

Grazing Optimization: Enhancing Resource Use and Weed Management in Tree Crops



Thematic area:

Environmental Sustainability.

Priority: How to improve biodiversity while maintaining equine activities?

Need: Find solutions to reduce the loss of biodiversity (and/or even increase biodiversity) in equine farms (positive and negative impacts of horses): How to identify good, practical and biodiversity-friendly methods?; How to fight weeds without phytosanitary products?; How to fight against the decline of biodiversity?

Solution EU number: BD-10.

Content of the solution:

Using natural grass cover within permanent tree crops (e.g., olive groves, cork oak stands) as a grazing resource to enhance biodiversity.



Reasons for Implementing the Solution

The use of the area for grazing under tree crops serves as natural weed control and at the same time promotes biodiversity. This enables environmentally friendly maintenance with additional benefits for animals, e.g. as horse pasture, and nature.

Description of Solution Strategies

It is now well established that horses, due to their feeding behaviour can be used to control weeds in permanent crops providing an alternative to mechanical cutting. Grazing allows horses to be fed while simultaneously managing unwanted vegetation and improving the biodiversity of the grazed areas.

- Although grazing animals can sometimes create imbalances in pasture, these issues can usually be corrected by adjusting the timing, the duration, or the intensity of grazing. For example:
- Increasing grazing pressure (higher stocking rates) reduces selective grazing and can help control certain weed species.
- Adjusting stocking density can encourage the growth of desirable forage species, making them more competitive and better able to resist invasion by annual or biennial weeds.
- Horses are also capable of browsing and suppressing some spiny shrubs, such as gorse.

For grazing animals to be useful for weed control, such animals must be available for use, and they must be able to be fenced onto or off an area in order to adjust grazing pressure.

More widespread adoption of grazing animals for control of weeds could lead to a reduction in herbicide use, itself seen by some as a healthy trend, which may lead to pastures with a greater diversity of useful species. Having more animal species on a farm could allow a more balanced approach to weed control, and under some circumstances may be more profitable for the farmer.



Implementation Steps

1. Area assessment and planning

- Analysis of existing tree crops and grazing areas.
- Identification of problematic weed species and other species and map their distribution.
- Assessment of ecological suitability for horse grazing.

2. Selection of suitable animals

- Selection of suitable horse breeds (size, temperament, robustness).
- Consideration of their nutritional needs and compatibility with local conditions.

3. Prepare infrastructure

- Set up or adapt fences for controlled grazing.
- Set up water points, shelters and mobile fencing if necessary.
- Ensure animal welfare (shade, access to minerals, veterinary care).

4. Determine grazing strategy

- Plan grazing times and intensity depending on the stage of vegetation.
- Targeted grazing of areas with high weed levels.
- Rotational grazing systems to recover areas and promote desirable plant species.

