Small-scale conservation tillage-ripping of soil using oxen-drawn ploughs in Kenya

Summary

This practice describes how small-scale farms can use oxen-drawn for soil ripping in Kenya. This practice improves water storage capacity and the productivity of the land.

Description

Ripping of soil using oxen-drawn implements, to improve water storage capacity and cropland productivity on small-scale farms. Laikipia District in Kenya is characterised by a semi-arid climate, high altitude and rolling terrain.

Most of the soil and water loss occurs during a few heavy storms at the beginning of each growing season. More than 90 percent of families have under two hectares of land, and few have alternative sources of income.

1. How to apply the oxen-drawn?

The form of conservation agriculture described in this practice involves the use of oxen-drawn ploughs, modified to rip the soil. Ripping is performed in one pass, to a depth of 10 cm, after harvest. Spacing between the rip lines is 30 cm in the case of wheat.

Deep ripping (subsoiling) with the same implement is done, when necessary, to break a plough pan and reaches depths of up to 30 cm. An adaptation to the ordinary plough beam (the common mould board ‘Victory’ plough) makes adjustment to different depths possible and turns it into a ripper for surface and deeper ripping.

The aim of ripping is to increase water infiltration and reduce runoff. In contrast to conventional tillage, the soil is not inverted, thus leaving a certain amount of crop residue on the surface. As a result, the soil is less exposed and not so vulnerable to the impact of splash and sheet erosion, and water loss through evaporation and runoff. In addition, there are savings in terms of energy used for cultivation.

In well-ripped fields, rainfall from storms at the onset of the growing season is stored within the rooting zone, and is therefore available to the crop during subsequent drought spells. Ripping the soil during the dry season combined with a mulch cover reduces germination of weeds, leaving fields ready for planting. In case of stubborn weeds, pre-emergence herbicides are used for control.

Yields from small-scale conservation tillage are higher than under conventional ploughing. An additional important benefit is that crops mature sooner in conservation agriculture, because they can be planted earlier: under inversion tillage the farmer has to wait for the soil to become moist before
ploughing. Earlier crop maturity means access to markets when prices are still high.

2. Supportive technologies
There are various supportive technologies in use which can improve the effectiveness of the ripping. These include:

- use of compost/manure to improve soil structure for better water storage;
- use of a cover crop (*mucuna pruriens*) planted at the end of the season to prevent erosion, control weeds and improve soil quality; and
- agroforestry: principally *grevillea robusta* planted on the field boundaries (see also ‘Grevillea agroforestry system’).

The joint effects of the different advantages that this type of tillage has will help improving the resilience of livelihoods of Lakipia against natural hazards. The better infiltration will help better resistance against intense rainfall and drought. The improvement in crop yield will affect positively the nutritional status of the farmers and allowing them to diversify and increase their income.

3. Validation of the practice
Yields from small-scale conservation tillage can be more than 60 percent higher than under conventional ploughing.

4. Minimum requirements for the successful implementation of the practice
- Having an oxen-drawn ploughs

5. Agro-ecological zones
- Tropics, warm

6. Objectives fulfilled by the project
- Pro-poor technology