

Re-Organise - The Game - English- V2.0

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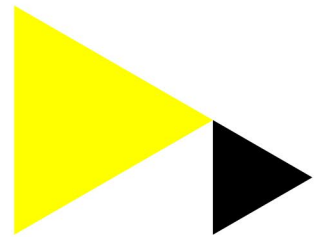
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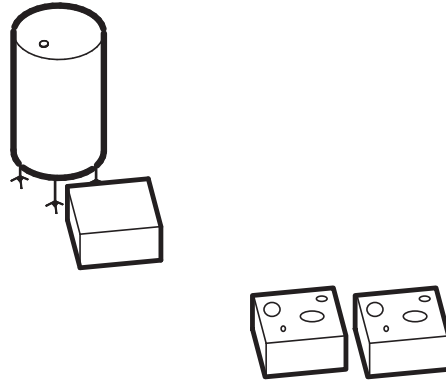
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Worm composting



Input (minimal)

Raw organic material 50 kg /year

Output

Organic fertiliser (worm compost)

Animal feed

2 kg input-1kg output

Required assets

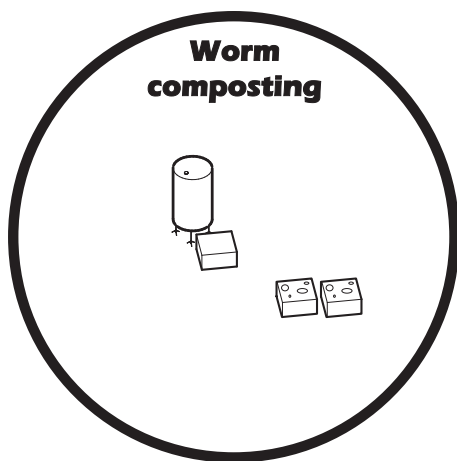
Big investment (1 card)

Knowledge (1 card)

Maintenance time (1 card)

Outdoor space (1 card)

Indoor space for winter (1 card)



Worm composting happens when worms break down organic material into a stable compost product. In this process, organic waste streams such as raw organic material and crops are converted into worm compost, a high-quality organic fertiliser. The worms themselves can also be harvested in worm composting. For example, they can serve as animal feed.

The organic side streams may only consist of raw material. There must be no biocides and there should be as little citrus waste as possible. The more homogeneous the organic wastestream, the better the worm composting process.

Small-scale worm composting is an easy-to-use technique that requires little investment (50-100 euros) and labour. Worm composting can take place on 1 m² and there are no restrictions of legislation or nuisance on this scale.



Input

Raw organic material

50 kg/year

Output

Organic fertiliser (worm compost)

2 kg input - 1 kg output

Animal feed

Required assets

Small investment (1 card)

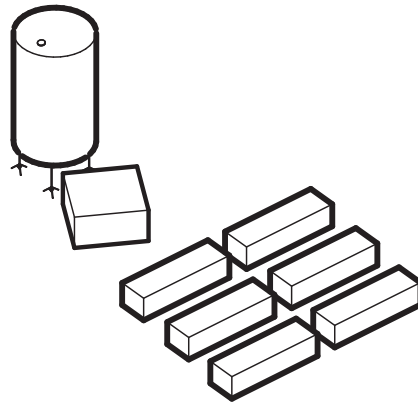
Outdoor space (1 card)

Knowledge (1 card)

Indoor space for winter (1 card)

Maintenance time (1 card)

Large-scale composting



Input (minimal)

Raw organic material

1000 kg/year

Output

Organic fertiliser (compost)

2 kg input - 1 kg output

Required assets

Big investment (3 cards)

Government permit (1 card)

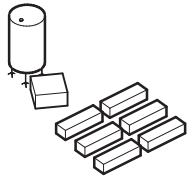
Knowledge (1 card)

Machines (3 cards)

Maintenance time (3 cards)

Outdoor space (1 card)

Large-scale composting



Composting happens under oxygen-rich conditions, when micro-organisms break down organic material into a stable form. In this process, organic compounds are oxidized, releasing heat and water vapour. Compost consists of stable organic material and minerals. Compost is an organic fertiliser.

The organic residual stream must consist of organic material with a maximum moisture percentage of 65%. It is important that the input material consists of both carbon-rich materials and nitrogen-rich materials. Biocides and citrus waste must be avoided. The more homogeneous the organic waste stream, the better the composting process.

Large-scale composting is a technique that requires a great deal of knowledge and labour, as well as large investments. Large-scale composting takes place on at least 50 m² and the Environmental Management Act must be observed. With bad composting, odour nuisance is a potential big risk.

