

BioBeo

BioBeo Experiments to Try



Co-funded by
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Content

- Introduction
- Grass Paper
- Bioplastic
- Bio Enzyme Cleaner
- Rain Water Filter
- Summary



Introduction



- Bioeconomy is all about sustainability, using bio-based products and recycling bio-waste to create products that are easily degradable and processes that are not harmful for the planet.
- Using bio-based products and services not only reduces strain on fossil fuels usage, but it is also less detrimental for the planet.
- Using bio-based products and implementing processes and services in homes and communities will help in creating sustainable and greener community.
- In slides that will follow, there are products and processes that you can create yourself and try.
- Maybe through your motivation you will be able to implement some of them at community level.



- Grass grows everywhere, and believe it or not, can be used to produce paper.
- Like many of the plants, grass also contains the basic material cellulose which is used for paper making.
- Depending on the grass type, the grass pulp quantity varies between 10–60% for creating proper paper using a process developed by Creapaper.
- Advantages of Grass Paper:
 - Grass paper saves water.
 - Grass paper saves Energy.
 - Grass paper has no chemicals.
 - Grass paper is easier to produce as it doesn't have high percent of lignin and resin.
 - As grass is readily available everywhere and requires less transport the emission is less.
 - Grass paper is easily compostable without harm.
 - Grass paper doesn't contribute to deforestation.



Grass Paper

Process of Making Grass Paper by Creapaper



Grass



Dried grass is collected



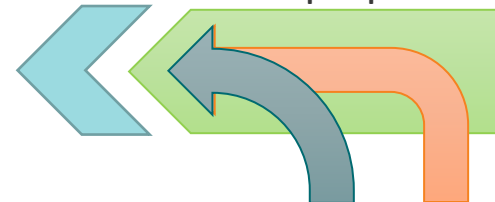
Dried Grass is transported

The dried grass is then processed by cleaning, cutting and pressing into grass pellets



Grass Pellets

Depending on requirement up to 60% grass pellets + Recycled paper or Fresh wood fibres or both can be used to create pulp

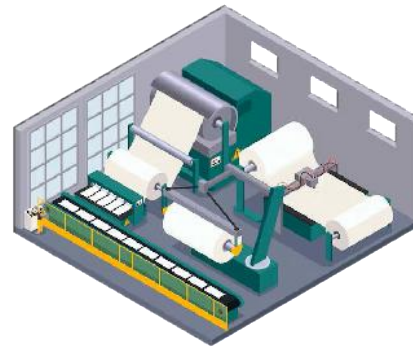


Fresh wood fibres

Recycled Paper



Final products



Paper Production Machine

Grass Paper

Things you will need to make Grass Paper by Yourself



- Raw material – grass (can be dried grass)
- Chopping/ cutting board
- Knife/ Cutter
- Larger container to wash and clean
- Old cooking pot to boil the cleaned grass (check with adults in your house)
- Washing soda
- Blender (check with adults in your house) or hand beater to make pulp
- Mould and deckle frame can be made at home
- Tub/ vat larger than the mould and deckle
- Sponges/ and sheets of cloth
- You can always use other types of material such as cardboards, wooden boards, canvas which might be practical and available.
- If possible, work outside and not in kitchen.

MAKING PLANT PAPER FROM WILD FALL GRASS

and making art out of it

Metric Conversion

Use the below tables for conversions or online metric conversion tools where required.

Length		Area		Volume	
U.S. unit	Metric unit	U.S. unit	Metric unit	U.S. unit	Metric unit
1 inch	25.4 mm	1 sq. inch	645.16 mm ² 6.4516 cm ²	1 teaspoon	4.929 ml
1 foot	30.48 cm	1 sq. foot	929.0 cm ² 9.290 dm ²	1 tablespoon	14.79 ml
1 yard	91.44 cm 0.9144 m	1 sq. yard	0.8361 m ²	1 fl. ounce	29.57 ml
1 mile	1.609 km	1 acre	4'046 m ²	1 cup	0.2365 l
1 nautical mile	1.852 km	1 sq. mile	2.590 km ²	1 pint	0.4732 l
				1 quart	0.9464 l
				1 gallon	3.785 l

