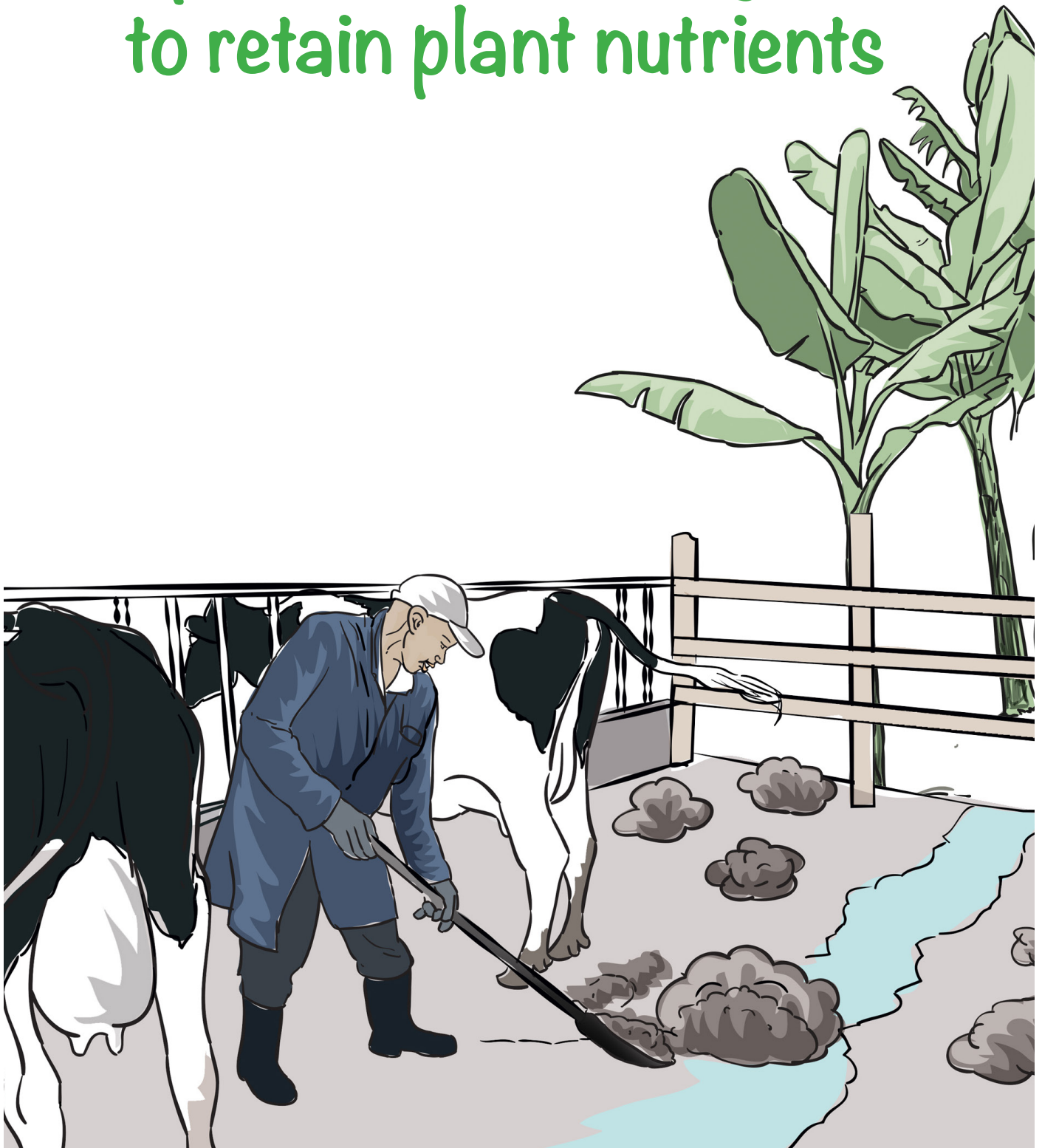


# Simple manure management to retain plant nutrients



Manure from livestock contains many important nutrients that are vital for plant growth.



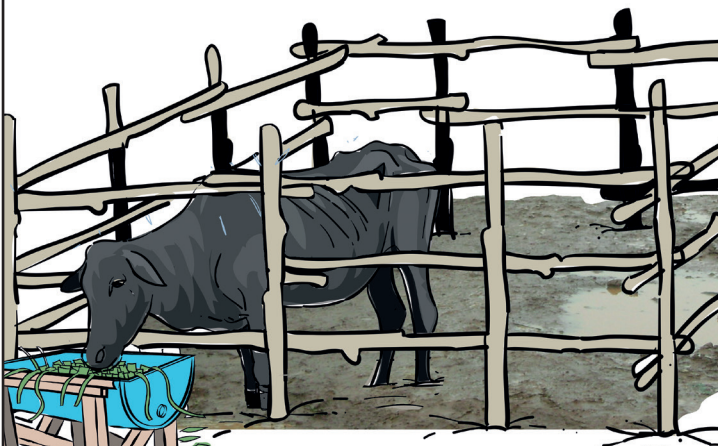
These nutrients make manure a valuable fertilizer that is easily available on many farms in Africa.



Animal manure can be used to increase crop yields and improve soil fertility at a cheaper cost compared to synthetic fertilizer.



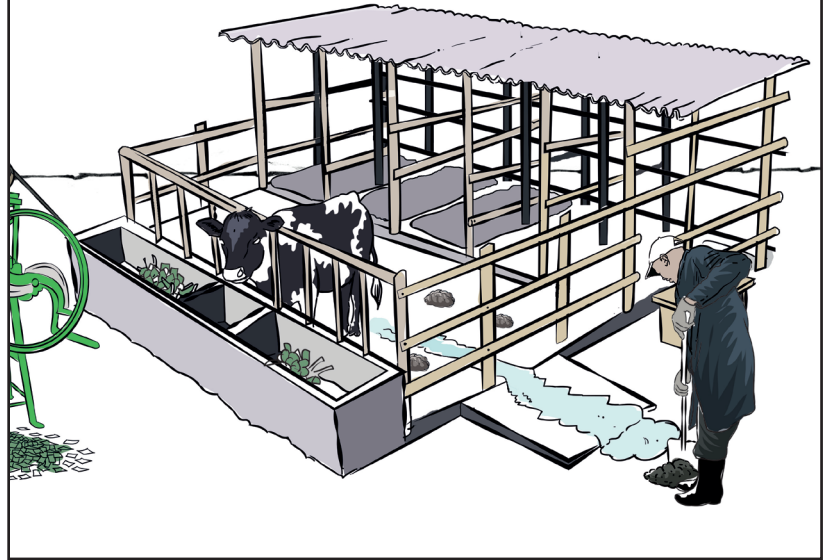
To make sure animal manure contains the maximum nutrients, it is important that it is properly handled and stored, otherwise the nutrients will be lost.



In this booklet, we will show you how to maintain the quality and get maximum benefits of animal manure in six simple steps.



