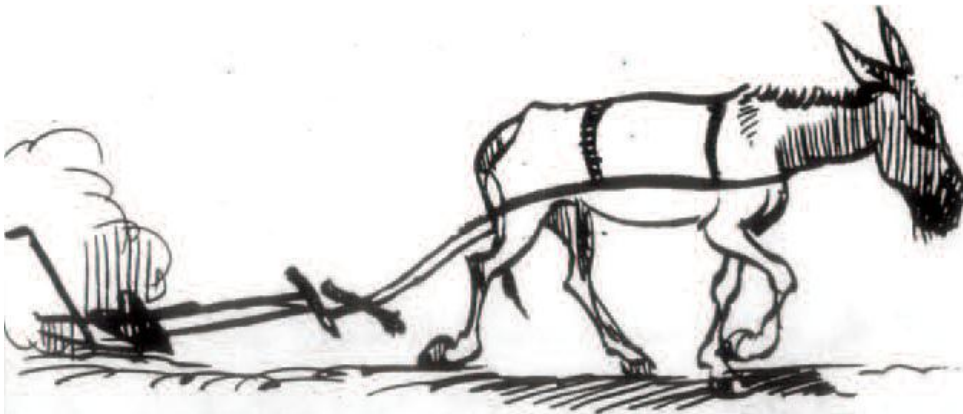
5.2. Make sure that the donkey has been pulling heavy load (such as bushes and branches) for at least a week prior to the date of starting ploughing.



5.3. Dig two parallel lines between which donkeys can practice moving.



5.4. Tie plough on donkey so it can practice pulling it for 3 hours every morning and evening each day.



5.5. Begin with intensive deep ploughing so that the donkey gets used to ploughing without having the tendency to escape.



5.6. Train the donkey to move in straight lines without bridles and to make turns by using a stick and rope.

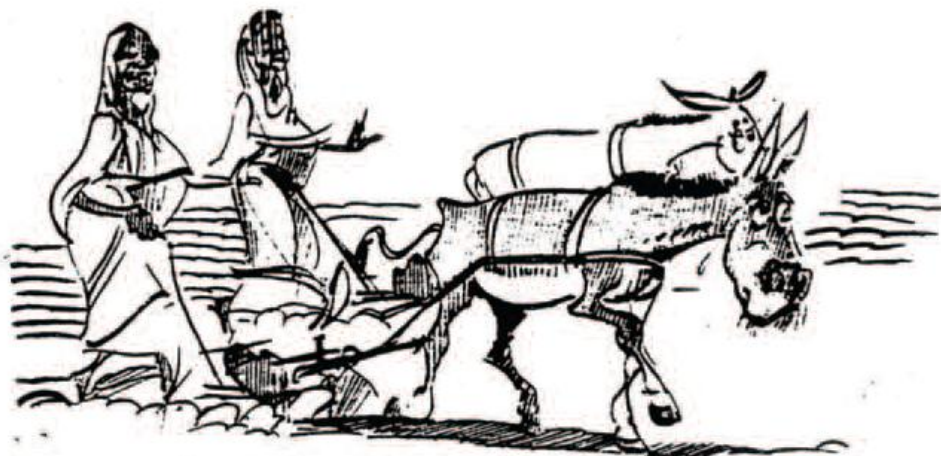


5.7. Build a small straight furrow and let the donkey walk beside it several times to practice moving in straight line.



5.8. Keep the donkey healthy and active. Ploughing hours shouldn't exceed 6 hours a day (3 in the morning and 3 in the evening) to prevent the donkey becoming exhausted. This is actually enough to plough half a "Mukhamas".

To double the area another donkey with plough can be used.



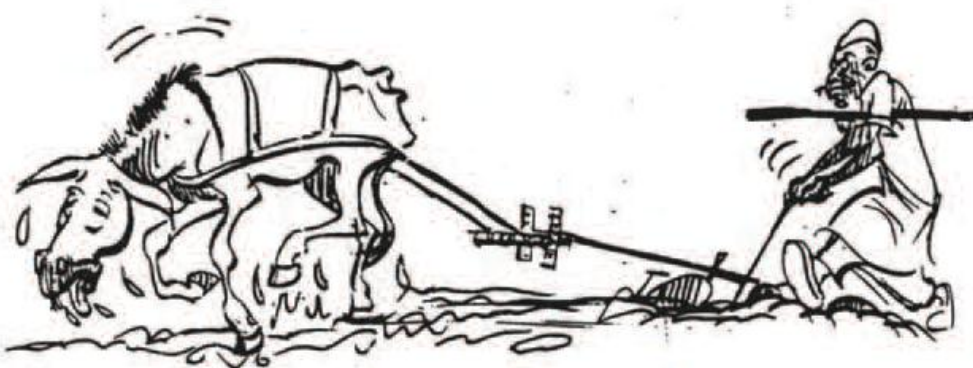
## 6. Ploughing Duration

A week or two after a reasonable amount of rain ploughing can start. It is a time when newly germinating grass will start to grow but ploughing will lead to its eradication.



