

WEED CONTROL

Weeds harbour pests and diseases and compete with the growing plant for nutrients, water and sunlight. Remove weeds by hand as soon as you see them.

PEST AND DISEASE MANAGEMENT

Observe your plants daily for any incidence of pest and disease problems. Remove pests, diseased plant or diseased parts of the plant by hand and dispose safely.

Use environmentally friendly methods as described in the factsheet "Making Natural Pesticides" to control pests and diseases.

Note: *Plant pungent plants in and around the garden for example marigold, chive and celery. These plants repel pests from attacking your plants.*

HARVESTING

Harvest plants/fruits once they reach the desired stage of maturity.

REPLANTING

Once the harvest is complete, you can replant. The following is recommended to prevent the gradual loss of the sharp sand from the container:

- Uproot the entire plant once harvesting is complete.
- Wash roots in a bucket of clean water.
- Return the sand that was collected in the bucket into the container.
- Remove all remaining plant parts and weeds.

The container is now ready for replanting.

WHAT ARE THE ADVANTAGES OF GROWING PLANTS IN THE SHARP SAND BASED HYDROPONICS SYSTEM AS COMPARED TO SOIL?

- **Less use of pesticides** - This is because sharp sand has less weed seeds and pest and disease organisms than soil.
- **Better quality produce** - The harvested produce has a longer shelf life and higher nutritional value.
- **Higher yields** - The plants grown in the system produce higher yields. The nutrient solution provides all the elements as needed by the plant in a readily available form for growth and production.
- **More efficient fertilizer use** - The hydroponics system uses water and fertilizers more efficiently when compared to soil.

Ministry of Food Production
Extension Training and Information Services Division

FACT SHEET

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GROWING PLANTS IN CONTAINERS USING THE SHARP SAND BASED HYDROPONICS SYSTEM

WHAT IS HYDROPONICS?

Hydroponics is a technique of growing plants without soil.

Crops can be grown in the absence of soil, compost or manure by adding required nutrients to the rooting medium in which they are grown.

Some crops that can be grown in the Hydroponics System include:

- **Leafy vegetables** : lettuce, pakchoi, cabbage
- **Herbs** : chive, celery, parsley
- **Fruiting vegetables** : tomato, pepper, melongene
- **Vining crops** : bodi, seim, cucumber, melon
- **Root crops** : radish, beet, sweet potato
- **Other crops** : cauliflower and broccoli
- **Ornamentals** : ixora, butter cup

WHAT ARE THE MATERIALS NEEDED FOR GROWING PLANTS IN A SHARP SAND MEDIUM?

- **Containers for planting** e.g. flower pot, tyre, bucket
- **Sharp sand:** A cubic yard of sharp sand will fill fifteen (15) containers 20-30 cm (8-12 inches) wide by 30 cm (12 inches) deep.

Do not mix any other material with the sharp sand.

- **Fertilizers**
⇒ either 12:12:17:2 + TE **or** 12:8:16 + 3
⇒ Calcium Nitrate
⇒ Magnesium Sulphate
- **Three (3) cotton bags** (30 cm long by 15 cm wide/ 12 inches by 6 inches) to hold **each** of the measured amounts of fertilizers
- **Plastic barrel** 200 litres (50 gallons) with a cover

SETTING UP THE SYSTEM

Setting up the system involves site selection, selection and preparation of the containers and preparation of the fertilizer solution.

Site Selection

- **Select a site to place the container.** Ensure the area is flat and gets at least 5-6 hours of sunlight daily.



Figure 1: A Range of Crops Grown using the Sharp Sand Based Hydroponics System

The Extension Training and Information Service Division acknowledges
Mr. Barendra Ram (Agricultural Assistant II) County St. Patrick West for the research
and development of the Sharp Sand Based Hydroponics System in Trinidad

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Published and Printed by
the Extension Training and Information Services Division
Ministry of Food Production
Trinidad and Tobago
December 2012

Selection and Preparation of the Container

- **Choose a container.** The depth and width of the container chosen depends on the size of the mature plant. Most vegetable plants can grow in 20 - 30 cm (8-12 inches) deep containers.
- **Prepare the container** by making drainage holes at the bottom and place it on a flat concrete surface.



Figure 2: Drainage Holes at bottom of container

- **Fill the container with sharp sand only.**

Preparation of the Fertilizer Solution

- **Fill the plastic barrel with tap water.** The barrel must be of a dark colour (blue, green or black) with a cover to keep out the sunlight.