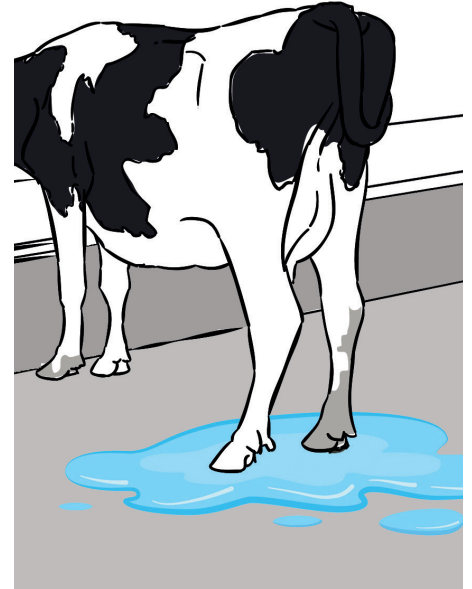
Keep your animals in a housing with a roof that allows easy holding and collection of manure.



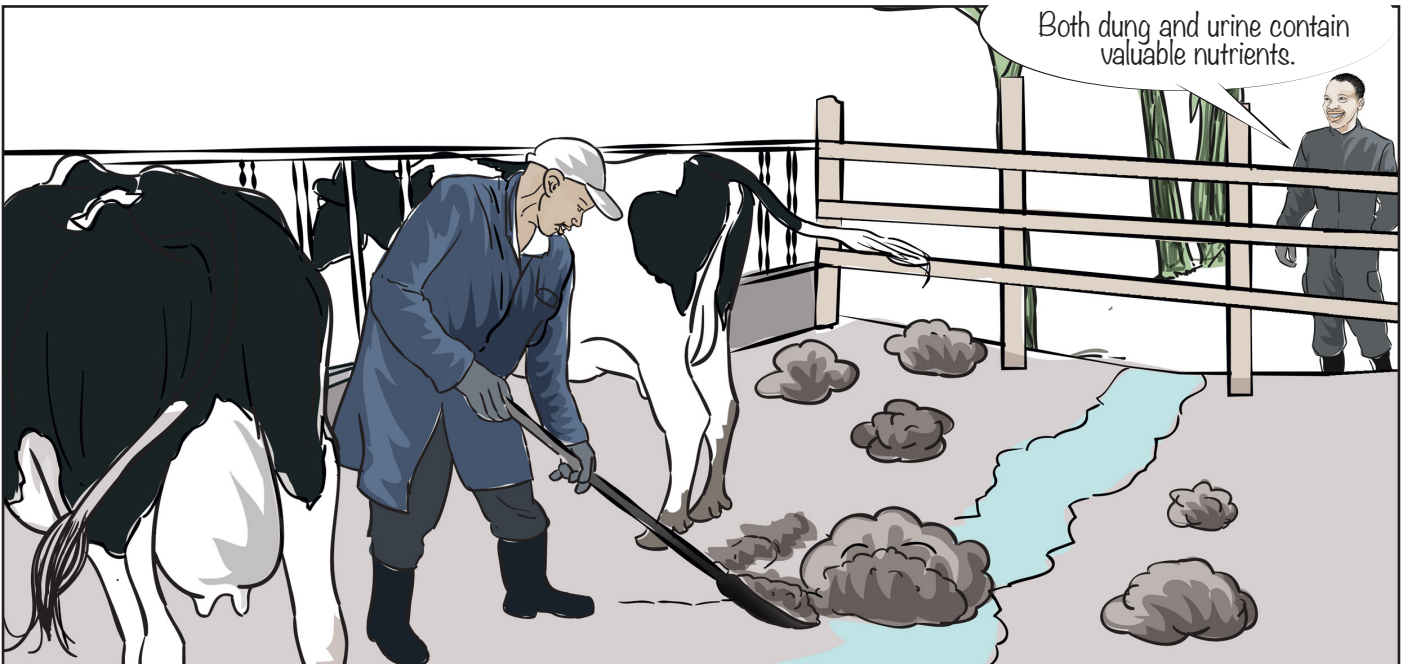
Animal manure contains a solid component - the dung,



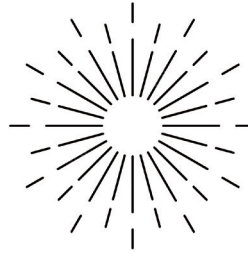
...and a liquid component - the urine.



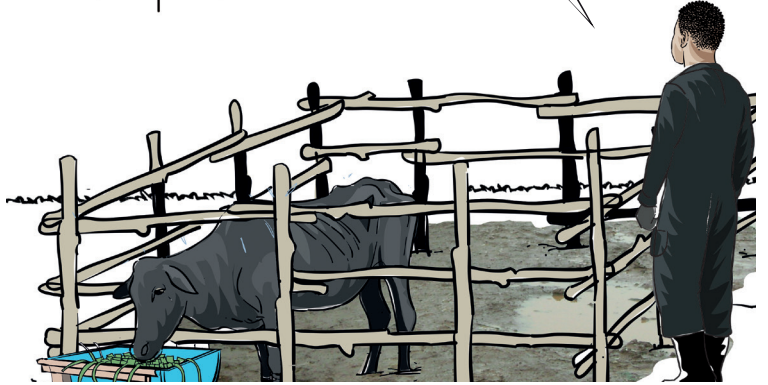
Both dung and urine contain valuable nutrients.



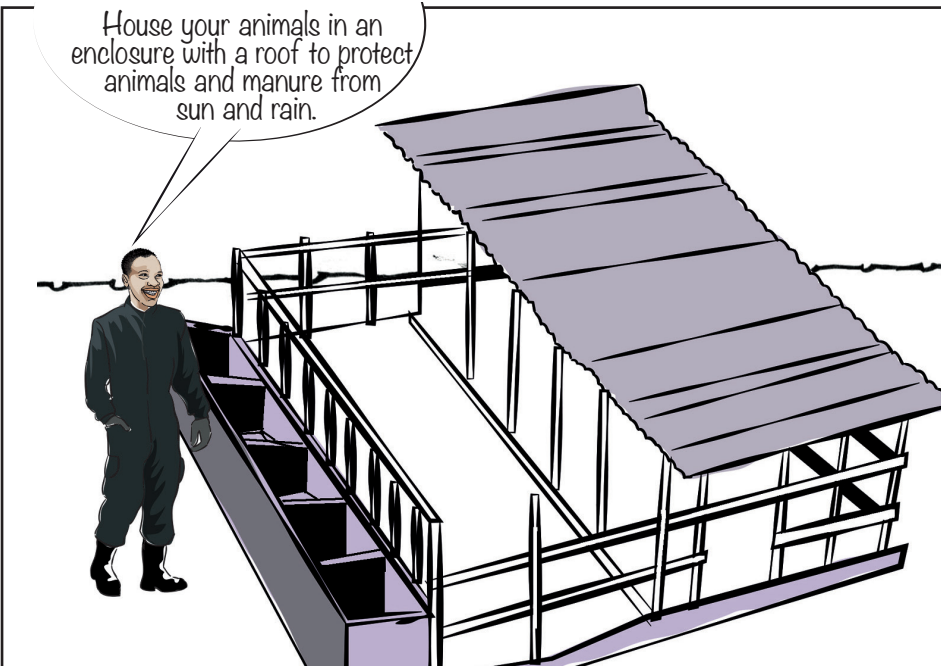
Dung can be easily collected when livestock are confined at least some of the time and manure accumulates.



