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Zero Tillage / Minimum Tillage Agriculture Technology

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Tillage is an agriculture land preparation through mechanical agitation which including digging steering and overturning. Zero tillage not only reduces the cost of cultivation it also reduces soil erosion, crop duration, irrigation requirement and weed effect which is better than tillage. Zero tillage it also No tillage and Nil tillage. The term No-tillage or minimum-tillage has been used since ancient times. Therefore, it called "primitive cultures" for the production of crops, simply because man has not the muscle force to till any significant area of land to a significant depth by hand. The concept of zero tillage was started in early 1940s by Edward Faulkner. Tilling of soil is used to remove weeds, shape the soil into rows for crop plants and furrows for irrigation. This leads to unfavourable effects like soil compaction; loss of organic matter; degradation of soil aggregates; depths of destruction of soil microbes and other organisms and soil erosion where top soils washed or blown away.

Definition of Zero Tillage

It is an extreme form of minimum tillage. Primary tillage is completely avoided and secondary tillage is restricted to seedbed preparation in the row zone only. It is placement of seed into soil without soil preparation. It is the direct sowing of seed in the field without any disturbance to the soil. There are different forms of tillage systems which are practiced by the farmers and their levels of crop residues formations are different for each tillage practices.

Management of Zero Tillage

Zero tillage requires some different skills in order to do it successfully with any production system, if zero tillage is not done correctly, yield can drop. So, a combined technique is required for the management of zero tillage. Soil structure and health improve and biodiversity is encouraged. Soil erosion and diffuse water pollution are reduced. In the long run, costs of labour, energy and, often, agrochemical and fertilizer inputs decrease, even if yields are sometimes lower. Early adopters, and ultimately advocates, of ZT are most likely to be found in younger or more entrepreneurial farmers, more willing and able to change their approach and systems. Use of practices like cover crops, integrated disease and pest management, crop rotation and light implements.

Advantages of No Tillage Practices

Economic Advantages

- Energy and Labour costs over the total production process can be reduced.
- Reduced use of fertilizers and lower production costs.
- Crop productivity increased

Social Advantages

- Better profitability and higher crop yields mean that the farming family could have a greater chance of succeeding and remaining on the land

Environmental Advantages

- Crop yields are equal to or better than under conventional tillage
- Maintenance or increase in the SOM content (enhancement of soil quality)
- Soil improvement (chemical, physical and biological characteristics).

Disadvantages of No Tillage Practices

Economic Disadvantages

- Short term yield effects have been found to be variable (positive, neutral or negative yield responses which can discourage the adoption of zero tillage practices).
- The variability in short-term crop responses to ZT is principally the result of the interacting effects of crop requirements, soil characteristics and climate.

Social Disadvantages

- Not tilling the soil may results in increased weed pressure. The increased amount of labour required for weeding with ZT may outweigh the labour-saving gained by not ploughing,
- Herbicides are used to control weeds. It enhances environmental pollution.
- No tillage has resulted in increased labour requirements when herbicides are not used.

Environmental Disadvantages

- Herbicides must be used often and with accuracy.
- Application of herbicides is critical in cases where the farmer does not plough or till to control weeds and grasses.
- Before planting, any vegetation present must be killed with a broad – spectrum herbicide, the effects of which are non-persistent.
- After planting, more specific and more persistent herbicides are usually required to control specific weeds particular to the crop situation.

Initial Cost of No till Equipment:

- Good used no till equipment is readily available in most places.
- If cropping diversity is increased, seeding equipment can be smaller (narrower) and still be very timely.