Technical Sheet for Solution Implementation

Integrating Beekeeping into Equine Farms to Enhance Pollination & Biodiversity


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Thematic Area: Environmental sustainability.

Priority: How can biodiversity be improved 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 against the decline of biodiversity?

Solution EU Number: BD-14.

Content of the Solution: Use of pollinators (Apiculture): Installation of beehives as a way of promoting pollination as well as their importance in the ecosystem.

Reasons for Implementing this Solution

Beekeeping offers not only ecological benefits or added value for agriculture by improving pollination yields, but also economic prospects through the production of honey, wax and other bee products.

Description of Solution Strategies

The installation of beehives is an effective method of promoting pollination and contributes significantly to biodiversity. Honeybees play a central role in the ecosystem by supporting the reproduction of numerous plant species and thus contribute to increasing agricultural yields. For effective pollination, it is recommended to start with at least five hives. Beginners can start with fewer hives, but should never set up just a single hive, as colonies in isolation are more susceptible to disease and death. After about a year, it is possible to divide a colony and establish a new colony in a separate hive. In this way, the apiary can grow sustainably without having to buy new swarms. In addition, locations should be chosen so that the bees have access to a diverse floral landscape and are protected from extreme weather conditions. A nearby water source is also essential for the well-being of the bees.

The legal regulations for setting up beehives vary within the European Union. As regulations may vary from region to region, it is advisable to check with local authorities or beekeeping associations for specific regulations before installing hives.

This solution should be integrated into aa broader farm strategy for preserving biodiversity, including the development of melliferous (nectar-producing) plantations.

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Implementation Steps

1. **Research and Planning**
   - Identify suitable locations for hive placement, ensuring they are on the outskirts of the farm, elevated, and in sunny spots.
   - Ensure the chosen locations are near natural water sources but separate from those used by horses.

2. **Training and Preparation**
   - Attend a beekeeping basics workshop to gain essential knowledge and skills.
   - Purchase necessary beekeeping protective gear (suit and gloves) to ensure safety during hive management.

3. **Equipment Acquisition**
   - Acquire initial bee swarms with queens and complete hives (nucleus with hive frames already with wax).
   - Ensure all equipment is ready for installation, including fencing materials to protect the hives.

4. **Hive Installation**
   - Set up the hives in the designated locations, ensuring they are properly fenced to prevent horses from disturbing them.
   - Provide dedicated water sources for the bees, such as shallow dishes with pebbles, to keep them away from horse water troughs.

5. **Ongoing Management and Monitoring**
   - Adjust hive management practices according to the seasons, ensuring proper feeding and ventilation.
   - Place clear signage around the hive area to inform farm workers and visitors about the presence of bees and the need to avoid disturbing them.

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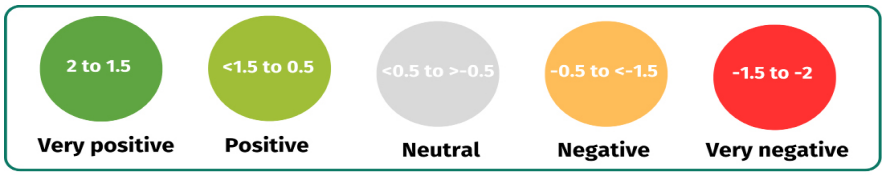
How Will this Solution Impact the Performance of your Farm ?

TOPIC	SCORE
Social	0.50
Economics	1.50
Welfare	0.50
Health	1.00
Environmental	1.67
Land access and management	0
Global	1.00



Color coding explanation

Socioeconomics: This solution will support socioeconomic performance of your farm because installing beehives promotes biodiversity and ecosystem health while generating additional income through honey sales, leasing grasslands to other beekeepers, and creating new job opportunities, all of which enhance the farm's public image and environmental credibility.

Health & Welfare: This solution may decrease the use of veterinary products when the farm has own natural bee products. Horses may then profit from natural products that positively affects general health, so then also the welfare of horses. It must be considered that the sting may cause allergic reactions or annoyance to the horse.

Environmental Sustainability: This solution has a very positive effect on environmental sustainability performance in all three aspects: climate change mitigation, halting biodiversity loss and water management. Soil is covered by plants - maintaining water in soil. On the other hand, this solution has no effect on farm lever performance in grassland management.

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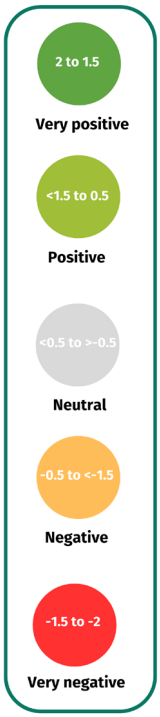
How Will this Solution Impact the Resilience of your Farm?