However, urine can easily drain into the soil if there is no floor.



House your animals in an enclosure with a roof to protect animals and manure from sun and rain.



The housing should have a solid floor that allows urine and dung from the livestock to sit until collected or to drain into a central collection point.



If you cannot have an enclosure with a solid floor, use bedding materials that soak up urine and prevent its loss and hold the dung for easy collection.



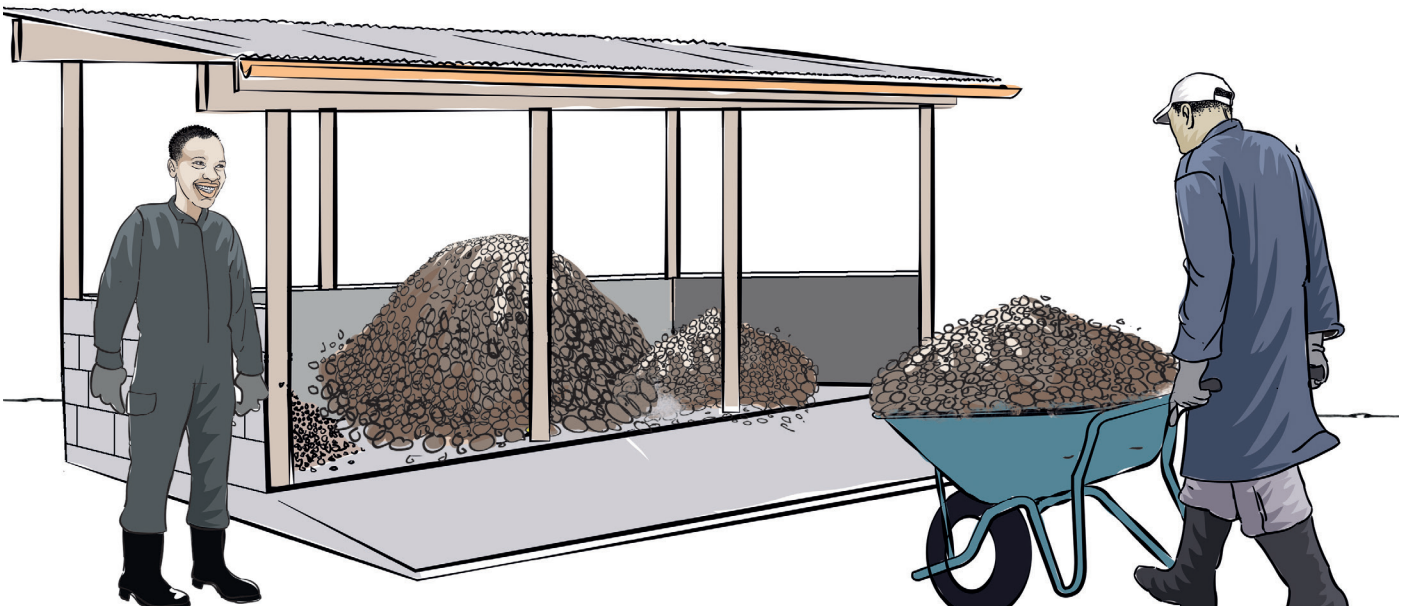
In all animal housings, both dung and urine should be collected as frequently as possible, ideally once a day, to preserve the nutrients and to keep the area where livestock are kept clean and safe.



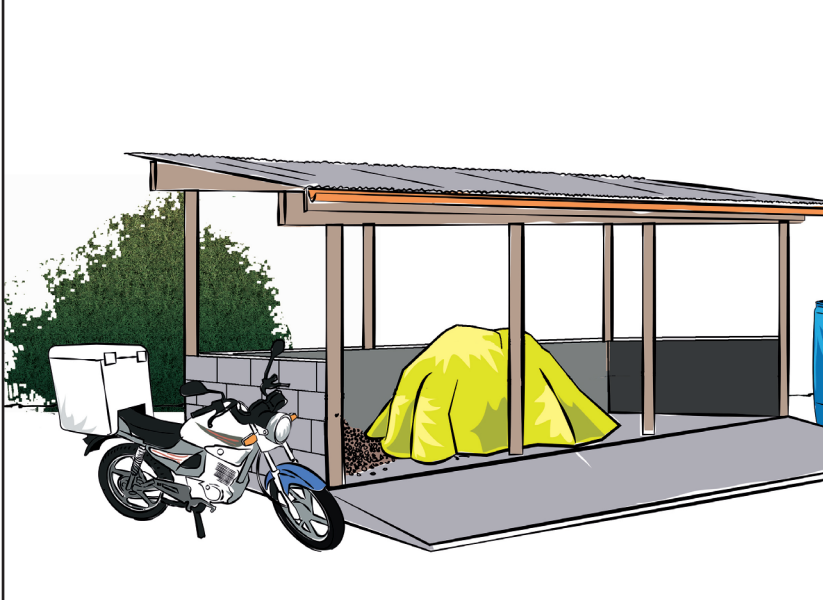
This is also important for animal and human health! Remember to always protect yourself when handling manure by wearing gloves and over coats, using long handle shovels, and thoroughly washing your hands after touching any animal excreta!



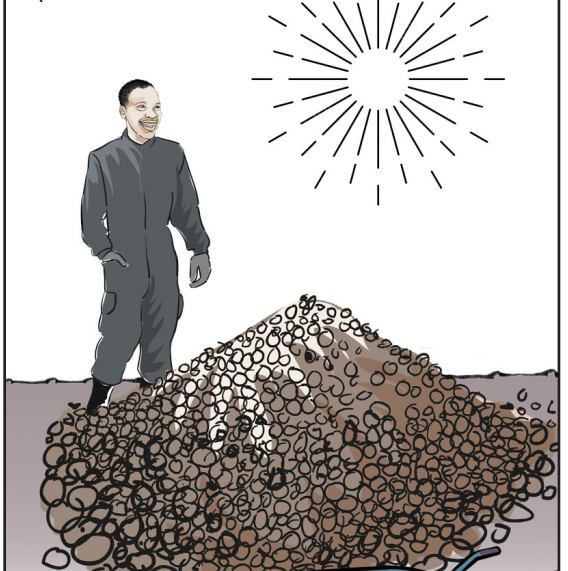
Properly store manure to avoid nutrient loss through exposure to elements and contamination.



Once you have collected manure from the animal enclosure, store it in a way that preserves the nutrients and prevents contamination until the manure is used.

