

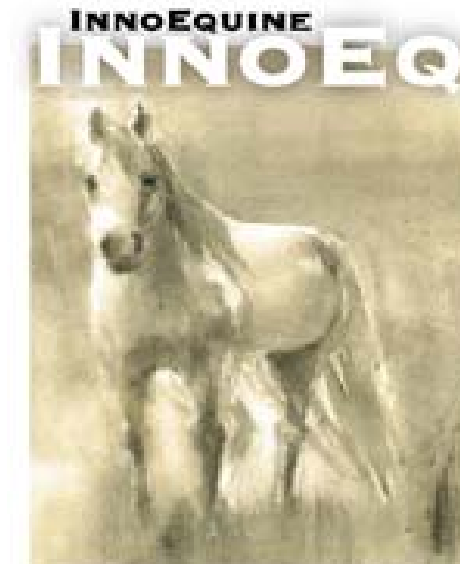


# A web tool helping horse stables to improve manure management

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# Background

- Manure management is the biggest environmental challenge in horse economy and it also has a great impact on the image of the branch
- Manure management is problematic for many horse entrepreneurs, particularly in or near urban areas
  - Storage and utilization of manure is especially challenging for those stables which do not have opportunities to use manure as a fertilizer in their own fields
  - For these stables, manure represents a sizeable expenditure, and in some cases, manure management is neglected. If manure is not managed properly it can heavily load environment, particularly locally
- There is a need for a tool where horse entrepreneurs can easily find information concerning manure issues

# InnoEquine project (2011-2013)



- The InnoEquine project's goal was to create a base for cross-border networking in the horse industry in the countries of the Central Baltic Sea region
- The goal of the project is to promote the competitiveness of the equine industry by developing networking and the skills of entrepreneurs, finding practical solutions to environmental and security issues and by helping entrepreneurs to develop their services with introduction of innovations and policy recommendations
- The project was managed and coordinated by MTT Agrifood Research Finland (MTT) and carried out in collaboration with Helsinki University, The Swedish University of Agricultural Sciences (SLU) and Latvia`s University of Agriculture.

# The aim of the web-tool

- There is no uniform solution to organize manure management in horse farms, since the operational environment, location and resources surrounding are affecting the selection of suitable management practice in each stable
- → The aim of Innohorse –web tool is to offer different practical manure management possibilities/solutions
- The manure management issues has been viewed through following themes: handling, storing, utilization of manure and horse paddocks and pasturing
  - In each theme there is described key legislation in Finland and Sweden and concrete examples which are in use in Finland and Sweden → the entrepreneurs can find ideas how to develop

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## Welcome to the InnoHorse webtool!

The InnoHorse web tool was created to help the horse entrepreneur in business planning and development. From these pages you can find information on key legislation regarding manure management, employee and customer safety and well-being of horses in Finland and Sweden. In addition, there are examples of good practices in use in stables in Finland, Sweden and Latvia. Through reading this information you can find ideas on how to develop your business and what to consider when building a new stable.

For services and business development you will find support from the development and innovation section. The website provides concise information on services and innovations and a variety of services and good practices for Finland, Sweden and Latvia. We hope that new ideas inspire you to develop your own activities!

### What to improve?

In the Manure Management section you will find information on the principal environmental legislation for the horse industry in Finland and Sweden. In addition, you can review the best practices section for tips on how to achieve your goals. The information is written in English, Finnish and Swedish. The Finnish part also includes a manure maintenance checklist that tells you if your stable still needs improvements. The checklist is based on Finnish legislation



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## Looking for good ways to deal with manure?

In this section you will find some useful ideas. These good practices are all based on real businesses and they have been proved to be good based on legislation, environmental issues and last, but definitely not least, by their practice and entrepreneurs' own experiences. Not all of these are necessarily suited to all stables, and naturally every entrepreneur should consider what would be the best solutions for precisely his or her stable and horses.

We hope that these examples will encourage you to develop your manure management. Remember that even the smallest improvements may have a huge impact on time saving, coping of employees and costs and results. Think also about co-operation possibilities with stables, farmers and other entrepreneurs to arrange manure management effectively in your stable.

To improve safety in your stable, look also at **good safety practices**. All good practices are also collected under the title Good Practices. More ideas for developing your business and services can also be found from the section on **Ideas for service development**.



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## Handling of manure

### Think about your stable and manure management as a whole:

- > How many horses do you have?
- > What kind of bedding material do you use? (Think about: horse welfare, price, availability)
- > How are you going to clean the stalls? What would be the method used in your stable? Do you need machinery, do you have employees, what is your budget?
- > What are you going to do with the manure (what is the storage system? How is the manure utilized; by yourself or someone else?)

There exist various methods for stall cleaning. Depending on the selected system and bedding, cleaning is done on a daily basis or only 2-3 times a year. Work practices and employee training play essential roles in the cleaning and handling processes. Proper working methods help enhance work efficiency, reduce the risk of injury, and also reduce costs. In addition, adequate lighting, wide aisles, easy access to manure storage, and minimization of lifting will enhance the manure handling process in stables (see pictures of functions with the traditional wheelbarrow and pitchfork, there are several different tools used in manure handling below).