Input (minimal)

Raw organic material

1000 kg/year

Output

Organic fertiliser (compost)

2 kg input - 1 kg output

Required assets

Big investment (3 cards)

Government permit (1 card)

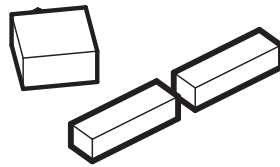
Knowledge (1 card)

Machines (3 cards)

Maintenance time (3 cards)

Outdoor space (1 card)

Small-scale composting



Input (minimal)

Raw organic material

1000 kg/year

Output

Organic fertiliser (compost) 2 kg input - 1 kg output

Required assets

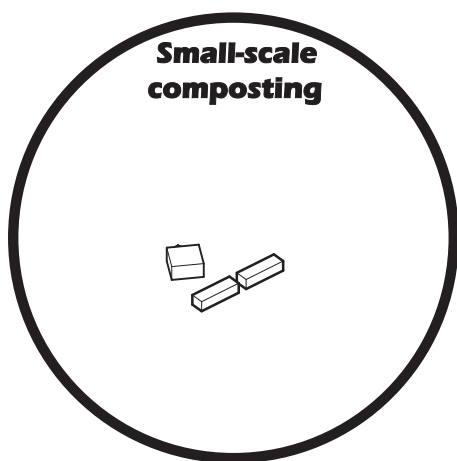
Small investment (1 card)

Outdoor space

(1 card)

Knowledge (1 card)

Maintenance time (1 card)



Composting happens under oxygen-rich conditions, when micro-organisms break down organic material into a stable form. In this process, organic compounds are oxidized, releasing heat and water vapour. Compost consists of stable organic material and minerals. Compost is an organic fertiliser.

The organic residual stream must consist of organic material with a maximum moisture percentage of 65%. It is important that the input material consists of both carbon-rich materials and nitrogen-rich materials. Biocides and citrus waste must be avoided. The more homogeneous the organic waste stream, the better the composting process.

Small-scale worm composting is an easy-to-use technique that requires little knowledge and labour, as well as only a small investment (0-100 euros). Small scale composting can take place on 2 m². There is no legislation that needs to be taken into account, but with bad composting, odour nuisance is a potential risk.

Input (minimal)

Raw organic material	1000 kg/year
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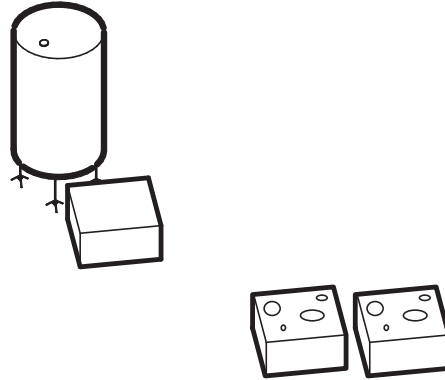
Output

Organic fertiliser (compost) 2 kg input - 1 kg output

Required assets

Small investment	(1 card)	Outdoor space	(1 card)
Knowledge	(1 card)		
Maintenance time	(1 card)		

Wet biodigestion



Input (minimal)

Manure, stale bread,
fat, crop residues,
chicory roots

15000 kg/year

Output

Biogas (for heat/electricity)

100 kg input- 10 m3 output

Required assets

Big investment (3 cards)

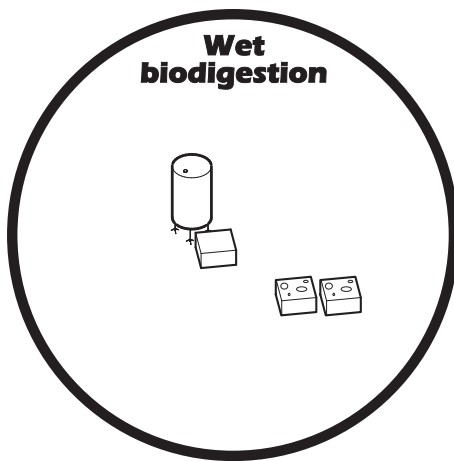
Government permit (1 card)

Knowledge (1 card)

Machines (shredder) (3 cards)

Maintenance time (3 cards)

Outdoor space (1 card)



Wet biodigestion happens under anaerobic conditions, when micro-organisms break down organic material into a more stable form. In the process, organic compounds are broken down and biogas is released. The reactor must be heated for an efficient process. Heat can be extracted by converting the released biogas in a gas engine into electricity and heat.

The wet digester must not be fed with pumpable streams with a maximum dry matter content of 15%. Material with a high sulphate content must be avoided because it has a strong oxidizing effect and is therefore harmful to the installation and the gas engine.



Small-scale wet digestion is a technique that requires some knowledge and labour input. Large-scale digestion requires more knowledge and requires continuous process control. Investments for a small digester with gas engine amount to around 15,000 to 20,000 euros. A large digester costs around 300,000-500,000 euros. For digesters with a higher annual input of 600m³, the Environmental Management Act must be complied with.