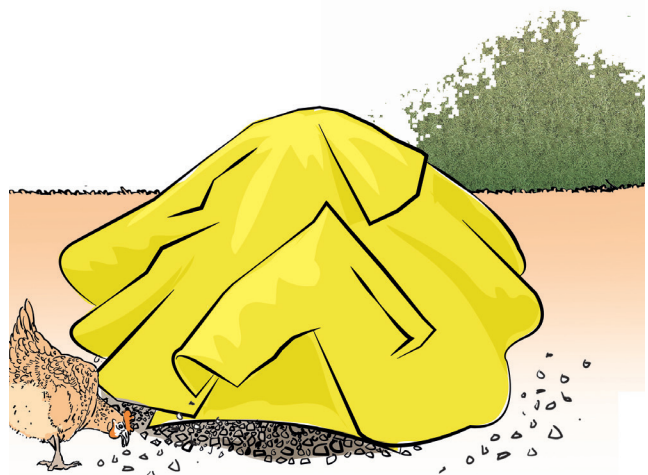


If it is dry enough, manure can be stored by stacking it in a heap and letting it sit, or it can be composted to further improve its value, as we'll explain later.





Cover the stored manure to protect it from sun and rainfall.



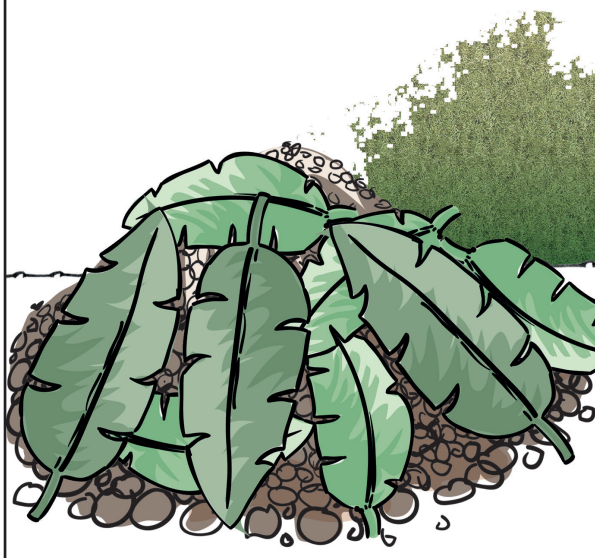
If manure is not covered properly, nutrients will be washed away by rainfall or can be destroyed by the sun.



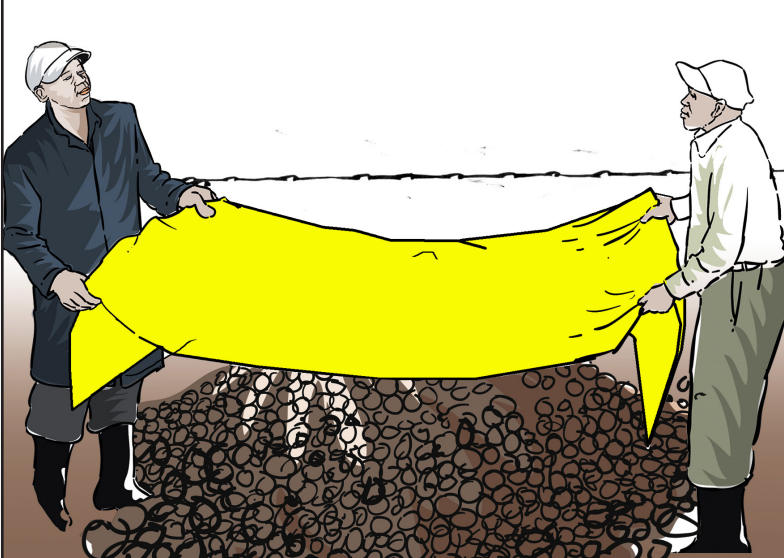
You can construct a simple roof over the manure heap, such as the one shown here using low cost and locally available materials.



If a roof is not practical for you, another way to protect the manure is by covering it with a plastic sheet or with banana leaves.



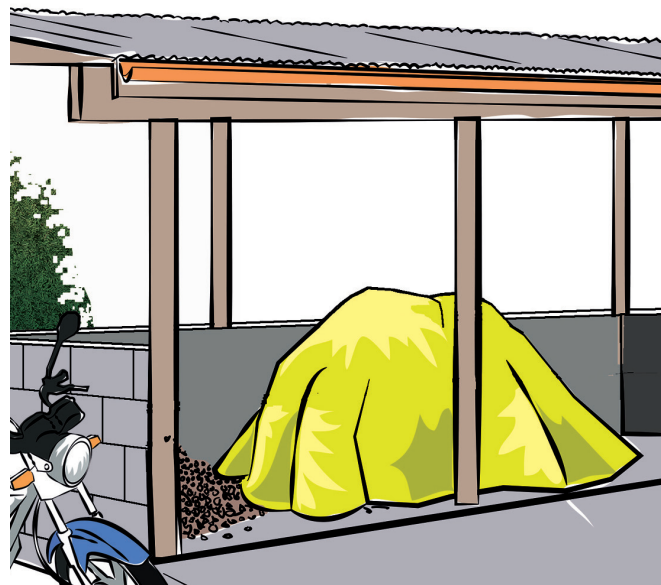
Any material that prevents the manure from getting wet and protects it from the sun can be used as a covering.



Store your manure on a waterproof surface to prevent nutrient leaching.



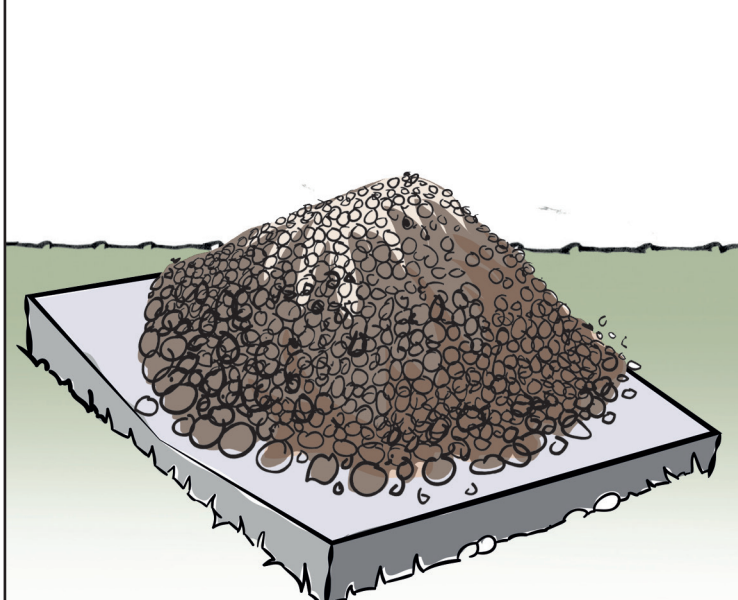
Roofs and coverings can already reduce the loss of nutrients from manure during storage.



But manure that is stored on top of bare soil can still lose nutrients through leaching of urine and water.