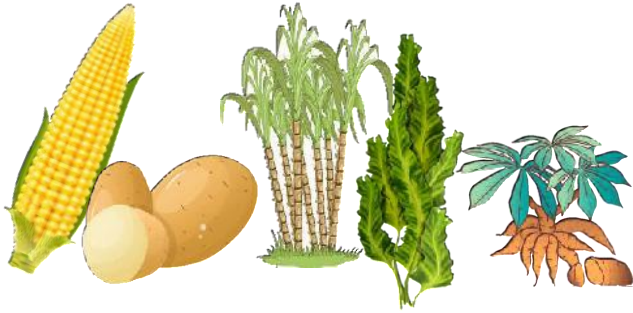
U.S. unit	Metric unit
1 ounce	28.35 gr
1 pound	453.6 gr 0.4536 kg
1 ton	907.2 kg 0.9072 t

- Bioplastics are created from renewable resources which are biodegradable.
- They help in combating the problem with millions of tons of plastic waste which is littering across land and oceans, and harming marine and wildlife.
- Bioplastics are being manufactured from various bio resources, algae's, by fermenting raw vegetables with a series of bacterial strains, sugarcane, potato starch, corn starch, etc.
- Bioplastics that are biodegradable include versions like polylactic acid (PLA), polyhydroxyalkanoates (PHA), polybutylene succinate (PBS).
- Advantages of Bioplastics:
 - They reduce the carbon footprint.
 - They use less energy for production compared to traditional plastics.
 - They do not contain non-renewable raw material.
 - They help in reducing the non-degradable plastic waste.
 - They do not contain chemicals that are harmful to health.
 - They do not affect the food that gets packed into it.

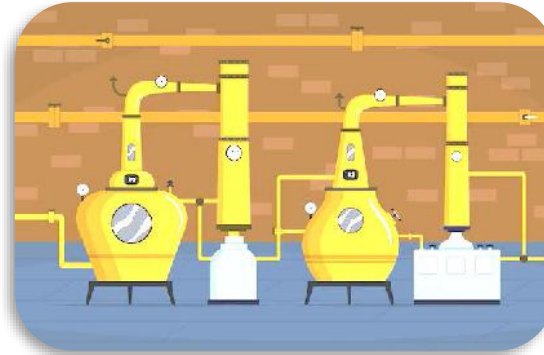


Bioplastic

Bioplastic Making Process



1. Raw Material
Growing / Collection



2. Extraction/ Dissolving
of Biomaterial

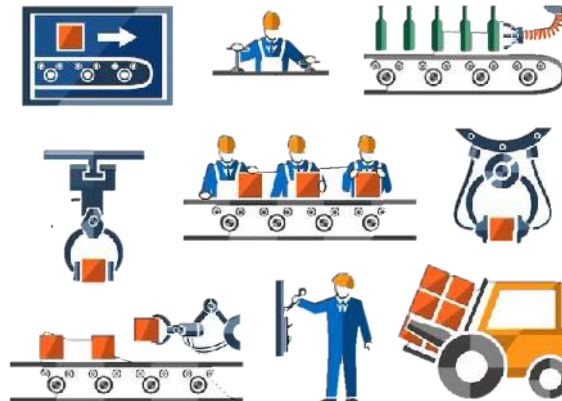


3. Adding
compounds
to make
Bioplastic

5. Final Bioplastic products



4. Manufacturing products
from Bioplastic



Bioplastic

Supplies Needed to Create Bioplastic

- Starch – Potato/ Corn
- Water
- Vinegar
- Glycerine
- Bowl
- Heat source
- Kitchen Towel
- Measuring spoons/ Scale
- Tray/ Mould/ Flat board
- Oven Mitts
- Pan
- Spatula
- Food colour (optional – if you want to add colour to your plastic)





- Proteins known as bio enzymes are created by microorganisms including bacteria, fungus, yeast, and algae. They are employed to decompose biological materials and transform it into valuable products. Various Bio enzyme products for various uses can be produced using different raw materials. For example: Bio enzyme cleaners. Bio enzymes are also known as “garbage enzymes”.
- Different types of enzymes included in bio enzyme cleaners:
 - Proteases: Capable of dissolving protein-based substances like blood and food.
 - Lipases: Degrades grease and fat.
 - Amylases: Degrades all molecules of starch.
 - Cellulases: Soften the cloth and bring back the fibres' original colour.
- Advantages of Bio-enzyme cleaners
 - Bio-enzymatic cleansers promote sustainable living and are environmentally friendly.
 - Traditional chemical cleansers cannot remove stains from narrow gaps and fractures like the microorganisms can.
 - Compared to the harmful chemical cleansers that are sold on the market, they are cheaper.
 - They promote a zero waste lifestyle since it is an environmentally friendly approach to maintain the home.
 - The lakes and subterranean water are not contaminated by the cleaners.



