Weed control methods used in Ethiopia

by

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Abstract

Farmers in Ethiopia commonly lose up to 40% of their crops because of weed infestations. Because crops are not normally planted in rows, weeding is a time-consuming task, taking up to 140 h/ha.

Weeds are controlled mainly by hand weeding, but also by good agricultural practices such as increased plowing, delayed planting and crop rotations. Some mechanical weeding is also carried out, using simple traditional implements and some modern tools. Some animal-powered weeding systems are efficient in time and cost savings. A few farmers also use herbicides, but these are not very appropriate.

Effects of weeds on crop yields

Most farmers in Ethiopia do not weed their fields at the right time because of labour bottlenecks. Weeds are therefore one of the most important crop production constraints in the country. Research by the Institute of Agricultural Research throughout the country studied the effects of delayed weeding on crop yields. The results are shown in Table 1.

Current weed control practices

Because crops are not normally planted in rows, weeding is a time-consuming task, taking up to 140 h/ha. Farmers in Ethiopia use various strategies to reduce or avoid weed infestation in their fields. Current weed control practices are discussed below.

Hand weeding

Hand weeding is the most common weed control method used by small-scale farmers. It usually requires no capital outlay. This is a major advantage when cash is not readily available and labour is provided from the farmer's immediate family or through non-cash exchange. It may be the only feasible method for weeding broadcast crops when herbicides are not available. Hand weeding is intensive and slow compared to other methods, and may damage crop roots.

Increasing the frequency of plowing

Making three to six passes with a traditional plow before planting is a common practice aimed at preventing or reducing weed emergence.

Late planting

Maize and sorghum are normally planted before the rains. Dry planting allows crop seeds and weeds to germinate simultaneously, so weeds and crop seedlings compete for moisture and nutrients. However, planting after rainfall allows crop seeds to germinate before weeds, so that crop seedlings dominate the weeds.

Crop rotation

Crop rotation is an important means of weed control adopted by some farmers. For example, sorghum, a weed-suppressing crop, can reduce weed levels in the following season.

Table 1: Estimated yield reductions due to delayed weeding

Crop	*% yield reduction*
Maize	40
Sorghum	30
Wheat	35
Barley	18
Teff	30
Lentils	50
Chickpeas	30
Faba beans	20
Haricot beans	36
Field peas	15
Soyabeans	50
Cotton	73
Peppers	30
Coffee	62

Data from the Institute of Agricultural Research, Addis Ababa, Ethiopia (1988).

A traditional animal-drawn weeding system

A practice known as *Shilshalo* involves ox cultivation in either broadcast or row-planted sorghum or maize at 50–70 cm spacing. A traditional animal-drawn plow is used for inter-row cultivation. This breaks the soil crust, reduces run-off and increases the soil infiltration rate, in addition to controlling weeds and thinning plants to appropriate levels. However, as most farmers do not practise *Shilshalo* at the correct stage of crop development, substantial plant damage (stem breakage and uprooting) is common, leading to low yields.

A series of experiments was carried out to improve the existing traditional practice by determining the optimum time for ox-cultivation operations to increase sorghum and maize yields. *Shilshalo* was effective when carried out at the 6- to 8-leaf stage for sorghum and the 4- to 6-leaf stage for maize.

Alternative weeding methods

Mechanical weeding implements

Efforts have been made to design and develop convenient and practical mechanical weed-control methods using simple implements and tools. Mechanical equipment can be time-saving during peak operation, resulting in higher output per worker and reductions in the cost of weeding. Such mechanical equipment may be manual or animal-drawn.

Manual weeders

Manual weeders commonly used include chopping hoes (pull-and-push type weeders) comprising a steel blade (the soil-working component) fitted to a long wooden handle. These weeders are most useful when weeds are small and the soil is not too hard.

Specialised animal-drawn weeders

Animal-drawn three-tined sweep cultivators with narrow reversible shovels fixed to a frame by means of moveable clamps, bolts and nuts, designed for attaining a correct width and depth of weeding, are used in some parts of the country.

A toolbar has been imported and distributed to selected farmers for promotional and evaluation purposes. This comprises a frame able to fit different weeding attachments, two wheels for manoeuvrability, and provision for raising and lowering the soil-working components.

Chemicals

A few farmers have started using herbicides to control weeds, especially in double-cropping areas. However, herbicides have been found to be less effective than hand-weeding, as they require specific conditions which may be more limiting than other control methods. For example, the correct herbicide must be selected for the particular crop and weed spectrum present. It must be applied at a specific rate, at the correct time and only under specific environmental conditions (soil type, soil organic matter content, soil moisture, rainfall, temperature, humidity and air movement).

Conclusion

Weeding is essential for successful crop production but is time- and labour-consuming. Weeds deprive crop plants of nutrients and water, and often serve as hosts to insects and other pests detrimental to the crop. Therefore, to increase agricultural production and to reduce the time and cost of weeding operations, there is an urgent need to improve hand-weeding practices with simple tools, and to develop and promote animal-drawn weeding technology.

