Technical Sheet for Solution Implementation

Adapting Daily Activity to Foal Development

Thematic Area: Health and Welfare.

Priority: What practices can be implemented to promote biosecurity measures and prevent emergent diseases?

Need: OCD, hoof problems: there is a need for good treatment practices based on scientific knowledge to promote good limb conformation. How to prevent these orthopaedic developmental diseases?

Solution EU Number: HE-12.

Content of the Solution: The importance of a rearing program that promotes healthy musculoskeletal and nervous system development in foals through early exercise, appropriate housing, varied terrain and proactive management from birth.

Reasons for Implementing this Solution

Implementing this solution in an equine farm ensures optimal foal development, reducing the risk of musculoskeletal disorders and enhancing long-term athletic potential. Providing appropriate turnout, varied terrain, and early movement opportunities supports natural growth, improving overall health and performance.

Description of Solution Strategies

A developmentally supportive rearing environment for foals in the first months of life is essential for their physical and neurological development. Adapting daily activities to support this growth ensures optimal development of the musculoskeletal system, proprioception, and overall well-being.

Providing ample turnout, encouraging natural movement patterns, and ensuring appropriate hoof contact with varied terrain are key strategies. A proactive approach to foal management—beginning at birth—maximizes the potential for healthy physical development and reduces the risk of conformational and orthopaedic issues later in life.

Ultimately, the principle of **«use it or lose it»** applies: Optimal movement and an enriched environment lay the foundation for a healthy, athletic horse.

The aim is to optimize the biomechanical, neurological and orthopaedic development of foals through an adapted posture and movement environment. This includes in particular the promotion of:

- Muscular and skeletal development.
- Proprioception and balance.
- Hoof and limb development.
- Prevention of orthopaedic diseases (e.g. osteochondrosis).

Adapting Daily Activity to Foal Development

Importance of Locomotor and Play Behavior

Spontaneous play behavior in foals is energetic and naturally directed toward their dam and environmental objects. Such play is essential for musculoskeletal development, promoting strength, coordination, and flexibility. Studies indicate that locomotor play in the first month of life is the most intense in terms of speed and distance covered. However, foals that are confined for extended periods and then allowed compensatory locomotor play do not achieve the same levels of activity as those raised outdoors full-time. Moreover, sudden or intense exercise bouts following confinement are not safe for the developing musculoskeletal structures, as they may cause undue stress on immature bones, joints, and tendons. Therefore, providing regular and moderate opportunities for movement is essential to ensure safe and harmonious musculoskeletal development.

Proprioception and Postural Control

Stability in foals develops progressively, as evidenced by stabilographic analyses measuring their balance from birth to five months of age. Initially, foals display greater craniocaudal sway due to underdeveloped flexor/extensor musculature. Over time, improvements in limb strength and postural control reduce sway amplitudes, particularly in the craniocaudal direction. The transition from a splayed stance to a vertical limb posture is a key marker of proprioceptive and neuromuscular development.

Early Hoof and Limb Development

At birth, foals could exhibit subtle limb deviations, including valgus conformations, which generally resolve with movement and natural loading patterns. Newborns initially splay their limbs to compensate for poor balance and muscle tone. Their first movements—rising, stumbling, and following the mare—are essential for stretching muscles, aligning the spine, and improving coordination.

Foal hooves undergo significant transformation during their first experiences on firm terrain. They are born with a protective soft covering, which wears down as they move, exposing the frog and enabling it to support the bone structure. This natural process is essential for proper hoof formation and durability. However, foals confined to soft bedding may retain the protective layer longer than necessary, leading to atrophied frogs and improperly developed hooves. This highlights the importance of early exposure to firm, varied terrain.

Similarly, articular cartilage at birth is also “naïve” in its structural organization and initially lacks adaptation to mechanical load. Its architecture and strength progressively develop in response to the forces generated through regular movement. Therefore, consistent, moderate exercise combined with extensive housing systems is crucial to stimulate proper cartilage maturation, ensuring optimal joint resilience and long-term soundness.

