

SITE NAME - Combating desertification in grazing land - Agia Barbara - Crete Greece

NOTE: This poster has presented in a previous DESIRE project meeting. The only changes is the expansion of graphs including data until September 2011.

“Executive summary of main findings:
The application of the appropriate land management practice can greatly affects land protection and reduction in desertification risk. The measured soil erosion rate under sustainable grazing was about one half of the erosion measured in overgrazing

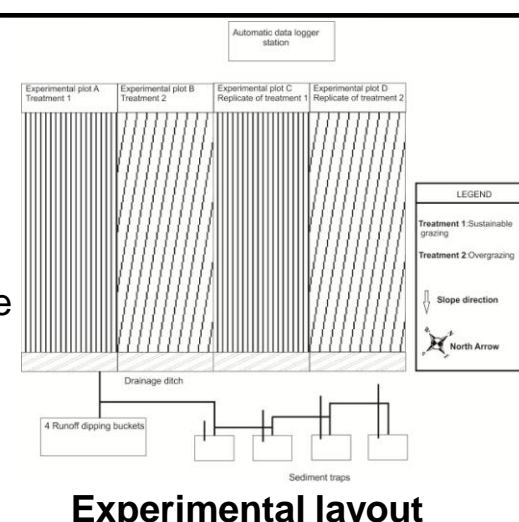
Introduction

Pastures are widely expanded in Crete with great ecological and economical importance for the production of low cost and good quality of animal products. The number of animals in the island have more than doubled in the last three decades in numbers higher than those defined by the stocking rate resulting in overgrazing with the consequences of high erosion rates. Overgrazing accompanied with long dry periods during the year is considered as the main cause of desertification in the island. The following two land management practices have been tested in the island: (a) sustainable grazing, and (b) overgrazing. The purpose of this study is to analyze the effect of these practices on desertification risk.



Experimental setup

The field experiment includes the following two treatments with two replicas (see map): (a) sustainable grazing – Technology A, and (b) overgrazing– Technology B,



Experimental layout

Continuous meteo measurements were conducted by an automatic station. One time measurements were carried out such as: texture and stoniness, organic matter, soil aggregate stability, etc. Repeated measurements were conducted such as soil moisture with permanent installed time domain reflectometers, soil temperature, sediment loss every rainfall event, surface water runoff every 5 minutes, etc.

Variable	2008	2009	2010	2011
Meteo				
Moisture				
Runoff				
Sediments				
Organic matter	*			*
Aggregate stability	*			*

Results of the biophysical experiments

1 – Technology A

The obtained results shows that this technology had the following effects compared to technology B:

- Lower surface rain water runoff (Fig.1).
- Low soil sediment loss.
- Higher amount of water stored into the soil.
- Higher organic matter content in the surface horizon.
- Lower soil temperature during the whole year in the surface soil layer (Fig. 2).
- Higher biodiversity.
- Lower desertification risk.

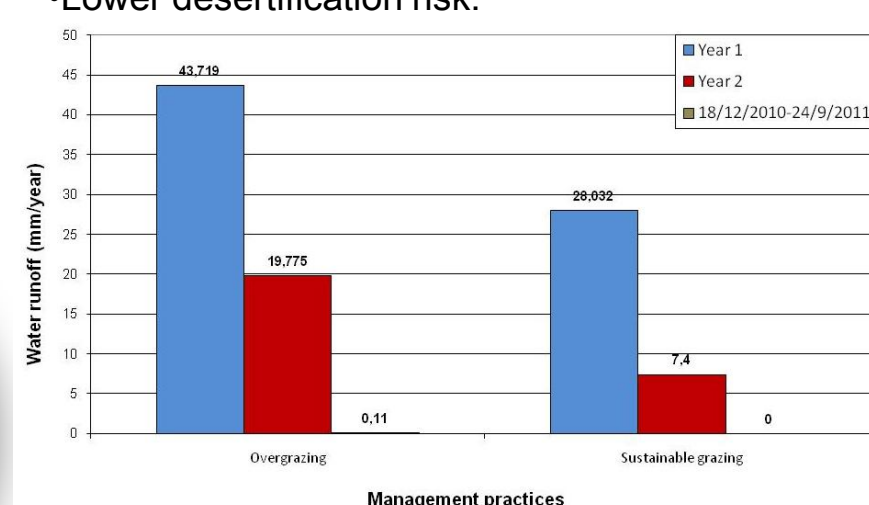


Fig. 1. Annual surface water runoff measured under sustainable grazing and overgrazing conditions

2 –Technology B

The obtained results shows that this technology had the a great impact on desertification risk compared to Technology A such as:

- 2.3 °C higher average annual soil air temperature at 10 cm soil depth.
- Lower organic matter content by 35% due to higher erosion rates.
- High soil surface crusting causing higher water runoff rates
- Higher cost paid as subsidies for keeping large number of animals causing problems of product quality.