5. Ensure animal availability

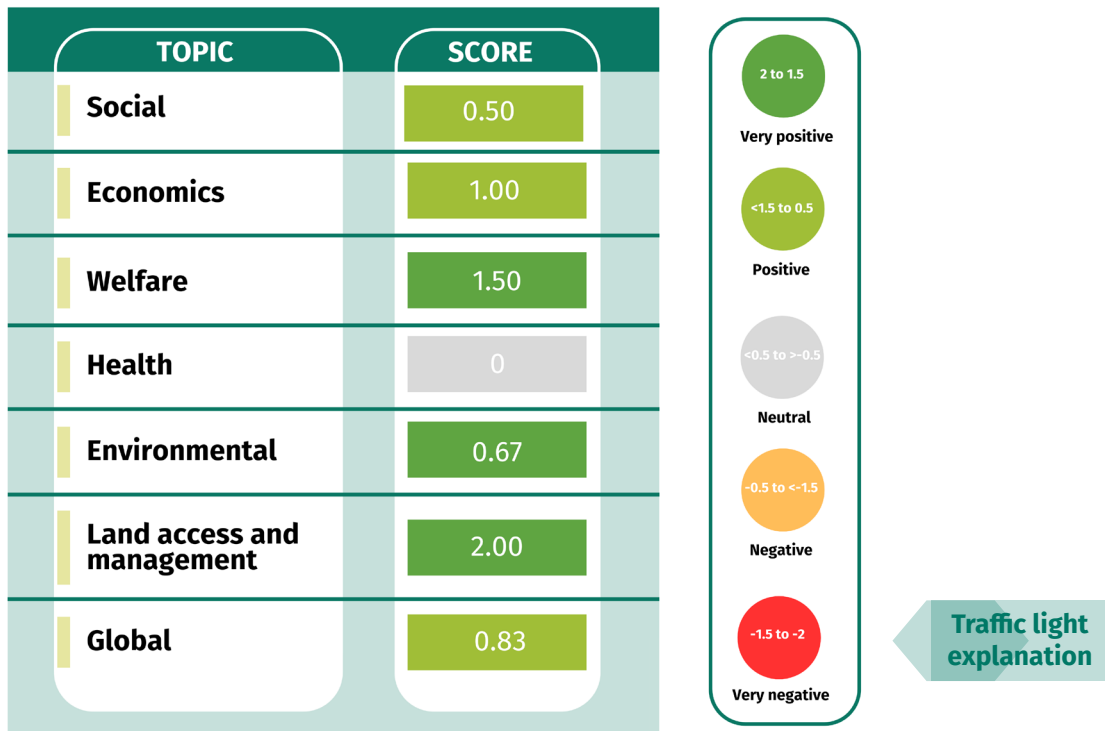
- Organization of a permanent animal herd or cooperation with animal owners.
- Clarification of ownership, care and liability issues.

Monitoring and adjustment

- Regular monitoring of weed development and vegetation changes.
- Adjustment of grazing intensity and times depending on success.
- Documentation of ecological and economic effects.

Grazing Optimization: Enhancing Resource Use and Weed Management in Tree Crops

How Will this Solution Impact the Performance of your Farm?



Socioeconomics: This solution will support socioeconomic performance of your farm because, if well managed, combining multiple activities on the same land can be highly lucrative and help enhance the farm’s image by optimizing land use. However, it is important to consider legal restrictions, such as grazing in forests being prohibited in some countries.

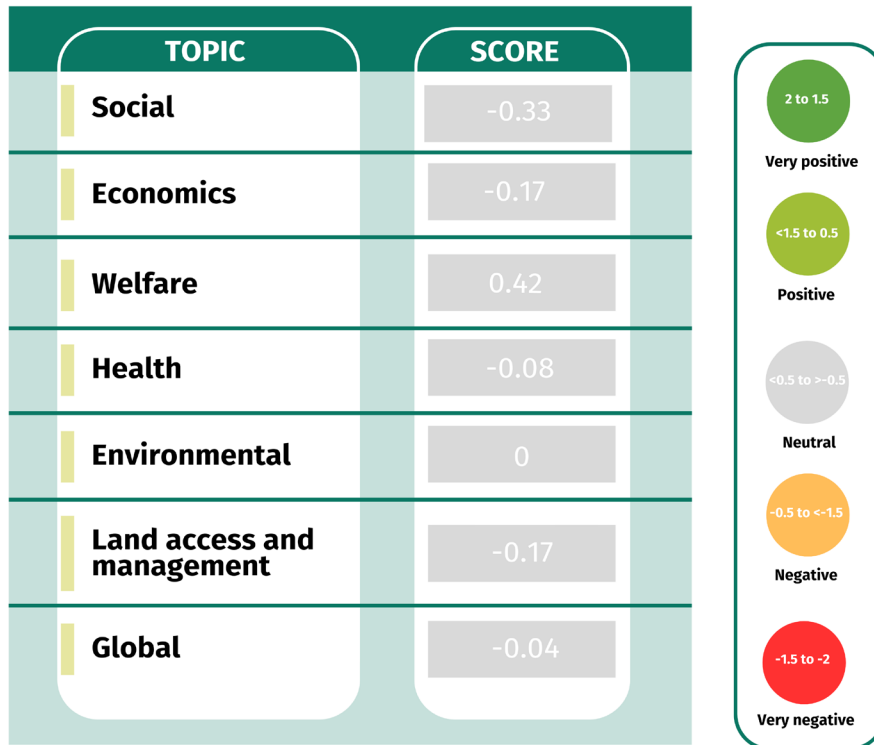


Health & Welfare: This solution may help the farm in providing free-movement, social company and opportunity for grazing, so promotes equine welfare. However, this will have little effect on health, it has to be considered that some weeds may be toxic. Also, appropriate stocking rate should be assured to avoid undernutrition of animals.



