

Policy brief

A pragmatic approach to Conservation Agriculture in the Mediterranean region

Scientific evidence and policy recommendations



Conservation Agriculture: An alternative for dryland agriculture to tackle water-scarcity

Mediterranean farming systems are currently challenged by periods of drought, erratic and heavy rainfall and rising temperatures. Combined with extensive tillage and monoculture, there is a high risk of soil and water erosion, adversely affecting yields. Conservation agriculture (CA), with its three principles of no-tillage, permanent soil cover and diverse crop rotations, has been promoted as a promising alternative for dryland farming systems to cope with climate-induced water scarcity and to regenerate soils. By improving soil stability and structure, the resilience of farms can be increased to maintain future crop productivity and stabilize yields.

Barriers to adoption

Despite the benefits, the uptake of CA in the Mediterranean remains negligible. Key constraints are

- Limited inclusion of legumes in rotations due to limited access to seeds and marketing opportunities.
- Livestock grazing, which limits the ability to leave biomass on the ground as soil cover.
- Weed pressure due to no-tillage and limited access to affordable herbicides.
- Limited access to direct seeding machinery.
- Limited knowledge of soil processes and soil as a living entity.
- Insufficient promotion of CA for the Mediterranean context.

Key messages

- CA is an alternative dryland farming system to cope with water scarcity.
- To increase adoption, a more pragmatic approach to CA is needed that reflects the reality of Mediterranean farmers.
- Support policies for farmers must be strengthened.
- Collaborative efforts between different stakeholders needs to be improved.

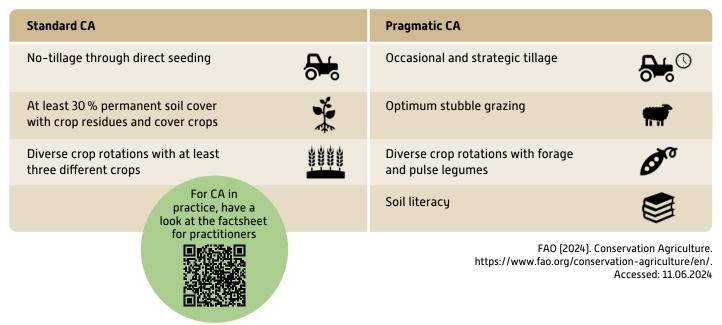
Scope

This factsheet is based on interviews, on-field and on-station research in Morocco, Spain, Tunisia and Türkiye carried out as part of the ConServeTerra project between 2020 and 2024. The project aimed to facilitate wider acceptance and adoption of CA principles in the Mediterranean area by understanding constraints and developing best management strategies under local conditions.



Policy brief

Results: A pragmatic approach to CA



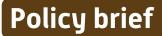
CA is often promoted as a package based on the principles of no-tillage, permanent soil cover and diversified crop rotations. The solution to overcoming barriers is a pragmatic and flexible approach to CA, which considers site conditions and sociocultural aspects:

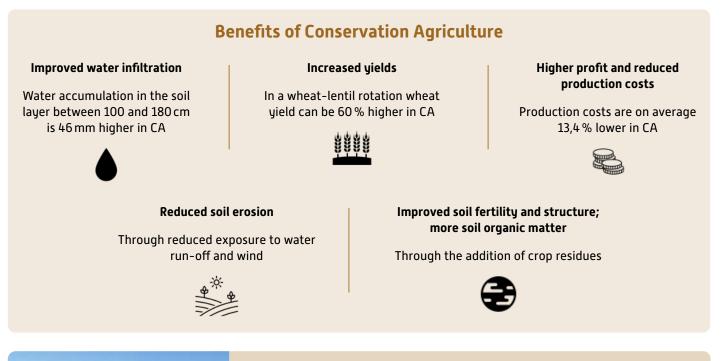
- 1. Occasional and strategic tillage: A strict no-till approach contradicts the reality of Mediterranean farmers, as tillage is a common tool for weed control, especially when affordable herbicides are limited. Occasional, strategic and reduced tillage can be an alternative to the strict no-tillage principle and motivate farmers to adopt CA. Benefits include the reduction of animal driven soil compaction, disrupting pest cycles, incorporating organic matter, controlling herbicide-resistant weeds and encouraging weed seed germination before planting. The type of machinery, timing and number of tillage operations will depend on the application objective, soil type, tillage costs and erosion risk.
- 2. Optimum stubble grazing: In CA, it is advised to leave crop stubbles on the field, which is difficult to implement due to the traditional grazing of crop residues. Intensive grazing with high stocking rates can have a negative effect on soil structure, leading to soil compaction and reduced water infiltration, resulting in more weeds and lower yields. However, these negative consequences are only seen in wetter areas on the globe. There is no scientific data from the Mediterranean region. Although excessive grazing is contrary to

the principles of CA, farmers should not be discouraged from using CA if their fields are being grazed beyond their control. An optimal approach would be a moderate grazing at lower stocking rates or grazing only immediately after harvest, when the nutritional value of crop residues is highest.

