Managing soil hardpan

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What is soil hardpan?

Conventional land ploughing using victory plough is always restricted to 3-4 inch soil depth. Repeated ploughing at this depth for many years makes the soils develop an impermeable layer called soil hardpan. Soil hardpan reduces rain water infiltration leading to low soil water retention and inadequate soil moisture for crop growth and productivity. The hard layer also restricts root growth, preventing plants from exploring for nutrients and water from a large soil volume.
Benefits of soil sub-soiling
Crops planted on sub-soiled soils gives 50-80% yield increase over crops planted using conventional land cultivation.

How is the soil hardpan broken
To increase rainwater infiltration and retention and storage, soil hardpan is broken through sub-soiling during land preparation. The tool is fitted on victory plough and drawn by a pair of oxen. It is set to penetrate the soil to 6-inch depth to break the soil hardpan. This leaves a narrow furrow 6 inches deep.
Soil sub-soiling to open narrow furrows

To widen the narrow furrow made by soil sub-soiling, the sub-soiler is exchanged with a ripper.
The ripper opens the furrow to 8-inches. This furrow harvests rainwater, stores it as it infiltrates the soil.