

Electric Wheelbarrow



Thematic Area: Socio-economic performance.

Priority: How can working conditions be improved?

Need: How to reduce arduousness; Attractiveness of professions; How to improve the well-being of employees and managers.

Solution EU Number: WC-1.

Content of the Solution:

Improving the image of the farm and the working conditions on farm by using the electric wheelbarrow for various tasks.

Key Contacts:

- Agricultural equipment dealers specialized in electric farm vehicles.
- Local agricultural extension services.
- Sustainable farming organizations.

Case Study: Not available.

Reasons for Implementing this Solution

Modern technologies reduce the physical strain on employees and increase the efficiency of transportation tasks. They reduce dependence on manual labor and lower CO₂ emissions compared to gas or fuel-powered alternatives. In addition, the image of the horse farm is improved by sustainable technologies, which also optimize the working conditions for the staff.

Description of Solution Strategies

The electric wheelbarrows are battery-powered and designed for ease of use. These wheelbarrows help with transporting heavy loads over long distances without requiring physical strain. Many models come with all-terrain wheels, making them suitable for uneven farm grounds.

An electric wheelbarrow is a battery-powered vehicle designed to transport materials around a farm or construction site. It typically features:

- A large, durable bucket or flatbed.
- Electric motor(s) for propulsion.
- Rechargeable battery pack.
- Control handles with speed and direction controls.
- All-terrain wheels for stability and maneuverability.
- Optional attachments for specific tasks (e.g., snowplow, spreader).

Implementation Steps

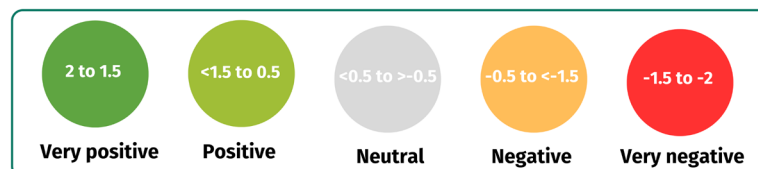
1. Assess farm needs.
2. Purchase appropriate Model (they vary in capacity, extra functions, battery time, etc.).
3. Set up a charging station in a convenient, sheltered location
4. Implement training and security procedures.
5. Integrate into daily farm operations.

Electric Wheelbarrow

How Will this Solution Impact the Performance of your Farm ?

| TOPIC | SCORE |
|-------------------------------|-------|
| Social | 1.50 |
| Economics | 1.00 |
| Welfare | 1.00 |
| Health | 0 |
| Environmental | 0.33 |
| Pasture access and management | 1.00 |
| Global | 1.00 |

Color coding explanation



Socioeconomics: This solution significantly reduces physical strain and fatigue, improving the overall working conditions. Electric wheelbarrows are modern equipment that enhances the farm's operational capacity. While they do require initial investment, the long-term reduction in labor costs and improved efficiency add value to the farm's assets and capital over time.



