

Soil Management

Key Points:

- ▶ Sugar beet is very sensitive to poor soil structure.
- ▶ The aims of primary soil cultivations are to dispose of the previous crop residue, improve drainage and to ultimately provide a medium to fine, uniform seedbed.
- ▶ Cultivations should aim to optimise the structure of the seedbed and the soil profile.
- ▶ Poor seedbed conditions can lead to yield loss through reduced establishment and gappy stands.
- ▶ Prepare the seedbed to a depth of 5-7cm aiming for a minimum of 30% particles < 3 mm around the seed to improve availability of moisture to seed.
- ▶ Below the seedbed, larger aggregates and a more open soil structure is desirable.

Inappropriate soil cultivations, incorrect timing of cultivations or carrying out cultivations under sub-optimal conditions can result in yield losses of 30% or more.



Subsoil structure

Compaction lower in the soil profile can make crops more vulnerable to drought because root growth is restricted reducing the ability of the roots to fully exploit water held by the soil.

Following the harvest of the previous crop it is good practice to determine the level of compaction in a field.

The best way to carry out a subsoil inspection is to dig an inspection pit with a spade (see below). If sub-soiling is required, only do so under suitable conditions. If the ground is too wet the soil will not shatter.

Set the depth of the sub-soiler to 5-7 cm below the depth of the compacted 'plough-pan'.

Dig an inspection pit to investigate

- Headlands.
- Where soil type changes.
- Areas harvested under poor conditions in the previous crop.
- Lower yielding areas in previous crop.





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Ploughing

Ploughing should be carried out with the aim of producing a level finish for uniform soil weathering.

Ploughing at the correct time and under the correct conditions should allow for just one cultivation pass in the spring.

The optimum timing of ploughing depends on the soil type and prevailing weather conditions.

Heavy soils

Plough before the end of October to maximise soil weathering.

Plough under dry conditions. Under wet conditions a smeared layer can be formed, particularly where the tractor furrow wheel is slipping. This can result in drainage problems and restricted root growth in the spring.

Heavy soils tend to leave an uneven surface when ploughed leading to the formation of hollows, which can reduce the benefit of overwinter soil weathering. In such instances it is advisable to carry out a cultivation to level the surface and break up the furrow slice. A furrow cracker or narrow ring furrow press have been shown to be beneficial in these circumstances.

Medium soils

Plough from mid-October onwards with the aim of finishing before January.

Aim to produce a level finish but avoid the surface being too fine because a weak structure can cause furrows to run together and slumping can occur.

Soils that have slumped take longer to dry out in the spring, potentially delaying drilling.

Light soils

Plough shortly before drilling to reduce the risk of drying, slumping and erosion.

The use of a wide ring press helps to improve consolidation and creates a rough soil surface to reduce the risk of soil erosion.



Spring cultivations

Aim for just one pass in the spring to create a level consolidated seedbed. A level seedbed is essential to reduce losses at harvest and allow seed to soil contact.

Timing is very important; go as early as possible but ensure soil moisture is at the correct level to prevent excessive compaction.

To reduce the risk of compaction, as with all cultivations, use wide tyres, the lowest possible tyre pressures and preferably a lightweight tractor.

Under optimum conditions

- Use a combination harrow working at a depth of 7-9 cm (to create 5-7 cm depth of seedbed).
- If a second pass is required, ensure low ground pressure to reduce excessive compaction.

