



A global initiative to combat desertification



AGRICULTURAL
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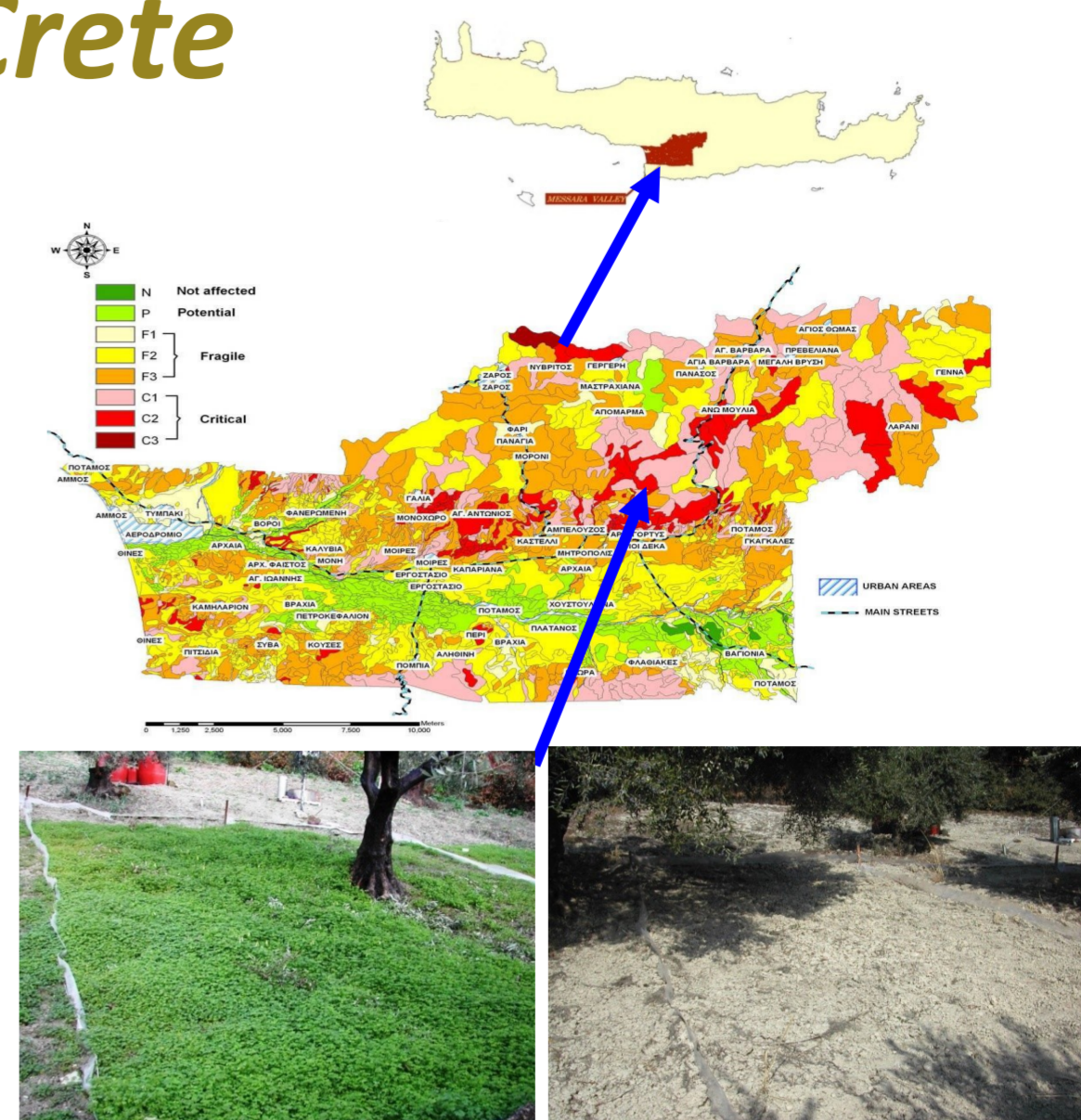
Stakeholder involvement:

The landowner is very much interested for the research work carried out in his land. People in the Village have been informed for the Monitoring activities carried out. Farmers have realized the importance of no-tillage farming in olive groves, taking into consideration the reduction in labor and increase in net income. Issues concerning land management and protection of olive groves from soil erosion and land desertification are considered very important from the local farmers. Stakeholders are very much interested to have the results of DESIRE and to use new technologies on land management and protection of the environment.

Study Site: *Augeniki, Crete*

Description of the monitoring area

Monitoring has been conducted on an systematic olive grove. The soil is characterized as moderately deep soil (soil depth 55-65 cm), moderately steep slope (slope gradient 17%), formed on marl parent material, prone to surface water runoff and tillage erosion. Water stress to the growing plants is also a major issue in the area since climate is semi-arid and water for irrigation is not available. The average annual rainfall is 570 mm with a rain season period from October to early May. Evaporation is ranging from 1370 1570 mm per year.



Wider attention is going to be given after organizing visits for officials in the monitoring area to present the implementation and to provide them with the DESIRE results

Conservation measures and experimental setup

Experimental setup:

The field experiment includes three treatments with two replicas (see map). The following three treatments are applied: (a) treatment 1, no tillage – no herbicides application, (b) treatment 2, no tillage – herbicides application, and (c) treatment 3, tillage operations perpendicular to the contour lines at depth 20 cm using a disk. At the bottom of each plot there is a small ditch and a tube that leads runoff water to a dipping bucket and soil sediment trap. Measurements are automatically controlled.

