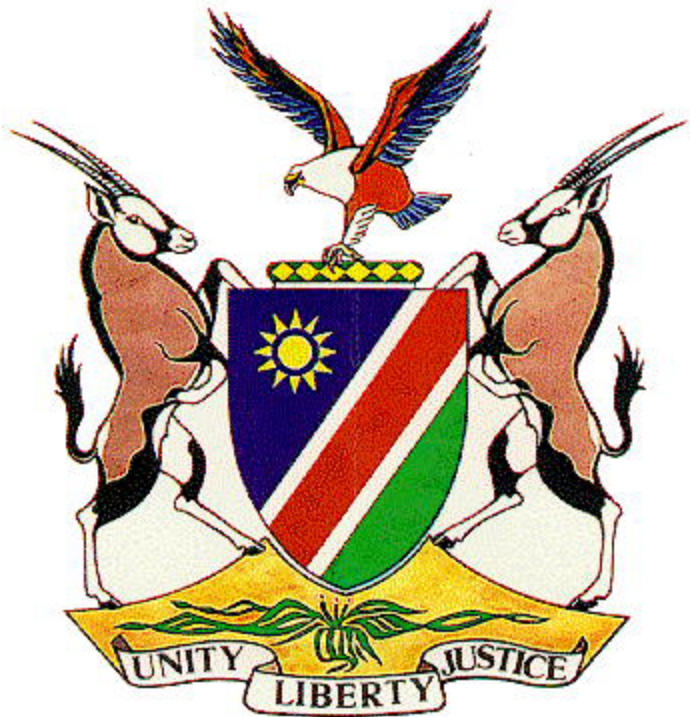


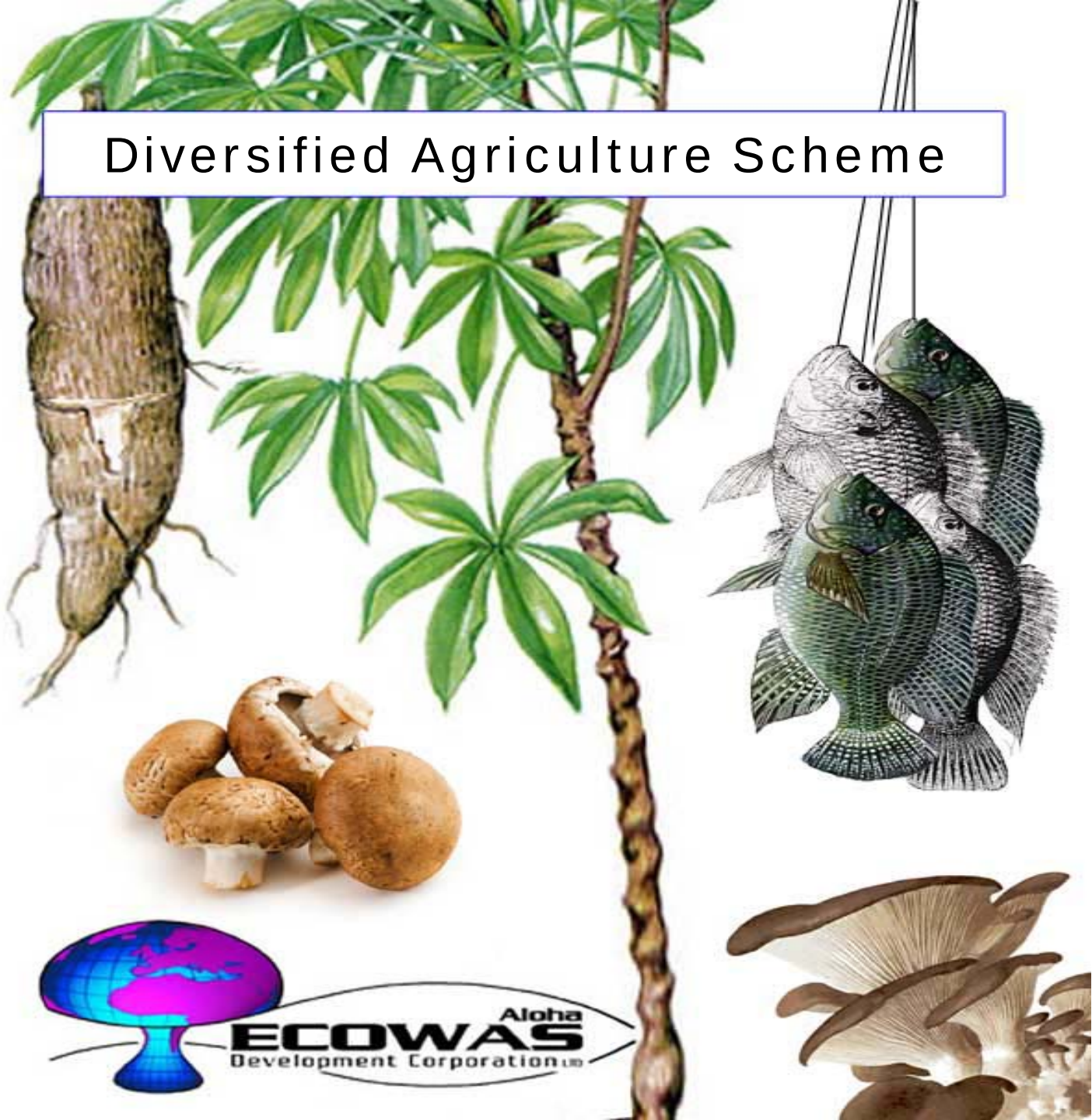
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Low Cost Mushroom Cultivation for Namibia



