UPDATE ON SOILpak

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What is SOILpak?

SOILpak is a soil management manual for cotton growing on cracking clays. It leads you through the decision-making process to a number of options.

The manual presents options rather than hard-and-fast rules. The approach is 'here are the options' rather than 'here are the answers'. Thus it is not a recipe book; it is a decision-support system. You choose, and so you stay in control.

Who is it for?

SOILpak is aimed at consultants, extension officers, growers and researchers within the cotton industry. In particular it is aimed at:

- consultants and extension officers who wish to become skilled in advising their clients on soil management
- growers who wish to learn how to better manage their soils
- researchers who wish to see how their results apply to practical soil management and to identify areas in need of further study.

What's in it for you?

The manual is designed to help you find information easily. The Quick Help section covers some situations where you may need a quick solution without long explanations. The

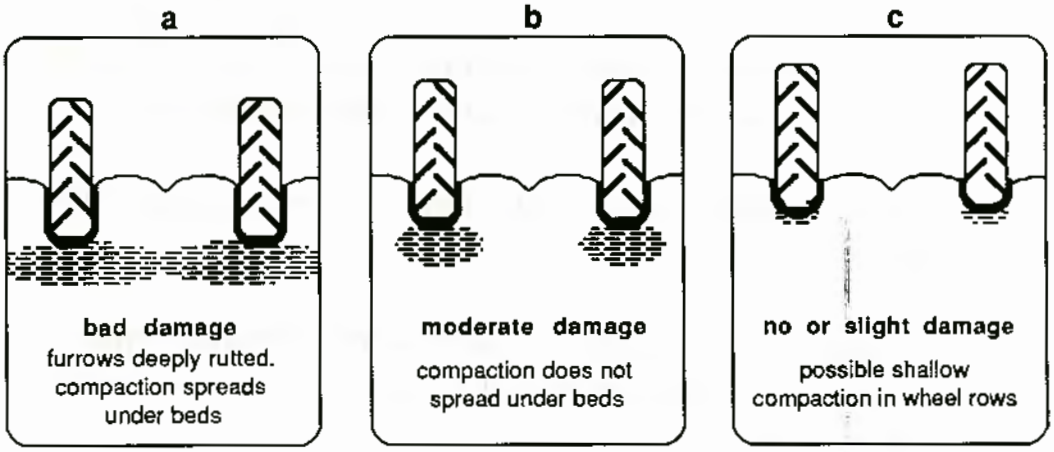
situations are covered again in other sections, with more detail and some background information to help you make decisions with more confidence.

The section showing you how to examine your soil is the core of SOILpak. The central message in SOILpak is simple: look at the soil, decide what condition it is in and then choose a management option.

As an example, consider your farm as it is now after our last wet harvest. Harvesting on wet soil has compacted some furrows. Possibly the wheel ruts are very deep. How bad is the compaction? Can you grow cotton next season? What should you do to get the ground ready for planting another crop?

SOILpak has a chapter devoted to cropping after a wet harvest. It will help you determine whether a field is badly, moderately or not damaged. With that information you can choose a tillage option.

Figure 1: Wheel damage.



