



JNEC

Compost Manual

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Why a compost?

What is a compost?

Opportunities

Objectives

01

The aim of this manual is to provide an overview of how a compost could be implemented on JNEC campus and how its implementation would benefit the student community. It is important to keep in mind that the indications given in this manual are our best estimates, following the research done during two weeks spent on the campus. Thus, a more in-depth evaluation should be led before bringing this project to life, especially regarding the dimensions of the compost structure.

What is a compost?

Composting is a natural process that recycles various organic materials into a new stabilized substance, hygienic and nutrients-rich, called “compost”. This process, adopted by humans long time ago, gives a new value to organic waste as compost is used to improve the fertility of soils. Indeed, if appropriate biodegradable materials are well mixed together and correctly balanced with the right amount of moisture, different types of aerobic microorganisms (that need oxygen) will recycle them into soil fertiliser. Whether it is at an individual, household, community or societal scale, composting is widely used nowadays and requires little expertise or maintenance. To sum up, compost is the output that makes waste profitable in a way that is accessible to all.

- 1_ Reducing the amount of waste by turning organic waste into resources.
- 2_ Reducing air and water pollution caused by inadequate management of biodegradable waste.
- 3_ Raising awareness, educating and encouraging students to segregate waste by providing them an experience of composting and its advantages.
- 4_ Segregating biodegradables might enhance the segregation of other types of waste (plastic, glass, metal...)

Opportunities

Objectives

- 1_ Students segregate their waste and understand the advantages of this small action.
- 2_ To build and permanently maintain a compost.
- 3_ Students gain knowledge on waste and particularly on biodegradable waste.
- 4_ Reduction of waste disposal in open pits that are not sustainable.
- 5_ Reduced air and water pollution caused by improper management of biodegradable waste.

Choose a scenario

Scenario 1

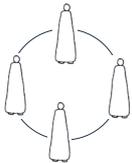
Scenario 2

Scenario 3

02

Scenario 1 _ Waste Club

The JNEC Waste Club shifts their focus from picking up waste from the campus to managing biodegradable waste. They build and maintain the prototype compost for building DD in the JNEC Campus.



For whom ?

All residents of building DD.

Value

The waste club could use a tangible project to raise awareness on the importance of waste segregation and attract new members. The project also has the opportunity to raise some funds by selling the final compost material.

Where

The compost is strategically located on a flat surface: it is easily accessible for the residents of building DD, but not to others.

Challenges

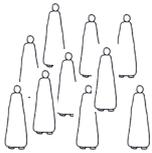
- Creating ownership among the residents and enforcing compliance might be difficult.
- The workload of the waste management club might be heavy – especially until the compost is in the use phase. The project is a long-term project and requires commitment from the waste club.

Opportunities

- A successful project creates ownership among the residents who ultimately take over the maintenance tasks.
- The waste club members as well as the residents gain knowledge, practical skills and experience on composting.
- They understand and appreciate the value of composting. Once their time at JNEC ends, they can share the gained knowledge, skills and experience to their succeeding residents. These ones might be more motivated to create their own compost at their future residence.

Scenario 2 _ Compost Community

Around 4 to 10 interested students form a compost community. One or more students gather these other students to form the community. The members build, use and maintain a compost by themselves. They can use the final compost material for gardening or sell it to staff or locals.



For whom ?

Members of a compost community. Eventually the compost could be used by other students that are not part of the community, provided that the segregation of biodegradable waste is done properly.

Value

The members of the compost community can use their biodegradable waste to produce soil for gardening. The soil can also be used to create some funds by selling it. They are a model for other residents and their environment gets safer, cleaner and more beautiful. They have the opportunity to gain knowledge, skills and experience in composting.

Where

Easily accessible for the members of the compost community and on a flat surface.

Challenges

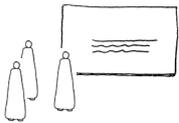
- Find students who would be interested in forming a compost community.
- The project requires long-term commitment. There might be a risk that the project is abandoned half-way through, especially considering that some students only stay two years at JNEC.

Opportunities

- The project has the power to raise awareness on the topic of waste among other students and might result in imitation at JNEC and outside of JNEC.
- The members of the compost community voluntarily invest a considerable amount of time in the project – especially at the beginning. Due to high sunk costs, the risk of the project being abandoned is relatively low.

Scenario 3_ Final Year Project

One of the next year's projects includes designing, building, prototyping and maintaining a compost.



For whom ?

The communal kitchens of the students participating in the project.