Bio Enzyme Cleaner

Bienzymatic action



Process of Making Bio enzyme Citrus Cleaners



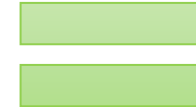
Raw Material/
Citrus Waste



Jaggery/ Organic
Brown Sugar



Water



Bio enzyme
Saturated Cleaner

Bio Enzyme Cleaner

Supplies Needed for Making Citrus Bio enzyme Cleaner



- Orange peels
- Used lemon pieces/ lemon pieces
- Used Lime pieces/ Lime pieces
- Water
- Jaggery/ Palm sugar or Organic brown sugar
- Large bottle/ container

Bio Enzyme Cleaner

Try Yourself

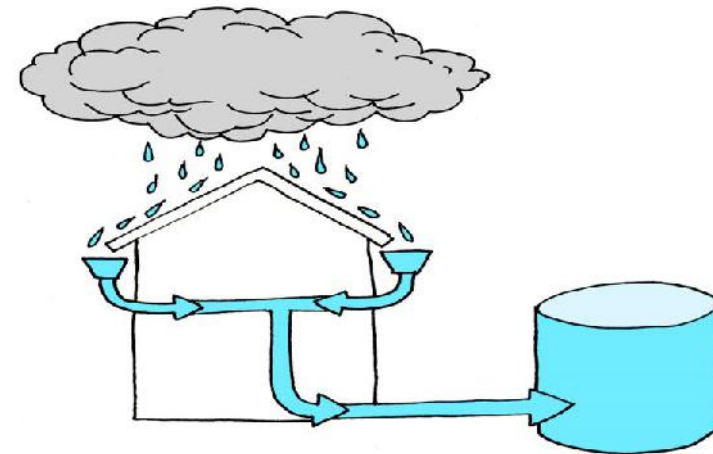


**How to make your own
Bio enzyme soap**

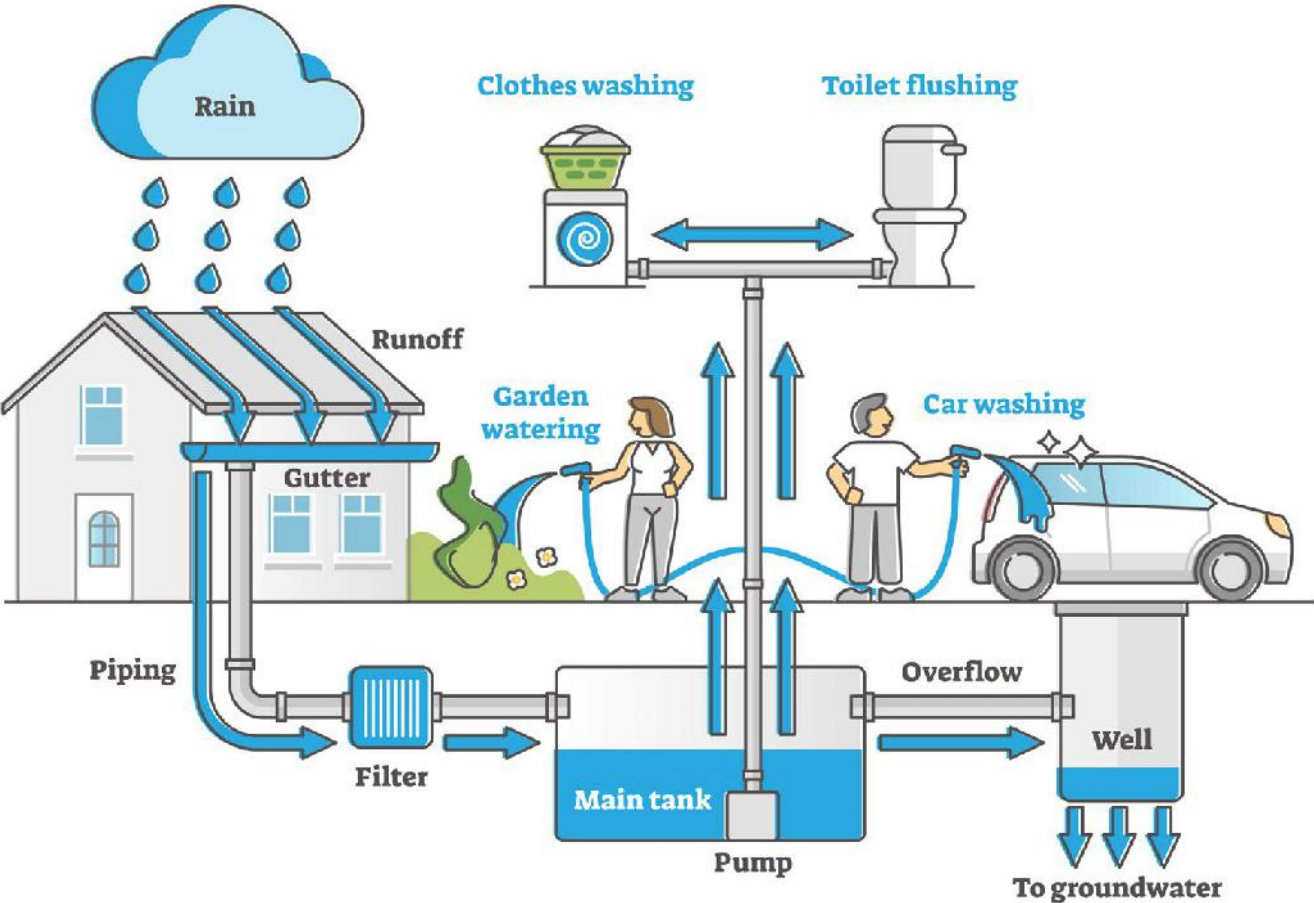
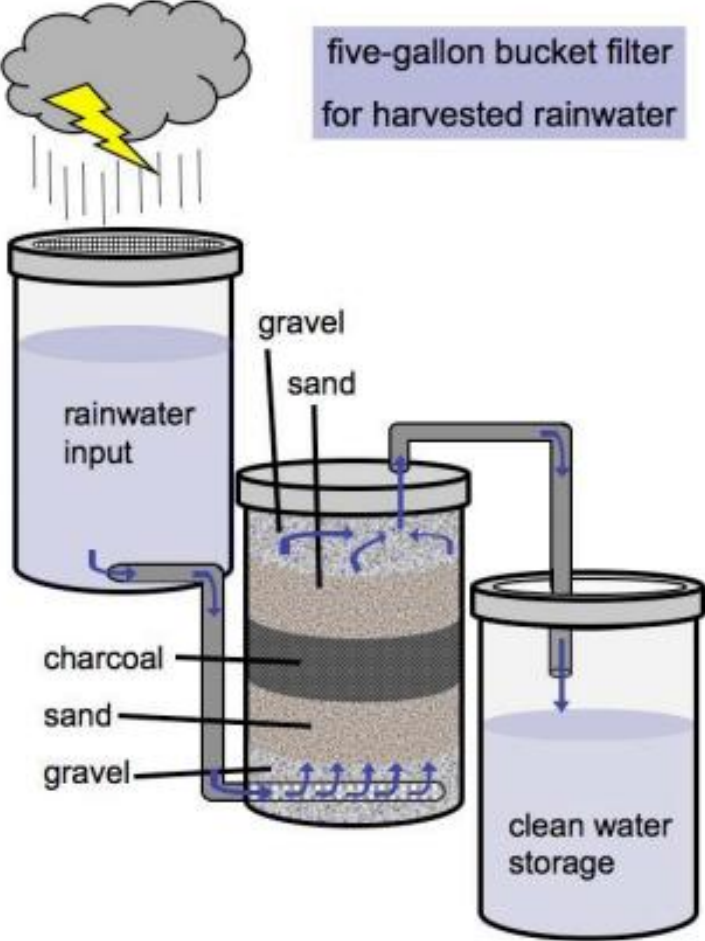


Rain Water Filter

- One of the consequences of Climate Change is depleting water levels. This makes it important to harvest and filter rainwater which can help reduce the effects of water scarcity.
- *“**Rainwater harvesting** (RWH) is the collection and storage **of rain**, rather than allowing it to run off. **Rainwater** is collected from a roof-like surface and redirected to a tank, cistern, deep pit (well, shaft, or borehole), aquifer or a reservoir with percolation.”*
- Rainwater filters are used to remove material from rainwater as it flows from the collecting roof before it enters the storage tank, and they are crucial to make the water useable. It helps to remove sand, organic matter and some microorganisms.
- Removal of this particulate matter, along with oxygenation of the water, greatly reduces the number of harmful bacteria in the tank.