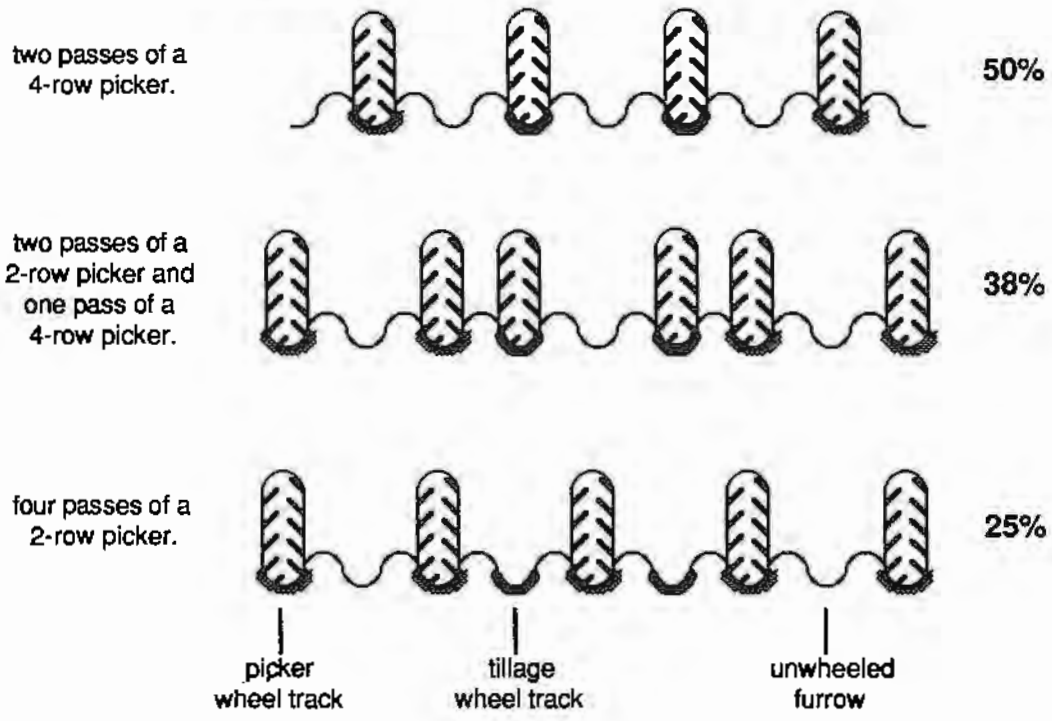
Badly damaged soil (Figure 1a) will require special attention to watering and fertilising and will still produce less yield than a good soil; you may decide to take such a field out of cotton next season. Moderately damaged soil (Figure 1b) can

grow a good crop if the damage does not spread completely under the beds and if you leave the beds in place. With no damage or slight damage (Figure 1c) the field has good yield potential: look after it!

For the times when there is no alternative but to grow cotton in a badly damaged soil, another chapter deals with ways of nursing the crop.

Planning your harvesting pattern can reduce the amount of compaction. Make use of already-compacted furrows rather than attempt to spread the compaction. Figure 2 shows three ways to pick a field set up for eight-row tillage, assuming you can not pick across guess rows. Note in each case the number of furrows **not** wheeled by either the tillage tractor or pickers. SOILpak contains diagrams for picking other tillage configurations. Perhaps you know of better ways to pick. If so, let us know!

Figure 2: How picking pattern affects the % of furrows not wheeled (8 row cultivation set).



Future developments in the SOILpak project

See David Larsen's background paper in this conference booklet.

Research needs

As information was collected and organised for the manual, we noted some areas where further research is needed. These areas are listed below.

- There are cases where soil condition is not easily assessed when observing the soil profile. This leads to uncertainty in making recommendations. We need simple, reliable tests that are free from observer's bias. Sue Greenhalgh at Trangie Agricultural Research Centre is addressing this topic.

- Even when there is no difficulty in assessing soil structure, there is still no way of predicting potential yield from observations of soil structure in pits.

- What causes roots to bend? Is root-bending a good indicator of damaged soil? Do roots avoid penetrating soil because the soil is too hard, too dry or too anaerobic? When roots do penetrate soil, is it because they have to, or because they can?

- Cycles of wetting and drying can restore structurally damaged cracking clay soils. Different cracking clays have different clay contents and clay types, and hence vary in their ability to recover from damage. A simple test to determine this recovery ability would enable a farmer to identify problem soils.

- What exactly is the effect of traffic on soil? How dry does a soil have to be before traffic causes no appreciable compaction? What depth of dry soil (over wet soil) is necessary to support

traffic? The problem of harvesting on wet soil has come up over the last three seasons, and doubtless will come up in the future. Will tracked vehicles help? How well do tracks perform when the tractor is pulling a load?

- A crop in poorly-structured soil needs careful irrigation management, but even so will not yield as well as a crop in good soil. Frequent watering will prevent water stress, but causes more waterlogging. What is the best irrigation management to maximise yield with poor soil structure?

- The economics of deep tillage: potential increase in yield compared with tillage costs.

- Effect of safflower on *Verticillium* carry-over.

- Comparison of 2 m wide beds and 1 m wide hills.

Thanks!

The Cotton Research Council is providing financial assistance towards compiling and publishing the manual. The project has made use of research results and practical experience. Appendix 1 in the manual acknowledges the many organisations and individuals involved.