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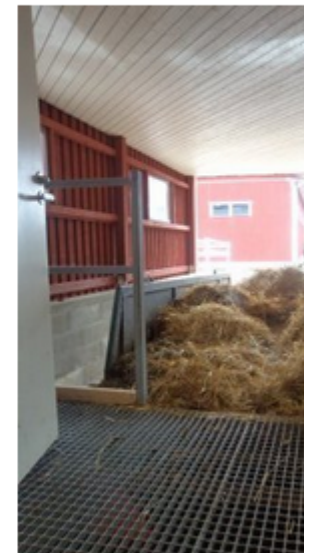
## Examples of covered manure storages

### Trans Horses, Kerava Finland

Trans Horses is located in southern Finland in Kerava and has a stable of 55 horses for riding school. The manure storage has a capacity of 1200 m<sup>3</sup> and it is large enough for the whole winter season storage. The storage capacity enables storing of farm machines when the store is empty of manure. Manure is spread on the stable's own fields.

In 2012 a new 29-stall stable was built, with covered manure storage adjacent to stable. A container is moved into the covered storage area and the manure is put into the container, which is emptied with a tractor at a storage facility every 2-3 days. Thus the new manure storage system is only temporary. The stalls are kept empty because access to the manure storage facility is inside the building. This also reduces the risk of odors. The owners are pleased with the practicality of the new stable and manure storage.

Moreover, the owners have been satisfied with the manure storage capacity, but they point out that the system applies to large, covered manure stores. One should pay special attention to fire safety and regular maintenance. Currently, the stable owners have permission to empty the manure store earlier in the spring on to the field plot.





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## Manure utilization

### Consider:

- > how, where and by whom the manure is transferred for further processing?
- > whether the manure is primarily the opportunity to make use of fertilizer (to spread their own neighbor's field)?
- > could manure be used in construction material production (for example, to supply to local construction company)?
- > could manure be used in bio fuel production (is there biogas production plant near by)?
- > could heat from manure storage or deep bedding be utilized in heating up other parts of t

## Manure utilization for energy

There is increasing interest in using horse manure as a source of energy. The numbers of horses has increased in Finland and Sweden in recent years and managing manure production has become increasingly challenging, especially for stables located in urban areas (population centre). There are different ways in which to utilize manure and some recognized methods have not yet been tested in Finland and Sweden. For example, biogas from animal manure but not from horse manure in Finland and Sweden. On the other hand, concerning horse manure, there are no examples in Finland as legislation forbids it, although the situation differs in Sweden.

Read more about various methods for generating energy from manure:

- > capturing heat developed in the composting process
- > biogas

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## Tube composting

Manure is packed by a feeder machine into a plastic tube in tube composting. The tube is about 1.5 m wide and can be several tens of meters long. Tube compost uses black sealable plastic film, which helps to prevent the tube to maintain the composting. The composting process is made more efficient by blowing air through a drainage pipe that passes through the tube. The temperature inside the manure mass will rise to about 60°C, which prevents any nutrient leaching or odor problems because the tube effectively isolates the manure. Tube composting requires an insulated base or catchment basin, and smooth ground is sufficient for the platform. Composting usually takes from six to twelve months, depending on the type of litter used. In tube composting the manure is reduced to about one third of its original volume and becomes homogeneous, hygienic and odorless. Tube composting can be used for chicken manure and organic waste in addition to horse manure.



## Experiences about the drum composters

### Drum composter Upper-Savo Vocational College In Finland

All horse manure is treated in drum composters in Upper-Savo Vocational College. The college has which produce 936 m<sup>3</sup> of horse manure annually. Bedding material is mainly peat, but after a poor p 2011 it was necessary to use some cutter in addition. The college built a separate room for a 75 m<sup>3</sup> composter that handles about 40 m<sup>3</sup> of manure per week. The composting process is not fed with n manure, which is transported to the composter by wheelbarrows and small loaders and fed by a hyc Normally manure stays in the composter for 7-10 days and a complete rotation takes about 20 min the temperature reaches up to 50-60 °C. Achieving optimal composting conditions requires adjustm process temperatures. The composter has two fans, a one at the front and a second at the end of th composter has an internal mechanism to control the air conditioning system. The drum's optimal lo: a screw conveyor transfers composted manure from the end of the drum to interim storage, where it tractor to the post-composting storage facility. Currently the composted manure is spread on the co with environmental regulations and the excess is sent to other farms according to manure transfer a



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heat from a deep litter system to warm water and in the third stable the heat developed in a drum co warm a stable by using a heat pump technique.

## Heat recovery from manure storage by means of water circulation

### Wikner stable, Kirkkonummi

The heat from manure storage is used in a heating system at the Wikner horse stable in Kirkkonummi has been installed beneath the stored manure. It stores heat from the manure in water that is cycled including the horse washing facilities and equipment room in the 16-stall stable. When the manure s water cyler is turned off. Under slightly frosty conditions (below zero degrees) the circulating water No other sources of heating are required unless the temperature drops below  $-5^{\circ}\text{C}$ . The owners hav system by themselves, the cost (a few hundred euros is mainly from the water pipeline construction thermostat. According to the owners, the system has worked very well and there has not been a ne



# Conclusion

- Especially concerning utilization of horse manure many alternatives seems to be in experimental level
  - in the near future we hopefully have more practical and effective composting and manure energy systems
- There is a need for more information and experiments
- Also more interaction between entrepreneurs is needed
- Innohorse –web is one step towards common knowledge about good practices

# Research/work team

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# THANK YOU!



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