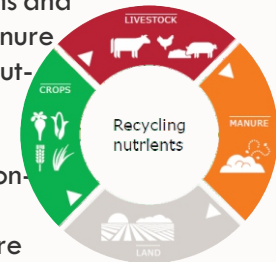




This work was implemented as part of the CGIAR Research Program on **Climate Change, Agriculture and Food Security (CCAFS)** with funding support from the government of The Netherlands. CCAFS is carried out with support from CGIAR Fund Donors and through bilateral funding agreements. For details please visit <https://ccaafs.cgiar.org/donors>. The views expressed in this document cannot be taken to reflect the official opinions of these organizations.

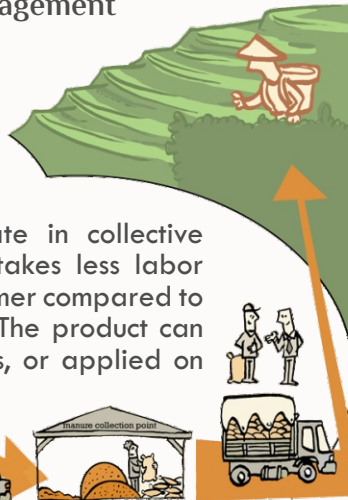
IMPROVING MANURE MANAGEMENT ON DAIRY FARMS

Manure is often discharged from dairy farms, ending up in streams and rivers. The discharged manure causes local nuisance, pollution of ground and surface water (affecting drinking water quality), and may contribute to climate change. Also, valuable nutrients are lost. Manure should be used as an organic fertilizer, which will protect the environment and reduces the need for synthetic fertilizer.



4. Collective Manure Management

No space for storing manure on your farm?



Possibly you can participate in collective manure management. This takes less labor and investment costs per farmer compared to individual manure storage. The product can be sold to large scale users, or applied on own land.



Suitable for	Materials needed	Costs
<ul style="list-style-type: none"> Manure collected from many farms Selling manure to large scale users 	Large storage location Floor, roof Packaging material Vehicles for transport	High (investment, labour)



Contact:
Windi Al Zahra
windialzahra@apps.ipb.ac.id



Wageningen University & Research
P.O. Box 123, 6700 AB Wageningen
Contact: Marion.deVries@wur.nl
T + 31 (0)317 486 133, M +31 (0)6 10 61 12 87
www.wur.nl/nl/project/Sustainable-Intensification-of-Dairy-Production-Indonesia.htm

Project Partners:



LIVESTOCK RESEARCH
WAGENINGEN UR



IPB University
Bogor Indonesia



trouw nutrition
a Nutreco company

Why

Manure Management?

Animal manure is an important resource for improving and maintaining soil fertility and soil structure. For centuries, farmers have used manure to provide nutrients to plants.

Manure contains nutrients and organic matter that are essential to plant growth and development:

- **Macronutrients** such as nitrogen (N), phosphate (P) and potassium (K),
- **Micronutrients**, such as zinc, which cannot be found in synthetic fertilizer,
- **Organic matter** in manure improves the soil structure and soil health, and helps to prevent soil erosion and runoff.

Nitrogen (N) is for healthy development for shoots, branches, and leaves

Potassium (K) is for overall plant health

Phosphate (P) is for strong roots

What is the difference between urine and feces?

- Urine contains much water and most of the N and K excreted by the animal, which are important for plant growth. Urine can be used directly as a fertilizer for fodder crops, but for arable crops it must be diluted with water.
- Feces are drier (often 12-15% dry matter) and contain most of the P and organic matter excreted by the animal. The organic matter is important for maintaining soil quality. The feces can be dried and composted.

What are your options to improve manure management?

1. Daily Spread

Do you have land next to your cow barn? In this case you can apply manure directly to the land via a piping system. Most of the nutrients are still in the manure, which will stimulate plant growth, improve soil conditions, and replace synthetic fertilizer. Ammonia and greenhouse gas emissions of this technique are low.



How does it work? The liquid manure is flushed with water from the barn to nearby land via a downstream piping system (PVC). Ditches are dug in the land to distribute manure more equally across the field. Daily application is easy, there is no need for storage space, and little labor is needed.

Suitable for	Materials needed	Costs
<ul style="list-style-type: none"> • Liquid manures, such as the mixture of feces and urine, biogas slurry, or urine. • Application on land close to the cow barn. The land should be located downstream. 	Pipes	Low

2. Manure Storage

Do you have land located far away from the barn? Also in this case you can apply the manure to land, but you will need to store the feces. The phosphate and organic matter in feces will improve plant health and soil conditions. Feces do not contain much nitrogen, and part of the nitrogen is lost during storage. Ammonia and greenhouse gas emissions from manure storages are higher than in daily spread of manure.



How does it work?

Manure heap: the feces are collected on a daily basis and stored on a heap. Storing feces on a heap makes it drier, because water is evaporated (do not cover with plastic).



Drier feces are more easy to handle and transport. More water will be evaporated when dry materials are added and feces are regularly mixed and turned ('composting').

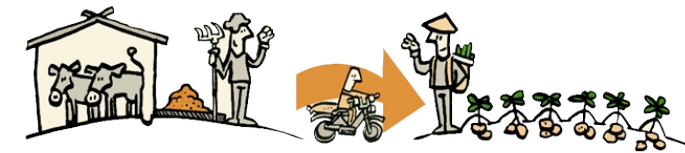
Sacks: the feces are collected on a daily basis and stored in sacks. The sacks can be transported by car or motorbike to the land or to buyers. Feces should not be stored in sacks too long to avoid greenhouse gas emissions.



Suitable for	Materials needed	Costs
<ul style="list-style-type: none"> • Application on land located uphill or far away from the barn • Selling manure to crop farmers • In most cases, only feces are collected, because urine is too wet. 	Storage location Floor Roof (or sacks)	Low-medium

3. Selling Manure

Do you have no land for applying manure? Possibly you can give away or sell the manure to other farmers. In this case you need to store the feces (see option 2 above).



How does it work? What are the requirements of the buyer? Is the manure used on fodder or vegetables? Or is it for gardens and flowers? If it is applied on land nearby, it might not necessary to produce very dry manure. Ask the buyer what type of manure he or she needs.

Horticultural farmers or a retail market in the city might ask for compost. Compost is drier, more homogenous, contains less pathogens and weeds seeds, and is easier to handle and transport than fresh feces. Producing compost is more demanding in terms of investment, process control (quality control) and labor.

Read more about **composting techniques** in the leaflet 'composting of cattle feces'.