3rd ASEMM Conference – Windhoek, Namibia – June 24-28, 2012

Diversified Agriculture Scheme

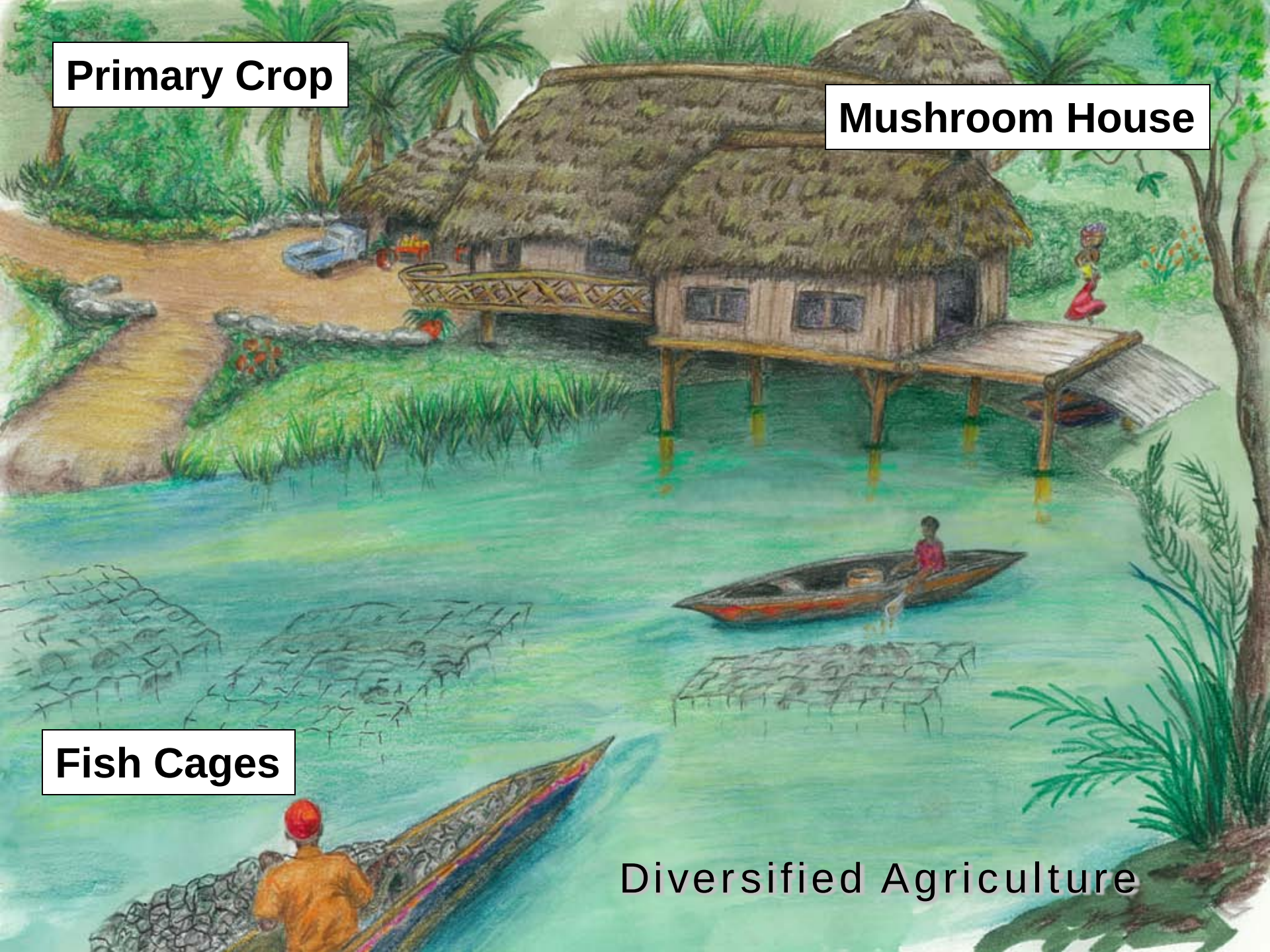


Primary Crop

Mushroom House

Fish Cages

Diversified Agriculture





Mushrooms Earn a LOT of Money for Farmers



But are CHEAP to Grow !



