

Can photovoltaic panels increase the amount of rainwater

How much rain can a PV panel harvest a year?

Each PV panel can harvest 1.07m³ of rainwater a year on average, showing the great potential to rainwater harvesting. This study set strict geographical constraints for the installation area of the PVRH harvesting system, while the actual engineering planning may exceed the boundaries of the constraints.

How much rainwater can be harvested from a PV system?

In this study, the PV panel surface area used for rainwater harvesting is 288 m². It was calculated that around 118 m³/year of harvest can be made annually from the current rain harvesting system. Rainwater harvesting potential for all of the current power plant was calculated as 1646 m³/year.

How do PV panels affect rainfall?

The raindrops intercepted by PV panels during rainfall will concentrate along the lower edges of PV panels and fall onto ground surface, causing heterogeneous spatial distribution of rainfall (Barron-Gafford et al., 2019, Jahanfar et al., 2019). Some researches indicated that runoff in slopes or hillslopes can be increased by PV panels.

Does rain affect the energy productivity of photovoltaic systems?

Obtained results are promising and confirm that the overall impact of rain can have non-negligible positive influences on the energy productivity of photovoltaic systems, mainly for thermal and optical reasons, paving the way for further studies on the topic.

What is PV panel rainwater harvesting (pvrh)?

Therefore, we have designed a PV panel rainwater harvesting (PVRH) system that integrates the functions of PV power generation and rainwater harvesting, aiming to develop newly available water and clean energy supply for agricultural production to realize a synergic WEF nexus.

Can photovoltaic panel rainwater harvesting improve agricultural WEF Nexus?

The model increased water and energy supply for agriculture through photovoltaic panel rainwater harvesting, and achieved the objectives of reducing resource inputs and increasing economic benefits by adjusting planting structures. The incorporation of the PVRH systems into agricultural WEF nexus is the main innovation of this study.

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