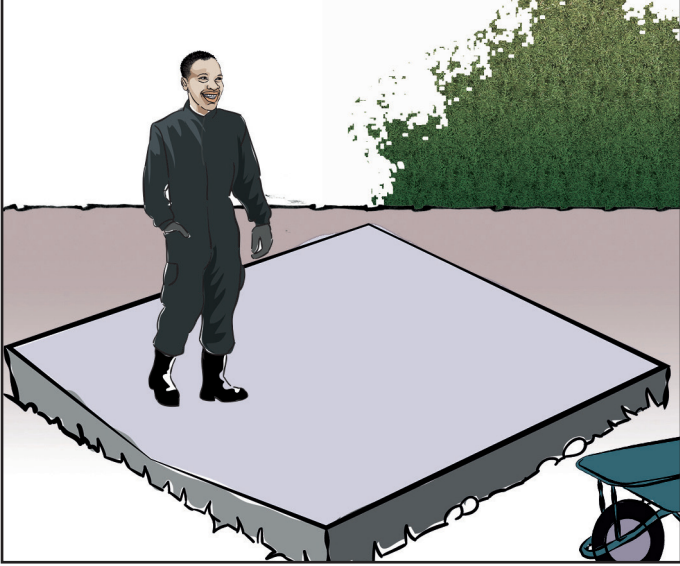
You can avoid this by constructing a floor beneath the manure heap.



Floors should be constructed from solid, waterproof materials that eliminate contact with the soil surface and prevent nutrients from being lost.



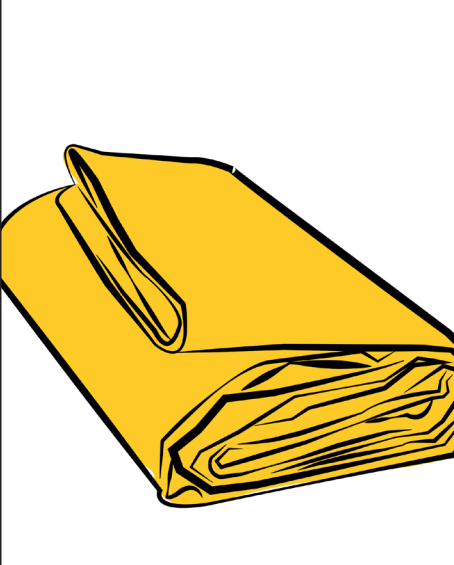
A good type of flooring is concrete, such as in the floor shown here, since concrete is very solid and will prevent any leaking of nutrients into the soil.



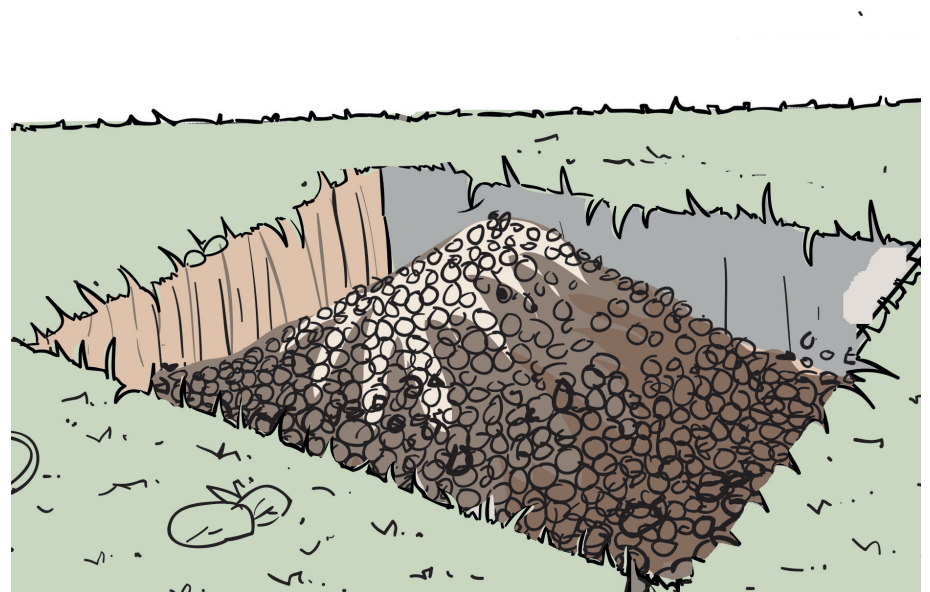
If concrete is too expensive or not practical, you can place a plastic sheet beneath the manure heap, as is shown here.



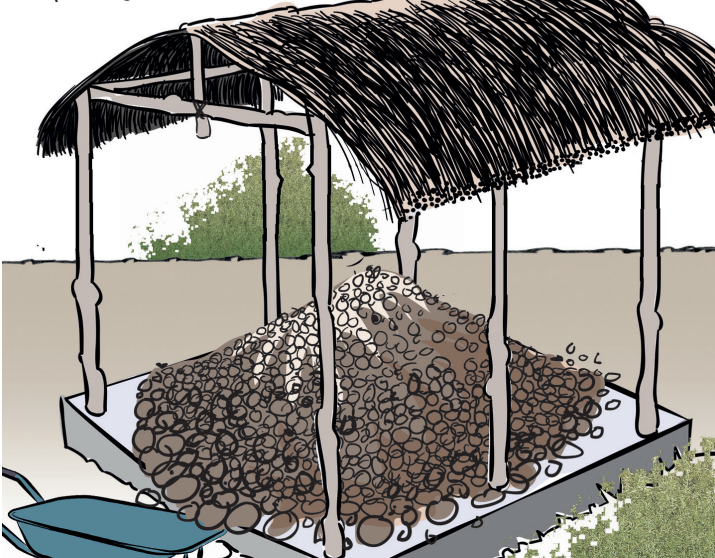
The plastic sheet should be made of sturdy materials and should be free from holes.



Composting of the manure improves its quality and removes pathogens that cause diseases



In addition to building a roof and water-proof floor, a very good way to improve manure quality and make it safe for use is active composting.



The biggest benefit of composting is the development of heat. A compost heap gets hot on the inside, and this heat kills any dangerous pathogens and bacteria that can cause animal and human diseases.

