

Technology 11: Sub-surface Compaction for Coarse Textured Soils

The soils of arid and semi-arid and looseness. The moisture retentive capacity of these soils is very low and due to high porosity most of the applied water received either through rain or other sources gets lost through percolation. Frequent irrigation to these soils is required for successful crop production. These soils possess low organic matter and cation exchange capacity besides lesser amounts of fine clay particles. Addition of organic matter can improve the physical environment of these soils, but the availability of such materials is not adequate. Also due to high temperature intensity of organic material added to the soils is oxidized rapidly and lost. Thus, low water retentive capacity and fertility inhibit better crop production on these soils. The S.K.N. College of Agriculture, Jobner has taken a lead by way of developing compaction technology for the solution of the above problems. The technology is more suitable for coarse textured soils with clay less than 8 per cent. It is also found promising on floppy soils at Coimbatore.

Methods

- Compaction is done during onset of monsoon.
- After receiving sufficient water either through rain or irrigation the soil is ploughed with either tine cultivator/disc harrow/country plough.
- The field is then leveled with the help of planker.
- Thereafter within 24 hours of water supply (at proctor moisture level), compaction is done with 1,000 kg weight of iron roller passed 3 to 4 times or with 500 kg weight of iron roller passed 6 to 8 times.
- Recommended dose of fertilizer is applied and a suitable kharif crop viz., pearl millet is sown.
- The residual effect of compaction persist and is utilized for taking any one of the following rabi crops (wheat/mustard/taramira/barley).

Advantage

- It increases moisture retentivity and thus moisture content.
- The effect persist even during the following rabi crops
- It increases crop yield. For example, grain and straw yield of pearl millet and wheat crops increased by 30 to 40% and 15 to 30%, respectively over uncompacted soils.
- It has also been found useful in reducing the infestation of white-grub, termite attacks on pearl millet crop and offer frost resistance to tomato and chilli crops during rabi season.
- About 20-25% saving of nitrogen, potassium, zinc, sulphur and other nutrients for various kharif and rabi crops and two irrigations for wheat crops can be made with compaction treatment.
- The benefit: cost ratio per rupee return analysis varies from 4.0 to 6.0 through the adoption of soil compaction technology.