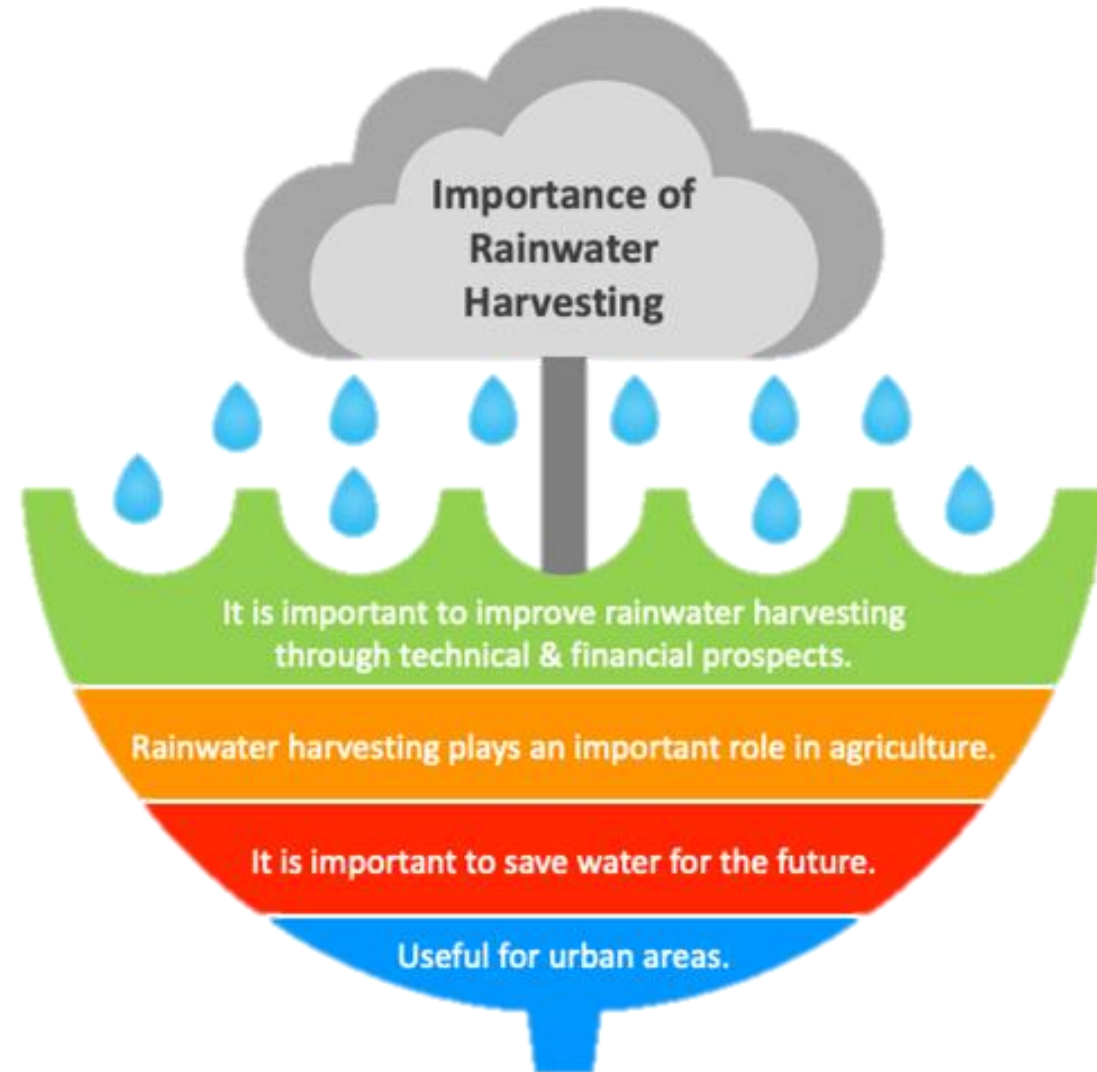
Rain Water Filter



Rain Water Filter

Supplies Needed

- Clean Transparent 1-litre bottle
- Cotton/ Clean white cloth for filtering
- Clean and washed sand
- Charcoal (not used)
- Pea Gravel
- Pebbles
- Small stones



Rain Water Filter

Try Yourself



Summary

- There are several biobased methods which are sustainable and environment friendly, and if applied at community and national level can help in transforming the economy into bioeconomy.
- To achieve this every individual needs to be involved.
- Policy Makers across the regions need to be made aware of the different possibilities available and how they can be implemented to benefit the community.
- People in the community need to come together to trigger the change towards sustainable development.
- Youth need to come forward with innovative ideas that can further make this happen.
- So, use your knowledge and skills, let's move towards a ***Sustainable World***.



Implement bio-based ideas at your school or community level, or come up with your ideas about bio-based products and processes that can be implemented in your school or community.





BioBeo Project

Innovative Education for the Bioeconomy
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