

Growing vegetables in photovoltaic greenhouses in Northeast China

Why do farmers use solar greenhouses in China?

China's solar greenhouses allow farmers to effectively control the environment and play a crucial role in the counter-seasonal cultivation of vegetables. Tomatoes (*Solanum lycopersicum* L.) are rich in lycopene, vitamin C and other nutrients, thereby making them one of the main vegetables grown in solar greenhouses.

Are China's solar greenhouses a good investment?

A promising prospect is shown by China's modern solar greenhouses at present levels of performances and costs exemplified by the photovoltaic (PV) greenhouses with a practicable payback period of less than 9 years.

Can solar panels help farmers grow vegetables?

In Hainan, China, photovoltaic greenhouses combine solar panels with farming, enhancing crop growth and reducing greenhouse gas emissions by providing clean electricity to power grids. The solar companies lease land for solar PV project development and simultaneously provide it at no cost to agricultural companies for vegetable cultivation.

How to improve greenhouse vegetable production in China?

The suggestions are as follows: For provinces with DEA efficiency, such as Tianjin, Heilongjiang, and Hubei, on the basis of maintaining the existing production advantages, the supply and demand of greenhouse vegetable production should be balanced.

What is a typical Chinese solar greenhouse?

Cross-section of a typical Chinese solar greenhouse. In addition to Chinese solar greenhouses, there are also facility cultivation units known as Gobi cropping systems. These cultivation systems used in China make full use of crop straw, animal manure, and other agricultural wastes to create a cultivation substrate for crop cultivation.

Are there solar thermal greenhouses in China?

There are also some other solar thermal greenhouses that have been applied in China's Beijing, Gansu, Xizang, etc. These greenhouses utilize heat-absorbing solar collectors accessed with circulation tubes to heat water for night space heating purpose.

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made the solar greenhouse a cornerstone of food production in central and northern China. One fifth of the total area of greenhouses in China is now a solar greenhouse and by 2020, they ...

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The reality of large human population and a relatively small arable land resulted in the convert of over 3.33 million ha of farmland to highly profitable greenhouse vegetable area in China ...

Traditional agricultural greenhouses have been used to grow vegetables in the winter without any auxiliary heating. However, crop production is highly influenced by soil and ...

The results revealed that greenhouse do have economic benefit on the farmers as one reason for setting up the greenhouse is said to be because of its income as almost all the greenhouse ...

Photovoltaic solar greenhouse is a new greenhouse, is in on the greenhouse top all or part of the sunny surface, laying photovoltaic solar power panels, it has power generation capacity, but also can provide a suitable production ...

Northeast China is colder in winter, but the weather in spring and autumn is relatively warm, which is very beneficial for the growth of greenhouse vegetables. At the same time, the summer temperatures in northeast China ...

In this paper, data envelopment analysis (DEA) is used to analyze the production process efficiency and the effective use of input elements of greenhouse vegetables at the provincial level in China. The results reveal ...

The studied PV Hydroponic greenhouse (PV-HG) developed by Bouadila et al. [45,46] as shown in Figure 1, includes all the essential components to ensure an ideal growth ...

The developments of greenhouses integrated with various solar energy technologies, including photovoltaic (PV), photovoltaic-thermal (PVT), and solar thermal collectors, are discussed in this chapter.

Chinese solar greenhouses are mainly used in northern China. Shenyang (41.77 N) lies in northeast China in a mild zone with a continental climate, with average annual temperatures of ...

To meet accelerating demands for vegetables, the greenhouse area in China doubled between 2006 and 2010 [12]. ... tomato crops growing inside the greenhouse varied from LAI = 0.74 to 1.30 m²/m²; m ...



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