Technical Sheet for Solution Implementation

Managing Pasture Irrigation in Equine Farms

Thematic area:
Environmental Sustainability.

Priority: How to manage grassland in the face of the future challenges?

Need: Grass stock management: How can we limit the effects of climate change on the surfaces of paddocks and pastures in terms of quality and quantity?; Rotational grazing: equipment and workshops on rotational grazing

Solution EU number: GM-10.

Content of the solution: Irrigated pasture refers to grassland systems where water is actively supplied to maintain plant growth and ground cover during periods of insufficient rainfall. The aim is to stabilise forage production, support continuous pasture regrowth, and reduce seasonal feed gaps through controlled water management combined with grazing systems.

Reasons for Implementing the Solution

Irrigated pastures help maintain stable forage production during periods of low rainfall, reducing seasonal feed shortages and improving pasture reliability. By supporting continuous plant growth and ground cover, irrigation contributes to more resilient grazing systems and better long-term pasture availability.

Description of Solution Strategies

What irrigated pasture means in practice

Irrigated pasture systems supply water to grasslands when natural rainfall is insufficient in order to maintain active plant growth and ground cover. Irrigation is typically applied using sprinkler systems (portable or solid-set), while drip or subsurface systems are less common but may be used in high-value or intensively managed areas.

Irrigation is most effective when combined with rotational grazing and rest periods, ensuring that plant recovery is supported and overgrazing of irrigated areas is avoided.

Core strategies

Efficient irrigation management

Water application should be scheduled based on soil moisture, temperature, and seasonal growth conditions. Irrigation is typically applied in defined cycles rather than continuously, with preference for early morning or night application to reduce evaporation losses. Avoiding overwatering is essential to prevent runoff and soil degradation.

System design and farm adaptation

Different irrigation systems can be selected depending on farm size and labour capacity:

- Portable or movable sprinkler systems: flexible and lower investment, but more labour-intensive.
- Permanent or solid-set systems: higher investment but reduced daily labour and more uniform coverage.

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A zoning approach is recommended, where only selected paddocks are irrigated while others remain rainfed. Additionally, dedicated sacrifice areas should be maintained for periods of extreme wetness or drought to protect pasture integrity.

Water sourcing, storage and resilience options

Water supply may come from permitted groundwater abstraction, surface water systems, or farm infrastructure. In addition, rainwater harvesting in tanks or above-ground reservoirs can be integrated to support irrigation during dry periods and reduce pressure on external water sources.

Environmental protection and runoff management

Buffer zones should be maintained near watercourses to reduce nutrient runoff risks. Irrigation should be carefully managed in combination with soil fertility practices to avoid leaching and environmental pressure.

Legal and regulatory framework (important addition)

The implementation of irrigated pasture systems is subject to national and regional water-use regulations. Depending on the country and location, permits may be required for water abstraction, irrigation infrastructure, and environmental impact compliance. Legal requirements vary significantly across regions, and feasibility must always be checked at local level before installation.

Costs and funding

Typical cost categories include:

- Water access infrastructure (wells, connections, licensing where applicable).
- Distribution systems (pipes, valves, sprinklers or drip lines).
- Energy supply for pumping systems (electricity, fuel, or renewable alternatives).
- Water storage solutions such as tanks or ponds (optional but increasingly relevant).
- Monitoring equipment (rain gauges, soil moisture sensors, flow meters, or automated controllers).

In some regions, irrigation investments may be supported through agricultural or rural development programmes, particularly where they contribute to improved water efficiency and sustainable land management. Eligibility depends on national and regional regulations, farm location, and environmental permitting conditions.

Implementation Steps

1. Define the objective: Set clear farm-specific goals, such as maintaining pasture growth during dry periods, ensuring sufficient ground cover, reducing hay dependency, or enabling additional grazing cycles.

2. Assess pasture and site conditions
- Soil analysis (pH, P, K, organic matter).
- Evaluation of compaction and drainage conditions.
- Assessment of species composition and weed pressure.
- Estimation of current carrying capacity and pasture productivity.

3. Select the appropriate irrigation system
- Match to paddock geometry, labor capacity, wind exposure, budget.
- Portable sprinkler systems: flexible, lower investment, higher labour demand.
- Solid-set systems: higher investment, reduced labour, more uniform irrigation.
- Hybrid solutions: combination of fixed and movable components depending on paddock use.

