

# Guidelines for Land Managers

## **The OVERGRAZING**

### **context**



Principles and  
recommendations from the  
CASCADE project with  
contributions from land users  
and land managers

Principle 1: Reduction of vegetation increases soil erosion, leading to less fertile soil and less productive pastures



- ✓ Keep a minimum of 30-40% soil cover
- ✓ Rotate grazing areas and control the amount of animals
- ✓ Use stall feeding, especially during the dry season

Vegetation cover is important to protect soil against erosion and to maintain soil nutrients and soil water content\*, which in turn guarantee that plants remain healthy and continue growing (1). If the surface cover falls below 30-40%, soil erosion increases sharply. At such low cover, connectivity of bare patches facilitate loss of water and nutrient resources, resulting in possibly irreversible changes\*\*.



\*\*Temporary (right) and permanent degradation (bottom) caused by overgrazing

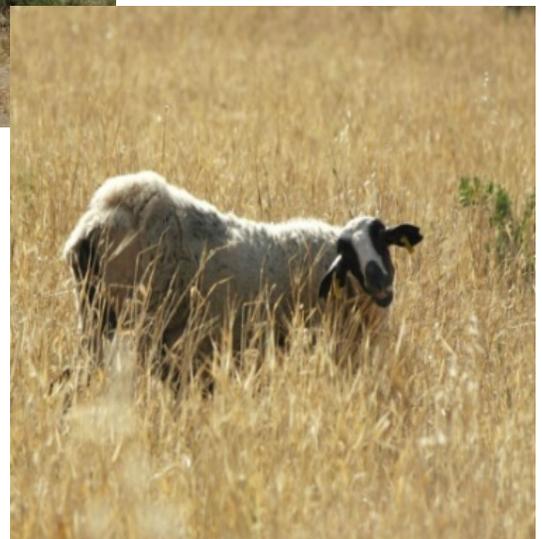


\*Healthy (darker) soil from a vegetated area placed on a degraded (white) soil from an overgrazed area



If grazing is too intense, the proportion of bare soil increases and hence permanently degrades the pasture (2). This is particularly relevant during droughts (2) or in summer, where the vegetation is most under pressure. During these periods, alternative sources of fodder\*\* should be provided to animals (3), and care should be taken to maintain a vegetation cover of at least 40 % (1,4).

Land management options include **fodder provision** (3), rotational grazing and area closure.



\*\* Cultivating and storing fodder, hay making, cut and carry systems, and excluding some areas from grazing can help maintain the environment even during the driest periods

Sources:

- (1) CASCADE Deliverable 4.2
- (2) CASCADE Deliverable 6.1 page 3
- (3) [Fodder provision to reduce grazing pressure on natural vegetation \(CYP001\)](#)
- (4) [Mayor A. G. et al. \(2016\). Fire-induced pine woodland to shrubland transitions in Southern Europe may promote shifts in soil fertility. Science of The Total Environment](#)

## Principle 2: Integrating trees and pastures has ecological and socio-economic benefits



- ✓ Protect existing trees
- ✓ Plant fruit and fodder trees such as carob
- ✓ Diversify pasture land products to explore new market opportunities

Livestock production allows only relatively low gains, especially if competition from markets elsewhere is high and the productivity of pastures is low. Introducing fruit trees in pastoral lands can improve pastures\*, provide additional fodder and shade for the animals, decrease soil erosion and improve soil fertility. Products from olive or carob trees can create additional income from alternative markets\*\* (4, 5).

Land management options include **planting carob trees on grazing land** (5).



\*\*Carob trees are particularly adapted to dryland pastures and provide valuable products



\*Trees in pastures help retain the soil and provide shade



Source:  
(5) [Planting Carob trees in degraded grazing land \(GRE008\)](#)

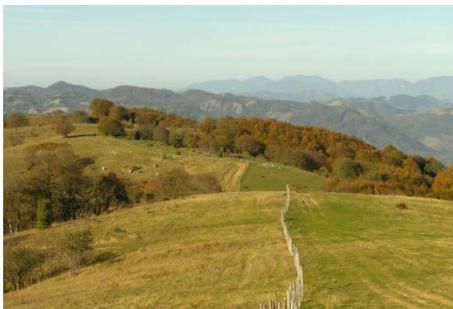
### Principle 3: Pest management requires an integrated ecosystem approach to promote natural predators



- ✓ Protect ecosystem floral and faunal diversity
- ✓ Avoid killing all snakes, wolves or other predators
- ✓ Protect trees against rats
- ✓ Install fences and traps
- ✓ Provide nest boxes for birds of prey

Animal pests such as rats and boars, beyond a certain number, can damage the vegetation, increase soil erosion and thus reduce the value of pastures. Long term improvement has to consider the ecosystem as a whole, in order to increase the number of wolves, snakes, and eagles.

Short term land management options include **tree protection from rats\*** (6) and **fences to prevent damage from wild boars\*\*** (7).



