



**NATAE**  
North African Transition  
to AgroEcology

# Reduced tillage in the Mediterranean

## Agroecological zones

### Cereal plains

#### Introduction



Source: INAT, Tunisia



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Along with permanent soil cover and crop diversification, reduced tillage is one of the fundamental pillars of conservation agriculture. It is an essential approach in sustainable farming systems, particularly in the Mediterranean, where climatic conditions and environmental challenges make agriculture particularly vulnerable. Tillage, which encompasses all operations aimed at modifying the structure and composition of the soil, can have significant negative effects on **biological fertility**, **water conservation** and **soil erosion**.

## Tillage reduction objectives

Reducing tillage in the Mediterranean **improves soil structure** by reducing compaction caused by the passage of farm machinery, which in turn improves soil porosity, allowing better water infiltration and root aeration.

Less soil disturbance **reduces the risk of water or wind erosion**, which is very significant in Mediterranean regions, and allows organic matter to be stored on the surface instead of being diluted in the tilled layer, improving soil stability and resistance to erosion.

Limiting tillage **conserves soil moisture**, as intensive tillage encourages water evaporation, particularly in dry regions, and preserves **soil biodiversity** (microfauna, earthworms, etc.), which plays an essential role in fertility.

Lastly, reducing the number of farm machinery passes and limiting the inputs required **reduces farm costs and farm labour**.

## Techniques for reducing tillage in the Mediterranean

### a. No-till

For field crops, no-tillage (no-till) is combined with other practices and management methods, including permanent soil cover and No-till seeding (**see the corresponding factsheets**).

In arboriculture, no-tillage is also practised between rows of trees to preserve the tree root system, responsible for absorbing water and mineral elements. Where possible, permanent grass cover improves soil quality and maintains soil moisture.

### b. Minimum tillage

Simplified Cultivation Techniques (TCS) consist of reducing tillage operations to a minimum. Minimal tillage is often associated with the use of tine tools, rather than ploughshares or disc ploughs. These tools do not turn over the soil, helping to maintain biological fertility and preserve organic matter.

## Challenges and limitations

**Soil compaction:** In field crops, no-till farming can lead to soil compaction after a few years, particularly with successive passes of no-till seeders, sprayers and harvesters. Tine implements (decompactors) can be used. The alternative is to introduce a plant with a deep taproot system into the rotation. In the cereal-growing plains of the Siliana Living Lab in Tunisia, farmers are biologically decompacting soils by integrating a biennial plant, sulla (*Hedysarum coronarium*), into their cereal-growing rotations.



Alfalfa (*Medicago sativa*), with its deep taproot system (up to 2 metres deep), can also be a crop for decompacting soil.

**Weed management:** No-till or reduced tillage can encourage weed growth. Effective, reasoned weed management is essential. Several methods are used by Mediterranean farmers, such as total herbicides or mowing. In some tree farms, the use of brush cutters or rotary tillers is an effective way of managing a permanent grass cover. Weeds can also be managed through rotations that include allelopathic species, which inhibit the growth of other plants, such as barley or sorghum.

**Difficult transition:** Reduced tillage practices may require a significant change in farm management. Farmer training and demonstration fields can help to overcome initial reluctance, transition hurdles, and promote the adoption of these practices. The provision of equipment adapted to the (small) size of farms and to soil and climate conditions, possibly managed jointly through farmer cooperatives, is also necessary as access to equipment is often a limiting factor (**see No-till seeding in the Mediterranean factsheet**).



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