

Reduced Tillage

Goal	Increase the health of the soil
Target group	All farmers
Description of the measure	<p>There are many ways to reduce tillage, from changing moldboard plows and spaders to disc-harrows and chisel plows, which cause fewer problems, to implementing strip-till or any other technique to reduce the impact of tillage practices on the soil structure and the soil biomass.</p> <p>If this technique is used in combination with a diverse crop rotation, including cover crops or organic mulches, it helps to increase the soil organic matter (SOM) and the soil biology.</p> <div data-bbox="373 808 927 1066" data-label="Image">  </div> <p>Pic. 1: Tractor with chisel plows, a good way to implement a reduced tillage with depth of up to 15 cm;</p> <div data-bbox="957 808 1214 1066" data-label="Image">  </div> <p>Pic. 2: Moldboard plows are tools used to achieve a more in-depth tillage</p>
Suitable sites	<ul style="list-style-type: none"> Most farmers in the Mediterranean area usually apply traditional tillage with soil inversion to avoid potential problems of soil compaction. Non-tillage might cause some difficulties for soil workability and crop development derived from the original soil conditions. However, less aggressive tillage practices, such as reduced tillage, could solve the problem without losing the advantages of conservation agriculture In temperate climate regions of the EU, reduced tillage is gaining importance. It is widely applied and, along with the growing experience of farmers, mulch seeding will expand further Reduced tillage can be applied on all types of soil. It has its benefits in comparison to non-tillage systems as a sporadic soil inversion helps to reduce compaction, populations of hard-to-control weeds and reduces soil born diseases.

How a good implementation looks like	<p>The use of the plow depends on the crop rotation as well as on the regional climatic conditions. Depending on the crop rotation, crops that benefit soil born diseases may be cultivated consecutively. In this situations it is useful to turn the soil in order to create a field hygiene and to supress these diseases. As the system of reduced tillage lies between the non-tillage approach and the conventional use of the plow, soil inversion may happen every 3-5 years. If longer time intervals are planned, it may be a better option to implement a non-tillage system.</p>
Effects on bio-diversity (ecosystems, species, soil bio-diversity)	<p>Reduced tillage avoids soil erosion. This is crucial for the improvement of water quality since the sediments and the diffusion of phytochemicals are reduced. Good quality of water improves a higher diversity of species and number of individuals.</p>
	<div data-bbox="411 902 523 1019"></div> <p>The emission of greenhouse gases decreases because the amount of organic matter available for microorganisms is reduced since reduced tillage avoids a great alteration of the soil.</p> <p>In this way soil fertility is recovered and carbon sequestration is enhanced. Soil biology is disturbed less and the populations of soil organisms increase.</p>
	<div data-bbox="376 1196 557 1265"></div> <p>The reduced tillage also has positive impacts on biodiversity, as it increases the number of species present and the number of individuals, both in terms of microorganisms and fauna thanks to the fact that in this type of tillage crop residues are maintained, giving shelter and food for wildlife.</p>
Other positive effects/benefit for the farmer	<ul style="list-style-type: none"> ▪ Reduced soil erosion due to wind and water. ▪ Improved soil structure and better water take up and retention ▪ Reduces labour, saves time and fuel. ▪ Increases soil organic matter. ▪ Improves air quality: reduces fossil fuel emissions from tractors by making fewer trips across the field and reduces the release of carbon dioxide into the atmosphere by tying up more carbon in organic matter
Indicator/key data	<ul style="list-style-type: none"> ▪ % of UUA with reduced tillage.
Risk and further recommendations	<ul style="list-style-type: none"> ▪ There are particularly challenges with growing crops that need a very fine seed bed preparation, are slow to emerge and do not compete well with weeds, such as carrots and onions. ▪ If you have an early developing crop, there can be problems with shortage of nitrogen, this can be overcome by supplementing with a nitrogen-rich fertilizer such as slurry, but it should only be required in small quantities (i.e. 15 kg) at the beginning of the cropping cycle.

	<ul style="list-style-type: none"> ▪ When making the transition to reduced tillage systems, compaction can be quite a big issue. A controlled traffic system (in larger fields) can be used to manage this. ▪ Reduced tillage goes hand in hand with a greater need for herbicides. As chemical inputs always have a negative impact on biodiversity, the implementation of cover crops, interrow cropping and other means to reduce weeds are of great importance.
Timeframe (When to start a measure and anticipated time for implementation)	Permanent Action
Additional special resources/equipment/skills needed	Machinery, training and in some crops, specific research might be needed.
Reference	<ul style="list-style-type: none"> ▪ https://nevegetable.org/cultural-practices/reduced-tillage ▪ Laboreo de conservación: Efectos a Corto y Largo Plazo en la Calidad del suelo y el desarrollo de los cultivos. R. López Garrido. Sevilla (2010) ▪ www.agricology.co.uk/resources/practical-recommendations-reduced-tillage-systems

Further information: Knowledge Pool

This Action Fact Sheet belongs to the training package for advisors of standard organisations and companies and was developed within the project LIFE Food & Biodiversity (Biodiversity in Standards and Labels of for the Food Industry). The main objective of the project is to improve the biodiversity performance of standards and sourcing requirements in the food industry by helping standard organisations to integrate efficient biodiversity criteria into their schemes and motivating food processing companies and retailers to include comprehensive biodiversity criteria into their sourcing guidelines.

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