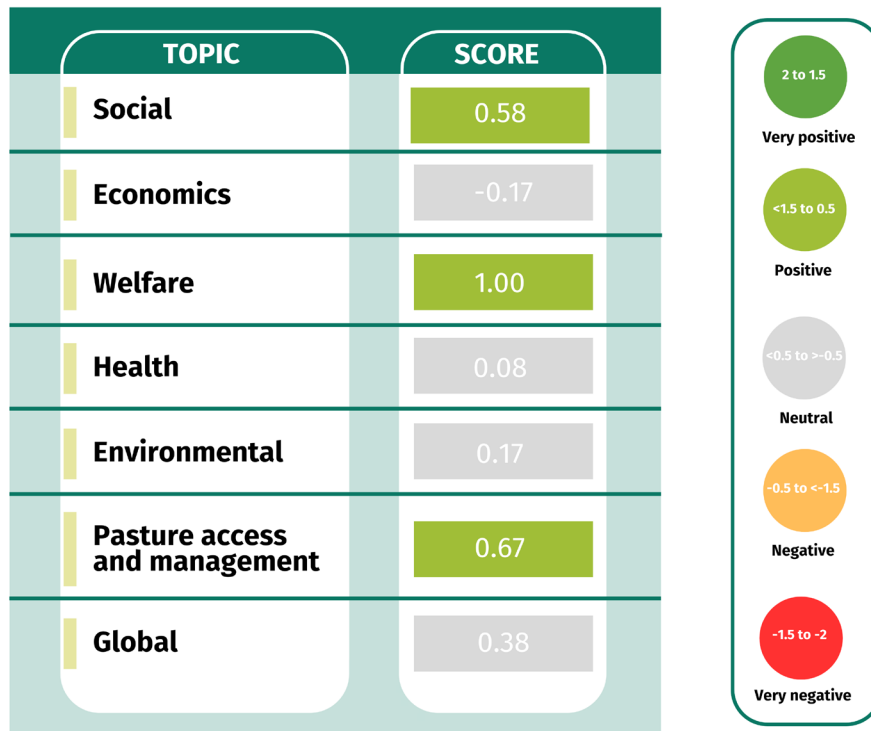
Health & Welfare: This solution, providing support for caretakers, may spare their energy and time to observe the horses for longer episodes. This can result in detecting potential problems which otherwise could be overlooked.



Environmental Sustainability: This solution has zero emissions during use, helping to reduce the farm's carbon footprint compared to gas-powered alternatives. It's all-terrain capabilities allow workers to move materials easily across uneven farm surfaces, contributing to more efficient use and management of grasslands. This reduces soil compaction and damage to grassland caused by heavy equipment.

Electric Wheelbarrow

How Will this Solution Impact the Resilience of your Farm?



Socioeconomics: Fewer workers are needed for physically demanding tasks, mitigating the effect of labor shortages due to budget or any constraints inducing staff reduction. In all cases, the improvement of working conditions is guaranteed and is therefore associated with a positive social resilience score. It's more nuanced. The initial cost of electric wheelbarrows could become more challenging to finance if an event reduces the available budget for new investments. However, the long-term savings in operating costs and improved efficiency may still provide some return on investment. So, this solution can help to maintain a good level of social performance facing external challenges.



Health & Welfare: The device can operate more quietly than traditional fuel-powered alternatives, reducing noise pollution and potential stress in horses. Even if labor increases due to inflation, the positive environment created by quieter, more efficient operations can help maintain horses' emotional well-being. So, this solution can help to maintain a good level of welfare performance facing external challenges.

Electric Wheelbarrow



Environmental Sustainability: This solution can help to maintain a good level of grassland management performance facing external challenges because :

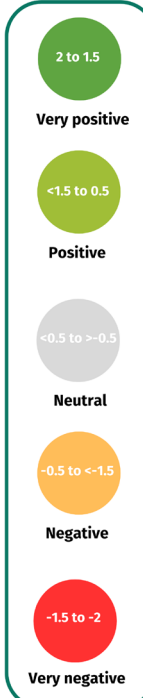
- The electric wheelbarrow's all-terrain functionality allows fewer workers to manage grasslands more effectively. In the event of labor shortages, it helps maintain productivity in the use and management of grasslands, ensuring that essential tasks can still be performed with a reduced workforce.
- The electric wheelbarrow's ability to navigate rough terrain and facilitate transportation of feed or materials helps ensure that grasslands are managed effectively, even if the area per animal increases due to welfare regulations. This can help optimize the use of grasslands despite the challenges of adapting to new standards.
- The electric wheelbarrow's all-terrain capabilities allow for more effective management of grasslands, even when they are damaged by extreme weather. It helps workers manage these areas more efficiently by reducing the physical strain of manual tasks, especially when other equipment may be harder to use in compromised conditions.



