



PRODUCTION OF APPROPRIATE FOOD: sufficient, safe, sustainable

PROTOCOL FOR ANIMAL IMPLEMENTS

1. Introduction

The harness consists of a set of elements (tools) for the different working operations such as plow, harrow, ridger and cart, etc., and are attached to the draft animals by means of the harness.

2. The tools used and their characteristics

- **Plow** (*fig. 1*): is used to loosen the soil, control weeds, bury manure, green manure or do to cultivate the land. If your soil is not hard, you start plowing during the dry season so that you can start planting as soon as the rains are steady. On hard soils we start plowing as soon as the rains have softened the soil. There are two methods to plow either from the center to the edge (backing) of the field (*fig. 2*), or from the edges toward the center and (slitting) (*fig. 3*). The depth is maintained between 0 and 20 cm. The plow also has negative effects such as erosion and loss of soil organic matter.



fig 1: Plow

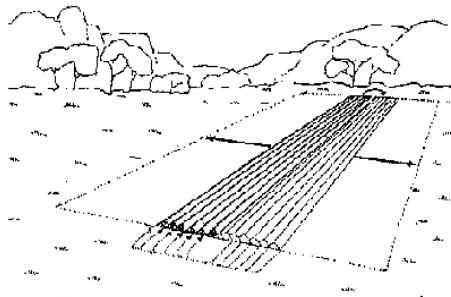


fig 2: Backing labour (from the center to the edges)

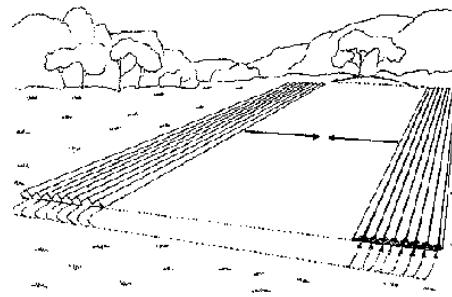


fig 3: Slitting labour (edges towards the center)

- **The harrow:** is used for raking, harrowing and levelling the soil. After plowing, you use the harrow (*fig. 4*) to break big clods of earth and to remove unrooted weeds. It can also be used for burying small seeds sown. Harrow the field not more than 2 to 3 times. Use the harrow across the direction of the plow. Do the second harrowing across the first harrowing. Never park your harrow upside down. The tines can wound man and animal.

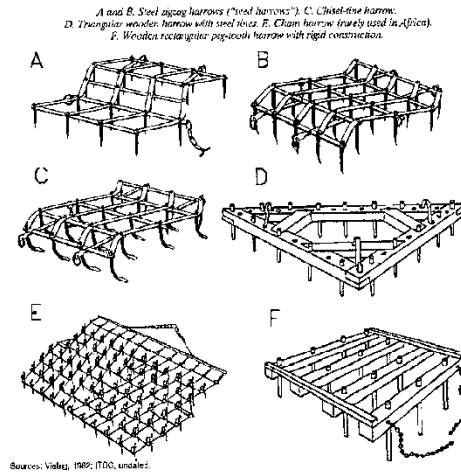


fig 4: The different kinds of Harrow

- **The ridger** (*fig. 5*): This is the most important tool. It is used to prepare the furrows. Ideal to cover the tubers and roots (*fig. 6*), avoids water stagnation. It also facilitates the burial of organic matter (*fig. 7*), sowing, harvesting and reduces the spread of disease, weeds. When cropping on ridges, you do not have to plow after harvest. You use your stopper to divide the old ridges and cast new.