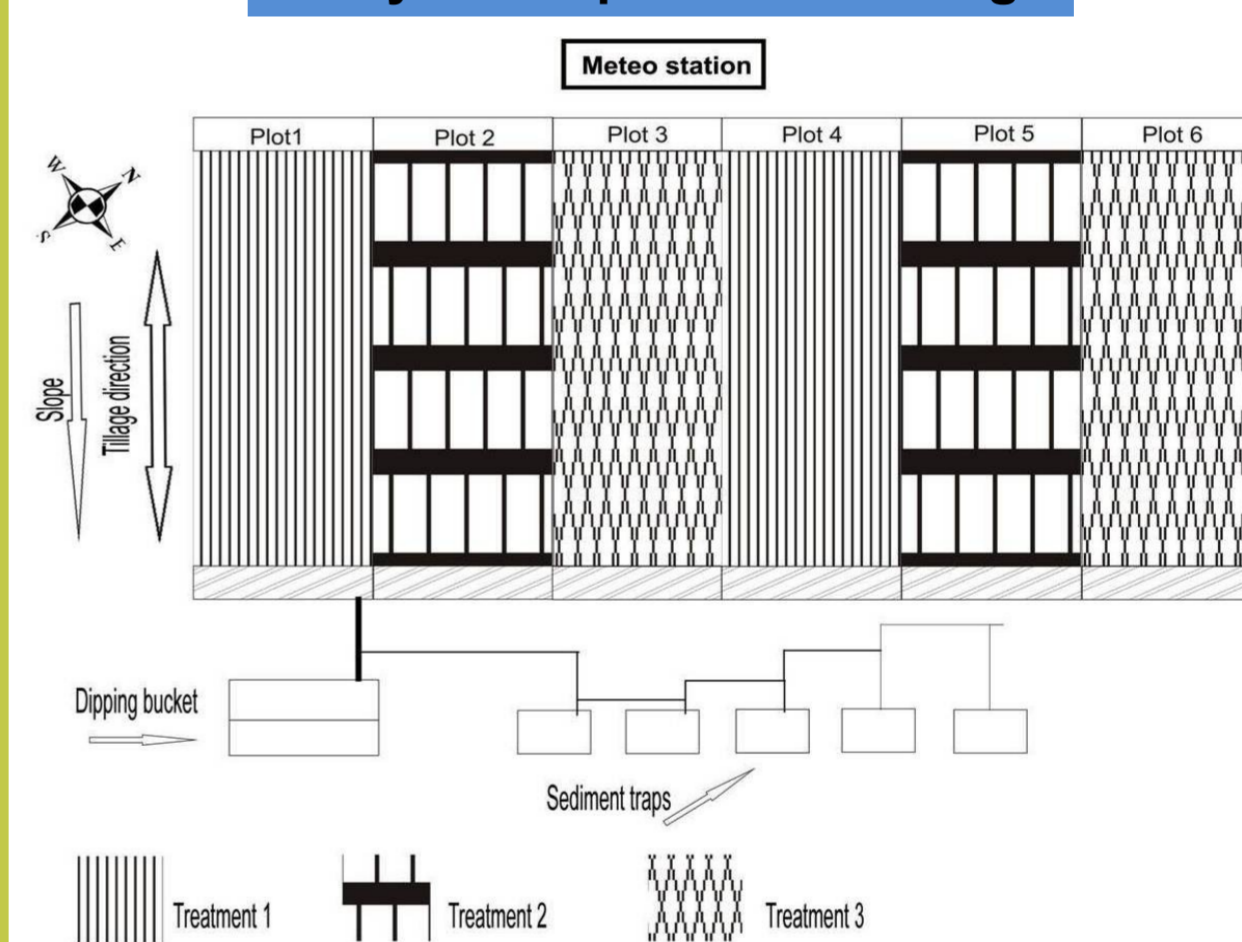
Expected effects:

No tillage or herbicides application will reduce surface water runoff and sediment loss. Furthermore, soil water conservation, organic matter content, and structure stability will be enhanced.

Monitoring activities

- **Continuous meteo measurements by an automatic station:** rainfall, open pan evaporation, wind speed, air temperature, relative humidity.
- **One time soil measurements:** texture and stoniness, organic matter, saturated hydraulic conductivity, porosity, Ksat, and bulk density.
- **Repeated visual monitoring supported by digital photography:** Regular soil surface assessment, crop characteristics, plant cover, erosion features,
- **Repeated measurements:** soil moisture, soil temperature, sediment loss every rainfall event, surface water runoff, soil shear strength, soil compaction.
- **Agronomical activities by stakeholder:** Dates and type of tillage operations, application of chemicals/fertilizer, etc.
- **Yield assessment:** Total yield in kg/ha, general impression by stakeholder, comparative assessment with regular practice.

Study site experimental design



Important results

- **Measurements** have been conducted from middle of November 2008 to end of September 2009.
- **Total rainfall** for the above period reach 704.4 mm with one major event with maximum rainfall intensity 74.4 (Fig. 1).
- **Four major surface water runoff events** occurred (Fig. 2). There was a great change in total runoff and sediment loss among the existing land management practices: tillage= 46.9 mm, 123.2 kg/ha; herbicides =13.5 mm, 60.6 kg/ha; and no tillage-no herbicides =2.9 mm, 8.9 kg/ha.
- **Soil moisture** at 20 cm (Fig. 3) and 40 cm depth (Fig 4) was affected by land management practices (LMP) with higher soil water conservation in the no tillage (Fig 3).
- **Soil temperature** at 10 cm depth was higher in the tillage LMP (Fig 5). The average soil temperature for the above period was 14.8 °C, 17.6 °C, and 18.0 °C for the no tillage, herbicides, tillage LMP, respectively.
- **Soil compaction** (Fig 6), shear strength, and plant cover values were higher in no tillage LMP, followed by herbicides application, and tillage LMPs.