4. Design a safe and functional layout
- Protect pipes, valves, and hydrants from horse damage.
- Avoid trip hazards and ensure durable installation of visible components.
- Secure electrical installations and pump systems.
- Plan gates, lanes, and rotation routes to prevent access through waterlogged areas.

5. Integrate irrigation with grazing management
- Combine irrigation with rotational grazing systems and defined rest periods.
- Adjust grazing access based on soil moisture and pasture recovery status.
- Avoid overgrazing of irrigated paddocks to maintain long-term productivity.

6. Manage nutrients and environmental buffers
- Apply fertilisers in a controlled and split application strategy where relevant.
- Maintain buffer strips near watercourses and drainage areas.
- Avoid irrigation immediately after fertilisation or before heavy rainfall events to reduce nutrient losses.

7. Monitor performance and adjust management
- Track pasture height, ground cover, and regrowth rates.
- Monitor forage availability and external feed requirements.
- Record horse body condition and grazing behaviour.
- Assess water and energy use efficiency.
- Continuously adjust irrigation scheduling, stocking rate, and rotation plan.

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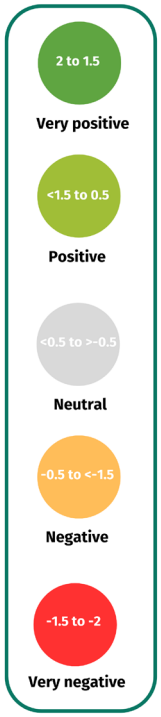
How Will this Solution Impact the Performance of your Farm?

TOPIC	SCORE
Social	-1.00
Economics	-0.50
Welfare	1.00
Health	0
Environmental	1.00
Pasture access and management	1.00
Global	0.25



Traffic light explanation

Socioeconomics: This solution will weaken the social performance of the farm because the use of irrigation for horse pastures may be perceived negatively by some stakeholders and members of the public, particularly in regions affected by water scarcity. Using water for pasture production can be viewed as an inefficient or inappropriate use of a limited resource, potentially reducing social acceptance of the farm. Concerns about competition for water resources and environmental sustainability may also affect the farm's public image, especially during drought periods or in water-restricted areas. This solution will weaken the economic performance of the farm because irrigation systems require substantial investments in infrastructure, water supply, storage, and energy for pumping, while operating costs can be significant. In areas where water availability is limited or regulated, access restrictions, permits, and increasing water costs may further reduce economic viability. Although irrigation can improve pasture productivity, the dependence on a scarce resource and the associated operational expenses may weaken long-term profitability, particularly where water resources become increasingly constrained due to climate change.

Health & Welfare: This solution will have a neutral effect on the farm's health performance because it does not directly contribute to reducing pain, mortality, or drug use. However, grazing generally has a positive effect on equine health, as it allows animals to engage in locomotor activity and express more natural foraging behaviour. Allowing horses to spend longer periods outdoors may also contribute to a lower incidence of respiratory disorders. However, it should be noted that well-

watered pasture can grow rapidly and, due to its high sugar and protein content, may increase the risk of metabolic disorders and serious health problems in horses. Therefore, grazing time should be adjusted according to the animals' body condition and susceptibility to laminitis. The quality and botanical composition of the pasture should also be monitored to prevent health issues in equines.

This solution will support equine welfare performance by promoting positive emotional states and providing welfare-friendly conditions. Grazing is one of the most highly motivated and preferred behaviours in horses and prevents the development of oral stereotypies. Moreover, group grazing plays an important role in meeting animals' social needs by providing opportunities for social bonding and support. Continuous access to pasture and unrestricted locomotor activity further contribute to positive welfare outcomes. Access to pasture areas that would otherwise be unavailable due to insufficient grass growth increases opportunities for choice and agency, allowing horses to interact with and exert control over aspects of their environment. These opportunities contribute to positive welfare and an optimal mental state.