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Steps Involved in Mushroom Cultivation

- 1) Choose Species
for your Climate and Substrate
- 2) Generate Spawn
- 3) Prepare Substrate - Sterilize or Pasteurize
- 4) Inoculate Substrate
- 5) Harvest and Market



Choosing Correct Strains

More than 100 different mushrooms in cultivation



**1. Must grow in your
Climate**

**2. Must grow on available
substrate**

**Must resist local
contamination**

Choosing Strains

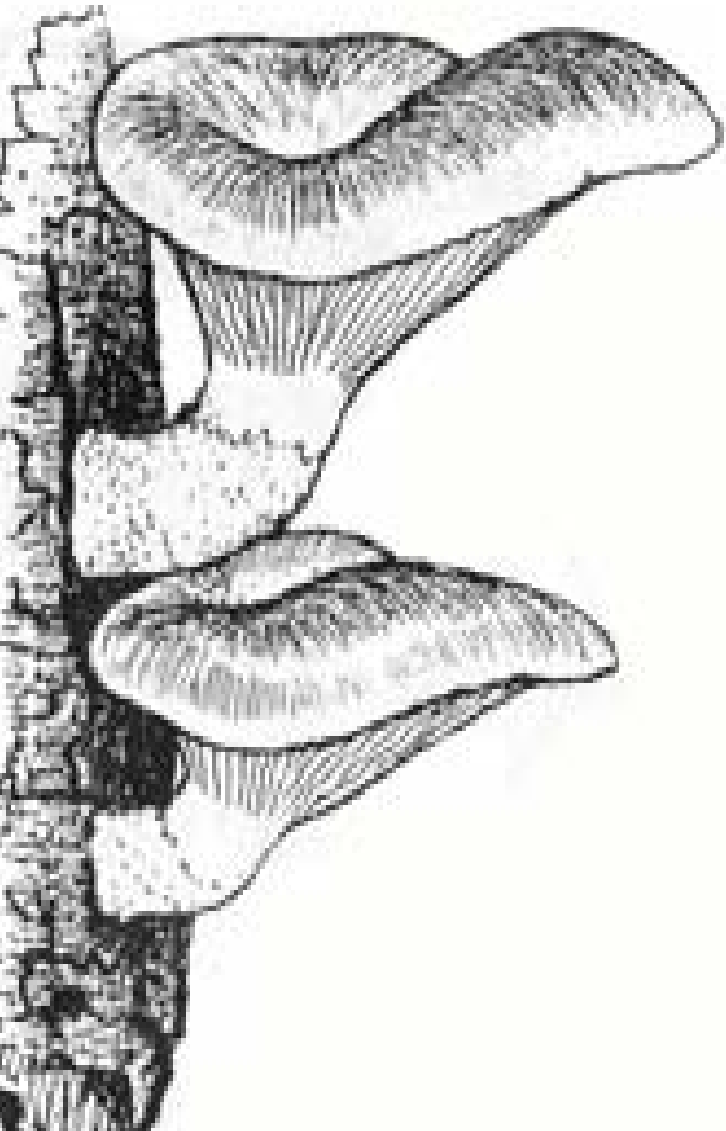
Choose Acclimatized Strains when Possible

Choose Strains for your Substrate

- **Purchase**
- **Tissue Culture**
- **Spore Print**



Strain Capture by Tissue Culture



- **Choose Local Strains growing on your available substrate**
- **Sterile Transfer Tissue Segments onto Agar**

Agar Substitutes:

Banana – Potato – Maize - Cassava

- **Isolate Pure Culture**



Banana Makes Good Agar Substitute



Another Agar Substitute

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**Spore Printing Wild
Collected Specimens**

or

Purchased Mushrooms



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Substitute Bottles and Jars



for

Low Cost Labware

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Petri Dish



Glass Jar with paper filter



Glass Jar with Polyethylene – Rubber Band Closure

Whiskey Bottles and Cotton for Grain Spawn



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Hardwood Plug Spawn

Log Culture with Hardwood Plugs

No Sterilization

Multi-Year Crop

Very Easy



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Substrate - Sawdust and Timber Waste