Electric Wheelbarrow

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

| CHALLENGES | SCORE |
|----------------------------------|-------|
| Inflation | 0.25 |
| Pandemic | 0.33 |
| High welfare standard | 0.42 |
| High infectious diseases | 0.42 |
| Extreme weather event | 0.42 |
| Loss/limited access to grassland | 0.25 |



- 2 to 1.5
Very positive
- <1.5 to 0.5
Positive
- <0.5 to >-0.5
Neutral
- 0.5 to <-1.5
Negative
- 1.5 to -2
Very negative



Inflation & Social Crises: Electric wheelbarrows improve farm efficiency through all-terrain capabilities, reducing soil compaction and physical strain on workers, which is especially helpful during labor shortages or pandemics. Despite higher initial costs, electric wheelbarrows provide long-term savings in labor and energy, supporting sustainable and cost-effective farm operations.



Welfare & Diseases: When this solution limits dust and noise, having it will make the farm more resilient to welfare and health challenges, like high welfare standard legislation. With dust reduction, electric wheelbarrows may contribute to better general health and then potential resilience to diseases.



Climate Change & Access to Land: The electric wheelbarrow's all-terrain capabilities allow for more effective management of grasslands, even when they are damaged by extreme weather events (abnormally high temperatures, draught or excessive rain). When extreme weather increases the need for additional resources or energy usage elsewhere. Its positive effect on reducing emissions becomes even more valuable during periods of climate stress. But globally the effect of this solution is neutral facing environmental challenges.

Electric Wheelbarrow

Cost-Benefit Analysis

Costs

Socioeconomics:

- The costs for an electric wheelbarrow can vary in a huge range from 400 – 10.000€ in Germany, same in France, in Poland: 2.300 – 3.200PLN, in other countries it's about the same price ranges.
- The costs vary depending on model, extras, battery capacity, loading capacity, ...
- Due to the additional electrical components, maintenance costs for electric wheelbarrows are anticipated to be higher than those of standard manual wheelbarrows.
- The implementation of electric wheelbarrows necessitates the allocation of additional storage space and charging infrastructure.
- All staff members must undergo comprehensive training to ensure the safe and efficient use of electric wheelbarrows.
- Limited operation time based on battery life.
- Potential for longer downtime during recharging.
- May require maintenance of electrical components.
- Less powerful than some gas-powered alternatives for very heavy load.



Benefits

- The equine farmer benefits from lower labor costs and improved worker output.
- Electric wheelbarrows significantly reduce labor time and physical strain, leading to higher productivity and efficiency.
- Reduced physical strain and potential for injury.
- The integration of an electric wheelbarrow with an individual photovoltaic system can substantially reduce operational expenses, potentially approaching zero.
- Improved image of the horse farmer for focusing on sustainable technologies which are improving the working conditions on the farm.
- Quiet operation, reducing noise pollution.
- Lower operating costs compared to fuel-powered alternatives.

Electric Wheelbarrow

Costs

Health & Welfare:

- Once horses are accustomed to electric wheelbarrows, there are no additional drawbacks.

Environmental Sustainability:

- While electric wheelbarrows offer potential energy savings, their initial production and ongoing maintenance processes often involve higher environmental impact compared to traditional manual wheelbarrows.
- In comparison to the manual traditional wheelbarrow, they are increasing gas house emissions.

Cooperation between Farms:

No effect.



Benefits

- Electric wheelbarrows ensure timely and consistent feeding and care for horses, which may be compromised with more labor-intensive methods.
- A wide range of horse transportation tasks, such as moving feed or cleaning stalls, can be accomplished with minimal noise disturbance what leads to a stress reduced environment. Nature and the local community benefit from reduced air pollution and improved environmental health.

Carbon Emissions:

- Electric wheelbarrows reduce greenhouse gas emissions compared to fuel-powered alternatives, contributing to the farm's overall sustainability efforts.
- Nature and the local community benefit from reduced air pollution and improved environmental health
- Zero emissions during use.

No effect.