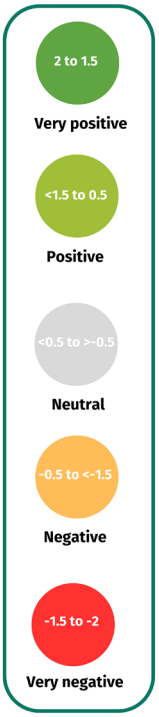
Environmental sustainability: This solution will support the environmental performance of the farm because irrigation can provide climate adaptation benefits. However, the environmental impact of irrigation depends strongly on water source and local availability: if irrigation relies on rainwater harvesting or recycled water, the pressure on freshwater resources is reduced and impacts on climate and ecosystems are lower. If it depends on surface water (lakes, rivers) or groundwater in water-scarce areas, it can contribute to water depletion, negatively affecting ecosystems and increasing vulnerability to climate change. From a biodiversity perspective, irrigation has mixed effects: Maintaining grass cover can prevent land degradation, reduce soil erosion, and supportcertain species. On the other hand, excessive water use or altered land management can negatively affect natural ecosystems, especially if water is diverted from rivers or wetlands. Irrigation itself does not reduce carbon emissions and may even increase them through energy use for water pumping. One critical issue is the water management,

Water is a finite and location-dependent resource. Using high-quality freshwater for horse pastures in water-stressed areas increases environmental pressure Poorly managed extraction can harm ecosystems, while maintaining vegetation can support soil and some habitat. From a water management and climate perspective, this concern is valid when high-quality freshwater (such as drinking water) is used for non-essential purposes like pasture irrigation.

This solution will support the land access or management performance of the farm because it helps maintain grass growth during droughts and high temperatures, enabling longer grazing periods and improving hay quality.

How Will this Solution Impact the Resilience of your Farm?

TOPIC	SCORE
Social	0
Economics	0
Welfare	0.08
Health	0
Environmental	0.33
Pasture access and management	0.17
Global	0.11



Socioeconomics: This solution will not impact social performance of the farm facing external challenges assessed because irrigation management has little direct influence on social aspects such as public perception, stakeholder relationships, or labour organisation under most external challenges. It does not substantially affect resilience to pandemics, disease outbreaks, or higher welfare standards, as horses can also be maintained under alternative grazing or feeding systems without irrigation. Any welfare benefits linked to maintaining greener pastures are indirect and therefore considered limited from a social resilience perspective.

This solution will not impact economic performance of the farm facing external challenges assessed because its economic benefits depend strongly on local conditions, water availability, energy costs, and feed market prices. Under inflation, rising electricity and pumping costs may offset the benefits of irrigated forage production, making the overall economic effect uncertain. While irrigation can become more attractive during droughts, extreme weather events, or periods of high hay prices by helping maintain pasture productivity, it does not fundamentally protect the farm from external economic pressures and therefore provides only a context-dependent and limited contribution to overall economic resilience.

Health & Welfare: This solution does not directly support the farm's health performance, as pasture irrigation does not directly reduce pain, mortality, or the need for medication when the farm is exposed to external pressures. Nevertheless, prolonged access to high-quality pasture may help maintain horses in good health and body condition, thereby supporting their ability to cope with external challenges.

When the farm is subjected to socio-economic or environmental pressures, such as staff shortages, reduced farm income, water scarcity, or limited access to maintenance and technical services, the effectiveness of this solution may be compromised. As a result, the solution has a neutral effect on farm welfare performance under such conditions, since access to irrigated pastures may need to be restricted to prevent overgrazing and pasture degradation. Therefore, this solution positively affects welfare performance only as long as the irrigation system remains functional and effective.

Environmental sustainability: This solution will not impact environmental performance of the farm facing external challenges assessed because the assumption that the solution is in use before farm faces these challenges. There are no significant changes in climate change adaptation or halting biodiversity loss when farm faces these challenges. Water management can be a critical issue when farm faces extreme weather event, but in a case of other assessed challenges it does not have a major role on farm level.

This solution will not impact land access or management performance of the farm facing external challenges assessed because he assumption that the solution is in use before farm faces these challenges. Hence, this solution does not have impact on grassland management when farm is trying to recover from assessed challenges.

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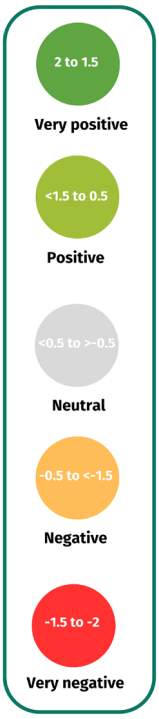
How can this solution help your farm to face specific external challenges to be more resilient?

