Abstract

Despite the recognition of freshwater challenges in Palestine, no prior research has been conducted to assess the effectiveness of AWG systems in harnessing atmospheric water in this particular context. The effectiveness of an Atmospheric Water Generation (AWG) system for obtaining freshwater in Palestine, is examined in this study. The study focuses on the effects of temperature and humidity on the system's performance and offers information about the system's suitability for reducing freshwater scarcity. The study also investigates how solar energy might be incorporated into AWG systems, offering a novel strategy for producing freshwater that is consistent with Palestine's sustainability objectives. To achieve this, the experiment was conducted for 12 months in 2022 under specific climatic conditions for the Palestinian cities studied (Tulkarm, Nablus, Jenin, Ramallah, and Jericho). Knowing the effects of temperature and humidity on the system's performance in Palestinian cities will help reduce costs and the suitability of the device’s work in the regions. The results summarized that in the city of Tulkarm, the highest production is in March, and the lowest production is in July, there is no production in either Jan, Feb, or Dec. in the city of Ramallah, the lowest production is in April, the highest is on July and There is no production in either May, June, and October. in the city of Jenin, the lowest production is in July, the highest is in March and There is no production in either Jan or Feb and Dec. in the city of Jericho the lowest production is in Feb, the highest is in Jun and There is no production in either April, May, Nov, and Dec. in the city of Nablus the lowest production in is on March and the highest is on November. We can also conclude that in the city of Tulkarm, there is a need for a solar system with a capacity of 5007 watts per 30 liters of water, in the city of Ramallah 15878.1 watts per 30 liters of water, in the city of Nablus 9540 watts per 30 liters of water, in the city of Jenin 6545 watts per 30 liters of water and in the city of Jericho. 5356 watts per 30 liters of water. In conclusion, this research focuses on evaluating the efficiency of the AWG system in extracting fresh water from the atmosphere in the climatic conditions of Palestine. By examining the impact of humidity and temperature on system performance and exploring solar integration, this study provides valuable insights and potential solutions to enhance freshwater availability and sustainability in the region.