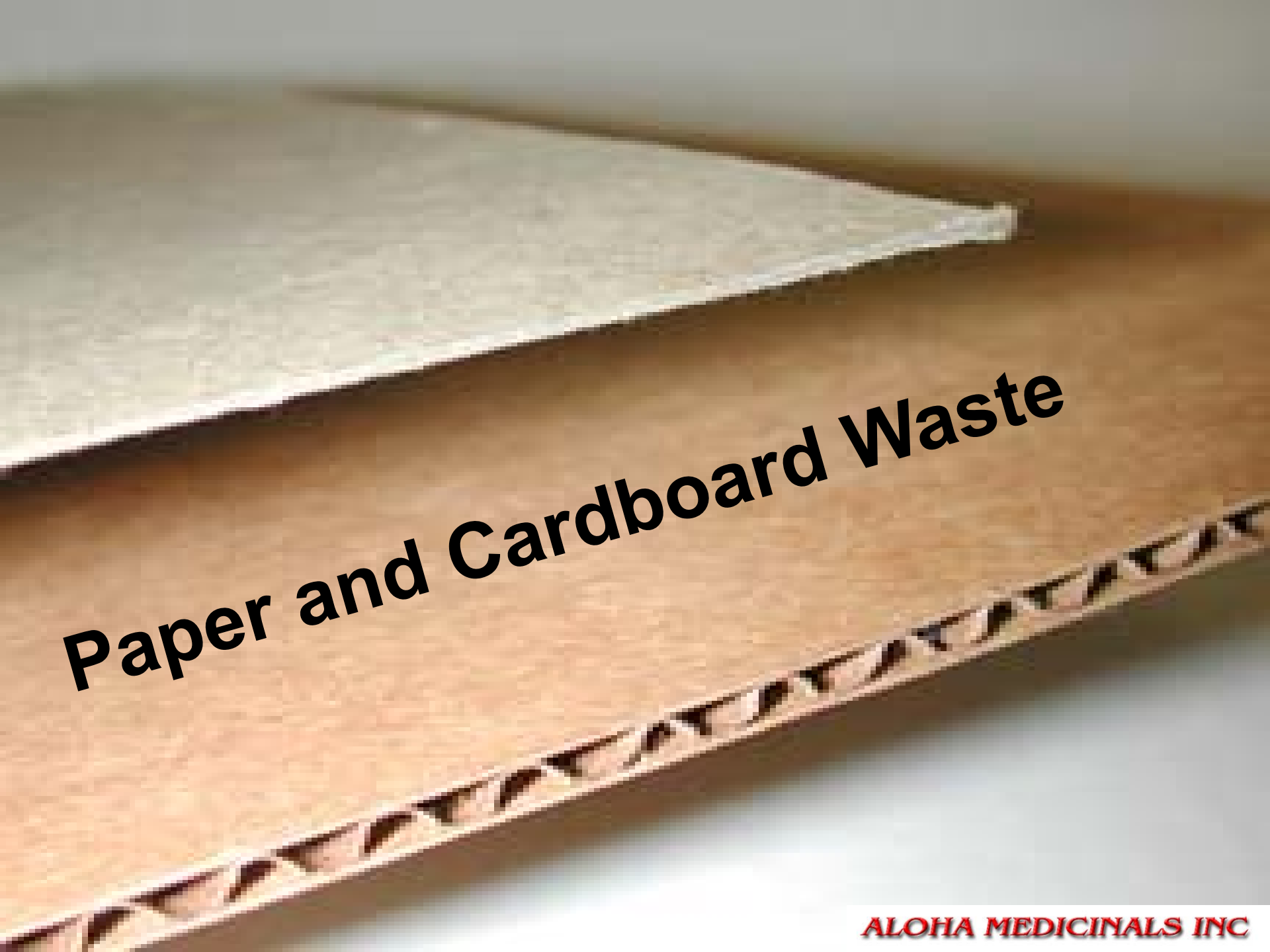


Substrate – Sugar Cane Fiber





Coffee Waste



Paper and Cardboard Waste

Straw

The image shows a vast field of harvested rice. In the foreground and middle ground, there are large, neat bundles of harvested rice straw laid out on the ground, likely for drying. The straw is a golden-brown color. In the background, there are still some standing rice stalks, also golden-brown. The overall scene is a rural agricultural setting.

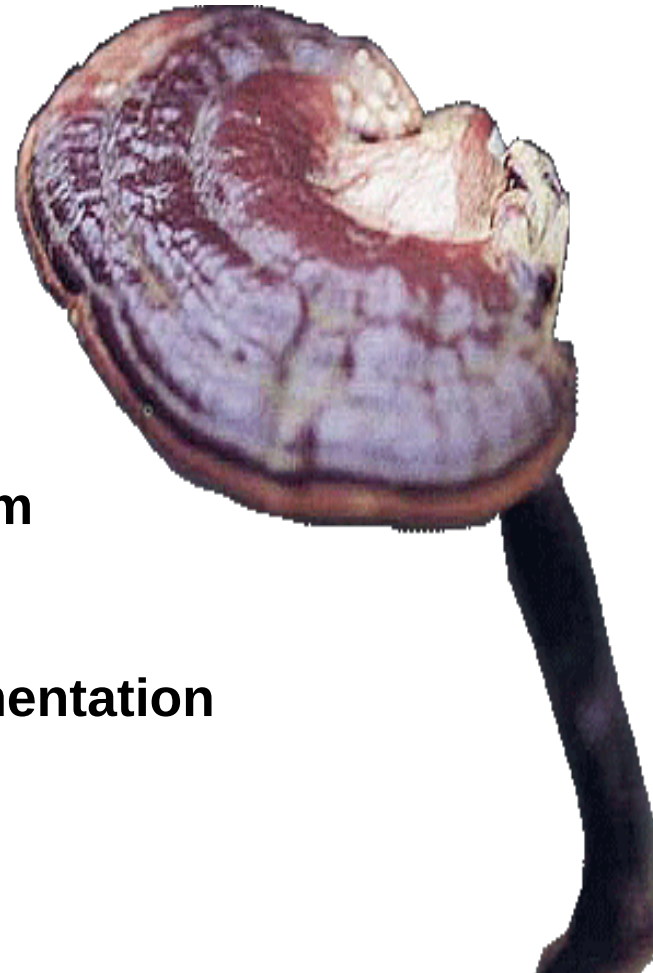


Cassava Peelings

**In Short, nearly any
agricultural byproduct
can be used as a
growing substrate**

To Grow Mushrooms - Substrate needs to be Sterilized or Pasteurized.