Input (minimal)

Manure, stale bread,
fat, crop residues,
chicory roots

15000 kg/year

Output

Biogas (for heat/electricity)

100 kg input- 10 m³ output

Required assets

Big investment (3 cards)

Government permit (1 card)

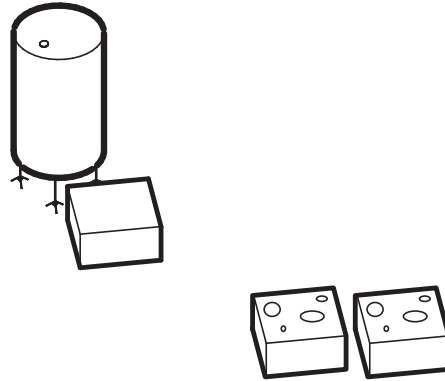
Knowledge (1 card)

Machines (shredder) (3 cards)

Maintenance time (3 cards)

Outdoor space (1 card)

Dry biodigestion



Input (minimal)

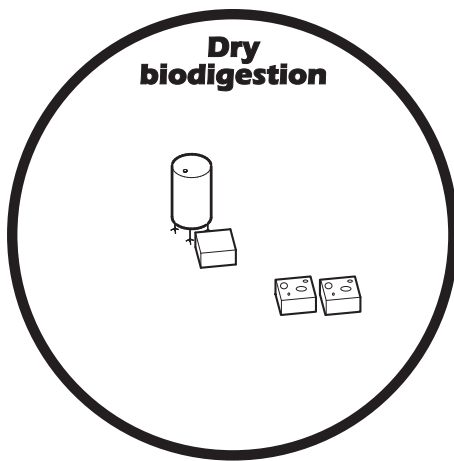
Raw organic material, crop residues, verge grass cuttings, garden waste (pruning) 5000 kg / year

Output

Biogas (for heat/electricity) 100 kg input -10 m³ output

Required assets

Big investment	(3 cards)	Government permit	(1 card)
Knowledge	(1 card)	Machines (tractor)	(1 cards)
Maintenance time	(2 cards)	Outdoor space	(1 card)



Dry biodigestion occurs in anhydrous and anaerobe conditions, when micro-organisms break down organic material into a more stable form. In the process, organic compounds are broken down and biogas is released. The reactor must be heated for an efficient process. Heat can be extracted by converting the released biogas in a gas engine into electricity and heat.

The dry digester must not be fed with stackable material with a minimum dry matter content of 15%. Material with a high sulphate content must be avoided because it has a strong oxidizing effect and is therefore harmful to the installation and the gas engine.



Small-scale dry digestion is a technique that requires some knowledge and labour input. Large-scale digestion requires more knowledge and requires continuous process control. Investments for a small digester with gas engine amount to around 15,000 to 20,000 euros. A large digester costs around 300,000-500,000 euros. For digesters with a higher annual input of 600m³, the Environmental Management Act must be complied with.

Input (minimal)

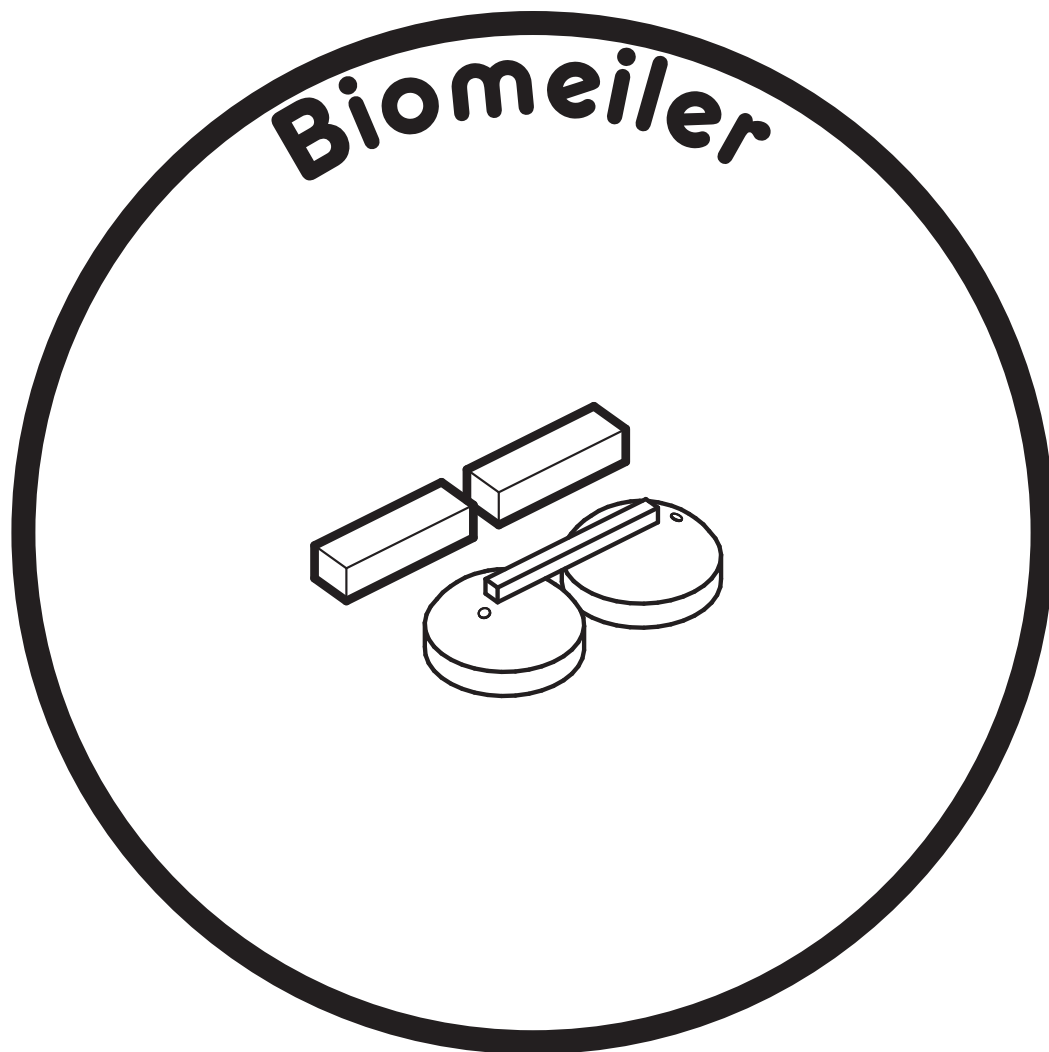
Raw organic material, crop residues, verge grass cuttings, garden waste (pruning) 5000 kg / year