Adapting Daily Activity to Foal Development

Preventing Developmental Disorders

Osteochondrosis (OC) is a common developmental orthopedic disease influenced by genetic and environmental factors. Studies indicate that maternal nutrition and early housing conditions play significant roles in OC risk. Foals housed exclusively at pasture during their first year exhibit lower OC prevalence than those housed in stalls or mixed housing systems. This underscores the importance of adequate exercise and appropriate dietary management from gestation to weaning.

Housing Considerations and Exercise Opportunities

Where pasture turnout is limited, innovative housing solutions, such as large barns with appropriate substrates or 'active stables,' can provide sufficient space for movement and play. These environments encourage natural behaviors and mitigate the risk of developmental issues associated with inadequate physical activity. Ensuring access to suitable terrain further aids the foal's biomechanical adaptation by promoting correct limb loading and hoof development.

Implementation Steps

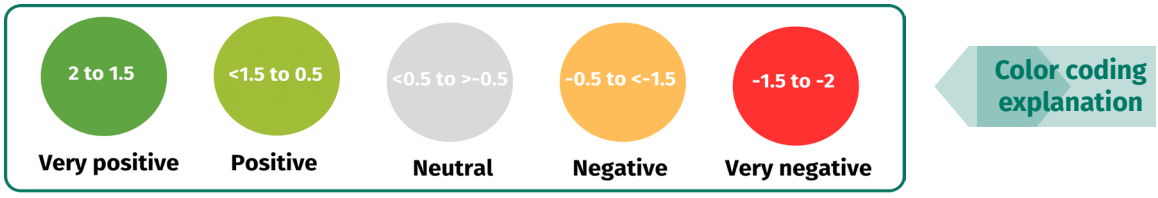
1. **Assess Existing Facilities and Resources**
   - Evaluate current turnout areas, shelters, and terrain types.
   - Identify limitations such as insufficient pasture, inadequate footing, or poor drainage.
   - Plan necessary modifications to enable appropriate movement and environmental enrichment.
2. **Optimize Turnout and Exercise Opportunities**
   - Maximize pasture access wherever possible.
   - In limited-space scenarios, design structured turnout zones using varied substrates (e.g., sand, gravel, firm ground) to stimulate natural locomotion.
   - Provide consistent daily movement opportunities to avoid compensatory behaviors.
3. **Enhance Housing Conditions**
   - Implement active stable systems or large group barns with movement-friendly flooring.
   - Ensure robust, safe fencing and all-weather shelters to support group housing and free movement.
   - Promote social interaction and species-typical behavior through environmental design.
4. **Support Early Hoof and Limb Development**
   - Allow immediate access to firm, dry terrain to encourage natural hoof wear and healthy limb alignment.
   - Schedule regular farrier care with emphasis on natural hoof balance and frog development.
   - Monitor limb posture and address deviations early through movement-based correction.

Adapting Daily Activity to Foal Development

5. **Monitor Nutrition and Growth**
   - Provide balanced nutrition for both mare and foal to support skeletal and muscular development.
   - Avoid overfeeding concentrates, which may increase the risk of developmental orthopedic diseases (e.g., osteochondrosis).
   - Adjust feeding strategies based on growth rates and body condition.
6. **Track Development and Adjust Management**
   - Observe foal movement, play behavior, and postural control routinely.
   - Adapt turnout schedules, terrain exposure, and management strategies to individual developmental needs.
   - Document growth and locomotor milestones to guide proactive adjustments.

How Will this Solution Impact the Performance of your Farm ?

TOPIC	SCORE
Social	0.75
Economics	0.75
Welfare	2.00
Health	0.75
Environmental	0.33
Land access and management	0.50
Global	0.83



Adapting Daily Activity to Foal Development

Socioeconomics: This solution will support the social performance of the farm because it can improve working conditions by reducing the need for stall cleaning, enhancing perceived animal welfare through visible pasture access, and potentially offering more enjoyable outdoor work—although its impact depends on the farm layout, staff preferences, and weather conditions.

This solution will support the economic performance of the farm because it may reduce bedding and feed costs by encouraging early grazing, optimize long-term foal health and athletic value, and justify investments in land or infrastructure improvements through enhanced farm capital and reduced veterinary expenses over time.