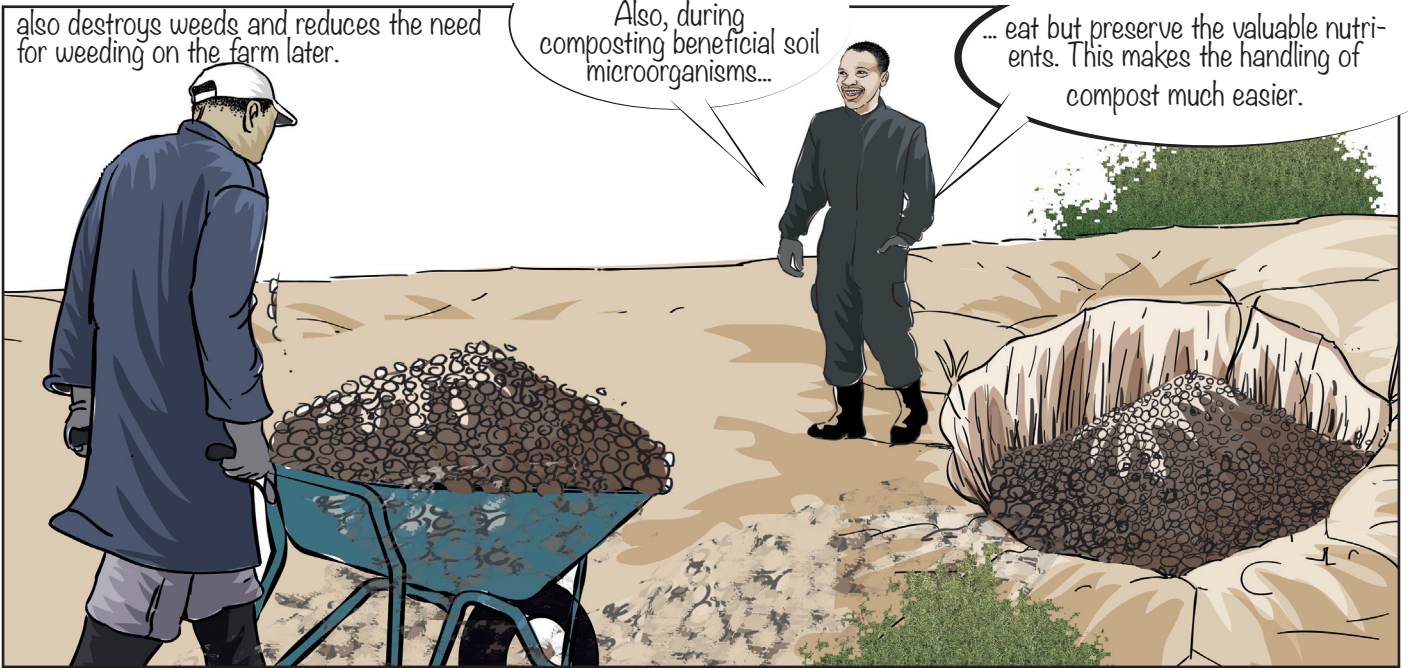




also destroys weeds and reduces the need for weeding on the farm later.

Also, during composting beneficial soil microorganisms...

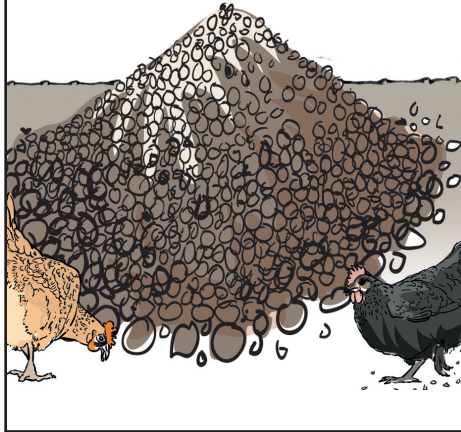
... eat but preserve the valuable nutrients. This makes the handling of compost much easier.



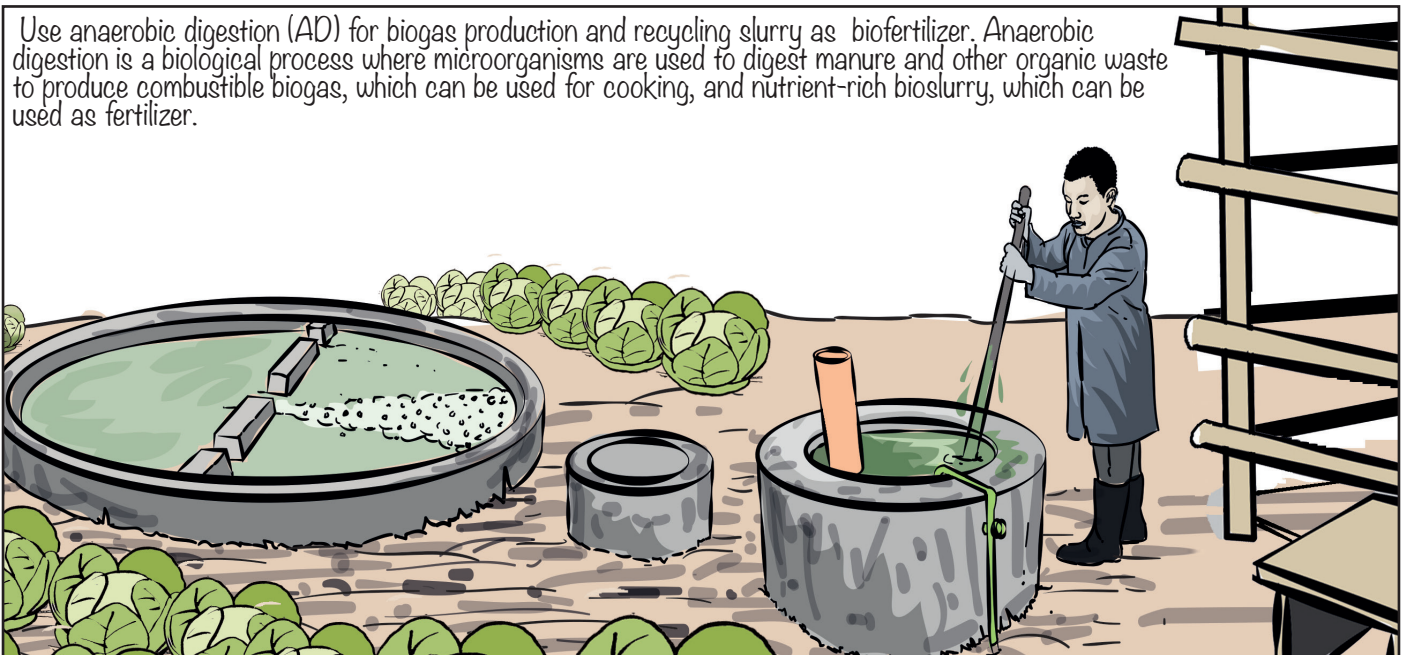
Composting can be done on any farm, no matter its size.

There are two common methods: The heap method, which is suitable for areas that receive a lot of rainfall...

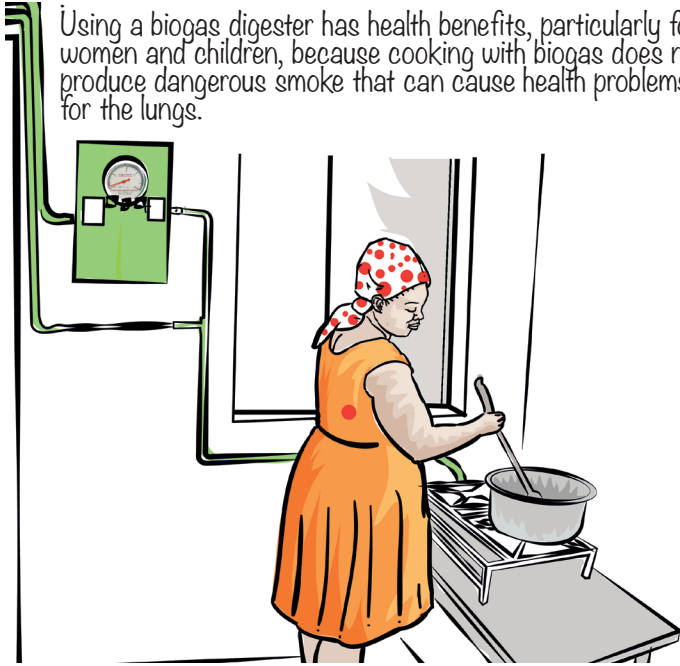
and the pit method, which is good for dry areas.