Output

Biogas (for heat/electricity) 100 kg input -10 m³output

Required assets

Big investment	(3 cards)	Government permit	(1 card)
Knowledge	(1 card)	Machines (tractor)	(1 cards)
Maintenance time	(2 cards)	Outdoor space	(1 card)



Input (minimal)

Raw manure, wood chips 2000 kg / y

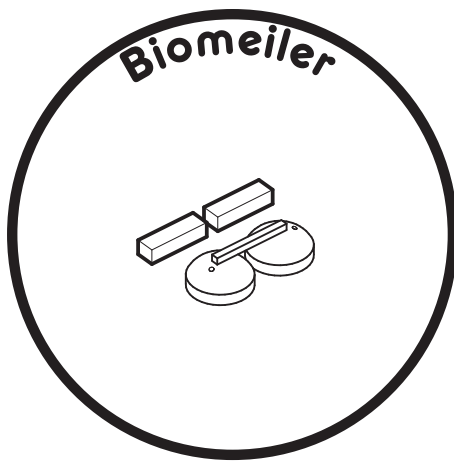
Output

Compost 2 kg input - 1 kg output

Heat 10 kg input - 15 kWh/y output

Required assets

Low investment	(1 card)	If > 400 tons: gov. permit	(1 card)
Knowledge	(1 card)	Machines: tractor, shredder	(2 cards)
Maintenance time	(1 card)	Outdoor space	(1 card)



The biomeiler process occurs under oxygen-rich conditions, when micro-organisms break down organic material into a stable form. In this process, organic compounds are oxidized, releasing heat and water vapour. Compost consists of stable organic material and minerals. Compost is an organic fertilizer. The heat that is released is generated by pumping water through hoses processed in the biomeiler. With this a house or barn, for example, can be heated.

The organic waste stream must consist of organic material with a maximum moisture percentage of 65%. It is important that the input material consists of both carbon-rich and nitrogen-rich materials. Biocides and citrus waste must be avoided. The more homogeneous the organic waste stream, the better the composting process. Ideal materials for processing in a biomeiler consist of wood chips as a carbon component, and animal manure as a nitrogen component.

It costs around 1500-2000 euros to set up a biomeiler. A biomeiler of 3 meters high and 10 meters in diameter will take up around 75 m² of land. In the event of a poor process, odour nuisance is a potential risk. Max. life span: 2 yrs.