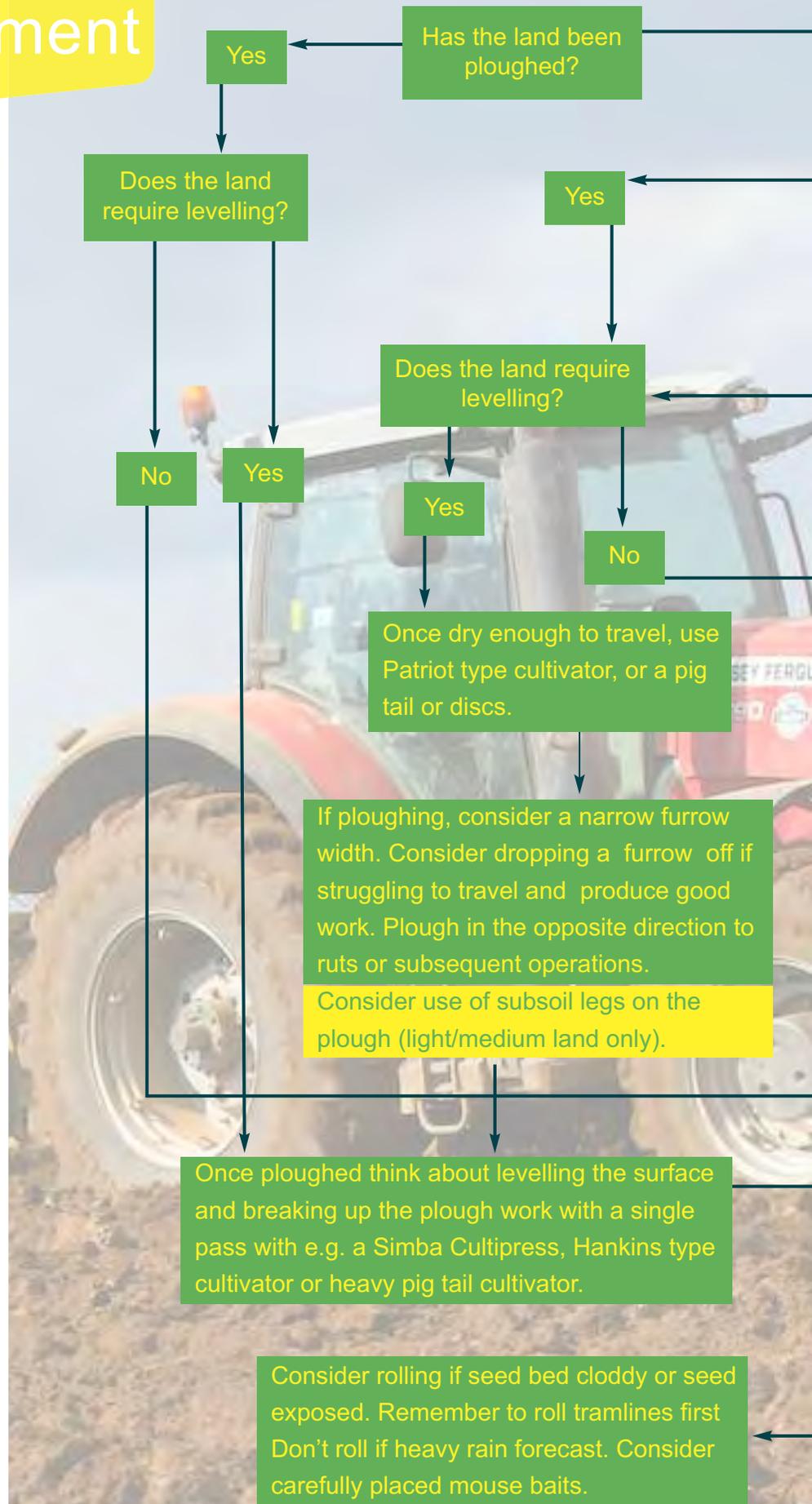
Non-inversion tillage

- Ideally before using this system for sugar beet, non-inversion tillage should have been used on two cereal crops. This allows organic matter and biological activity to accumulate in the upper layers of the topsoil.
- After harvesting the cereal crop, either bale and remove the straw or chop and spread. Aim for the straw to be spread as evenly as possible and for the stubble length to be around 15 cm.
- A shallow cultivation may be required to encourage weed germination before the main cultivation.

Under less than optimum conditions on heavy soils

- Use a combination harrow on the front of the tractor and a power harrow behind to carry out two passes in one travel of the field.
- If an ideal seedbed cannot be created, consider rolling after drilling.

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- Use a spade to check soil conditions below the surface.
- Patience is key; wait until the conditions are right.
- Remember to select the right tyre type and to reduce the pressure as much as possible.