Use anaerobic digestion (AD) for biogas production and recycling slurry as biofertilizer. Anaerobic digestion is a biological process where microorganisms are used to digest manure and other organic waste to produce combustible biogas, which can be used for cooking, and nutrient-rich bioslurry, which can be used as fertilizer.



Using a biogas digester has health benefits, particularly for women and children, because cooking with biogas does not produce dangerous smoke that can cause health problems for the lungs.

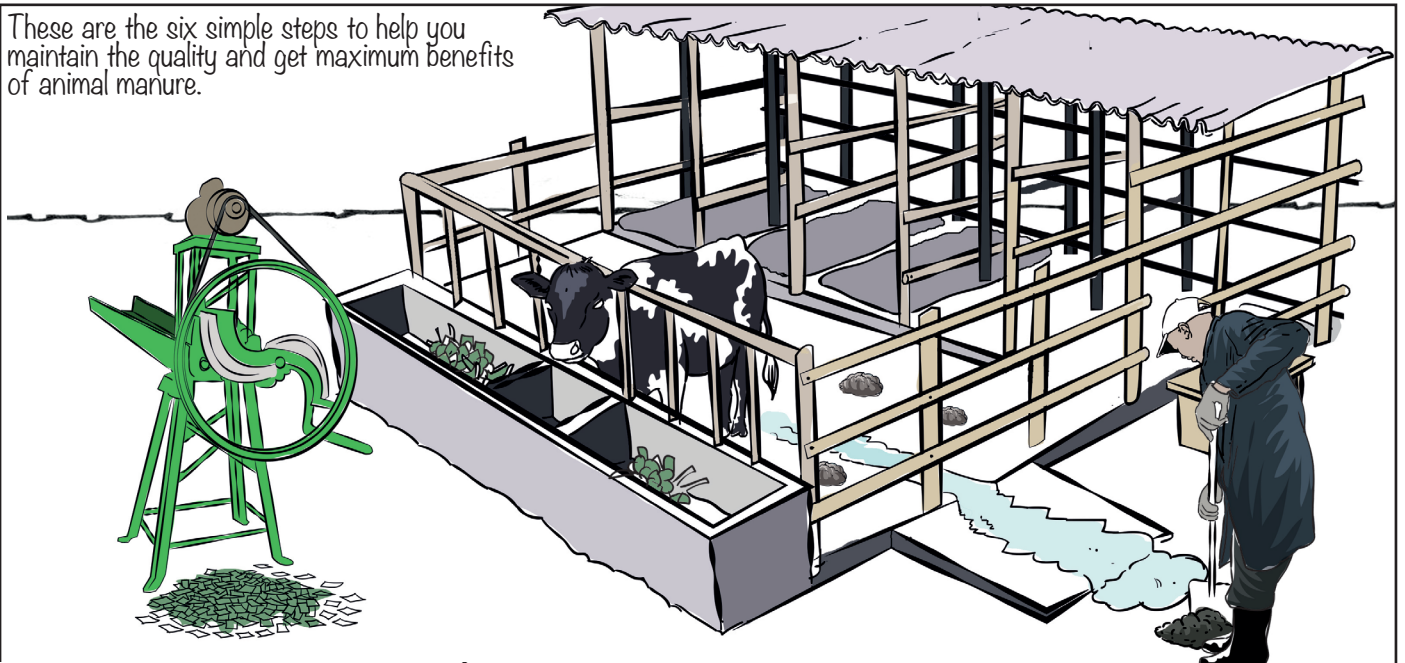


Also, the bioslurry from the digester is a very good and nutrient-rich organic fertilizer.



**Recap**

These are the six simple steps to help you maintain the quality and get maximum benefits of animal manure.



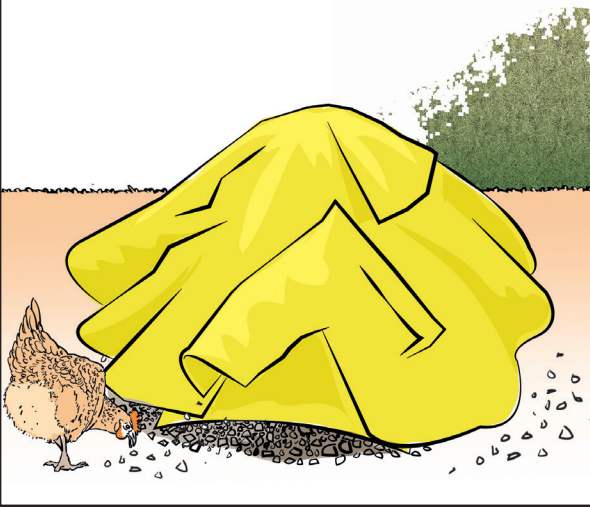
Keep your animals in a housing with a roof and a floor that allows easy holding and collection of manure



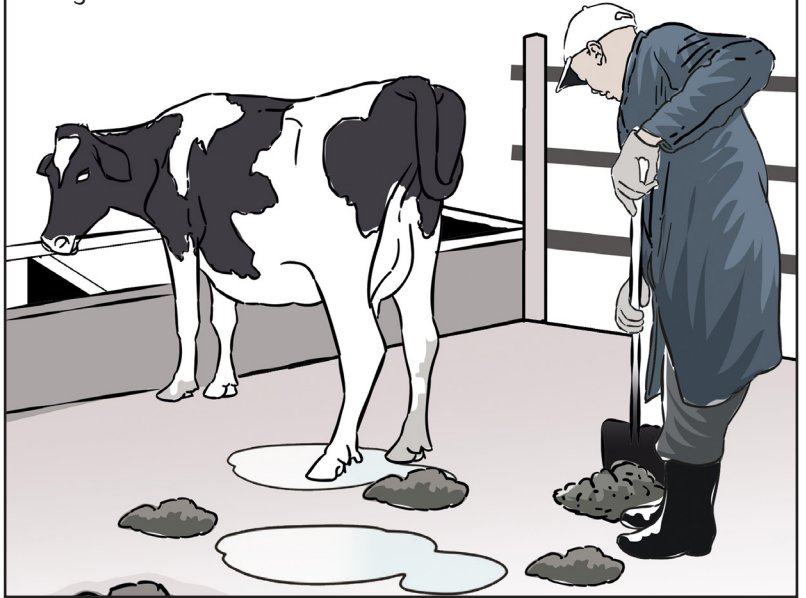
Stack the manure into a heap and compress it.