Input (minimal)

Raw manure, wood chips 2000 kg / y

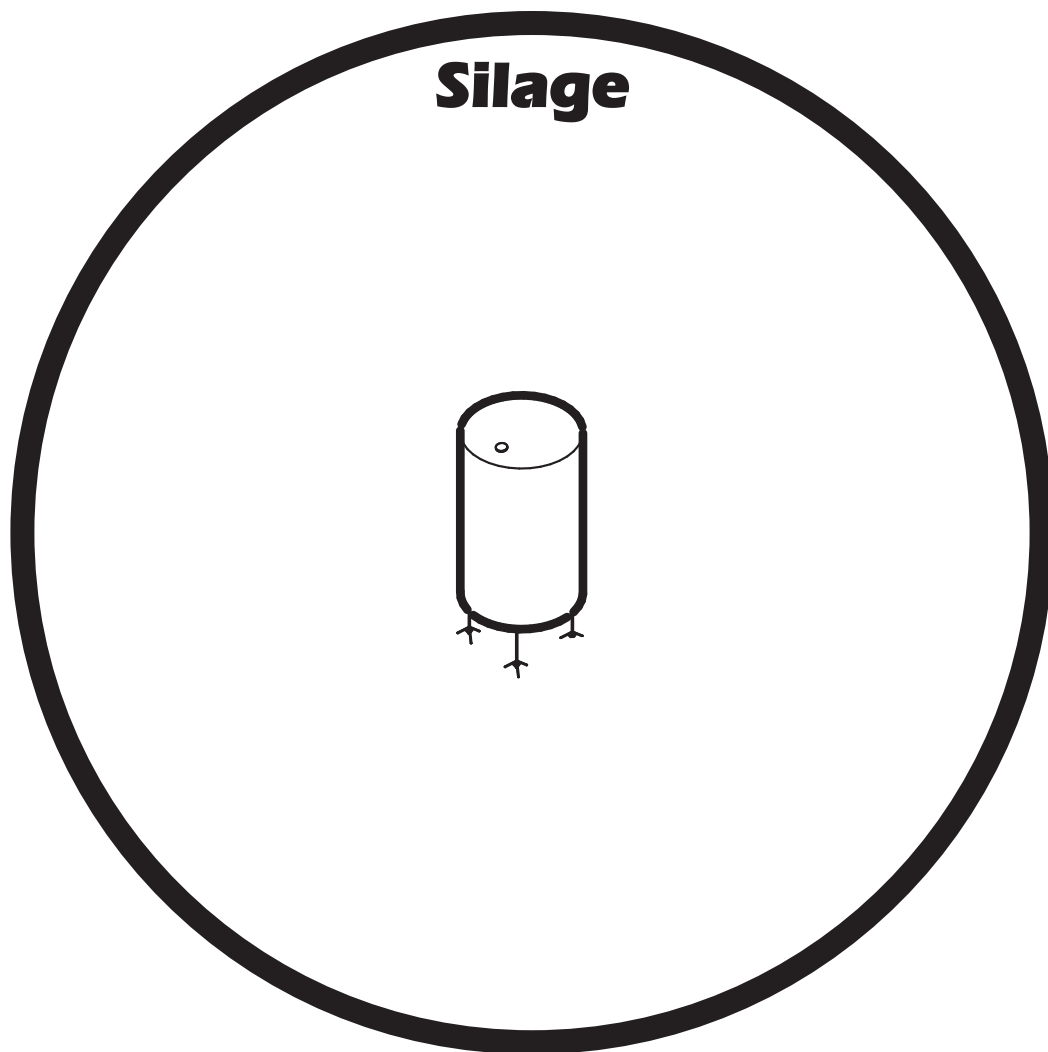
Output

Compost 2 kg input - 1 kg output

Heat 10 kg input - 15 kWh/y output

Required assets

Low investment	(1 card)	If > 400 tons: gov. permit	(1 card)
Knowledge	(1 card)	Machines: tractor, shredder	(2 cards)
Maintenance time	(1 card)	Outdoor space	(1 card)



Input (minimal)

Natural grass
cuttings, brewer's
grains, ditch crops

1000 kg / year

Output

Animal feed

1 kg input - 0,8 kg output

Required assets

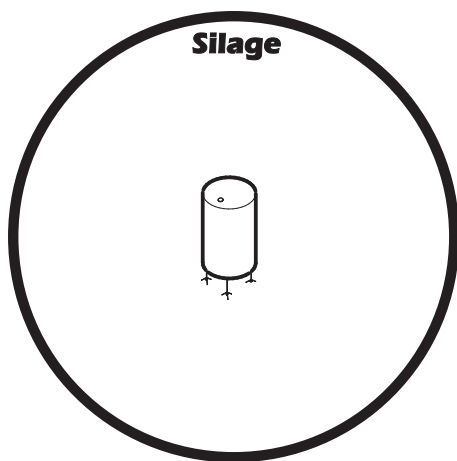
Investment (2 cards)

Knowledge (1 card) Machines: tractor

(1 card)

Maintenance time (1 cards) Outdoor space

(1 card)



Silage occurs under lactic acid conditions, when lactic acid bacteria convert organic material into a stable form. In this process, sugars are converted into lactic acids. The organic material becomes sustainable due to the acid environment.

The organic residual stream must consist of organic material with a maximum moisture percentage of 65%. The input material must contain sufficient sugars. Too much protein has an adverse effect on the process, because protein has a buffering effect on the acidification. Materials such as grass, corn, and garden waste can be ensured.

