

# A note on weed control in Machakos District, Kenya

by

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## Abstract

*More than 80% of farmers in Machakos District in Eastern Province of Kenya use oxen for land preparation. Labour for weed control is a major factor limiting crop production: uncontrolled weed growth can reduce crop yields by up to 60%. Some farmers solve this problem by cultivating a smaller area, but this also reduces total yields. Herbicides are too expensive for most smallholders. Animal-powered weeding using blades, cultivators, sweeps and ridgers offers an alternative means of controlling weeds, without loss of production.*

## Introduction

Machakos District (presently Makueni & Machakos) is located in Eastern Province of Kenya, south-east of Nairobi. The climate is semi-arid with average annual rainfall of 800 mm. The soils are generally alfisols (sandy clay) and vertisols (black cotton). The altitude varies from 1000 to 1600 m.

The major food crops grown are maize, beans, millet, sorghum, cassava, peas, sweet potatoes and English potatoes. Coffee, cotton and horticultural crops are grown as cash crops.

The major source of farm power is draft animals, and over 80% of the farmers use oxen for land preparation.

## Background information

The major limiting factors in crop production are soil tillage and weed control, especially for the smallholders. Most smallholders usually spend a substantial amount of their resources and time on land preparation and very few resources are left by the time weeding is required. Inability to control weeds leads the farmer into cultivating a smaller area, resulting in substantial loss of yields. Use of herbicides for weed control is beyond the means of smallholders, especially in food-crop production.

In some areas of the district, weeding consumes as much as 50% of the total inputs into crop production.

Average yield losses due to uncontrolled weed growth are around 50–60%. Fertiliser should not be applied if weeds are not adequately controlled. Timing, rather than the frequency of weeding, is a major determinant of effective weed control for maize. Weeds cause greater yield loss in maize under low than high soil fertility, and the biggest increase in food production can be obtained if the loss due to weeds can be reduced on the small farms where fertility is low and where weeds still cause most damage.

Weed control by mechanical methods is primarily achieved by:

- the burial of small annual weeds by soil being thrown over them by the weeding implement
- the disruption of the intimate relationship between the weed plant and the soil, either by loosening the soil round the roots, disrupting water absorption and causing death by desiccation, or by cutting the plant off below the ground.

## Present situation

Most farmers in the district are smallholders; there are also a few ranches and coffee estates. Most of the smallholders use oxen for land preparation, and there is some use of donkeys, particularly in the drier regions of the district. It is estimated that about 50% of the farmers with access to oxen use the animals for weeding.

Tillage has traditionally been primarily associated with weed control, especially in sandy clay soils where porosity is not a problem. In the Machakos area, farmers usually perform wetland preparation with the Victory plow (animal-drawn) after the initial flush of weed emergence. This reduces weeding requirements by half and, moreover, does not require a second weeding, as does a dryland planted crop.

The equipment most commonly used by the farmers both for tillage and weeding is the Victory plow. During the first weeding, when both the plant and the weeds are still small, the plow body is removed to avoid burial of the crop.

Farmers using the Victory plow have to make two or more passes between the rows of a maize crop to achieve complete weeding.

### Equipment options

Mechanical means of weed control were quite common in Kenya during colonial days, as evidenced by the old equipment abandoned in farms throughout the country. Several different implements were tested by farmers, using the Victory plow and the multipurpose toolbar developed by the Ministry of Agriculture.

#### *Blades, cultivators and sweeps*

Blades, cultivators and sweeps are mainly effective if used when the ground is fairly wet and where there are few perennial weeds. Roots are cut below the ground, leaving the weeds on the surface to wilt and dry. These tools are readily available in many shapes and sizes and can be mounted on almost any toolbar.

Cultivators have a better weeding efficiency than either A-blades or sweeps.

#### *Ridgers*

A ridger was developed by the author to be used mainly for second weeding and/or hilling. It reduces the time required to weed a particular plot by almost 50% compared with traditional weeding using the mouldboard plow. It is very effective, especially if weeding is carried out when the maize crop is about knee high. Using a ridging body is one of the most effective methods of controlling weeds in major food crops. The most recent model of the ridger is now available in the country for widespread adoption. It is easy to manufacture and light, with adjustable wings.

### Conclusions

There is still scope for mechanical means of weed control. The major limiting factor is lack of readily available and appropriate animal-powered equipment. Availability of this equipment will offer labour savings and the opportunity to cultivate more land and achieve better weed control; the result will be increased food production.