Do not use clear or white barrels since they allow sunlight to enter and break down the fertilizer, making the solution weak. The cover also prevents the wind from breaking down the fertilizer solution.

- **Add the recommended measured amounts of the following three fertilizers to different cotton bags and tie them.**

Table 1 : Recommended Fertilizer for use in Barrel of Water

Fertilizer	A Barrel - 200 litres (50 gallon)
12:12:17:2+ TE or 12:8:16 + 3	12 tablespoons / 180 grams
Calcium Nitrate	6.5 tablespoons / 98 grams
Magnesium Sulphate	3.5 tablespoons / 53 grams

The cotton bags will keep the insoluble material in the fertilizer out of the solution.



Figure 3: Fertilizers in cotton bags

- **Place the three (3) cotton bags with the fertilizers in the barrel of water and cover the barrel.**

Leave the bags of fertilizers in the barrel of water for 10 - 12 hours to allow all the nutrients to be released.

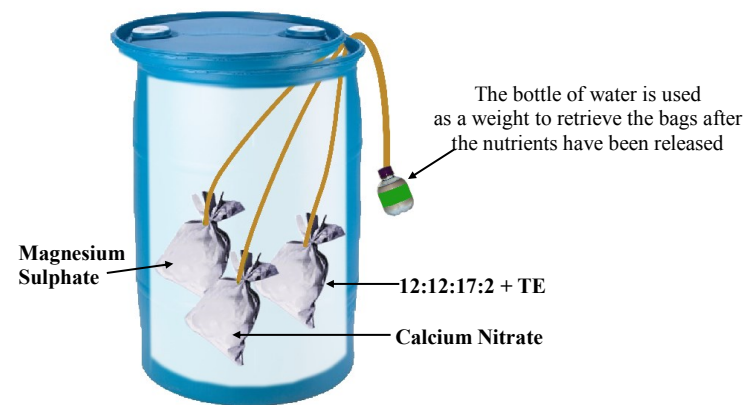


Figure 4: Fertilizers in barrel of water

The fertilizer solution is now ready for use. Remove the bags from the barrel.

One litre of nutrient solution is needed to fertilize one (1) container 20-30cm (8-12inches) wide by 30cm (12inches) deep with plants per day.

PLANTING

The size of the container will determine the type of plant and how many can be planted.

Only use seedlings that were grown in a sterile rooting medium to ensure that you do not introduce any pests and disease problems into the system. Seedlings grown in soil, compost and manure may introduce weed seeds, pests and diseases to the sharp sand.

Transplant healthy seedlings into the container at the recommended depth and spacing.



Figure 5: A two-week old cabbage seedling growing in a sharp sand based hydroponics system

Vegetable and herb seedlings must be green, with 4-6 leaves and have cream to white roots. There must be no discoloration or holes on the leaves; and no flower buds, flowers or fruits.

Note: Large seeds, for example, cucumber and bodi can either be planted directly as seeds or planted as seedlings.

FERTILIZING AND FLUSHING

Fertilizing and Flushing must be done in a seven day cycle throughout the life of the crop.

Use a watering can to apply the nutrient solution for the first 6 days followed by a flushing of the growing medium with water on day seven (7).

- **Apply the nutrient solution to the sand immediately after planting the seed or seedling until the solution slightly drains from under the container.** This should be counted as the first day or day 1.

Table 2: Fertilizing and Flushing Cycle

Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 1
Nutrient Solution	Nutrient Solution	Nutrient Solution	Nutrient Solution	Nutrient Solution	Nutrient Solution	Water only	Nutrient Solution

- **Apply the nutrient solution, once daily in the morning, for the next five (5) days until the solution slightly drains from under the container.**



Figure 6: Nutrient Solution draining from bottom of the Container

This should be counted as day 2 to day 6 in the cycle.

The nutrient solution will provide all the nutrients needed for all stages of plant growth and production. Do not apply any additional fertilizers to the plant or to the nutrient solution in the barrel.

- **On the seventh day after planting apply water only** until it drains slightly from under the container. This will flush out any build-up of elements, which can be toxic to the plant.

Do not use the nutrient solution on the seventh day.

Repeat the process of fertilizing and flushing : 6 days of nutrient solution followed by 1 day of water only throughout the life of the crop as described in Table 2.