

Efficient Resource Management for
Sustainable Farming

Dewatering of manure



What is dewatering of manure?

Dewatering manure involves separating its solid and liquid components of animal manure to make it easier to handle, store, and use as a resource, using equipment like screw presses or centrifuges.

The goal is to transform manure into more manageable forms for various applications, like soil amendment, nutrient recovery, or as feedstock for biogas production. **The solid portion**, rich in nutrients, is ideal for compost or direct application as a soil amendment. **The liquid portion** can be treated further or reused for irrigation.



Spreading of nutrient rich liquid manure.



Algae flowering in a water body as a result of eutrophication

Separation of manure into liquid and solid fractions is commonly practised for several reasons. This process plays a crucial role in improving manure management and enhancing environmental sustainability, particularly in large-scale agricultural operations. Manure is full of nutrients like nitrogen, phosphorus, and potassium. Dewatering reduces the water content, making it:

- **Lighter and Cheaper to Move:** Transporting dry solids costs less than hauling water.
- **Easier to Store and Use:** Solid manure is less messy to handle and store.
- **Better for the Environment:** It reduces the risk of nutrient runoff into rivers and lakes, which can cause algae blooms and harm fish.

Environmental Benefits

Reduced Risk of Runoff: By separating solid and liquid fractions, dewatering reduces the volume of liquid manure, decreasing the risk of nutrient runoff into water bodies and protecting local ecosystems.

Lower Greenhouse Gas Emissions: Properly managed solid manure can reduce methane emissions compared to untreated liquid manure in open storage lagoons.

Improved Nutrient Management: Dewatering allows for targeted application of nutrients. The liquid fraction, rich in nitrogen, can be applied to crops requiring rapid uptake, while the solid fraction, rich in phosphorus, can be composted or applied to crops needing longer-term nutrient release.

Economic Benefits

Reduced Transportation Costs: The solid fraction is less bulky than liquid manure, making it cheaper and easier to transport, especially over long distances.

Marketable Products: Solid fractions can be sold as compost, bedding material, or bioenergy feedstock, creating additional revenue streams for farmers.

Cost Savings on Fertilizers: The separated fractions can be reused on the farm as fertilizers, reducing reliance on commercial products.



Operational Benefits

Improved Storage: Dewatering decreases the volume of liquid manure needing storage, freeing up capacity in storage lagoons or tanks.

Ease of Handling: Solid manure is easier to handle, transport, and spread compared to raw slurry, especially on uneven or remote terrains.

Flexibility in Nutrient Application: Farmers can apply nutrients more precisely based on crop needs, reducing over-fertilization risks.

Benefits for Circular Economy

Resource Recovery: Dewatering supports the circular economy by extracting valuable nutrients and materials from manure, aligning with sustainable farming practices.

Energy Production: The solid fraction can be used as feedstock for anaerobic digestion (biogas production) or combustion for energy generation, contributing to renewable energy goals.



Technical Solutions



Mecanical separation

Screw Press Separators: These use a screw mechanism to press the solid fraction out of the manure while allowing the liquid fraction to pass through. It's one of the most common methods used on farms, especially for dairy and pig manure.

The advantages are that it is simple and effective for a wide range of manure types and has low energy requirements and relatively low maintenance. Suitable for medium to large scale farms.

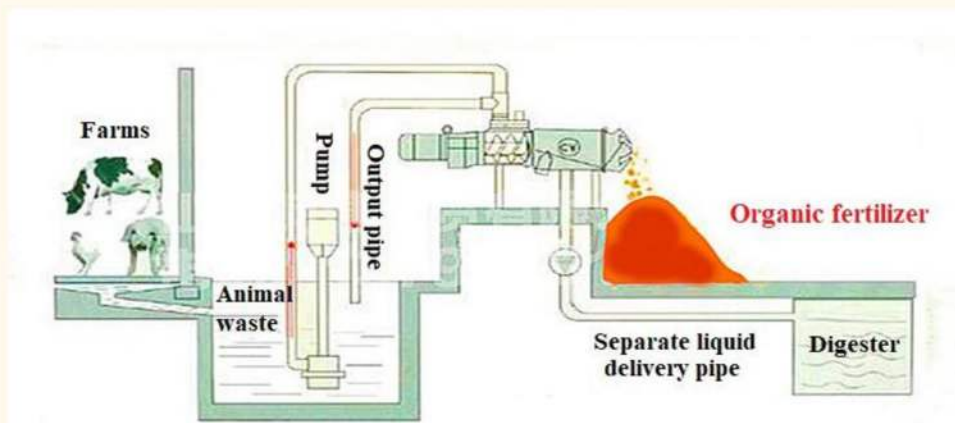
Belt Press Separators: A continuous belt squeezes the manure between rollers, separating solids from liquids by pressure. Belt press separators are effective at recovering a high percentage of solids, making them common on farms that compost manure or need solid material for other uses.

The advantage is the high solid content in the separate material, and it is suitable for manure with high fibre content. The application is for dairy farms and poultry farms where the solid fraction is valuable for bedding, compost or for further drying into organic fertiliser pellets.

Vibrating Screens: These screens shake the manure, allowing liquids to pass through while solids are retained. It is often combined with other systems for more efficient separation.

Rotary Drum Separators: A rotating drum with mesh allows liquids to filter through while the solids are retained and dewatered.

The advantage is that it is good for high-volume manure processing, and it may operate continuously with need of minimal maintenance. The application is usually large-scale dairy farms and biogas facilities.





Centrifugation

Centrifugal Separators:

These use high-speed spinning to separate solids from liquids based on their densities. The heavier solid particles move to the outer edges, and the liquid remains in the centre.

The advantage is that it is very efficient for fine particle separation and can handle large volumes. Typical application is when it is needed for advanced separation for better nutrient management like biogas plants and recovery of nutrients such as phosphorus.



Decanting and settling ponds

Gravity Settling Tanks or Ponds: Manure is allowed to settle in large ponds or tanks where the heavier solid fraction sinks to the bottom, and the liquid can be syphoned off from the top. This is a low-tech but effective method, often used in large-scale or less mechanised farms.

The advantage of this technology is the minimal equipment and operational cost. The technology is often used in pig and cattle farms when land is available for large storage ponds. The need for cover may reduce the cost effectiveness.



Filtration systems

Geotextile Bag Filters: These are large permeable fabric bags into which manure is pumped. The liquid fraction seeps through the fabric while the solids are retained inside. It is an emerging technology in the agriculture sector.

The advantage is that it is portable and easy to install, as well as low maintenance level. This technology is suitable for small and medium farms and for simple manure management.

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