



CONTEXT

Mediterranean agriculture suffers frequent droughts. Water limitations imposed by climate have an impact in the crop yields and its stability. Poor soil coverture by vegetation exacerbates the soil erosion problems and reduces fertility of the soil. In these conditions, agricultural practices as the Conservations Agriculture (CA) production system enhance soil protection, water conservation and biodiversity, improving the yield of the crops.

WORK DONE IN CAMA

Due to high diversity of pedo-climatic conditions in Med area and the diversity of crop production systems, CAMA project objectives included to demonstrate that in such different conditions the implementation of CA did not limit crop yields. A set of 11 experiments in 10 field controlled commercial conditions was used during 3 growing season from 2020 until 2023 in the different countries, with a diversity of climate and production system conditions, and with different agricultural practices adjusted to the implementation of CA.

The network of experiments allowed us an assessment and comparisons of soil management systems (effect of reduction of tillage: conventional - reduced - no till). Other factors as water regime, crop and varieties types, cropping system (crop rotation - intercropping), fertilizer application were also studied. The impact of CA on crop yield and some related variables as yield component and even grain protein content was evaluated under these multiple conditions and factors.



Figure 1. As examples of the field network, field experiments conducted in Foggia, Italy-CREA (left) and in Kef, Tunisia-INRAT (right)

RESULTS

Table 1 resumes average yield obtained as average comparing different soil management systems (Conventional/Intensive, Minimum and No tillage) in different field experiments in different conditions and under particular cropping system. Despite the heterogeneity of the different locations and pedo-climatic conditions **CA options (Minimum and No tillage) obtained a better o equal yield as intensive tillage**. In the experiments as in Italy (CREA) and Greece (HAO), representing more **humid conditions, minimum tillage use to be optimum strategy**. However in dryer situations **No tillage performed better and is the optimal and**

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Conservation Agriculture in Mediterranean countries improves crop yield



recommended strategy for soil management. Table 2 indicates, as an example in the particular case of Tunisia, the **interest of the crop rotation when implementing CA.**

Table 1. General yield average (t ha⁻¹) of field crops comparing tillage systems under the different conditions of the field experiments and including different practices (Greece included rotation of different crops; Spain included comparison with fertilizer type and dose; Morocco included different tested plant material and Tunisia included different duration of a crop rotation).

Tillage system	Foggia Italy	Drimos Greece	Senes Spain	Merchouch Morocco	Kef Tunisia	Average
Conventional intensive tillage		3.85	1.06		1.50	2.14
Minimum tillage	2.35	3.35		4.30	1.70	2.92
No tillage	1.86		2.50	4.07	2.00	2.61

Table 2. General yield average (t ha⁻¹) of field crops comparing tillage systems under the different duration of a crop rotation in Kef Tunisia experimental fields.

Tillage system	Monocropping	2 Year Rotation	3 Year Rotation
Conventional intensive tillage	1.30	1.20	2.00
Minimum tillage	1.10	2.00	2.00
No tillage	1.30	2.30	2.40
Average	1.23	1.83	2.13

CONCLUSIONS AND RECOMMENDATIONS

Soil management options (main factor, tillage options). In general we could conclude that the reduction of the intensity of de tillage produces the same yields or better that intensive soil management options.

Cropping system. Cropping system factor represents the important factor in the definition of Conservation Agriculture (CA). Some scenarios of the network experiment concluded that **crop rotations as crop diversification are better for sustainable yield productivity.**

Fertilization options. All the scenarios where N fertilization is considered, demonstrate that there is an interactive effect thought the water response. **N application produces better response of the reduction of the tillage system.** In the experiments that consider the N fertilization, **a reduction of the dose is needed.** Farmers tend to over fertilize, and a reduction will lead to a better optimized for yield and for environmental sustainability.

References: Deliverable 5.1 CAMA project- Set of suggested technical improvements

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