Technical Sheet for Solution Implementation

Electric Wheelbarrow

Additional Resources

Websites

- <https://www.facebook.com/HeubedampfurnurHeuKing/videos/ab%C3%A4ppeln-im-handumdrehen/798915517181058/>
- <https://www.agrofossilfree.eu/european-agricultural-machinery-association/>
- <https://www.cema-agri.org/>
- <https://www.topagar.com/technik/news/wendige-helfer-mit-eklektropower-13082311.html>
- <https://www.cavallo.de/reitsportausruestung/test-leichte-arbeit-dank-motor-schubkarre/>
- <https://www.welt.de/vergleich/akku-schubkarre/>
- https://mag.farmitoo.com/de/landmaschinen/produkte_und_ratschlaege/e-schubkarre-praktischer-alltagshelfer/
- <https://mikesbackyardnursery.com/2015/01/electric-wheelbarrow-review-mike-mcgroarty/>

Publications

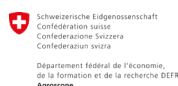
- Kotowski, S. E., Davis, K. G. and Waters, T. R. (2009). Investigation of Select Ergonomic Interventions for Farm Youth. Part 2: Wheelbarrows. Journal of Agromedicine 14: 44–57.
doi: [10.1080/10599240802612653](https://doi.org/10.1080/10599240802612653)
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Workshops

- Sustainable Farm Mechanization Seminar (offered by agricultural universities).
- Electric Farm Equipment Expo (annual trade show).

Further Information

- Consult with local farmers who have adopted electric wheelbarrows for peer advice.
- Check with regional agricultural authorities for specific regulations or incentives.



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Ideas to Animate a Workshop About the Solution

- Ask wheelbarrow distributors to sponsor the workshop.
- Find a model farm where the workshop can take place.
- Fulfil daily tasks with the electric wheelbarrow, let participants participate in those demonstration tasks too, so they can experience the electric wheelbarrow.

Proposed Structure for the Workshop About Using Electric Wheelbarrows in Horse Farms

1. Introduction to Electric Wheelbarrows

- What are electric wheelbarrows?
- Key features and components of an electric wheelbarrow (e.g., motor, battery, wheels, frame).
- Types of electric wheelbarrows available on the market (compact vs. heavy-duty).

2. Benefits of Electric Wheelbarrows on Horse Farms

- **Reduced Physical Strain:** Less manual labour for farm workers, especially important for those with physical limitations.
- **Environmentally Friendly:** Electric operation versus gas-powered machines.
- **Cost Savings:** Potential long-term savings on labour and fuel.
- **Increased Efficiency:** Faster transport of manure, bedding, and feed.

3. Practical Applications on Horse Farms

- **Manure Removal:** How electric wheelbarrows help transport manure from stables, paddocks, and barns.
- **Feed and Bedding Transport:** Moving large quantities of feed and bedding materials to stables.
- **Waste Disposal:** Transporting organic material, broken equipment, and other debris.
- **Grounds Maintenance:** Using electric wheelbarrows for landscaping, levelling areas, and moving gravel or dirt.

4. How to Choose the Right Electric Wheelbarrow

- Load capacity and weight considerations.
- Battery life and charging time.
- Durability and construction materials for outdoor use.
- Features like tilt mechanisms, speed control, and ease of manoeuvring.

5. Hands-On Demonstration

- Live demo of loading, transporting, and unloading materials with an electric wheelbarrow.
- Testing different models and giving participants a chance to try them out.
- Proper techniques for maximizing efficiency and reducing wear on the equipment.



6. Maintenance and Troubleshooting

- Battery Maintenance: How to extend battery life (charging, storage, and care).
- Cleaning and Storage: Regular cleaning tips for keeping the wheelbarrow in good working condition.
- Troubleshooting Common Issues: How to fix minor problems such as motor malfunctions or flat tires.

7. Case Studies and Real-World Examples

- Examples of farms or equestrian centres successfully using electric wheelbarrows.
- Discussion of how they have integrated these tools into their daily operations.
- Lessons learned and tips from farm operators who have adopted electric wheelbarrows.

8. Cost Analysis and Return on Investment (ROI)

- Initial cost of electric wheelbarrows vs. long-term savings in labour and fuel.
- How to calculate ROI based on farm size, workload, and usage.
- Financial benefits from reducing strain on workers and improving productivity.

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 electric wheelbarrows.

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 electric wheelbarrows if partnered with suppliers.