Health & Welfare: Locomotor activity is a very important feature of follower species—animals that begin following their mothers shortly after birth. Enabling movement in foals, especially various types of terrain, supports their health and promotes proper physical development, particularly of the musculoskeletal system. Moreover, allowing foals free outdoor movement is crucial for equine welfare. Opportunities to play with other foals and engage in prolonged physical activity contribute significantly to their emotional well-being by fulfilling their social and locomotor needs.

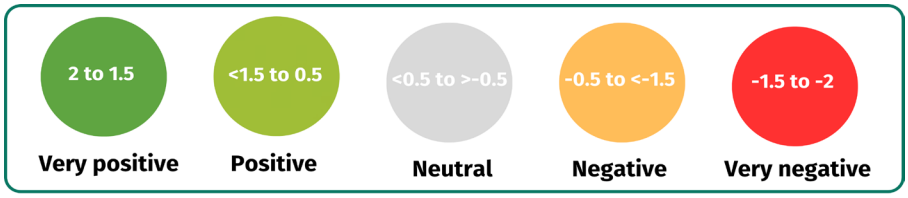
Environmental Sustainability: This solution will not have an effect on the environmental performance of the farm because there are several diverse effects. If pasture housing is chosen, energy consumption will decrease, and the maintenance of permanent pasture will increase. The maintenance of permanent pastures promotes biodiversity; however, since foals will be dewormed as recommended, biodiversity will be impacted by these molecules. Permanent pastures will be preserved since there will be no need to construct buildings for breeding if the foals are housed in pastures. At the very least, the size of these buildings will be reduced.

This solution will support the land access or management performance of your farm because the maintenance of permanent pasture will increase. In addition, permanent pastures will be preserved since there will be no need to construct buildings for breeding if the foals are housed in pastures. At the very least, the size of these buildings will be reduced. On the other hand, increased need for pasture and exercise areas raises competition for land/grassland.

Adapting Daily Activity to Foal Development

How Will this Solution Impact the Resilience of your Farm?

TOPIC	SCORE
Social	0.04
Economics	0.08
Welfare	0.29
Health	0
Environmental	-0.03
Land access and management	-0.08
Global	0.06



Socioeconomics: This solution will not impact social performance of the farm facing external challenges assessed because its effects are highly context-dependent, making it difficult to assess accurately. While there may be perceived welfare benefits, such as improved public image under high welfare standards, challenges like extreme weather or limited access to grassland can reduce social acceptability due to increased workload or negative visual impact (e.g. stressed animals in poor conditions).

This solution will not impact the economic performance of the farm facing external challenges assessed because the financial implications vary significantly depending on the farm's initial setup and environmental conditions. While there may be long-term health benefits and savings on feed through pasture use, uncertainties remain regarding disease risks (except for orthopaedic developmental diseases), increased pasture management, and potential vulnerability to climate-related feed or land limitations.

Adapting Daily Activity to Foal Development

Health & Welfare: When a farm faces specific external challenges, this solution may not effectively support its health performance, as it does not directly translate into reduced pain, mortality, or the need for medication through the prevention of infectious disease transmission.

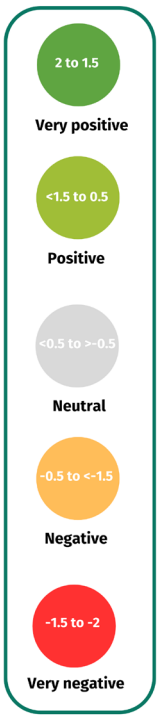
Similarly, the solution may not directly improve the farm's welfare performance when confronted with broader external factors such as inflation, pandemics, climate change, and other systemic disruptions.

Environmental Sustainability: This solution will not impact environmental performance of the farm facing external challenges assessed because the effects are minor and diverse, depending on the challenge. In the case of pandemics, it has moderate positive effect on climate change mitigation, but in the case of extreme weather events or loss of access to land, there are negative effects.

This solution will not impact land access or management performance of the farm facing external challenges assessed because effects are minor and diverse. There are some small negative effects: for example, if the grassland solution is applied, the reduction in access to farmland will generate a higher load per hectare.