- **3.** Diverse crop rotations with forage and pulse legumes: Legumes are important for biodiversity, soil fertility, soil structure and economic diversification. In particular, the inclusion of forages in the farming system can increase the adoption rate of CA due to their ability to suppress weeds and reduce the trade-off between the use of crop residues for biomass or as soil mulch. Farmers should be encouraged to start CA conversion with mixed forages. Limited availability and high cost of forage seeds are major obstacle to forage cultivation. A concerted effort should be made by the government and seed companies to make forage seeds available and affordable. For pulse production under CA, inrow cultivation for weed control should be promoted, especially in areas where selective herbicides are expensive and/ or unavailable.
- 4. Soil literacy: Next to agronomic principles, a basic understanding of soil processes is key to increasing farmers' appreciation of soil and their ability to practice CA. Farmer Field Schools (FFS) introduce farmers to soil processes using interactive tools such as a rainfall simulator and can act as a platform for co-learning and sharing experiences.







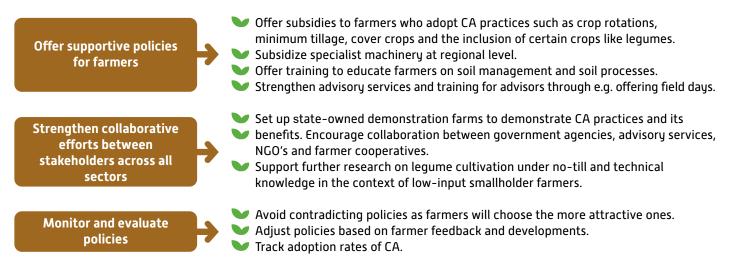


Policy example: Morocco to convert 1 million ha to Conservation Agriculture

Morocco is the largest practitioner of CA in the region. As part of the national Green Generation 2020-2030 strategy, the country targets one million hectares of cereals under CA by 2030. To achieve this, strategies have been formulated in a national program. The initiatives are largely the result of long-term research by ICARDA and INRA, which have identified CA as an alternative for dryland farming systems. Research has focused on crop rotation systems and alternating cereals with fodder crops and legumes to increase soil organic matter, improve soil fertility and reduce the widespread monocultures of cereals, which play a major role in soil degradation.

Policy recommendations

Farmers have different preferences and motivations when it comes to their choice of agricultural practices. Not all farmers will adopt CA practices in the same way and to the same extent. Policies need to provide a range of options to cater for farmers with different interests and to encourage wider adoption.





Policy brief

References

- Cicek, Harun, et al. "A critical assessment of conservation agriculture among smallholders in the Mediterranean region: adoption pathways inspired by agroecological principles." Agronomy for Sustainable Development 43.6 (2023): 72.
- V ICARDA (2024). Morocco to Convert 1M ha to Conservation Agriculture - how ICARDA/INRA Fit In. https://www.icarda. org/media/blog/morocco-convert-1m-ha-conservationagriculture-how-icardainra-fit
- Lawrence, P.A., Radford, B.J., Thomas, G.A., Sinclair, D.P., Key, A.J., 1994. Effect of tillage practices on wheat performance in a semi-arid environment. Soil Tillage Res. 28, 347-364. https://doi.org/10.1016/0167-1987[94]90140-6
- Loss, Stephen P., et al. The practical implementation of conservation agriculture in the Middle east. International Center for Agricultural Research in the Dry Areas (ICARDA), 2015.

Publication details

Publisher:

Research Institute of Organic Agriculture FiBL Kasseler Straße 1a D-60486 Frankfurt am Main Tel: +49 69 7137699 0 https://www.fibl.org

Editors: Mia Schoeber, Harun Cicek, Elisa Mutz

Project website: https://conserveterra.org/

Project partners: Research Institute of Organic Agriculture (FiBL); University of Kassel (UK); University of Barcelona (UB); Consortium of Gallecs (CPEING); National Institute of Agronomic Research (INRA); AGENDA Morocco; University of IAV Hassan II (IAVH II); El Baraka farmers association (El Baraka); West Maroc, National Institute of Agronomic Research of Tunisia (INRAT); National Agency for Field Crops (INGC); Association pour la promotion de l'agriculture durable (APAD); Office of Livestock and Pasture (OEP); Bahri Dagdas International Agricultural Research Institute (BDIARI); Conservation Agriculture Association (KTD)

Funding: The project is supported by PRIMA under Grant No 1913, a programme supported by the European Union



This project has been funded with support from the PRIMA (grant Number 1913), a programme supported by the European Union. This communication reflects the views only of the author, and neither PRIMA not the European Union can be held responsible for any use which may be IN THE MEDITERRANEAN AREA made of the information contained therein.