CHALLENGES	SCORE
Inflation	0.08
Pandemic	0
High welfare standard	0.08
High infectious diseases	0.08
Extreme weather event	0.50
Loss/limited access to grassland	0



Inflation & Social Crises: Social challenge: This solution will not impact the global performance of the farm facing pandemics because pasture irrigation does not address the main constraints associated with pandemics, such as labour shortages, movement restrictions, or reduced service activity. While it may help maintain pasture productivity, it has little influence on the farm's capacity to manage social disruptions and therefore provides no significant improvement in overall resilience to pandemic-related challenges. Economic challenge: This solution will not impact the global performance of the farm facing inflation because its economic benefits are highly dependent on the balance between irrigation costs and feed prices. Rising energy and water costs during inflation can substantially increase irrigation expenses, potentially offsetting the value of additional forage production. As a result, the solution does not provide consistent protection against inflation and its contribution to economic resilience remains uncertain and context-dependent.

Welfare & Diseases: Health challenge: This solution has a neutral effect on the global performance of the farm across the three sustainability dimensions when facing an infectious disease challenge. Socioeconomic, environmental, and animal health and welfare objectives may be difficult to achieve if the farm experiences a sudden outbreak of infectious disease. Although well-irrigated pastures can support good nutritional status and general health, they are unlikely to be sufficient to mitigate the consequences of an infectious disease outbreak. Welfare challenge: Similarly, this solution does not significantly affect the global performance of the farm when facing the implementation of high-standard animal welfare legislation. Access to pasture

access can be combined with the provision of high-quality, well-maintained pasture, this solution may contribute to greater farm resilience and facilitate compliance with higher welfare standards.

Climate Change & Access to Land: Environmental challenge: this solution will support the global performance of the farm facing abnormally high temperatures and/or draught because it helps with plant survival. Irrigation helps maintain pasture persistence and subsequent growth in cooler periods rather than providing substantial summer feed production during drought or heat stress. Depending on irrigation system of the farm, this solution can help to lower need of purchasing external feeds and thus support equine wellbeing. On the other hand, irrigated pastures under abnormally high temperatures and drought require increased water inputs, may experience declines in soil quality, and face economic considerations related to irrigation technology. These factors influence farm-level resilience and sustainability during such climatic stress. The use of water resources to pasture irrigation is likely to be restricted or forbidden during abnormally high temperatures or drought period.

Land access/management challenge: this solution will not impact the global performance of the farm facing loss or limited access to agricultural land because ít does not solve the initial problem of lost or limited access to grassland.

Cost-benefit Analysis

Costs

Socioeconomics:

- High upfront investment costs (pump systems, distribution infrastructure) and ongoing energy costs.
- Increased management complexity (irrigation scheduling, maintenance, equipment handling, monitoring).
- Exposure to water availability and pricing risks, including potential irrigation restrictions during drought periods.
- Higher operational dependency on external inputs (water access rights, infrastructure maintenance).

Health & Welfare:

- Risk of overconsumption of highly productive irrigated grass, especially for easy-keeper or laminitis-prone horses; requires careful grazing management (e.g. strip grazing, limited access, grazing muzzles).
- Risk of muddy or unstable ground conditions if irrigation is excessive or poorly managed, increasing slip and hoof-related issues; requires drainage management and sacrifice areas.
- Increased need for monitoring to ensure appropriate pasture condition and safe grazing access.

Environmental Sustainability:

- Significant water demand, particularly in hot or dry climates.
- Risk of inefficient water use if scheduling is poor (evaporation, runoff, over-irrigation).
- Potential nutrient leaching or runoff if irrigation is combined with fertilisation without proper timing and buffer management.

Benefits

- More stable and reliable forage production, reducing dependence on purchased hay during dry periods and extending grazing seasons.
- Improved pasture persistence and ground cover, potentially reducing the frequency of reseeding and pasture renovation over time (if well managed).
- Increased resilience of farm forage systems in regions with irregular rainfall patterns.
- Particularly beneficial where water access is secure, land availability is limited, or forage costs are high.

- Increased access to pasture and turnout time, supporting natural movement, social behaviour, and overall welfare.
- More consistent forage availability, reducing abrupt changes between feed scarcity and abundance.
- Improved control of pasture quality, allowing more predictable feeding conditions across seasons.