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

CHALLENGES	SCORE
Inflation	0.04
Pandemic	0.17
High welfare standards	0.54
High infectious diseases	0.08
Extreme weather event	-0.17
Loss or limited access to grassland	-0.33



Adapting Daily Activity to Foal Development

Inflation & Social Crises: This solution will not impact the global performance of the farm facing inflation because although it reduces dependency on raw materials by promoting grazing and natural development, the lack of precise data on economic outcomes make its effectiveness difficult to quantify. Its variable application across farm types and the additional effort required for pasture management further limit its measurable contribution under inflation pressure.

This solution will not impact the global performance of the farm facing pandemics because while it may support better animal health and eventually reduce the need for veterinary visits (for certain diseases), its added complexity in management and reliance on outdoor systems do not directly address workforce shortages or biosecurity concerns.

Welfare & Diseases: Despite its overall benefits to the health of young horses, this solution may not enhance the farm's overall performance, as it does not directly contribute to biosecurity when facing infectious disease outbreaks.

However, it significantly supports the farm's ability to comply with high welfare standards, as the provision of free movement is a key requirement of such standards.

Climate Change & Access to Land: If the horses are kept in stalls, the resilience criteria are neutral. If the grassland solution is applied, the reduction in access to farmland will generate a higher load per hectare. This will mean greater soil and water pollution, more complicated grassland management and greater loss of biodiversity due to overgrazing. The incidence of parasitism will be more pronounced. In addition, food resources will be lower.

Concerning environmental challenge: This solution will not impact the global performance of the farm facing extreme abnormally high temperatures and/or draught because diverse effects. If the pasture area was increasingly used as a food source, this scenario could worsen the situation compared to one where feed is already being purchased, depending on how strongly the event affects the feed supplier. No significant impacts on social, health, or ecological sustainability are expected.

The image of the farm among the general public could diminish. The workload is likely to be heavier, as food and water will have to be brought in more frequently. Horses will also be more disturbed by insects.

Land access/management challenge: This solution will not impact the global performance of the farm facing loss or limited access to agricultural land because there are diverse effects. If the horses are kept in stalls, the effect on the resilience is neutral. If the grassland solution is applied, the reduction in access to farmland will generate a higher load per hectare. This will mean greater soil and water pollution, more complicated grassland management and greater loss of biodiversity due to overgrazing. The incidence of parasitism will be more pronounced. In addition, food resources will be lower.

Adapting Daily Activity to Foal Development

Cost-Benefit Analysis

Costs

Socioeconomics:

- **Potential initial investment requirements**
  Costs arise from upgrading or adapting facilities, constructing or fencing turnout areas, improving terrain substrates, and modifying housing infrastructure.
- **Opportunity and land-use costs**
  Farms may face opportunity costs if existing land use must be reallocated or if additional land must be leased or purchased to provide adequate turnout.
- **Space limitations on small farms**
  Limited land availability may hinder full implementation of recommended turnout and terrain concepts, especially in densely developed or urban-fringe areas.
- **Increased labor demands**
  Additional time and personnel may be required for managing group housing, supervising foal activity, maintaining turnout areas, and monitoring health parameters.
- **Conflicting public perception**
  While outdoor horses are often perceived positively, nearby residents may also express concerns about odor, insects, or visual disturbances associated with increased animal presence.

Benefits

- **Reduces long-term veterinary and farrier costs**
  Natural movement and appropriate terrain reduce the need for corrective interventions, contributing to lower expenses for joint disorders, hoof problems, and musculoskeletal conditions.
- **Prevention of osteochondrosis reduces depreciation and treatment costs**
  Osteochondrosis requires veterinary treatment and can significantly reduce a horse's market value. Preventive strategies improve health outcomes and economic returns.
- **Lower feeding and bedding costs during pasture-based periods**
  Keeping foals outdoors reduces the need for concentrated feed and stall bedding during parts of the year, increasing operational efficiency.
- **Enhances farm image and public perception**
  The sight of foals on pasture is generally perceived positively, supporting the farm's social license to operate and improving acceptance of equine operations in rural areas.
- **Flexible applicability across different farm types**
  The approach is adaptable to both pasture-based and more confined systems with targeted modifications, making it accessible for various scales and budgets.

