ConServe Terra
Towards Conservation Agriculture in the Mediterranean Area

Factsheet for practitioners

Conservation Agriculture in the Mediterranean region

Practical recommendations for a pragmatic approach to CA

This factsheet outlines the benefits of Conservation Agriculture (CA) and what to consider when applying CA for the first time. It shows that CA can be adapted to your own farm's context. Best practice examples show how other farmers in the Mediterranean have successfully integrated CA practices on their farms.

The information is based on research from on-farm and station experiments conducted between 2020 and 2024 as part of the ConServeTerra project. The project aimed to facilitate wider acceptance and adoption of CA principles in the Mediterranean region by understanding constraints and developing

Mediterranean farming based on monoculture, intensive tillage and intensive grazing is at high risk of erosion and soil degradation, which is further intensified by climate change.

Conservation agriculture directly addresses these challenges, by increasing water-use-efficiency, improving soil structure and fertility through the addition of organic matter, diverse crop rotations and no-tillage.

Benefits of Conservation Agriculture

Improved soil fertility and structure; more soil organic matter

Increased profit and reduced production costs

Higher yields

Improved water infiltration

Reduced soil erosion

Biodiversity increase

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A pragmatic approach towards Conservation Agriculture

Conservation Agriculture has three main principles: No tillage, permanent soil cover and diverse crop rotations. Barriers to the adoption of CA in the Mediterranean include high weed pressure, limited access to seeds and marketing opportunities for legumes, and a trade-off between using crop residues as fodder or as soil mulch. Also, CA is often promoted as a package, without regard to the local context. A pragmatic and flexible approach to CA, considering local conditions and socio-cultural aspects, ensures the benefits of CA while being more practical for your farm.

Standard CA	**No-tillage through direct seeding**	**At least 30 % permanent soil cover with crop residues and cover crops**	**Diverse crop rotations with at least three different crops**
Pragmatic CA	**Occasional and strategic tillage**	**Optimum stubble grazing**	**Diverse crop rotations with forage and pulse legumes**

- Occasional tillage helps to reduce (herbicide-resistant) weeds and animal driven compaction.
- Inter-row tillage can be another alternative to chemical weed control.
- The timing and number of tillage operations depends on the application objective, soil type, tillage costs and weed pressure.
- Avoid tillage in months prone to wind and water erosion, or when the soil is wet.

- Allow grazing for a short period after harvest when the nutritional value is the highest, to reduce the trade-off between plant biomass for soil and forage.
- Find an optimum stocking rate that allows 20 to 30 % of the crop residues to be left as mulch on the soil surface to improve soil properties and alternatively feed forage crops with a higher nutritional value.
- Project results in Tunisia showed an optimum stocking rate of up to 30 sheep/ha for 30 days.

- Include perennial and annual forages and pulses in your crop rotation to enrich the soil with organic nitrogen, suppress weeds and reduce pests and diseases.
- Incorporate forage to reduce the trade-off between crop residues for feed or as soil mulch.
- Examples include chickpeas, lentils, Hungarian vetch, forage peas/barley or triticale and oat mixtures.

How to start with conservation agriculture on your farm

- Attend **courses and field days focusing** on soil processes, management and conservation.
- **Talk to extension workers and other farmers** who are already practising CA and share your experiences.
- Start with an **experimental trial on your farm**, for example to find the optimum stocking rate and suitable crops for a diverse crop rotation.
- **Start with forage mixtures** of vetch, forage peas, barley and triticale. Best practice is to use forage mixtures for two years to improve soil conditions and reduce weed pressure.
- **Hire machinery**, such as a direct seeder, from extension agents or farmers' organisations.

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Implementation of forage mixtures in a no-till system

Forage mixtures are a must in any no-till system to reduce weeds, improve soil biology, produce high quality forage and improve soil moisture holding capacity. ConServeTerra results show that the best mix is 30% cereals and 70% forage legumes, hayed at the end of flowering before seed formation. The mixtures should be applied once implementing no-till, to eliminate resistant weeds that may have established in fields. After cutting the forage mixture, livestock can graze it as an alternative to using herbicides. Incorporating forage into the management system can reduce stubble grazing as a barrier to CA adoption.

Successful livestock integration for weed control in a no-till faba bean system

The West Maroc family farm in the Meknes region of Morocco, characterised by a hot Mediterranean climate, is one of the few farms in the country to adopt conservation practices. Today, they practice no-till on 400 ha since 2012 to better manage water, regenerate soils and reduce the erosion risk.

One challenge with no-till is weed control. As an alternative to the limited supply of herbicides, they integrated livestock into the faba bean crop. This involves planting two rows of faba beans and leaving three rows, totalling 60 cm, empty. The sheep then graze the weeds until the faba bean flowers at a height of about 30 cm. Up to this point, the plants are too bitter for the animals to graze. However, as the sheep do not remove the roots, in some cases herbicides may be applied at later stages, and the plants are manually weeded in rows if necessary. The integration of livestock reduces the use of herbicides and tillage.

Visit the project website **www.conserveterra.org** or contact the project partners for more information:

- **Practice abstracts** with more detailed practical recommendations for implementing CA
- **Policy recommendations** for the promotion of CA in the Mediterranean region
- A **practical guide** to CA in different languages (English, Arabic, Spanish)
- **Videos** on implementing CA in practice.

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