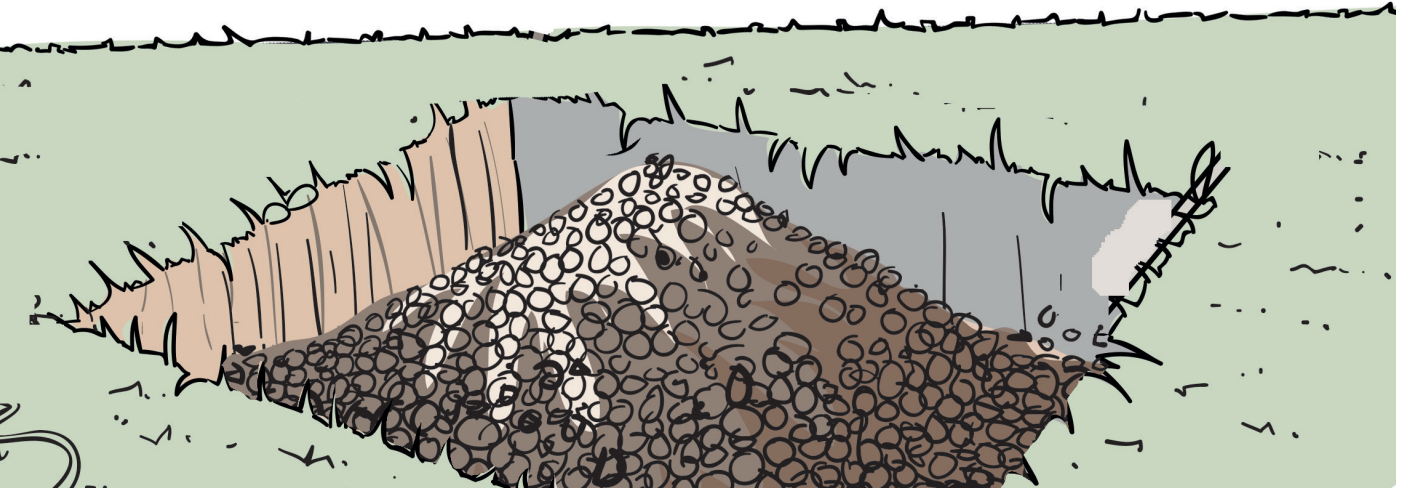
Cover the stored manure to protect it from rainfall and sun.



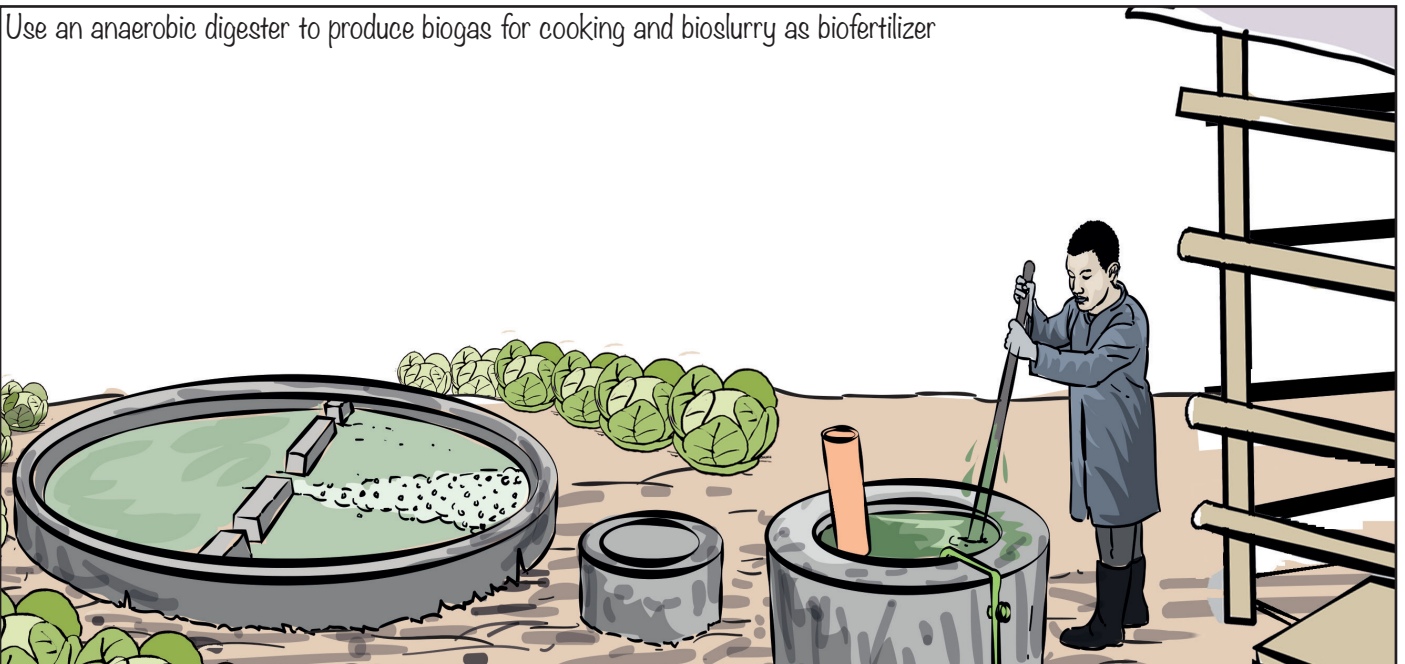
Keep your animals in a housing with a roof and a floor that allows easy holding and collection of manure



Compost your manure to improve the quality and make it safe



Use an anaerobic digester to produce biogas for cooking and bioslurry as biofertilizer



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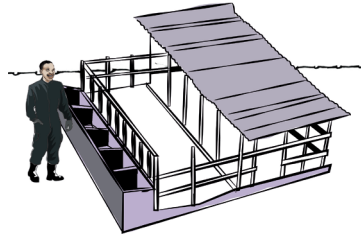
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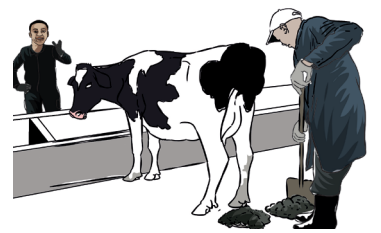
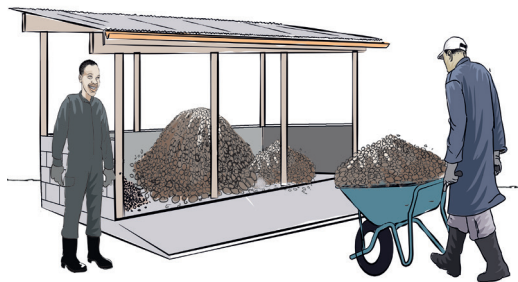
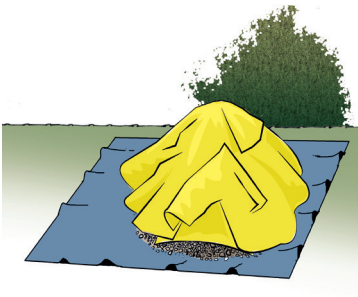
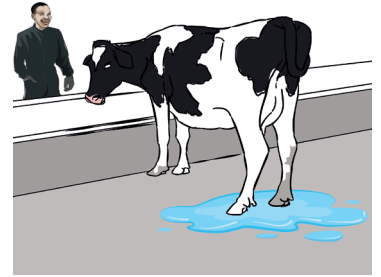
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