

# **CHAPTER 4. CROP HUSBANDRY**

## **4.1 CROP SOWING**

### **4.1.1 PLANNING THE SEEDBED PREPARATION**

#### **THE IMPORTANCE OF PLANNING**

A correctly prepared seedbed provides the optimum conditions for seed germination and the subsequent plant development. Specific requirements depend upon the crop sown, the soil type and the field topography. Other considerations involve the need to undertake preventive measures against soil erosion, to provide surface irrigation or perhaps to take advantage of residual soil moisture from a previous crop.

Planning is fundamental for successful crop establishment and should be undertaken before any field operations are initiated. The plan should include a study of field lay-out, the direction in which the operations will be carried out and above all, consideration of the timing for the various interventions.

The seed variety must be chosen and a decision made as to the needs for the application of fertilizer. Arrangements must be made early on to ensure that adequate supplies are available when needed for both the seed and fertilizer which will be used.

If credit facilities are available, application must also be made in good time if full advantage is to be taken.

The plan must also consider crop maintenance. Mechanical weeding with the animals is complicated when row widths vary greatly or when several point rows are planted in the field.

Obstacles in the field such as tree stumps or termite hills will also affect the efficiency when using animal traction equipment. If they are not going to be removed, the crop planting pattern must allow for the use of the inter-row weeder later in the season so as to avoid the plants being damaged unnecessarily.

Careful forward planning can avoid many last minute problems when the weather dictates that time should urgently be spent in the field.

## INSPECTING THE SOIL PROFILE

Although the farmer will normally explain that he knows his field well, it is often a useful practice to occasionally excavate a pit to allow closer study of the soil profile. Discussions based on actually seeing what lies beneath the surface are much more realistic than the mere observation of the soil surface from a corner of the field.

Pits may be dug before tillage commences to assist discussion of the type of tillage equipment which might be the most appropriate.

They can also be dug just before sowing in order to inspect the quality and the depth of the seedbed already prepared. Use a tape measure to quantify the depth achieved for both the primary and secondary tillage.

Finally, the pits can be excavated when the crop is already established so as to allow inspection of root growth development and to observe impediments due to the tillage techniques used. Look for aspects such as a compacted plough pan, a heavy surface crust or perhaps a seedbed which is too shallow (Fig.1).



*Fig. 1 Digging a pit in the field greatly assists detailed discussion of the effects of tillage on the seedbed.*

*Photo: J.E. Ashburner*

**DIFFERENT SEEDBED CHARACTERISTICS**

Tillage demands considerable time and cost. It is thus important that no more than a minimum effort should be expended to prepare the seedbed required for a particular crop.

Weed control is fundamental before sowing and must endure at least until crop emergence. Weed burial with a plough can give control until quite late into the growing season. Scarifying may allow weeds to regerminate much earlier and thus should normally be undertaken close to the time of seeding.

In general terms, small seeds require a finer tilth to ensure good soil/grain contact during germination. Larger grains and tubers benefit from coarser soil agglomerates in the seedbed. All crops can benefit from primary tillage down to some 15 cm but the need for deeper tillage will mainly depend on soil type.

Under certain conditions, a hardpan develops at depth, restricting root development. It may be necessary to periodically break this by using, for example, a ripper tine every few years. The ripper can also till "precision strips" for later planting.

The secondary tillage, if undertaken, normally should affect the upper 6 to 8 cm of soil. Excessive pulverising of the soil should be avoided as the surface will then become vulnerable to wind erosion and some soil types will later form hard crusts after rain.

Incorporation of organic material (manure) is generally beneficial and this may be achieved by the use of a mouldboard plough. As an alternative, the creation of a surface mulch provides the benefit of soil moisture conservation, protection from extreme daytime soil temperatures and from erosion caused by violent rain storms or wind. Mulches are better created and managed with tined implements.

In some circumstances, it is preferable to leave the soil untilled and to sow directly into the stubble of the previous crop. For example in some regions, maize or beans are planted into rice stubble, to take advantage of the residual moisture in the soil.

## THE CHOICE OF IMPLEMENTS

A farmer is unlikely to purchase more than a limited range of implements for establishing the crop. Details concerning the use of these tools is given in separate Modules. However a very brief summary of some of the most common types is presented below.

**THE MOULDBOARD PLOUGH** This inverts the soil, burying surface vegetation and breaking up larger clods. A longer mouldboard (a semi-digger body) permits better inversion in heavier soils whilst a shorter one (a digger body) is more appropriate in lighter or friable soils. A reversible plough can increase field efficiency and avoids the need to work in lands. It is however, usually more expensive than a simple mouldboard.

**THE SCARIFIER** This bursts the soil upwards, breaks up larger clods and leaves the weeds on the surface as a mulch. Heavy weed growth will not be adequately controlled but in dry climates, the scarifier provides a rapid method for preparing the seedbed after the first rains.

**THE RIPPER** The single narrow tine of the ripper can penetrate down to a depth of more than 20 cm and may be needed to break up compacted layers below the surface. In certain heavier soils, the ripper can greatly improve infiltration rates and promote deeper root development of the crop.

**THE RIDGER** In very light soils, it may be possible to use the ridger to directly form the seedbed without any previous tillage. It is more usual however, to plough and harrow the land before ridging takes place. Another technique is to ridge after the field has been scarified.

**THE HARROW** Many types of harrow may be available to break down the remaining surface clods and to stir and mix the upper layer of the seedbed. Wooden or metal spikes can penetrate down to about 6 cm or more, although this depends on the soil type and the implement design. The harrow may be used to incorporate seed and fertilizer broadcast on the surface although a uniform seeding depth cannot be achieved by this method.