Environmental sustainability: This solution will support environmental sustainability and pasture management performance. However, it needs to be confirmed that native plants are not affected by the presence of animals.

How Will this Solution Impact the Resilience of your Farm?



Socioeconomics: This solution won't have any effect on socioeconomic performance of the farm facing external challenges. While the solution is ecologically beneficial and can contribute to long-term sustainability, it doesn't significantly shift the economic needle in the face of external pressures. It's a good supporting strategy, but not a primary one for improving socioeconomic resilience.

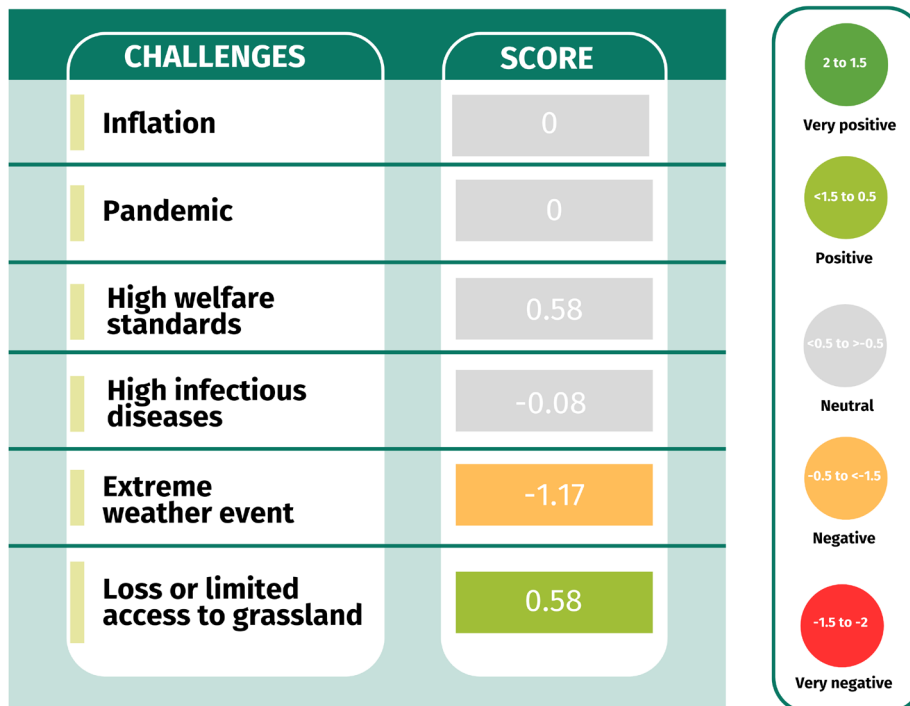


Health & Welfare: This solution has neutral effect on the farm resilience from challenges from health and welfare area, however, when appropriately planned, free grazing is always beneficial to horse welfare.



Environmental sustainability: This solution has neutral effect on farms ability to recover from challenges related to environmental sustainability and negative effect on grassland management.

How can this solution help your farm to face specific external challenges to be more resilient?



Inflation & Social Crises: This solution won't have any effect on the global performance of the farm facing inflation or a pandemic for the same reason as explained for the global resilience score above.



Welfare & Diseases: This solution, allowing group grazing in partially shadowed area could be effective for resilience to new legislation insisting on assuring more movement, social contact and feeding behavior. However, it will not prevent, but may contribute, to the spread of infectious diseases.