TOPIC	SCORE
Social	-0.42
Economics	-0.67
Welfare	-0.17
Health	0.08
Environmental	0.11
Land access and management	-0.17
Global	-0.18



Socioeconomics: This solution will weaken the economic performance but will not significantly affect the social performance of the farm facing external challenges because, although pollination can bring some indirect benefits (e.g. biodiversity enhancement and slight improvements in social image under higher welfare expectations), it also generates additional costs, workload, and technical constraints. In particular, inflation limits the farm's capacity to hire labour, while pandemics can exacerbate workforce shortages. During infectious disease outbreaks and extreme weather events, the added management of beehives increases operational pressure and costs. Although pollination can provide positive ecosystem services and may support production under land constraints, these benefits are generally offset by the increased workload and investment required, resulting in a negative overall economic effect while social dynamics remain largely unchanged.

Health & Welfare: This solution has neutral effect on the resilience of the farm in health and welfare criteria when faced with critical challenges.

Environmental Sustainability: This solution has no effect on farm's ability to recover from challenges in themes relating to environmental sustainability or pasture management.

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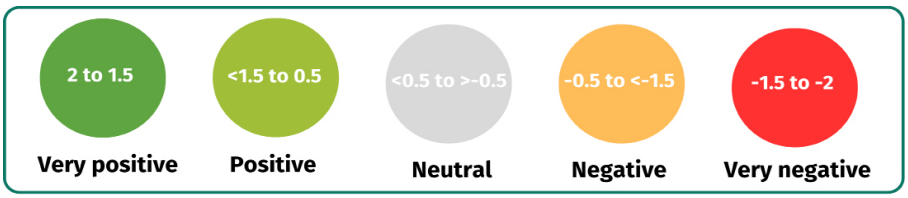
How Can this Solution Help your Farm Cope with Specific External Challenges to Become More Resilient?

CHALLENGES	SCORE
Inflation	0
Pandemic	-0.41
High welfare standards	0
High infectious diseases	-0.25
Extreme weather event	-0.17
Loss or limited access to grassland	0.08



Inflation & Social Crises: This solution won't have any effect on the global performance of the farm facing inflation or pandemic because it neither generates significant income nor reduces key expenses; however, a very slight negative impact could eventually emerge during a pandemic due to a shortage of workers and professionals available to take care.

Welfare & Diseases: This solution probably would not support the farm facing the introduction of the law related to high standards of welfare. As well, no effect on the resistance to the outbreak of contagious disease is probable with this solution.

Climate Change & Access to Land: This solution has no effect on farm's ability to recover from challenges in themes relating to abnormally high or low temperatures, excessive raining or draught. It was, however noted, that additional cost and workload during the critical situation can have some negative effects. This solution has no effect on the situation in which farm faces loss/limited access to grassland.

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Cost-Benefit Analysis

Costs

Socioeconomics:

- Initial investment in the installation of beehives or the promotion of the natural pollinator population.
- Acquisition and care of pollinators: Investment in the installation and maintenance of beehives or supporting natural pollinator populations.
- Management costs: Operating costs for the care of the colonies, monitoring the health of the bees and preventing diseases.
- Training costs: Necessary training for farmers or beekeepers on the effective use of pollinators.
- Risk of stings for workers and visitors
- Time and effort required for bee keeping.
- Prices related to Portuguese market:
  - Beekeeping basis workshop - around 50€.
  - Beekeping protective gear (suit and gloves) – 50 to 90€.
  - Inicial bee swarm with queen per hive – 100 to 150€.
  - Complete hive (nucleus with hive frames already with wax) – 40 to 70€.
  - Maintenance costs for hives (approx. 20€ per season per hive.
  - Total (for 5 hives with swarm and queen, minimum): 700 to 1100€.

Benefits

- Socially accepted and valued method of environmental protection.
- Enhanced crop/ fodder quality and production due to better pollination.
- Reducing the need for artificial pollination or the use of chemical fertilizers, leading to long-term savings.
- Access to new markets: Producers can differentiate themselves in markets through the quality and quantity of their products.
- Season extension: Better pollination can lead to certain harvests becoming more stable and predictable.
- Increased crop yields: Many crops rely on pollinators to produce good yields (e.g. fruit trees, vegetables).
- Long-term productivity: The use of pollinators can strengthen soil fertility and the ecological balance in the long term, leading to a sustainable increase in yields.
- Improving the quality of life in rural areas: Rural communities can be strengthened through sustainable agricultural practices.
- Job creation: The use of pollinators (especially bees) can promote local jobs in beekeeping and agriculture.
- Prices related to Portuguese market:
  - Multifloral Honey EU Price (export) – around 2€/Kg .
  - Regional Honey EU Price (export) – around 5€/Kg .
  - PDO Honey EU Price (export) – around 10 to 20€/Kg.