Value

The participating students do not only complete their final year project, but also gain knowledge, practical skills and experience directly connected to their everyday life.

Where

Easily accessible for the participating students and on a flat surface.

Challenges

- The composting process takes longer than the final year project. Therefore, the participating students do not see the end-result of their project.
- Find people who can continue the project.

Opportunities

- The implementation as a school project ensures proper management of the compost.
- The participating students gain knowledge, practical skills and experience on composting. They understand and appreciate the value of composting, and after their time at JNEC ends, take the gained knowledge, skills and experience to their new residence. They might even be motivated to create their own compost at their future residence.
- The activities to transfer knowledge also promote proper waste segregation and composting among the locals.

Find the resources

Human resources

Material resources (compost facility)

Material resources (compost maintenance)

Financial resources

03

Human resources

People to build the compost
People to maintain the compost

Material resources (compost facility)

As it is recommended to use a maximum of local materials, bamboo is the main material of the structure. The use of concrete aims to make the structure more resistant by preventing it from sinking in the ground or that the wood rots too quickly. An alternative would be to use pre-formed concrete blocks and lay the structure on it, but it would be less wind resistant.

Materials and quantity estimation for Scenario 1

- **Bamboos** 
 - Ø10x200cm: 22 pieces
 - Ø5x200cm: 20 pieces
 - Ø5x400cm : 5 pieces
- **Wooden planks** 
 - 400x8x2cm: 5 pieces
 - 200x14x4cm: 8 pieces
- **Iron sheets** 
 - Around 7m²
- **Concrete** 
- **Nails** 
 - Around 1000 pieces
- **Rope** 

Material resources (compost maintenance)

- **Shovel** 
- **Source of dry waste** 

Financial resources

Funding from Jigme Namgyel Engineering College, estimated at **5000 nu** (1500 nu for bamboos, 500 nu for wooden planks, 500 nu for iron sheets, 1000 nu for concrete, 600 nu for nails, 100 nu for rope, 300 nu for shovel and 500 for unexpected costs).