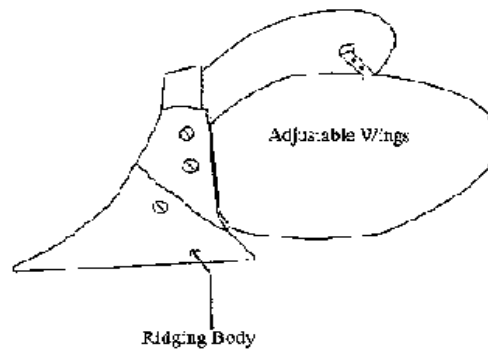


fig 5: The big adjustable Ridger

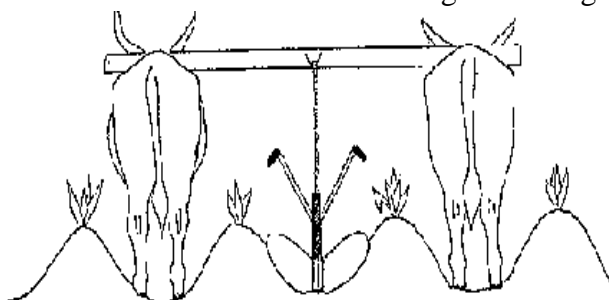


fig 6: For reridging or weeding, the adjustable ridger is attached to the long yoke

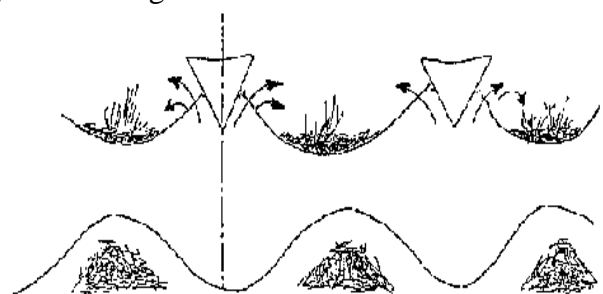


fig 7 : Split the old ridges after the cultivation season and incorporate organic matter in the soil

- **The tine-weeder/ho** (*fig. 8*): is used to control weeds, lifting the roots break the soil surface to improve the flow of air and water, improves yields. the working depth is 2-5cm. The working width is about 40 cm (*fig. 9*). Weeding crops occurs several times during production.

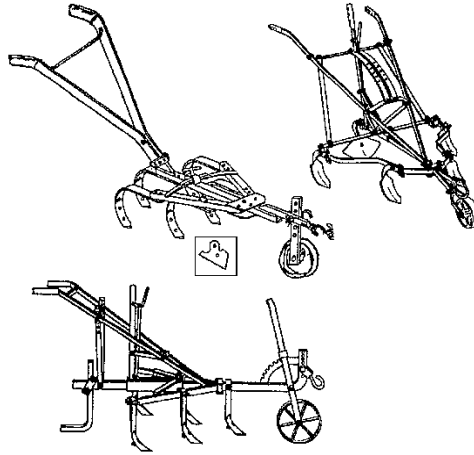


fig 8: The tine weeder/ho consists of a tine carrier, that is attached to the plow beam and the spring tines with a duck foot or small share, which are attached to the tine carrier

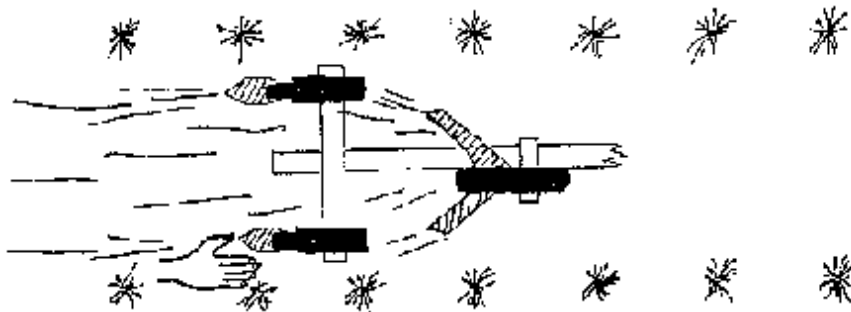


fig 9 : When weeding crops, the distance between the tines and the plants rows should be as wide as your palm

