



SHADE HOUSES

Climate Smart Agriculture (CSA) Brief No. 6 for Agricultural Field Officers



Shade-houses at the La Sagesse Farm, St David

Did you know?

Shade houses provide solutions to climate change impacts such as flooding, droughts and increased pests and at the same time increase the productivity of a farm.

Challenges

The negative impacts of climate change will lead to changes in rainfall patterns, with a predicted reduction in overall annual rainfall but, an increase in erratic heavy rainfall events. The distinction between the wet and dry seasons has become less prominent. Coupled with an increase in hot days and nights and increased rates of evapotranspiration longer and more severe drought risks are expected. This ultimately results in concerns for water availability for agricultural purposes. There is also an increase in pests and diseases as well as increased invasion of non-native species, such as bamboo, all of which negatively impact Grenada's agricultural production levels. **Shade-houses provide a viable solution to adapt to these climate-related impacts on farming.**

What are shade-houses?

Shade-housing is **defined as "modification of the natural environment to achieve optimal plant growth and production"**. It is one of the protected agriculture technologies. Vegetables and food crop production "in the open" is the traditional method of production, with no form of protection from the sun, rain or other environmental factors such as pests and diseases. Protected agriculture, therefore involves providing some form of protection / shelter to the plants. Protected agriculture also requires irrigation. Plants can either be grown in the soil or in an inert substrate e.g. sugar cane bagasse, compost, coconut fibre (coir) or water (hydroponic). The shade-houses are erected with tunnels made out of metal, wood or PVC, covered with plastic film and/or mesh. In Grenada shade houses have been used for many years, for example on a farm in L'Esterre, Carriacou for watermelon crops and on a farm in Mirabeau for short crops (tomatoes, sweet peppers, lettuce) and there are others around the tri-island state.



Shade-house for horticultural use in Laborie, St George's



Benefits of shade houses

- ✓ Farmers can farm intensively on small portions of land with very high yields.
- ✓ Plants can be grown in the soil or on other substrates with the option to stack planting beds.
- ✓ Farming becomes possible on waterlogged soil by using off-the-ground farming techniques.
- ✓ It allows for the growing of plants and fruits you would not otherwise be able to grow due to heavy rains which also facilitate the development of certain pests and diseases e.g. fungi.
- ✓ Production of high quality, fresh, green fruits and vegetables all year round.
- ✓ Allows for high productivity with reduced labour requirements, e.g. less weeding is necessary.
- ✓ Some vegetables mature earlier, e.g. lettuce.
- ✓ Reduces the incidence of pests and diseases.

Disadvantages of shade houses

- ✓ Construction costs can be high.
- ✓ Requires continuous monitoring, care and maintenance.
- ✓ Could lead to increased costs for water and or energy.
- ✓ The structure would have to be disassembled before and reassembled after a tropical storm.



Tips When Building Your Shade House

- ✓ Due to tropical storm risks, the choice of material used is important, e.g. easy to dismantle and reassemble before and after a tropical storm.
- ✓ Tunnels with metal framework covered with plastic film are used by farmers. However, local wood framework with plastic film can also be used.
- ✓ The tunnels used for sheltered cultivation are generally ten to twelve (10' – 12') feet high at the centre. This is to ensure a greater volume of air flow, hence providing lower temperatures around the plants.
- ✓ The dimensions are thirty (30') feet wide at ground level and one hundred and thirty (130') feet long at most. There would not be enough natural ventilation if the dimensions are longer.
- ✓ Allow for ventilation via an opening at the top to increase air circulation. There are various ways of doing this, e.g. leave a two to two and a half (2 -2.5) feet space at the center of the roof of the house, then construct a guttering for collecting rain water. The guttering should run the entire length of the house, suspended about twelve to eighteen (12 –18) inches from the top, but held in place with straps every five (5) feet.
- ✓ Align structure East to West to allow for air flow.
- ✓ Anchor the structure to the ground.
- ✓ In some tunnels, the curves are brought down to the ground while in others the sides are straight to facilitate plowing along them.
- ✓ The ground slope can be slight - around 1% - to facilitate drainage.
- ✓ The cover material is chosen in response to two main constraints: rain and reduction in sunlight.
- ✓ 180 to 200 um (micron) thick plastics can be used, the thicker plastic is more expensive but at the same time will last longer. This material should allow 70% external light to be transmitted underneath the shelter. If there are algae or dust on the cover the external light could drop to below 50% and can affect photosynthesis. Regular cleaning and maintenance are therefore required.
- ✓ Sheltered cultivation is intended to protect from the rain, hence the use of sprinkler irrigation will defeat the purpose. Therefore, **drip irrigation is the only recommendation**. In addition, it helps to save water.

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