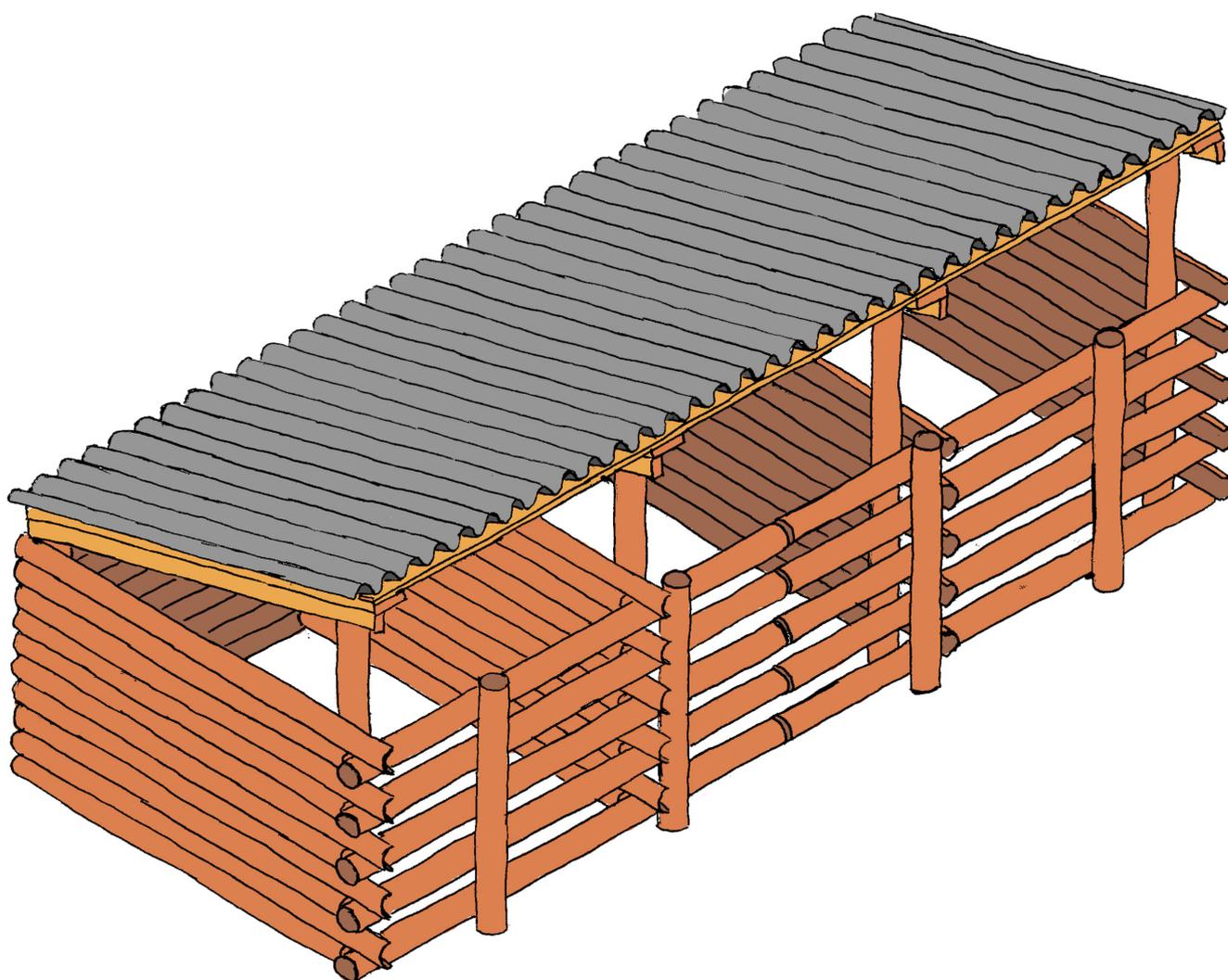
Build the compost

Dimensions

Construction steps

04

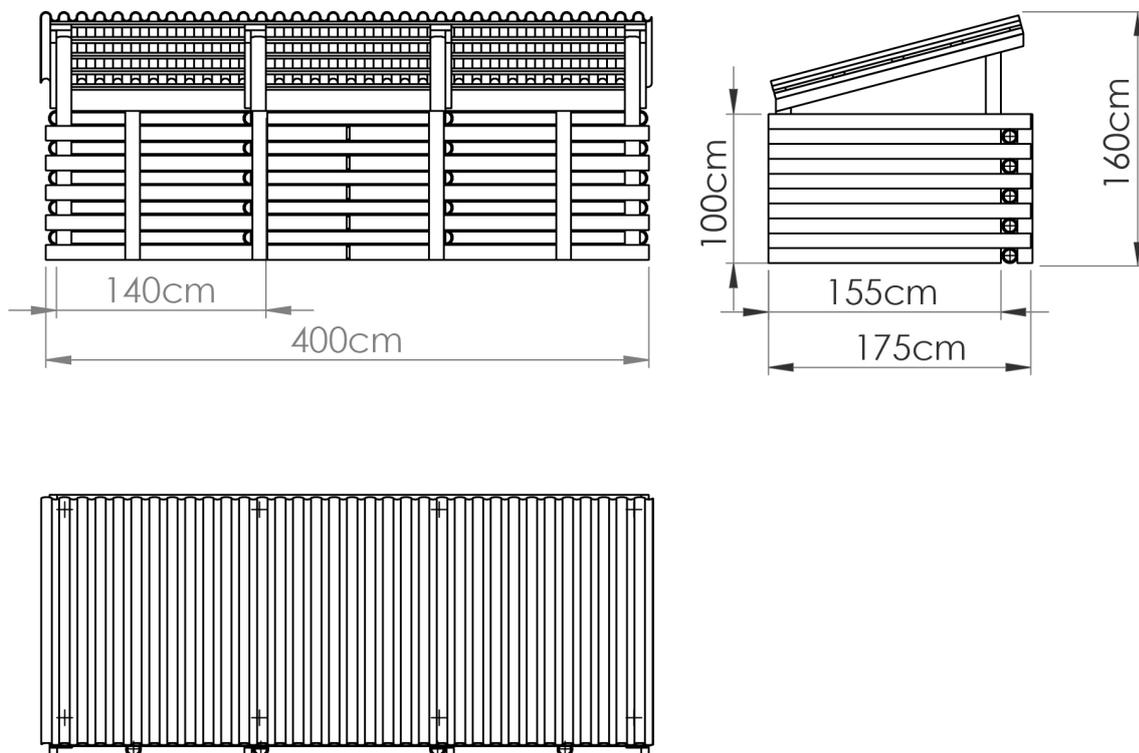
The construction of the compost structure is obviously part of the project. Here is an idea of the construction process we imagined. It is still recommended to consult the expertise of the construction faculties on the JNEC campus in order to optimize the structure and its construction.



Dimensions

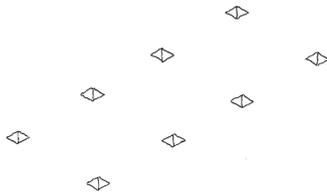
Here are the dimensions of the compost that have been evaluated to receive the amount of biowaste from a student building. These measures are therefore planned for **scenario 1**.