Small-scale silage requires little knowledge and labour, and only small investments (0 to 1000 euros) are needed. Small-scale silage in, for example, air-tight closable bins can take place on 1 m². There is no legislation that needs to be taken into account.

Input (minimal)

Natural grass
cuttings, brewer's
grains, ditch crops

1000 kg / year

Output

Animal feed

1 kg input - 0,8 kg output

Required assets

Investment (2 cards)

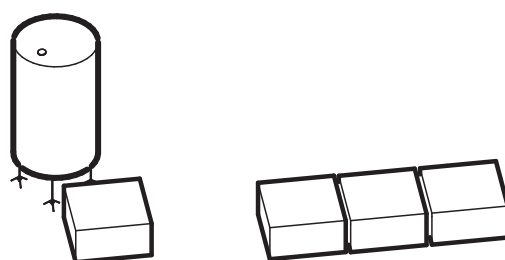
Knowledge (1 card) Machines: tractor

(1 card)

Maintenance time (1 cards) Outdoor space

(1 card)

Organic material storage



Input (minimal)

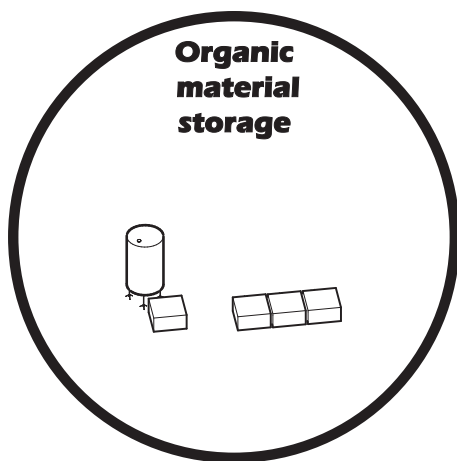
Manure (fresh), fat straw (dry stalks), wood chips, thick manure, grains, digestate 1000 kg / year

Output

Animal feed, or stabilized fertilizer (from digestate or manure) 1 kg in- 0,8 kg out

Required assets

Investment	(2 cards)		
Knowledge	(1 card)	Machines: tractor	(1 card)
Maintenance time	(1 cards)	Outdoor space	(1 card)



The storage of organic material must happen under oxygen-free conditions, when organic material is converted to a more stable form. In this process, sugars are converted into lactic acids. The organic material becomes sustainable due to the acid environment.

Wet materials - such as manure, digestate from the biodigester, glucose-rich streams and fats - and dry materials - such as straw, wood chips and solid manure - can be stored well.

Storing on a small scale requires little knowledge and labour, and only small investments (0 to 1000 euros) are needed. Small-scale airtight closable trays only take up 1 m². There is no legislation that needs to be taken into account.



Input (minimal)

Manure (fresh), fat, straw (dry stalks), wood chips, thick manure, grains, digestate 1000 kg / year

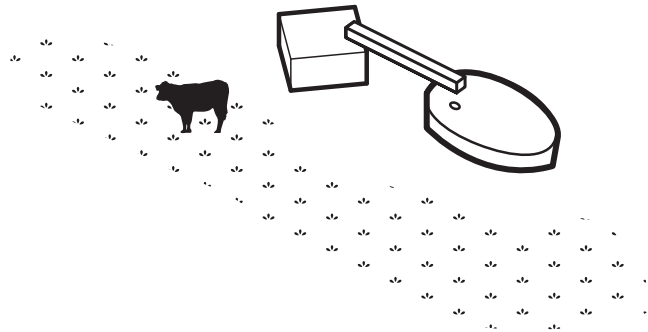
Output

Animal feed, or stabilized fertilizer (from digestate or manure) 1 kg in- 0,8 kg out

Required assets

Investment	(2 cards)		
Knowledge	(1 card)	Machines: tractor	(1 card)
Maintenance time	(1 cards)	Outdoor space	(1 card)

Manure separation



Input (minimal)

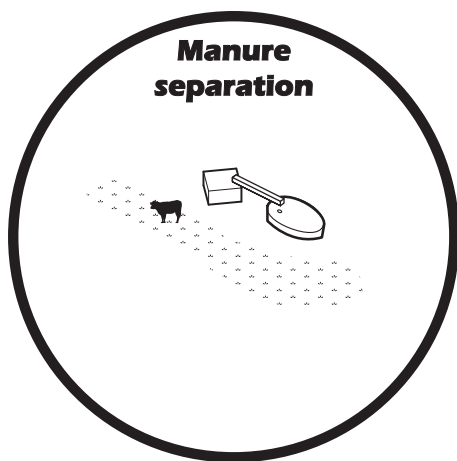
Digestate, manure	1000 kg / year
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Output

Thin fertilizer	1kg input- 0,8 kg output
Thick fibers/fertilizer	1kg input - 0,2 kg output

Required assets

Big investment	(3 cards)	Machines: tractor	(1 card)
Knowledge	(1 card)	Outdoor space	(1 card)



A thin and a thick fraction is produced when separating manure. The thin fraction can be used as an organic fertiliser and the thick fraction can be used as a fiber material in a box stall, as a fiber-rich fraction for paper or biocomposition production, or as an organic fertiliser. A digester can also be fed well with the thick fraction from manure.