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Cost-Benefit Analysis

Costs	Benefits
Health & Welfare: • Sting risk. • Horses must get accustomed to bees.	• Higher biodiversity of plants and animals in the grassland, better pastures.
Environmental Sustainability: • None.	• Higher biodiversity of plants and animals. • Less CO2 emission due to enhanced plant growth. • Contribution to ecosystem balance. • Promotion of biodiversity: The protection of pollinators promotes general biodiversity on the farm and in the surrounding landscape. • Reducing the ecological footprint: Using pollinators reduces the use of artificial or chemical pollination methods, which reduces the ecological footprint of agricultural production. • Long-term resilience: A strong pollinator population can make agricultural production more resilient to pests and climate change.
Cooperation between farms: • Coordination and management costs. • Communication challenge. • Potential conflicts.	• Shared knowledge, work and expertise. • Risk mitigation through shared resources. • Improved market access. • Community building and mutual support.

Additional Resources

Websites

- https://www.beeculture.com/honey-bees-horses/
- https://www.horsenation.com/2018/05/07/honeybees-horses-in-perfect-harmony
- https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/agriculture-and-seafood/agricultural-land-and-environment/strengthening-farming/farm-practices/870218-4_apiculture.pdf
- https://www.gov.si/en/news/2022-11-01-lipizzan-horse-breeding-and-beekeeping-receive-positive-recommendation-for-inscription-on-unesco-list-of-intangible-cultural-heritage

Publications

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- Khalifa, S. A. M., Elshafiey, E. H., Shetaia, A. A., El-Wahed, A. A. A., Algethami, A. F., Musharraf, S. G., AlAjmi, M. F., Zhao, C., Masry, S. H. D., Abdel-Daim, M. M., Halabi, M. F., Kai, G., Al Naggar, Y., Bishr, M., Diab, M. A. M., & El-Seedi, H. R. (2021). Overview of Bee Pollination and Its Economic Value for Crop Production. Insects, 12(8), 688. https://doi.org/10.3390/insects12080688
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Model Companies

- https://www.macmel.pt/colmeias
- https://valedorosmaninho.com/loja/loja-abelhas/

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Annex

Ideas to Ideas to Animate a Workshop about the Solution

- Ask a beekeeping supplier/advisor/company specialized in apiculture to sponsor the workshop.
- Find a model farm where the workshop can take place.
- Complete the required tasks and let the participants take part in these demonstration tasks so that they can get to know the system.

Proposed Structure for the Workshop on Beekeeping in Horse Farms

1. Introduction to Beekeeping on Horse Farms
- What is beekeeping and how does it integrate with horse farming?
- Key features and components of beekeeping (e.g., hives, protective gear, bee swarms).
- Types of beekeeping equipment which are available on the market (e.g., Langstroth hives, top-bar hives).

2. Benefits of Beekeeping in Horse Farms
- Enhanced Pollination: Improved crop and fodder quality due to better pollination.
- Additional Income: Potential income from honey production and other bee products.
- Biodiversity: Higher biodiversity of plants and animals in the grassland, leading to better pastures.
- Environmental Protection: Socially accepted and valued method of environmental protection.

3. Practical Applications on Horse Farms
- Strategic placement of hives to ensure safety for both bees and horses.
- Managing water sources to prevent competition between bees and horses.
- Regular hive inspections and seasonal care.

4. How to Choose the Most Suitable Beekeeping Equipment
- Evaluation of the needs of the farm.
- Assessment of the structural requirements for hive placement.
- Features such as material, construction, ease of use.
- Price comparisons of different beekeeping equipment.

5. Hands-On Demonstration
- Live demo of handling the bees and the beekeeping equipment.
- Testing different models of hives and giving participants a chance to inspect them.
- Proper techniques for maximizing efficiency and security.

6. Maintenance and Troubleshooting
- Cleaning and care of hives and equipment.
- Seasonal adjustments and treatments for bee health.
- Addressing common issues such as pests and diseases.

7. Case Studies and Real-World Examples
- Examples of farms or equestrian centers successfully integrating beekeeping.
- Discussion of how they have integrated these practices into their daily operations.
- Lessons learned and tips from farm operators using this system.

8. Cost Analysis and Return on Investment (ROI)
- Initial costs of beekeeping setup vs. long-term savings and income.
- How to calculate ROI based on farm size, workload, and usage.

9. Q&A Session
- Open floor for participants to ask questions about specific concerns or experiences.
- Address any uncertainties regarding the effectiveness or cost of beekeeping on horse farms.

10. Wrap-Up and Resources
- Summary of key points covered in the workshop.
- Additional resources for further learning (websites, suppliers, online communities).
- How to access special discounts or offers on beekeeping equipment if partnered with suppliers.