\*\*Fence to keep wild boars out

\*Measures to protect trees and pastures from pests



Sources:

(6) [Carob tree protection from rats \(CYP003\)](#)

(7) [Metallic fences to prevent damages to pastures from wild boars \(ITA005\)](#)

Principle 4: Animal types and herd composition influence plant diversity and health. Overgrazing by uniform livestock species can lead to the spread of invasive/unpalatable species



- ✓ Plan resting periods for pastures
- ✓ Selectively remove unwanted species, while keeping some for soil protection if necessary
- ✓ Diversify animal types
- ✓ Increase health and productivity of individual animals instead of increasing the size of the herds

Animals tend to eat the plants that they prefer (e.g. annual grasses or large-leafed plants) and avoid the unpalatable or less tasty species\* (e.g. perennial grasses or thorny shrubs).





\*Shift (from left to right) from annual grasses To perennials caused by prolonged grazing

Continued and heavy grazing changes the vegetation and can decrease pasture productivity\*. If the unpalatable species have a competitive advantage over the more palatable ones, this process can lead to a permanent change in the ecosystem.



\*Fencing to exclude livestock temporarily helps the "good" plants to recover



\*\*Unpalatable species like ferns (left) can be cut and used as litter for stables, and the fields can be ploughed and seeded (top) to restore them

Pasture degradation can be prevented by allowing the pastures to rest, especially during the growing season, favouring the recovery of more palatable species\*.

Land management options include having different types of livestock (e.g cows, sheep and goats), **manuring pastures** (8) and **ploughing and seeding of fodder species to recover degraded pastures** (9).

Sources:

(8) [Pasture manuring \(ITA003\)](#)

(9) [Ploughing and seeding of fodder species to recover degraded grazing areas \(ITA004\)](#)

Principle 5: Controlled grazing reduces risk of fires, and maintains grass species and productivity of pastures



- ✓ Avoid completely abandoning an area for a long period
- ✓ Limit grazing during the dry season as much as possible
- ✓ Remove woody/thorny bushes mechanically once they are abundant
- ✓ Install fuel breaks or reduce bush cover into hedge rows to (re-)allow grazing and thus decrease fire risk



\*Abandoned agricultural terraces and pastures in Cyprus

In dry areas, wildfires can occur whenever there is sufficient vegetation to burn\*. Grazing reduces the amount of fuel, and has an important effect in reducing the occurrence of fire (4).

If pastures are not grazed anymore, they can become much more vulnerable to fire. If the vegetation includes thorny shrubs, once it is too thick, animals will not be able to enter it, generating a vicious circle that leads to loss of productive pastures and increased fire risk.

Thus pastures should not be completely abandoned for long periods, but should be grazed at moderate intensity and rested occasionally.

Land management options include controlled and rotational grazing.



\*Abandoned pastures with too great a bulk of vegetation can easily catch fire

Principle 6: After a fire or drought continued grazing could lead to a permanent change in pasture productivity and quality



- ✓ Reconsider management immediately after a fire or during a drought by reducing grazing, allowing a minimum of 2 years for resting, and providing supplementary fodder
- ✓ In case of a permanent loss of vegetation cover or quality, actively revegetate/regenerate/restore

Even if grazing is sustainable during “normal” periods, it can degrade the land irreversibly during or immediately after a disturbance, such as a drought or a fire\*.



\*Allowing grazing after a fire prevents regrowth of palatable vegetation (left) and increases the presence of invasive species (right)

To ensure that the land recovers from disturbance and returns to productivity rapidly, it is important to modify the land management immediately after a disturbance and not to wait until it is evident that it is not recovering\*\*.

Land management options include grazing exclusion, irrigation, **revegetation** (11, 12).



\*Examples of grazing exclusion (left) and revegetation (right) in arid rangelands

Sources:

(11) Restoration options CASCADE Deliverable 5.2

(12) Multi-specific plantation of semiarid woody species ([SPA013](#))



The CASCADe Project study sites across southern Europe

*These guidelines were developed within CASCADe Project WP7 with contributions from land users and managers in all the study sites*

**Authors:** Matteo Jucker Riva, Hanspeter Liniger, Gudrun Schwilch, (Centre for Development and Environment CDE, University of Bern, Switzerland); with contribution from CASCADe study site researchers and collaborators

**Photos:** Matteo Jucker Riva

**Layout:** Nichola Geeson, (MEDES Foundation, Italy)

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**Contact information**

Project website: [www.cascade-project.eu](http://www.cascade-project.eu)

Project information system: [www.cascadis-project.eu](http://www.cascadis-project.eu)

Project coordinator: Prof. Dr. Coen Ritsema - [coen.ritsema@wur.nl](mailto:coen.ritsema@wur.nl)

Project manager: Erik van den Elsen - [erik.vandenelsen@wur.nl](mailto:erik.vandenelsen@wur.nl)

Communication: Dr. Nichola Geeson - [nicky.geeson@googlemail.com](mailto:nicky.geeson@googlemail.com)

EU Scientific Officer: Federico Nogara - [federico.nogara@ec.europa.eu](mailto:federico.nogara@ec.europa.eu)

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