- Radical pH Change: Lime or Ashes
- Oxidizer: Bleach or Hydrogen Peroxide
- Temperature: Pressure or Atmospheric Steam
- Reduce Simple Sugars: Composting or Fermentation
- Radical Change in Osmotic Pressure: Soap



Sterilizing

Simple Steam Chamber



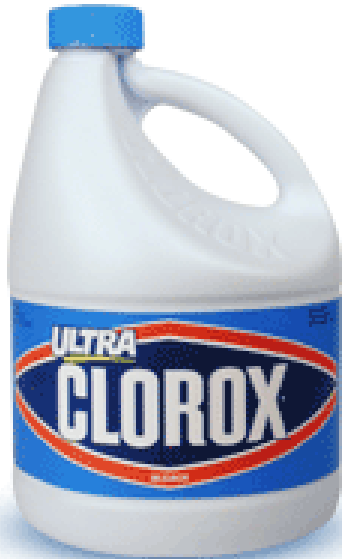
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Sterilizing

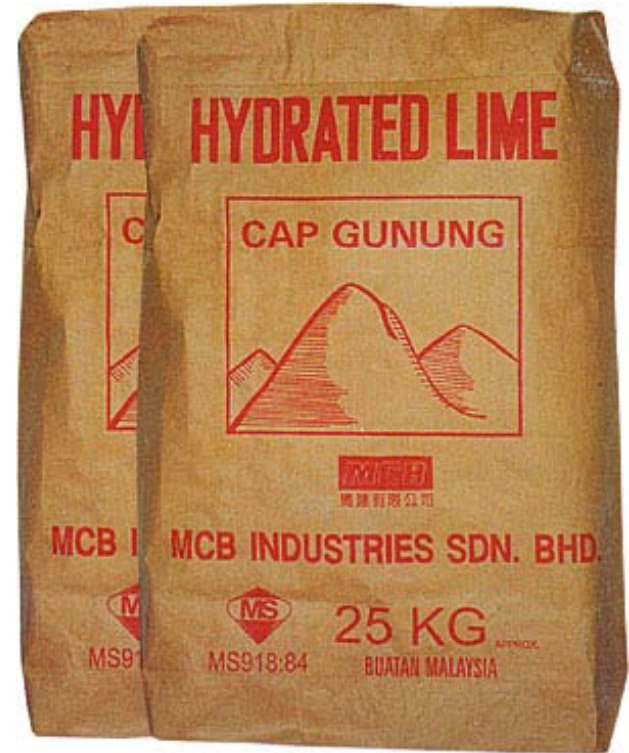
Another Simple Steam Chamber



Other Ways to Pasteurize / Sterilize Substrate



Bleach



Hydrated Lime



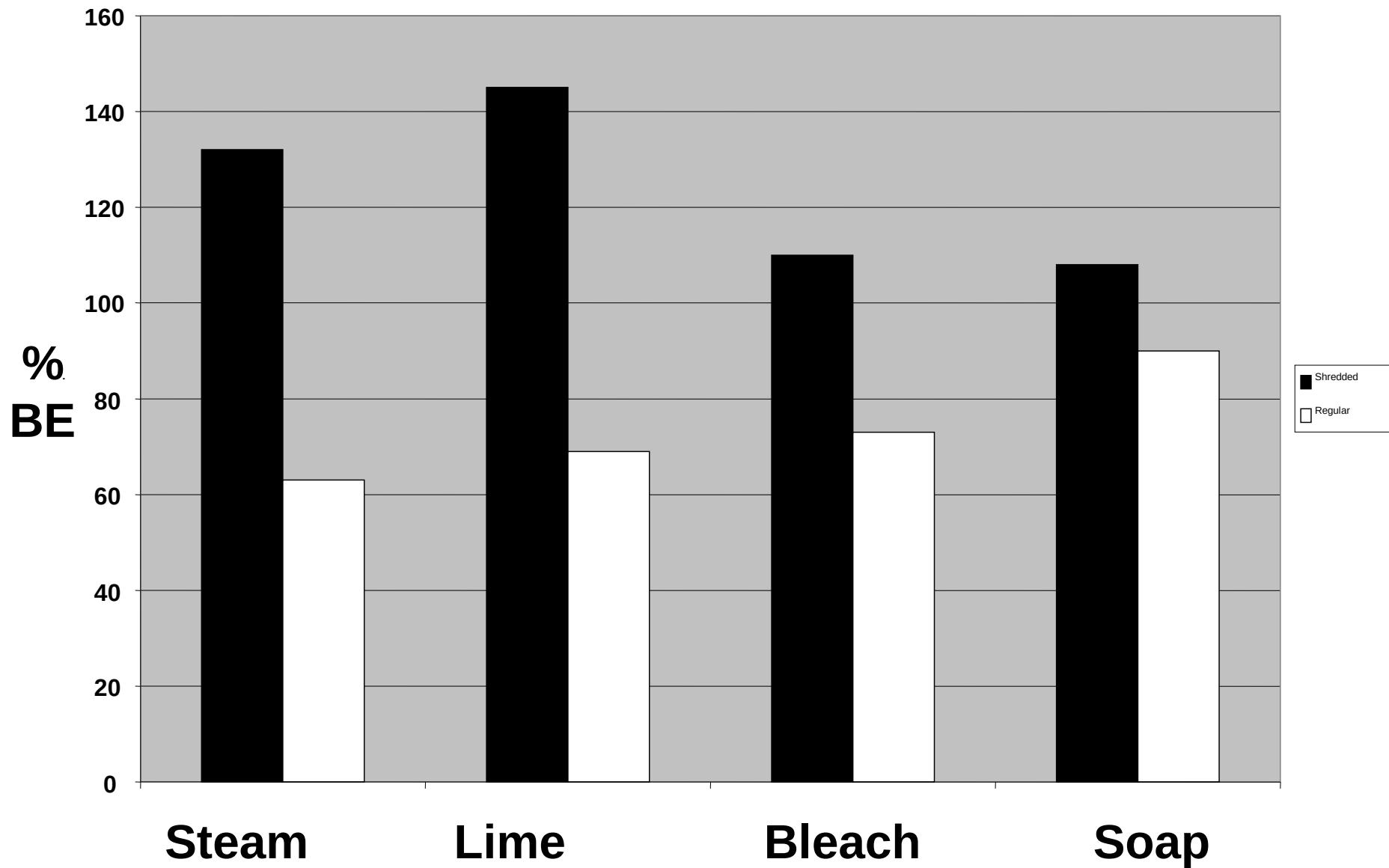
Washing Powder











Comparison of Different Substrate Treatment Methods

Other Ways to Pasteurize / Sterilize Substrate

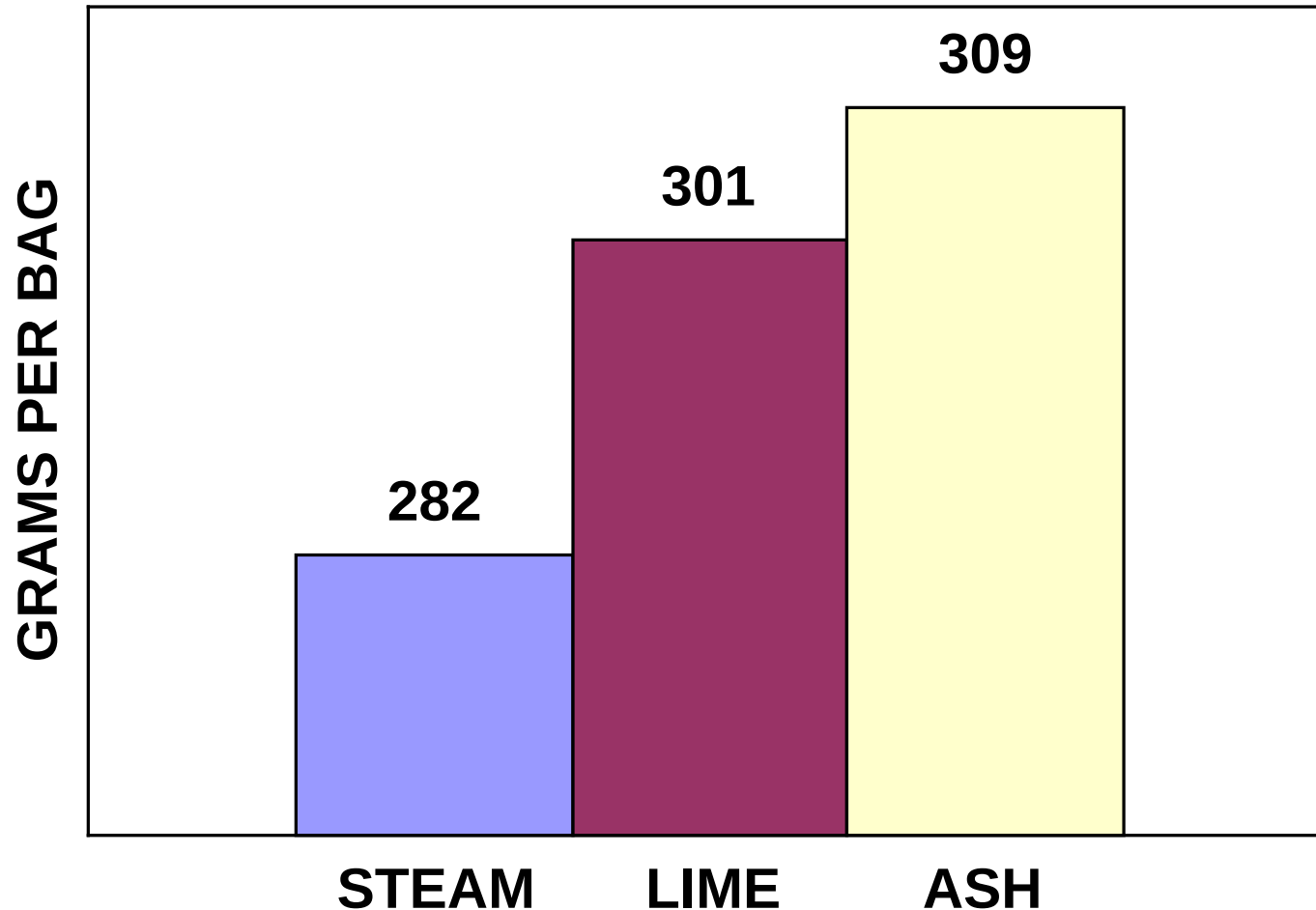
Wood Ashes