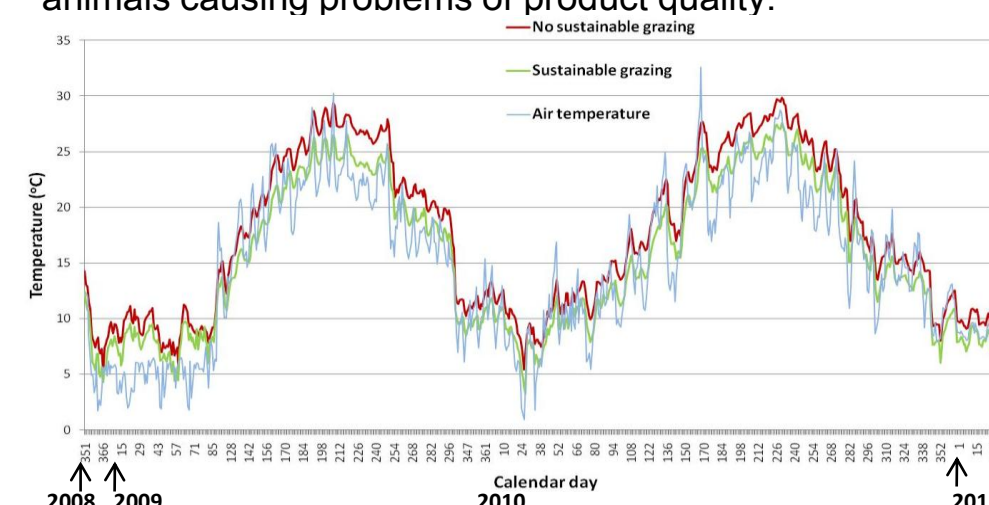
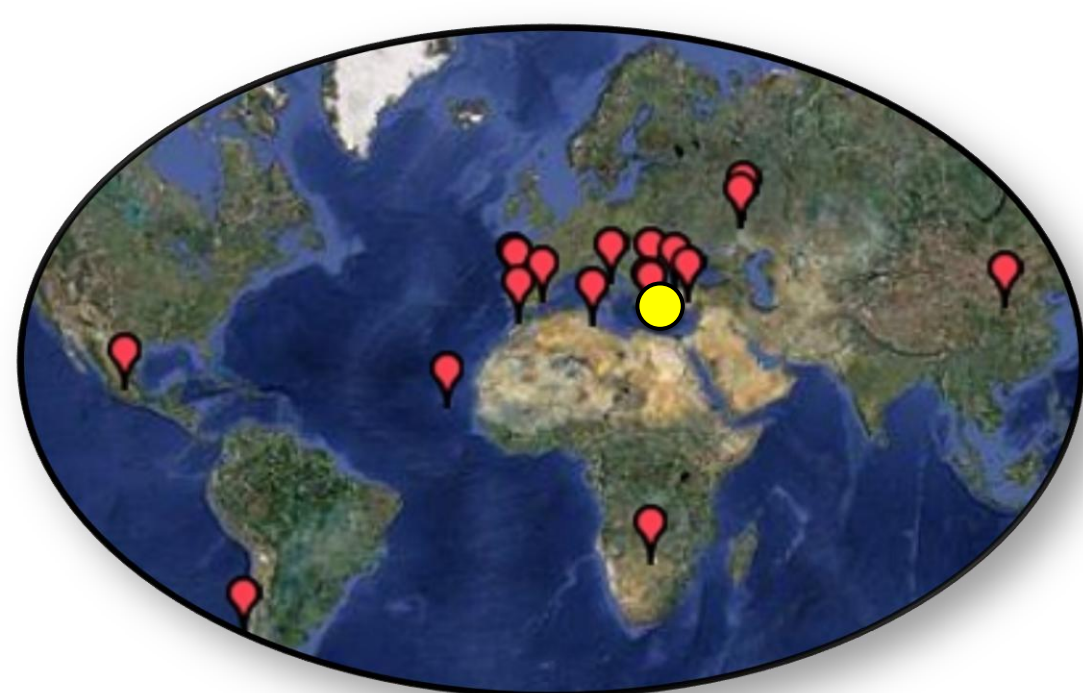


Fig. 2. Change of air and soil temperature at 10 cm soil depth with time under different land management practices



Overgrazing



Sustainable grazing



Stakeholder involvement and cost benefit information

Local stakeholder has offered his field for installing instruments and monitoring different land management practices. Many of local farmers have visit the monitoring site and observed the work carried out.. They have considered the applied sustainable land management practice, but the main constrain is the conditions of EU subsidies allocation. A 45 minutes documentary has been made and presented in the Greek national television in which the benefits and impacts of both the technologies pointed out.

The benefits are related to: (a) protection of the environment, (b) to increasing rain water stored into the soil and supplying water to springs and to the aquifer in the lower valley.

The application of sustainable grazing require additional funds for compensating the reduction of number of animals according to sustainable carrying capacity or to buy additional feed for keeping the animal out of the land for a certain period. The cost is estimated in 7 Euro per animal.

Few stakeholders have accepted this type of land management practice. The main reaction is the lack of funds for supporting farmer's income.

The expectations from the proposed technology in grazing land are: (a) limited expansion in larger areas, (b) protection of the environment if applied.

Main conclusions and implications for DESIRE as a whole

DESIRE project has a great contribution in providing knowledge on measures for combating desertification in the following issues:

- ❑Organizing knowledge on various effective land management practices existing around the word.
- ❑Providing technologies accompanied with real data on the effectiveness for protecting the physical environment and supporting farmer's income.

Farmers are greatly convinced for changing land management practices but there is a lack of the appropriate knowledge transfer to land users and available funds for supporting their income.

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