Climate Change & Access to Land: This solution has a negative effect on farm's ability to recover from challenges related to abnormally high or low temperatures, drought or excessive raining. Because its multiple activities being held in the same space/land, the effects of extreme weather is bigger. This solution will affect negatively in different weather conditions. On the other hand this solution has positive effect in case of limited or lost access to grassland due to horses grazing in an olive tree or cork oaks plantation, using land for multiple purposes.

Cost-benefit Analysis

Costs

Socioeconomics:

- Higher initial investment for fences, shelters and infrastructure for controlled grazing.
- Ongoing costs for animal care (feed, vet, deworming, hoof care, winter housing).
- Increased workload for grazing management (monitoring, relocation of animals, area maintenance).
- Possible yield losses if weeds are not sufficiently controlled or desirable plants are damaged.

Health & Welfare:

- Increased risk of parasites and diseases, especially with close grazing or poor surface rotation.
- Risk of overgrazing and malnutrition if pastures are not managed properly.
- Risk of injury due to uneven terrain, thorns or poisonous plants in the pasture.
- Mental stress for animals if grazing areas are too small or the social structure of the herd is disrupted.

Environmental Sustainability:

- Erosion and soil compaction due to excessive foot traffic and selective feeding.
- Uneven nutrient distribution, as horses prefer to defecate and graze in certain places.
- Water pollution due to nutrient leaching into nearby bodies of water, especially if stocking density is too high.



Benefits

- Reduction in operating costs through reduced use of herbicides and machinery.
- Diversification of income sources, e.g. by keeping horses as an additional form of operation.
- Long-term profitability, as sustainable grazing practices maintain soil quality and stabilize yields.
- Increased market appeal through sustainable, environmentally friendly production methods (e.g. for organic labels).



- Natural exercise and species-appropriate husbandry promote the health and well-being of horses.
- Healthier nutrition through varied pastures with different plant species.
- Reduced risk of obesity and metabolic disorders thanks to continuous exercise and feed intake.
- Improved hoof health through natural wear and tear on varying surfaces.



- Promotion of biodiversity, as fewer herbicides are used and diverse plant communities are preserved.
- Improving soil quality through natural fertilization (horse manure) and less soil compaction than with machines.
- Reduction of greenhouse gas emissions, as less fossil fuels are used for machinery.

Grazing Optimization: Enhancing Resource Use and Weed Management in Tree Crops

Cost-benefit Analysis

Costs

Cooperation between farms:

- Coordination effort between farmers to coordinate grazing plans, livestock and infrastructure.
- Conflicts over land use, especially with neighboring farmers or nature reserves.
- Possible damage to neighboring fields or forests if animals escape or fences are not adequately maintained.
- Differing management objectives between partner farms, which could make compromises difficult.



Benefits

- Sharing grazing land between farms can reduce costs and use resources more efficiently.
- Promotion of knowledge exchange and best practices between farmers and horse owners.
- Possibility of joint marketing of sustainable products or services (e.g. organic products, riding offers).
- Flexibility through cooperation, e.g. in the provision of animals or areas for changing grazing systems .



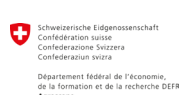
Technical Sheet for Solution Implementation