## 7. Useful Tips

7.1. Ploughing should not be done on dry or excessively wet soils as both require too much extra effort from the donkey. Also deep ploughing can not be obtained.



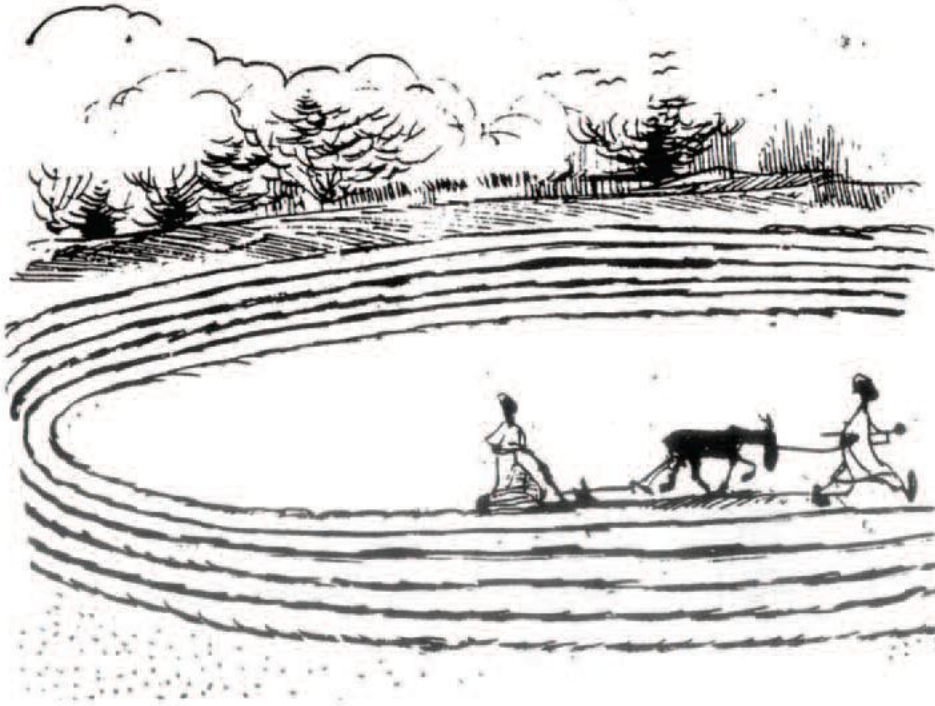
7.2 The Plough should work opposite the natural water course or slope direction because running water is a natural factor for damaging and eroding top-soil. So ploughing against the direction of water helps to minimise erosion and leads to top soil conservation.





## 8. How to Plough?

After fastening the plough and adjusting it for the required depth the donkey is then led in a straight line from one extreme end of the farm in a spiral movement (see shape).



## 9. Why the Kebkabiya Plough?

There are many positive characteristics that encourage farmers to use this kind of plough in the area:

9.1. The plough is locally manufactured, i.e. it can be locally maintained and the spare parts are available.



9.2. It is much cheaper compared to other ploughs. It costs only S DG 65 whereas others cost up to S DG 750.0 9.3. This plough was first introduced in 1990 in Kebkabiya. This gave many farmers the chance to use and maintain it expertly.

9.4. There is an availability of donkeys which are the best animals for Ploughing as they are easy to train.



9.5. Suitability of plough to light soils.

9.6. Using this plough in particular creates a suitable environment for quick germination of seeds.

9.7. It helps to stop soil erosion by minimizing surface drainage.

9.14. A 25% increase in cultivated farm area is reported in comparison to other manual equipment.

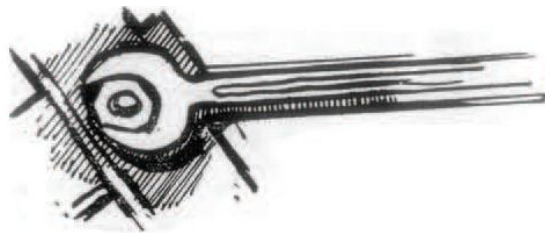
9.15. Great increase in cash crops yield has been observed -50% increases per unit.



## 10. Plough maintenance

10.1. Make sure that all nuts are firmly fastened and that all parts are well balanced.

10.2. Use the right size spanners when tightening and loosening nuts and bolts to prevent damage to them.



## 11. Cultivation

11.0. To avoid soil erosion all tributaries should be buried and covered with soil.

11.1. Animal dung is a great source of natural fertilizer which should be used whenever possible.



11.2. Planting the same crop annually in the same areas leads to land infertility. A plant rotation system should be applied annually.

11.3. Remains of crop stems and other grass humus increases soil fertility and give the soil higher humidity.



11.4. Growing legumes (beans-caw etc...) together with the main crop enriches the soil and provides a new variety of crop in the same area.

11.5. Using terraces and contour lines on hard and sloppy grounds protects the top-soil from being washed away and preserves surface water.



## References and further reading

- *Dead Level Contours* Practical Action Technical Brief
- *The A Frame* Practical Action Technical Brief

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