CONFERENCE PROCEEDING

Title: Greenhouse Smart Grow (GSG)

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Abstract

Urban gardening is an agricultural method practiced in the area limited in the city or suburbs whether using land or landless. This method of urban gardening allows the residents to cultivate crops such as vegetables in residential areas whether flat, apartment or central lot terrace. Although they have limited space, residents can still grow vegetables in creative ways such as vertically or even tiered as long as the plant gets sunlight. Greenhouse Smart Grow designed to apply 3 technologies namely hydroponic, solar, and greenhouses are expected to be used to grow vegetables indoors that are narrow. The materials we used are recycled and non-recycled. It is multilevel and variable to use for the long term. LED light is an electronic device that works using sunlight energy. Solar panels will collect energy from light from the sun and convert it into electrical energy which will give extra light to the crop at night. Here increase photosynthesis and stimulate mature plants faster. Greenhouse Smart Grow can benefit users in the future because it uses an independent source i.e. solar power, without land and safety. This project has produced lush vegetables, healthy, pesticide-free and can be harvested over some time. It helps continuously save household expenses. Also, vegetable maintenance methods are minimal with the availability of hydroponic technology and greenhouses on this model because fertilization is done periodically, there is no disruption of disease or pests, and continuous yield harvest.

Keywords: *Greenhouse Smart Grow, hydroponic, greenhouse and solar*

INTRODUCTION

The problem of lack of land or large-scale agricultural areas, especially in urban areas, is a major issue in the vegetable and other crop sectors. People living in landless houses such as apartments and small house terraces will have difficulty in cultivating crops. That inspired us to create a multi-story hydroponic shelf like a cupboard called Greenhouse Smart Grow. This model applies a combination of hydroponic technology, greenhouse concept, and solar technology in the process of growing vegetables. Our main objective is to provide a spacious mobile structure for use in narrow spaces at an appropriate cost for long-term use purposes. Lastly, it managed to produce luscious, healthy, and fresh vegetables in a short time.

MATERIALS AND METHODS/ METHODOLOGY

The preparation of Greenhouse Smart Grow requires several stages. Each one will be described in detail below in Table 1 and Figure 1.

Table 1. Procedure of making GSG

1)Build the frame of the model using PVC pipes
2) Wrap the entire model is by transparent plastic and mosquito net in the front door
3) Put the hydroponic system that has been provided
4) Install led lights that provide a light source to the plant
5) Install the solar panel at the top of the model
6) Choose leafy vegetable seeds
7) Prepare AB fertilizer water mixture

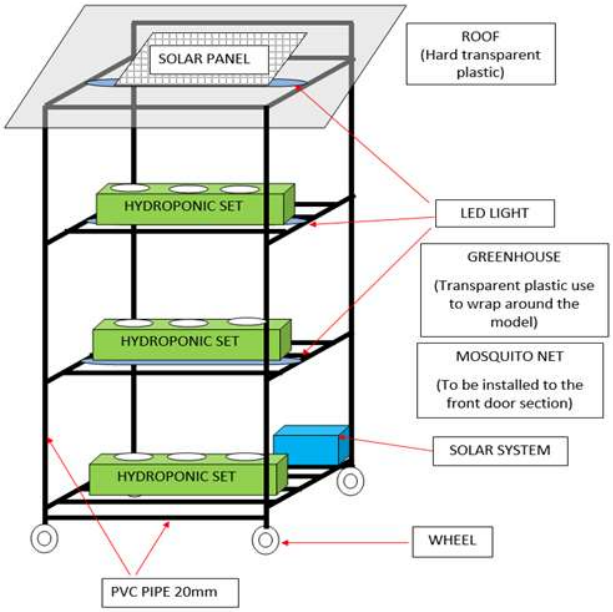

Figure 1 Self-sufficient hydroponic set up

RESULTS AND DISCUSSION

Greenhouse Smart Grow doesn't require spacious land or space. Vegetables planted in GSG will be safe from pest attacks, grow healthier and fresher. Lastly, vegetables don't need to be watered every day. As a result, crops are found to grow faster than those grown by conventional methods. The grown crops do not use any pesticides to ensure freshness and healthy yield. Crops can be planted in stages for continuous supply.

The limitations in this project are nutrient solutions if it is not suitable. This causes the growth of vegetables to be affected. To avoid this, ensure the pH of the solution according to the manufacturer's recommendation. Not all plants are suitable for this method of planting, especially the fruiting type. Some modifications to the model size are required if you want to grow fruit type vegetables. Besides that, the growth of vegetables could be affected by less sunlight due to inappropriate positions. Also, chlorinated water sources are less suitable. It is recommended to use rainwater or tap water stored overnight before use.

CONCLUSION

Our designed Greenhouse Smart Grow Project is expected to be used in small residential areas. This project succeeded in producing an indoor plant that is suitable for continuous use. For occupants in apartment houses or flats, they can use this idea for farming in the balcony or yard area. It can also indirectly green nature and provide fresh air. Greenhouse Smart Grow project revenue can help users plant their vegetables in more effective ways. It is expected that this model can be used or commercialized in the future at a minimal and reasonable cost (marketability).

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