Grazing Optimization: Enhancing Resource Use and Weed Management in Tree Crops

Additional Resources

Publications

- Bowen, F., Cousins, P., Lamming, R., Faruk, A. (2006). Horses for Courses: Explaining the Gap Between the Theory and Practice of Green Supply. In: Sarkis, J. (eds) Greening the Supply Chain. Springer, London. https://doi.org/10.1007/1-84628-299-3_9
- Fleurance, G., Edouard, N., Collas, C., Duncan, P., Farruggia, A., Baumont, R., ... & Dumont, B. (2012). How do horses graze pastures and affect the diversity of grassland ecosystems?. Forages and grazing in horse nutrition, 147-161. https://doi.org/10.3920/9789086867554_018
- Martinson, K. L., Siciliano, P. D., Sheaffer, C. C., McIntosh, B. J., Swinker, A. M., & Williams, C. A. (2017). A review of equine grazing research methodologies. Journal of Equine Veterinary Science, 51, 92-104. <https://doi.org/10.1016/j.jevs.2017.01.002>
- Moinardeau, C., Mesléard, F., Ramone, H., Thierry, D. (2020): Extensive horse grazing improves grassland vegetation diversity, seed bank and forage quality of artificial embankments (Rhône River - southern France). Journal for Nature Conservation. 56. 125865. [DOI:10.1016/j.jnc.2020.125865](https://doi.org/10.1016/j.jnc.2020.125865).
- Ringmark, S., Skarin, A., & Jansson, A. (2019). Impact of year-round grazing by horses on pasture nutrient dynamics and the correlation with pasture nutrient content and fecal nutrient composition. Animals, 9(8), 500. <https://doi.org/10.3390/ani9080500>
- Schmitz, A., & Isselstein, J. (2020). Effect of grazing system on grassland plant species richness and vegetation characteristics: Comparing horse and cattle grazing. Sustainability, 12(8), 3300. <https://doi.org/10.3390/su12083300>
- Smith, R., Cotten, K., Allman, R., Watson, R., Sena, K., & Keene, T. (2012). Grazing and pasture management considerations from around the world. In Forages and grazing in horse nutrition (pp. 195-208). Wageningen Academic. https://doi.org/10.3920/9789086867554_025



Funded by
the European Union

This project has received funding
from the European Union under
Grant Agreement No. 101086551.



Ideas to Animate a Workshop About Using Horses for Weed Control in Permanent Crops

- Ask agricultural organizations or equine associations specializing in sustainable farming, pasture management, or biodiversity to sponsor the workshop.
- Find a model farm that successfully integrates horse grazing into its weed control strategy.
- Demonstrate practical tasks like assessing pasture conditions, managing grazing intensity, and monitoring biodiversity, allowing participants to engage hands-on.

Proposed structure for the workshop on using horses for weed control

1. Introduction to Horse-Grazing for Weed Control

- What is horse grazing as a weed control method?
- Key benefits compared to mechanical cutting or herbicide use.
- Examples of farms successfully implementing this approach.

2. Benefits of Horse Grazing in Permanent Crops

- Environmental benefits: Reduced herbicide use, improved biodiversity, and healthier soils.
- Economic advantages: Lower input costs, dual land use for pasture and weed control.
- Equine welfare: Natural movement, species-appropriate grazing, and improved hoof health.
- Farm cooperation: Shared grazing systems to optimize land use.

3. Practical Applications on Farms

- Assessing land suitability for equine grazing.
- Designing a rotational grazing system to prevent overgrazing.
- Managing pasture composition to encourage beneficial plant growth.

4. How to Choose the most suitable approach for grazing management

- Evaluating farm-specific needs: crop type, available pasture, and horse density.
- Infrastructure requirements: fencing, water access, and shelter.
- Selecting suitable horse breeds and stocking rates for optimal weed control.

5. Hands-On Demonstration

- Live assessment of a pasture and identifying target weed species.
- Demonstrating controlled grazing techniques and adjusting stocking density.
- Proper manure management to prevent nutrient overload and weed spread.

6. Maintenance and Troubleshooting

- Monitoring pasture condition and adjusting grazing pressure.
- Identifying and managing overgrazing risks.
- Managing weed seed spread through feces and hooves.

7. Case Studies and Real-World Examples

- Success stories from farms using horses for weed control.
- Practical insights from farmers and equine experts.
- Common challenges and how to overcome them.



8. Cost Analysis and Return on Investment (ROI)

- Initial investment in fencing and infrastructure vs. long-term savings.
- Comparing costs of traditional weed control methods vs. equine grazing.
- Economic benefits from reduced labor, herbicide use, and improved pasture productivity.

9. Q&A Session

- Open discussion on specific farm concerns and experiences.
- Addressing misconceptions about weed control through grazing.

10. Wrap-Up and Resources

- Summary of key takeaways.
- Additional resources: best practice guides, online courses, and supplier contacts.
- Information on grants or financial incentives for sustainable grazing practices.