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# Module-2

## Soil Cultivation and Tillage



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## Creating good growing conditions

There are many reasons for cultivating the soil. The most important ones are to

- Loosen the soil to facilitate the penetration of plant roots
- Improve the aeration (nitrogen and oxygen from the air)
- Encourage the activity of the soil organisms
- Increase infiltration of water
- Reduce evaporation
- Destroy or control weeds and soil pests
- Incorporate crop residues and manures into the soil
- Prepare the site for seeds and seedlings
- Repair soil compaction caused by previous activities



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## Minimum disturbance:

- Any soil cultivation activity has a more or less destructive impact on soil structure.
- In tropical soils, regular tillage accelerates the decomposition of organic matter which can lead to nutrient losses.
- The mixing of soil layers can severely harm certain soil organisms.
- Soil after tillage is very prone to soil erosion if left uncovered before the onset of heavy rains.



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- Minimum tillage systems on the other side help to build up a natural soil structure with a crumbly top soil rich in organic matter and full of soil organisms.
- Nutrient losses are reduced to a minimum as there is no sudden decomposition of organic matter and nutrients are caught by a dense network of plant roots.
- Soil erosion won't be a problem as long as there is a permanent plant cover or sufficient input of organic material.
- Thus, each organic farmer will have to assess the soil cultivation practice which is most suitable for his/her conditions



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## Soil compaction

If soils are cultivated in wet conditions or burdened with heavy machinery, there is a risk of soil compaction which results in suppressed root growth, reduced aeration and water logging.

Where soil compaction is a potential problem, farmers should be aware of the following aspects:

- The risk of soil compaction is highest when the soil structure is disturbed in wet conditions
- Do not drive vehicles on your land soon after rains
- Ploughing of wet soils can lead to a smearing of the plough sole
- Soils rich in sand are less prone to soil compaction than soils rich in clay
- High content of soil organic matter reduce the risk of soil compaction
- It is very difficult to restore a good soil structure once soil compaction took place



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## Types of Soil Cultivation

- Post-Harvest
- Primary Tillage
- Seedbed Preparation
- In-between the crop

The tools for Soil cultivation can be grouped in four types

1. Tools for primary cultivation: pole plough, mouldboard plough, digging fork, spade.
2. Tools for secondary cultivation: cultivators, harrows, rakes.
3. Tools for inter-row cultivation: inter-row cultivators, hoes.
4. Tools for land forming: ridgers, hoes.

Tools should be chosen considering the soil cultivation purpose, the soil type, the crop and the available power source.