To be able to separate manure properly, it must be mixed and pumpable. It is important that the manure is not contaminated with stones and sand.

A manure separator is easy to maintain and operate, but requires a major investment of around 15,000 to 20,000 euros. A manure separator including pumps takes up around 8 m². There is no legislation that needs to be taken into account.

Input (minimal)

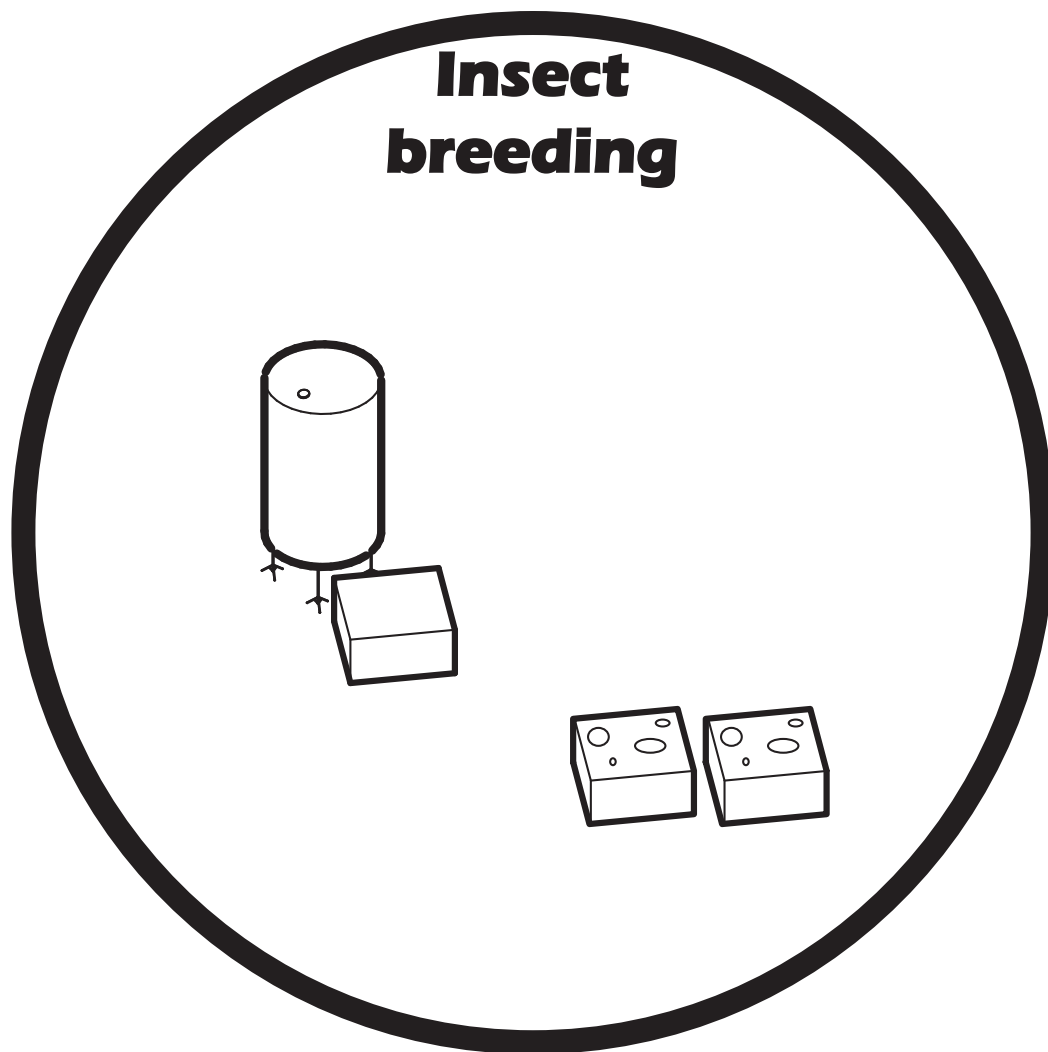
Digestate, manure	1000 kg / year
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Output

Thin fertilizer	1kg input - 0,8 kg output
Thick fibers/fertilizer	1kg input - 0,2 kg output

Required assets

Big investment	(3 cards)	Machines: tractor	(1 card)
Knowledge	(1 card)	Outdoor space	(1 card)



Input (minimal)