Technical Sheet for Solution Implementation

Adapting Daily Activity to Foal Development

Costs

Health & Welfare:

- **Risk of acute injuries due to increased activity**
  More frequent and intense locomotor play can lead to minor injuries (e.g., kicks, sprains), particularly in group settings without adequate space or supervision.
- **Health risks in group housing**
  Social dynamics, rough play, and competition for space or resources can increase the risk of stress or trauma if group management is suboptimal.
- **Predation risk on pasture**
  In certain regions, foals on pasture may be exposed to potential predators, requiring protective measures depending on local wildlife presence.
- **Higher deworming needs in youngstock**
  Foals require more frequent deworming, which can be a logistical and environmental concern (see below).

Benefits

- **Promotes efficient use of space and land**
  Encourages innovative stable designs and better land management through multifunctional use of turnout areas.

- **Supports optimal musculoskeletal development**
  Daily movement on varied terrain fosters strong bones, joints, and muscles, laying the foundation for long-term soundness.
- **Improves proprioception and neuromuscular coordination**
  Early stimulation of balance and coordination enhances stability, movement efficiency, and resilience.
- **Reduces risk of developmental disorders**
  Foals raised with adequate turnout have lower incidence of orthopedic conditions (e.g., OCD), colic, and limb deformities.
- **Encourages natural hoof development**
  Contact with firm ground enables natural wear, frog stimulation, and healthy hoof structure.
- **Promotes mental health and behavioral development**
- Movement, exploration, and social interaction reduce stress, support natural behavior, and strengthen social competence.
- **Increases future athletic potential**
  Foals develop greater physical and mental robustness, improving performance prospects and long-term usability.

Technical Sheet for Solution Implementation

Adapting Daily Activity to Foal Development

Costs

Environmental Sustainability:

- **Increased land consumption**
  The conversion of land for equine use can lead to loss of ecologically valuable habitats, depending on prior land use and pasture design.
- **Variable impact on biodiversity**
  While well-managed permanent pasture can enhance biodiversity, poor establishment or overgrazing may lead to soil degradation or reduced habitat quality.
- **Pasture contamination through anthelmintic residues**
  Frequent deworming of foals may contribute to the release of parasiticides into the soil, potentially affecting soil invertebrates and pasture health.
- **Erosion and soil compaction risks**
  In wet or intensively used areas, turnout can lead to soil degradation if movement is not managed through rotational systems or reinforced ground.

Cooperation between farms:

- **Limited feasibility for highly specialized or urban-adjacent farms**
  Not all operations are equipped to share land or implement pasture-based systems, particularly those in space-limited or specialized breeding environments.

Benefits

- **Supports the preservation of permanent pasture**
  Continued outdoor rearing contributes to the maintenance and sustainable use of pastureland, especially if turnout is rotational and well-managed.
- **May enhance local biodiversity**
  Depending on the design of the turnout areas, increased use of permanent pastures can contribute to plant and insect diversity, soil health, and ecosystem services.
- **Reduces resource consumption in stabling systems**
  Lower demand for bedding, feed concentrates, and energy-intensive stable infrastructure supports environmentally friendly farm practices.

- **Facilitates shared learning and best practice exchange**
  Farms implementing similar rearing approaches can share experiences on pasture management, group housing logistics, and health monitoring.

Adapting Daily Activity to Foal Development

Costs

- **Coordination and knowledge-sharing requirements**
  Effective implementation may require collaboration between farms, veterinarians, farriers, and pasture specialists, which can be time-consuming and require new competencies.

Benefits

- **Strengthens sector-wide welfare standards**
  Adoption of natural and developmentally appropriate systems promotes harmonization with modern animal welfare frameworks, supporting a positive image of the equine industry.
- **Potential for cooperative land use**
  Farms with limited pasture may collaborate with neighbors (e.g., cattle or crop farmers) to access suitable turnout areas seasonally.