Ash, Lime and Steam Mushroom Growing Trial

- 200 Liter drums –filled with ~150 liters water
- Drums were brought to pH 11 using
 - 1.25 kg Hydrated Lime
 - 4.24 kg Sifted Wood Ash
- After mixing - 35 kilos straw added to ea drum
- Straw Soaked in Drums for ~16 hours – 73% Moisture
- Straw put into 1.8 kgs Plastic Bags
- Each Bag Inoculated with 120 g Oyster Mushroom Spawn

AVG YEILD FOR DIFFERNT METHODS

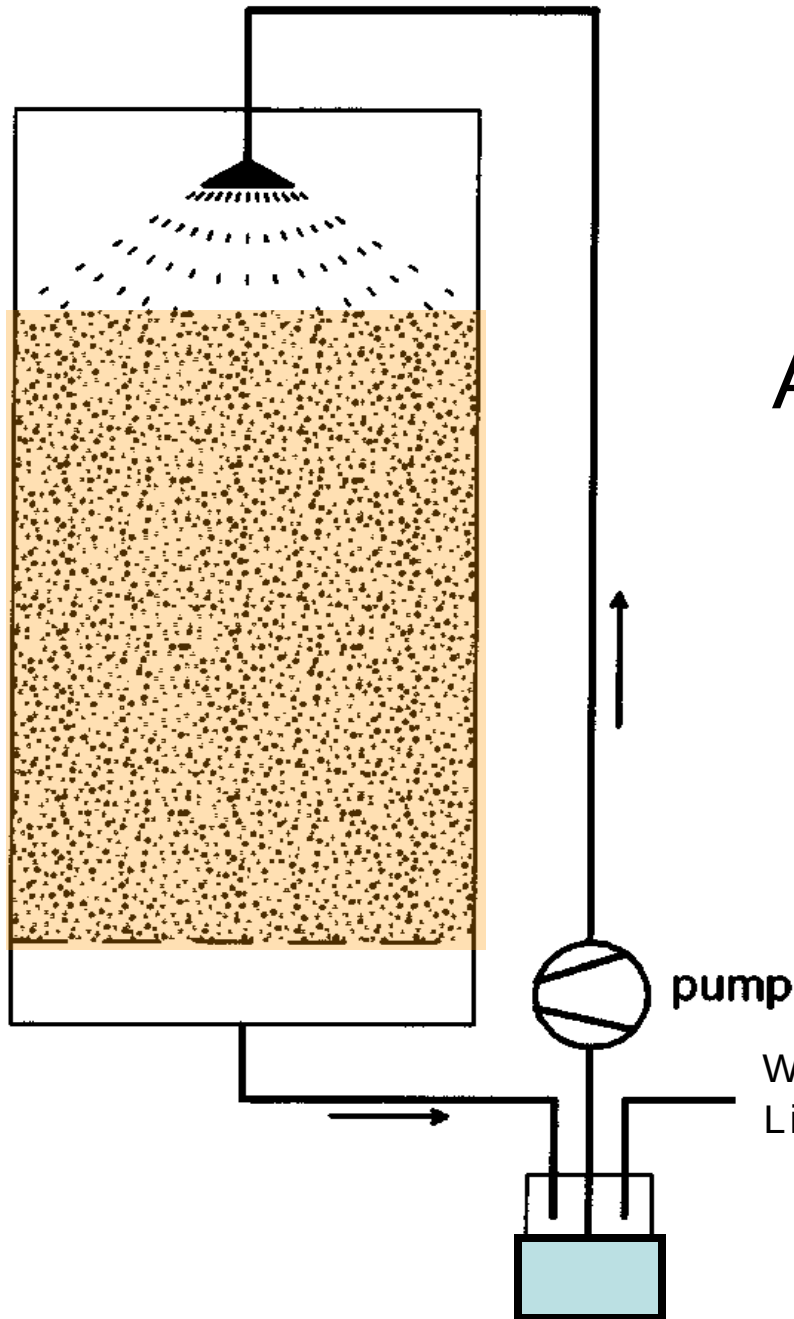


3 flushes – 1.8 kg bags (490 grams dry weight)



Hydrates and
Pasteurizes
All in One Step

straw



pump

Water and Sterilant
Lime, Ashes, Soap, etc.



This method has Several Important Advantages:

- 1) It requires very little water. Only the water which is bound to the substrate has to be added.**
- 2) No waste water is produced during the operation.**
- 3) Energy is needed only for the pumping of water. This can even be produced by a photovoltaic device.**
- 4) Additives can be easily and economically added to the cycling water.**





Paddy Straw Mushrooms

**Simple to grow, fast,
high volume
production**

Paddy Straw: growing pile



Paddy Straw: Open Pile





Paddy Straw: Fruiting

Growing Requires Good Temperature and Humidity Control





Grow Houses

A large pile of dry, brown, fibrous material, likely local agricultural waste or mulch, used for growing houses. The material is piled high and appears to be made of dried plant matter, possibly bamboo or similar. The pile is situated outdoors, with some green grass visible at the bottom left.