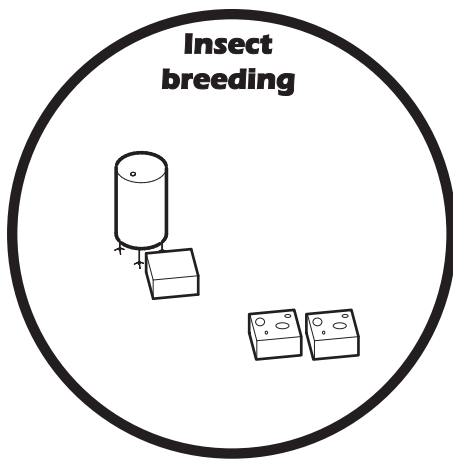
Raw organic material, kitchen waste (Swill), brewer's grains, chicken manure 1000- kg / year

Output

Animal feed 3 kg input - 1 kg output

Required assets

Investm. < 10000 kg/y	(1 card)	Machines: shredder	(1 card)
Investm. >= 10000 kg/y	(3 cards)	Indoor space	(1 card)
Knowledge	(1 card)	Gov. permit	(1 card)
Large maintenance time	(3 cards)		



When breeding insects, a waste stream such as organic waste is often used as food for the insects. Streams such as brewers grains, chicken manure, milk powder or egg powder can also be used. During insect breeding, insects that are suitable as animal or human food are released. An organic fraction is also released that can be used to ferment or compost. The insects are grown under controlled temperature and humidity conditions.



To be able to properly grow insects or worms, the organic waste stream must be free of biocides and toxic components such as plastic and heavy metals.

Growing insects on an industrial scale requires major investments. Small-scale insects, especially larvae, can be cultivated, but the investment costs increase with larger systems. A permit is necessary.

Input (minimal)

Raw organic material, kitchen waste (Swill), brewer's grains, chicken manure 1000- kg / year

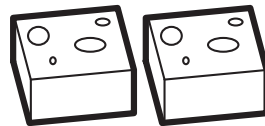
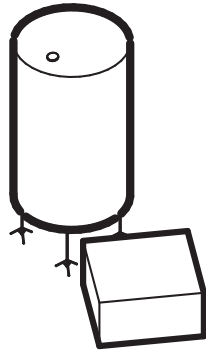
Output

Animal feed 3 kg input - 1 kg output

Required assets

Investm. < 10000 kg/y	(1 card)	Machines: shredder	(1 card)
Investm. ≥ 10000 kg/y	(3 cards)	Indoor space	(1 card)
Knowledge	(1 card)	Gov. permit	(1 card)
Large maintenance time	(3 cards)		

Oyster mushroom farm



Input (minimal)

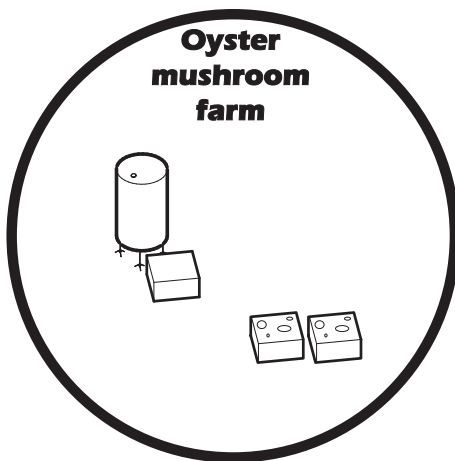
Coffee grounds, brewers grains, 100 kg / year
Straw

Output

Oyster mushrooms 200 kg input - 1 kg output
Champost 1 kg input- 1 kg output

Required assets

Investm. < 5000 kg/y	(1 card)	Machines: car	(2 card)
Investm. $\geq$ 5000 kg/y	(3 cards)	Indoor space	(1 card)
Knowledge	(1 card)		
Medium work time	(2 cards)		



Oyster mushrooms can be grown for human consumption on coffee grounds and straw. A substrate is made of these two products and the oyster mushrooms are grafted on it. The residual product is champost, an organic fertiliser. Brewers grains and straw are also suitable as substrate.

The substrate must be sterilized because it can contain pathogens. The substrate must be as homogeneous as possible to prevent production differences in the oyster mushrooms as much as possible.

To produce oyster mushrooms on a small scale, there are only low investment costs (100 euros). To produce oyster mushrooms on a larger scale and with higher production, climate cells and more automated production processes must be available. The investment costs for this can go up to 10,000-20,000 euros. It requires some labour to fetch sterilized substrate materials and to grow the mushrooms.

Input (minimal)

Coffee grounds, brewers grains, 100 kg / year
Straw

Output

Oyster mushrooms 200 kg input - 1 kg output
Champost 1 kg input- 1 kg output

Required assets

Investm. < 5000 kg/y	(1 card)	Machines: car	(2 card)
Investm. >= 5000 kg/y	(3 cards)	Indoor space	(1 card)
Knowledge	(1 card)		
Medium work time	(2 cards)		