Additional Resources

Websites

- UK Vet Equine - The developmental behaviour of foals and its relevance to husbandry. Part 1: the first 3 months
- Hoof Development in Foals

Publications

- Gorissen, B.M.C., Serra Bragança, F.M., Wolschrijn, C.F., Back, W. and van Weeren, P.R. (2018), The development of hoof balance and landing preference in the post-natal period. Equine Vet J, 50: 809-817. https://doi.org/10.1111/evj.12961
- Nauwelaerts S, Malone SR, Clayton HM. Development of postural balance in foals. Vet J. 2013 Dec;198 Suppl 1:e70-4. Epub 2013 Sep 27. PMID: 24176281. https://doi.org/10.1016/j.tvjl.2013.09.036
- Vander Heyden, L., Lejeune, J.-P., Caudron, I., Detilleux, J., Sandersen, C., Chavatte, P., Paris, J., Deliège, B. and Serteyn, D. (2013), Association of breeding conditions with prevalence of osteochondrosis in foals. Veterinary Record, 172: 68-68. https://doi.org/10.1136/vr.101034
- Mouncey R., M.de Mestre A., Arango-Sabogal JC., L. Verheyen K., Born to run? Associations between gestational and early-life exposures and later-life performance outcomes in Thoroughbreds, https://doi.org/10.1111/evj.70084

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Adapting Daily Activity to Foal Development

Annex

Ideas to Ideas to Animate a Workshop about the Solution

- **Ask a veterinary clinic, breeding advisor, or equine husbandry consultant** specializing in **young horse management, orthopedic development, or pasture systems** to support or co-host the workshop.
- Identify a **model farm** with pasture turnout, varied terrain, and/or active stables already in place.
- Prepare **practical stations** (e.g. evaluating hoof development, observing foal movement on different terrain) where participants actively experience the system and its effects.

Proposed structure for the workshop on solution in equine stables

1. Introduction to Developmentally Supportive Foal Rearing
- What defines a developmentally supportive system?
- Key components: daily turnout, varied footing, natural play, group housing.
- Types of systems: full pasture rearing, active stables, hybrid models.

2. Benefits for Horse Health and Farm Managementes
- **Improved Foal Development:** Stronger bones, joints, hooves, and coordination.
- **Lower Disease Risk:** Fewer orthopedic issues (e.g., OCD), better digestion.
- **Welfare & Behavior:** Socialization, reduced stress, species-appropriate movement.
- **Farm Image & Cost Saving:** Lower treatment costs, less bedding/feed use.

3. Practical Applications on Horse Farms
- Group and individual turnout strategies.
- Setup of safe paddocks with varied terrain.
- Weather- and season-adapted turnout routines.
- Examples of integrating into small and large-scale farms.

4. How to Choose the most suitable system for your farm
- Assessing your farm's space, resources, and climate.
- Evaluating suitable surfaces (gravel, firm ground, woodchips).
- Requirements for fencing, shelter, and drainage.
- Pros and cons of permanent pasture vs. constructed exercise yards.

5. Hands-On Demonstration
- Walkthrough of turnout setups (rotational paddocks, surface layering).
- Comparing effects of firm vs. soft terrain on hoof wear.
- Observation of foal locomotion and play behavior.

6. Maintenance and Troubleshooting
- Monitoring terrain condition and drainage.
- Group dynamics: early socialization vs. risk of rough play.
- Adjusting routines as foals age (e.g., weaning phase).
- Hoof and limb checks, deworming coordination.

7. Case Studies and Real-World Examples
- Example farm(s) using active stable or full pasture foal rearing.
- Before-and-after health observations.
- Testimonials: “What we would do differently again”.
- Integration of system into existing infrastructure. s.

8. Cost Analysis and Return on Investment (ROI)
- Initial setup (terrain, fencing, shelter) vs. reduced long-term vet/farrier costs.
- Labor savings: less stall cleaning, fewer interventions.
- ROI calculation tools for different farm sizes.
- Financial impact of preventing orthopedic issues.

9. Q&A Session
- Open discussion: challenges, breed-specific needs, seasonal constraints.
- Participants share farm contexts and seek feedback.

10. Wrap-Up and Resources
- Summary of key takeaways.
- List of suppliers for materials and consultation.
- Scientific references and recommended reading.
- Access to workshop materials and contact.