- **The seed planter:** (*fig. 10*) allows you to place and sow the seeds evenly spaced. Composed of a knife or a disc that opens the furrow, a hopper with adjustable disc that controls the fall of the seeds in the furrow. Depending on whether the seed disc wears, it must be changed. It is used to plant the seeds of the following crops: corn, beans, soybeans, groundnuts, cowpeas. The seed planter has three different settings: Adjustment of the seed distribution hole according to the different kinds of seed you want to plant, adjustment of the planting distance, from 0 to 30 cm, adjustment of the planting depth, from 0 to 8 cm. For the adjustment of the distribution hole, three distributors are given: . A distributor with a distribution hole of 16.5 mm diameter used for planting conditioned maize (over 8 mm) and beans,. A distributor with a distribution hole of 13 mm diameter used for planting conditioned soyabeans (over 6 mm). A distributor with a distribution hole of 18.5 mm diameter which is thicker and used for planting of conditioned groundnuts (over 8 mm).For the conditioning of the seeds, two sieves are provided: One sieve with holes of 8 mm diameter for sieving of maize and groundnuts. One sieve with holes of 6 mm diameter for sieving of soyabeans Special adjustment for groundnuts: the distributor is thicker (12 mm

thick) with a distribution hole of 18.5 mm diameter. Since the seeds are very fragile there are two adjustments. Inside the seed box, there is a predistributor rubber which is too strong for groundnuts. Remove the seed box, take away this rubber and replace it with a very soft one which is provided with the planter, then install the seed box in its place. Normally the injector pushes the seed inside the soil, but for groundnuts, the injector will break the seeds. To stop the injector, put a bolt with a nut (which are provided with the planter) in the hole which is at the above part of the Planter.



fig 10: The seed planter

- **Roller cutter** (*fig. 11*): pushes down grass, small bushes or harvest residues, which are overrolled and cut into small pieces by the rotating knives. The resulting mulch (cut organic matter) is easily covered with soil by using the plow or ridger. The Roller Cutter is an implement for clearing pulled by the draft animal. In addition it can be used to break up earth lumps (harrowing) and to puddle.



fig 11: Roller cutter



fig 12: Termination Roller cutter

Termination Roller cutter: used for cover crops (*fig 12*). Used to create a mulch on the ground without cutting the whole plant. To avoid breaking the beam and other damage to the roller cutter, never turn on one spot when loaded. Allow a larger turning circle, operate as indicated in *fig. 13*.

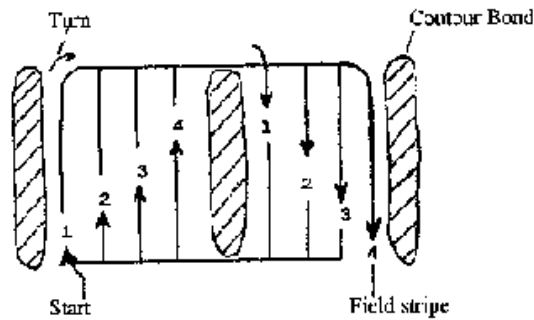


Fig.13: If the space between two contour bonds is too narrow to allow the roller cutter to turn round, work on two fields at the same time.

- **The cart** (fig. 14): The cart consists of the iron frame with the loading platform, the axle with the wheels, the break system and the beam, to attach it to the harness. The cart is used for transportation. The cart makes transportation easy and fast. You don't have to carry things on your head again. Don't use the draft animal more than 4 hours a day for transportation. The maximum load depends on the materials used for the construction and type of animal used. Do not in any event exceed 500 kg. Start loading in the middle of the cart. Extend at both ends evenly. Always balance the load you are putting on your cart as it is shown on the following figures.

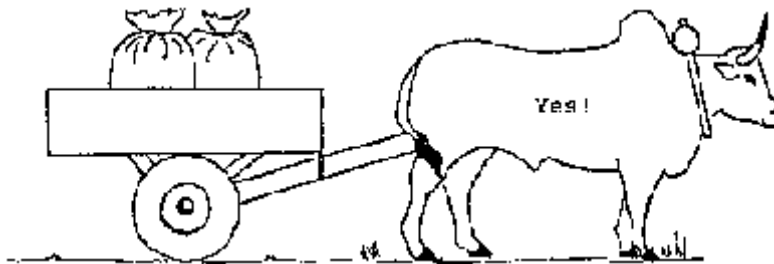


Fig 14 The load is well balanced on top of the wheels. Your animal will feel fine when pulling.