Concerning scenarios 2 and 3, it is necessary to do research on the required dimensions of the compost knowing that a compartment must be able to accommodate biowaste for minimum two months before being moved into the adjacent compartment.



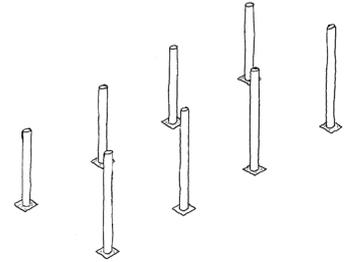
Construction steps

1



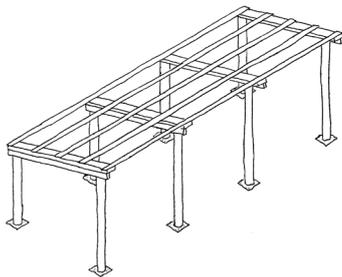
Establish the area of construction and dig the holes for the concrete in the ground.

2



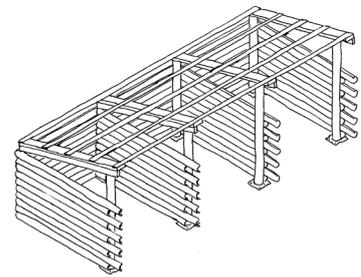
Pour the concrete and place the pillars in it.

3



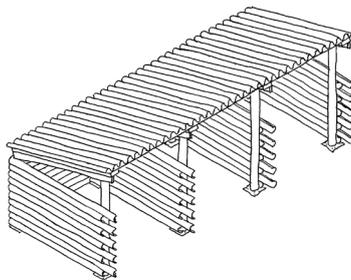
Once the concrete is dry, nail the wooden planks to the structure.

4



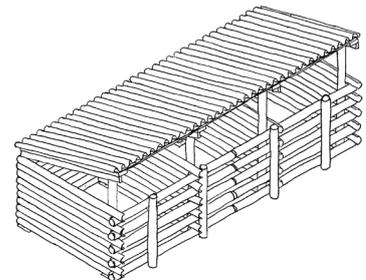
Nail bamboo halves to make the facades.

5



Place the iron sheet on the roof.

6



Build the two removable doors using ropes to assemble the bamboos.

Manage the compost

Type of waste

Compost management

Problems & solutions

05

Type of waste

Brown

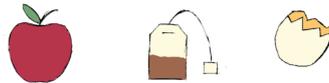
- Rich in carbon
- Dry in general
- Leaves, straws, wood chips, dead plants, brown paper bags, shredded cardboard, shredded paper, ...

Green

- Rich in nitrogen
- Wet in general
- Vegetables and fruits, leftovers, rice, bread, paper towels, fresh leaves, grass,...

