

## EFFICIENT GREENHOUSE DEVELOPMENT

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In recent years, the country has developed and implemented a set of measures to introduce innovative technologies in agriculture, efficient use of land, increase the volume of production and export of fruits and vegetables, increase the efficiency of land and water resources, increase family income through the rational use of greenhouses. Consistent work is underway on its application. The current global problem is the depletion of non-renewable energy resources (coal, natural gas, oil, etc.), as well as the widespread use of renewable energy sources, the creation of an efficient greenhouse in the Uzbek climate with the rational use of alternative energy sources. was developed.

At present, the factors hindering the full use of the potential of greenhouses in the production of fruits and vegetables, melons, the lack of modern facilities for the production of greenhouse complexes, the forced import of equipment from local producers, the elimination of service problems, the creation of modern greenhouses The Resolution of the President of the Republic of Uzbekistan dated November 20, 2018 "On measures to create additional conditions for the development of greenhouse complexes" No. PQ-4020 was approved.

Ensuring the implementation of this decision, researching the problems associated with the implementation of certain tasks and ways to overcome them, and developing scientifically based proposals is one of the pressing issues. Including the use of alternative energy sources.

It is well known that the ground temperature is constant at 23 °C, and using this temperature it is possible to maintain a moderate temperature of 10 °C in the greenhouse when the ground temperature is transferred to the greenhouse through heat pipes.

This experiment was tested at the solar lyceum at the Karshi branch of the Tashkent Institute of Irrigation and Agricultural Mechanization Engineers and gave positive results (Figure 1).

In the greenhouse scheme shown in Figure 1, a 10 mm pipe of 2 m<sup>2</sup> is placed at a depth of 8 m above ground level. In the deep pipe, the water temperature rises to 25 °C and transfers its heat to the greenhouse. As a result, the greenhouse temperature will be around 15 °C. Due to the upward movement of the heat and vice versa, the natural circulation occurs due to the downward movement of the cold and there is no need for excessive consumption or use of the device.

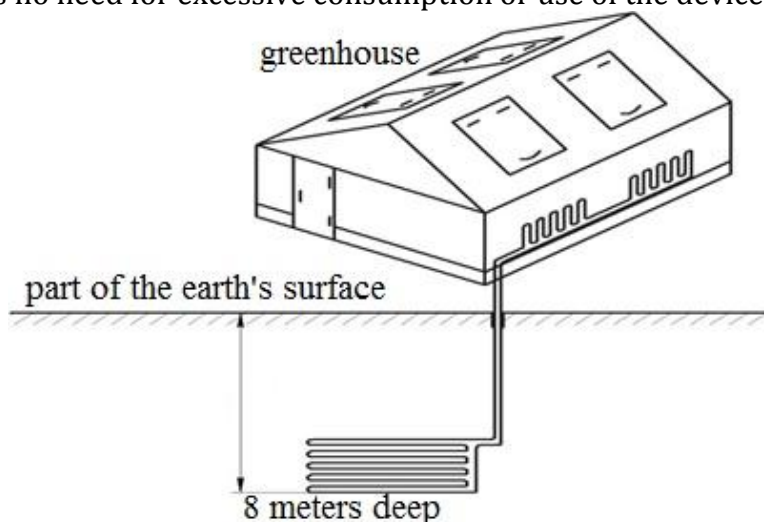


Figure 1. Scheme of an effective greenhouse.

To date, 130 cucumber and 450 tomato seedlings have been planted in this greenhouse (Figure 2). The drip irrigation system was used to irrigate the melons. The irrigation system is done

automatically. In this case, when the soil moisture reaches 8%, water is automatically added and the seedlings are irrigated through a drip irrigation system. Irrigation is turned off when the greenhouse soil reaches 98–100%.

Another advantage of the greenhouse is that with the help of a moisture meter, all indoor points of the greenhouse are able to record and record the air temperature and humidity, outside temperature and humidity, as well as indoor and outdoor soil moisture and temperature. These created capabilities will be able to monitor and analyze the temperature, humidity in the greenhouse under constant control.

For efficient greenhouses in the production of agricultural products, the use of mineral resources (coal, natural gas, oil, etc.) will help to save resources, use and promote renewable energy sources, increase income using them at home.

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