Grow House: Local Material

Inside Grow House



Inside the Grow House: The Beds



Inside the Grow House: The Beds – After Harvest



The Result of good mushroom cultivation



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The Result:



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A close-up photograph of several large, brown mushrooms with a textured, slightly scaly surface. The mushrooms are growing on a dark, textured substrate. The background is a light, neutral color.

The Result:

The Result



Increased Income for the Farmer

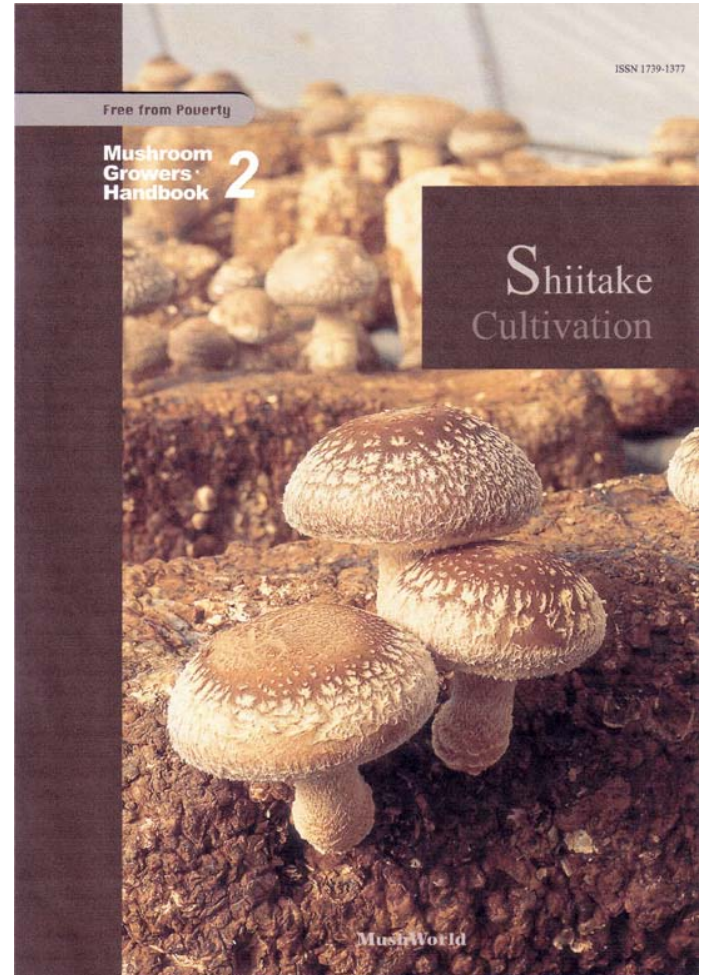
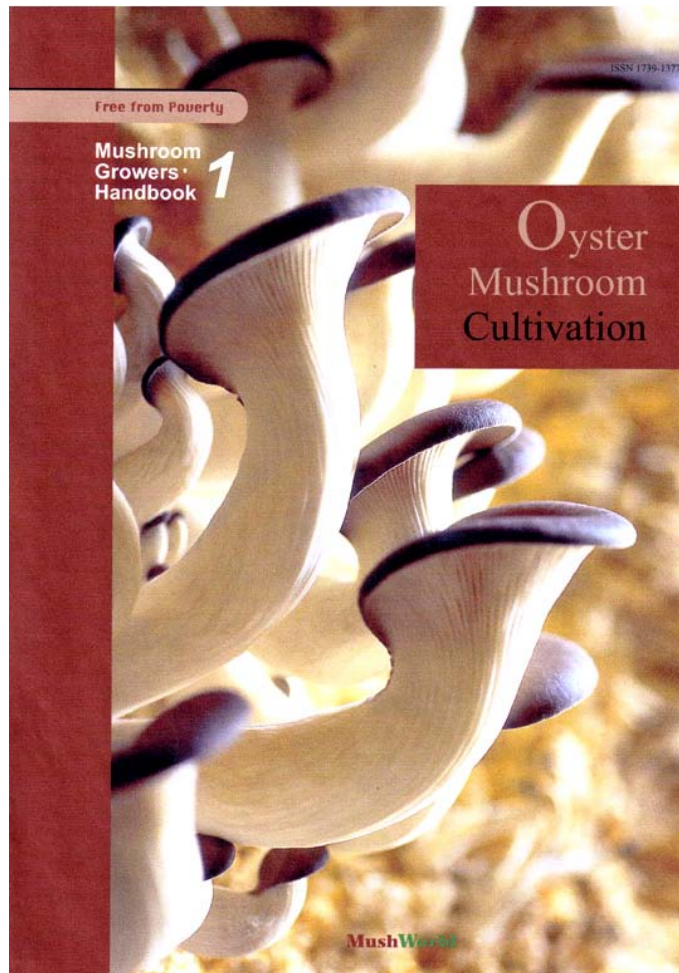
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Resources



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30 days in
Carson City, Nevada

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