YES

- Kitchen waste



- Garden waste



- Napkins/paper towels



- Corrugated cardboards



- Sawdust



- Shredded paper



NO

- Meat



- Fish



- Bones



- Ashes



- Juice or milk boxes



- Cans and other metals



- Oil & grease



- Liquid waste



- Rocks or soil



- Any kind of plastics



- Dairy waste



- Human waste



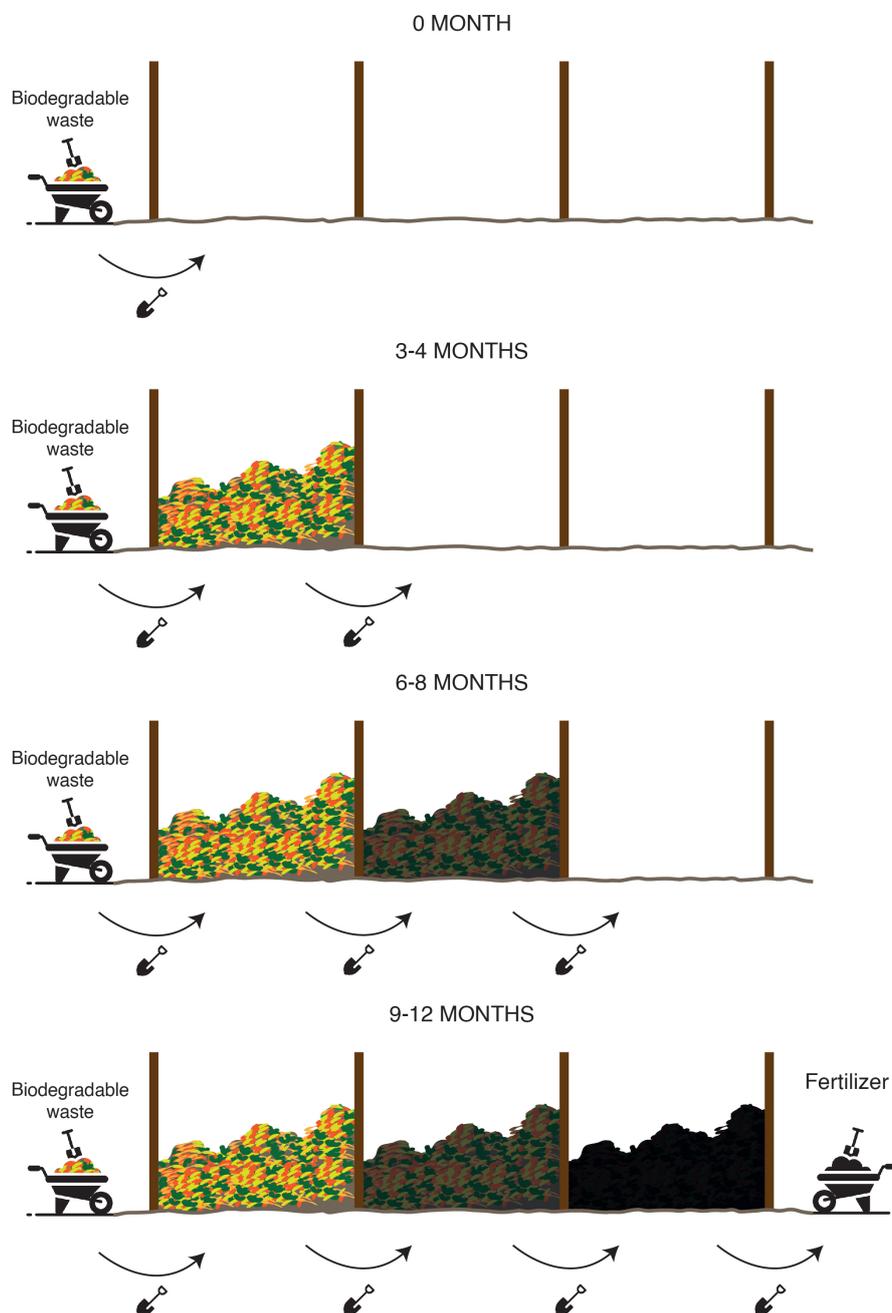
Compost management

Only one compartment is filled with fresh waste, the other compartments are used for transferring waste. Fill the first compartment with the waste and carefully mix the green waste and the brown waste well. After 2-3 months, when your first compartment is full, you can transfer the waste from the first to the second compartment, spreading the material well to promote ventilation. After this transfer, a new temperature rise occurs and accelerates the composting process. After a few months, the content of the second compartment is also transferred to the 3rd compartment, it is in this compartment that the compost will mature. Third, after about 10 months, the last compartment contains a lumpy compost ready to be used as fertilizer.



- Water the compost once it has been transferred.

- Cover the compost in the 3rd compartment with a tarp.



Problems & solutions

Problem	Cause	Solution
Compost is drying, nothing is happening	Lack of water for the microorganisms to decompose the organic matter	Add more green waste, humidify and mix well Avoid thick layer of only one material
Compost is too wet, has a slimy aspect	Lack of oxygen, pile is too wet or compacted	Add more brown waste and mix well, if necessary stop the use of the compost for a few days to let it dry out
Freezing of compost	Cold weather	Cover the pile with dry waste and wait for warmer weather
Compost is rotting	Lack of oxygen, pile is too wet or compacted	Add more brown material and mix well, if necessary stop the use of the compost for a few days to let it dry out
Smelly compost	Lack of oxygen, pile is too wet or compacted	Add more brown material and mix well, if necessary stop the use of the compost for a few days to let it dry out
Sprouted plants	Seeds were present in the waste	Pull weeds from their roots and toss them back on compost pile
Too many ants	Pile could be too dry	Moisturise compost with water.
Too many flies or midges	Inappropriate material (like meat or fish) put into the compost or leftovers is at the surface	Bury the leftovers at the center of the pile (you can also add brown waste) and check that no animal products are present
Cats and dogs start to go into the compost	Inappropriate material (like meat or fish) put into the compost or leftovers is at the surface	Bury the leftovers at the center of the pile (you can also add brown waste) and check that no animal products are present