- Maintained vegetation cover reduces soil erosion, dust formation, and degradation of pasture structure.
- Improved soil stability and water infiltration when grazing pressure is balanced with regrowth capacity.
- Efficient irrigation scheduling can optimise water use and reduce unnecessary losses.

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Costs

- Environmental impact depends strongly on water source (e.g. groundwater, river abstraction vs. rainwater harvesting systems).

Benefits

- Supports climate adaptation by stabilising pasture productivity under increasingly variable rainfall conditions.

Cooperation between Farms:

- Coordination challenges regarding water use rights, abstraction limits, and infrastructure planning.
- Additional management complexity if irrigation systems or water resources are shared.
- Biosecurity considerations when sharing equipment between farms.

- Opportunities for shared knowledge on irrigation efficiency (water use, pasture output, grazing optimisation).
- Shared investment or contracting for irrigation infrastructure and maintenance.
- Potential cooperation in water storage solutions (e.g. shared reservoirs or rainwater collection systems).
- Improved resilience through coordinated forage and drought management strategies.

Additional Resources

Publications

- Establishing and Managing Irrigated Pasture for Horses — University of California: https://anrcatalog.ucanr.edu/pdf/8486.pdf
- Horse Council BC. (2015). Horse pasture management [PDF]. https://hcbc.ca/wp-content/uploads/2025/10/Horse-Pasture-Management-2015.pdf
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Annex

Ideas to Animate a Workshop About the Solution

- Invite an irrigation technology provider, agronomist, or water management advisor specialised in pasture systems to support or sponsor the workshop.
- Cooperate with a model farm already using irrigated pasture systems for demonstration purposes.
- Active participant engagement through practical exercises and demonstrations:
  - Include a live demonstration of irrigation systems (sprinklers, portable systems, or solid-set systems if available).
  - Let participants calculate simple irrigation needs or design a basic paddock irrigation layout in small groups.
  - Organise a practical field exercise where participants evaluate pasture condition and decide whether irrigation would be needed.
  - Include a comparison exercise between irrigated and non-irrigated paddocks (if available on-site).

Proposed Struct.ure for the Workshop on Irrigated Pasture in Equine Farms

1. Introduction to irrigated pasture systems

- What is irrigated pasture?
- Basic principles of water application for pasture growth.
- Types of irrigation systems (portable, solid-set, hybrid systems).
- When irrigation is relevant in equine farming systems.

2. Benefits of irrigated pasture in equine farms

- More stable forage production across dry periods.
- Extended grazing seasons and improved pasture availability.
- Reduced reliance on purchased feed.
- Improved turnout opportunities and animal movement.

3. Practical applications on equine farms

- Integration of irrigation with rotational grazing systems.
- Paddock zoning (irrigated vs non-irrigated vs sacrifice areas).
- Seasonal adaptation of irrigation strategies.
- Matching irrigation intensity to horse stocking density.

4. How to choose the most suitable irrigation system

- Assessment of water availability and legal constraints.
- Farm size, paddock layout, and labour capacity.
- Comparison of system types (cost, flexibility, maintenance effort).
- Infrastructure planning and safety considerations for horses.

5. Hands-on demonstration

- Demonstration of irrigation equipment and components.
- Setting up and adjusting irrigation units.
- Identifying signs of under- or over-irrigation in pasture.
- Basic measurement of soil moisture and grass response.

6. Maintenance and troubleshooting
- Cleaning and maintenance of pipes, sprinklers, and pumps.
- Detecting leaks, blockages, or uneven water distribution.
- Seasonal system preparation (winterisation / restart procedures).

7. Case studies and real-world examples
- Examples of equine farms using irrigated pasture systems.
- Lessons learned from water management challenges.
- Successful integration with grazing systems.

8. Cost analysis and return on investment (ROI)
- Investment vs. operational cost overview.
- Savings from reduced feed purchases.
- Productivity gains through extended grazing periods.
- Importance of efficient water management for cost control.

9. Q&A session
- Open discussion on technical, economic, environmental, and practical questions.
- Farm-specific problem solving.

10. Wrap-up and resources
- Key take-home messages.
- Technical guidance documents and advisory services.
- Suppliers, irrigation experts, and support programmes (e.g. CAP-related measures where applicable).