

Fog collection potential for domestic rural use and irrigation in San Cristóbal Island, Galápagos

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The Galápagos Archipelago is a semi-arid zone where superficial water resources are scarce, which limits the development of productive activities, and therefore, it affects the population life quality. The increase of population and the development of the tourism industry put pressure over a scarce resource; thus, it is necessary to find alternatives to enhance the water supply in Galápagos. Due to its geographic position, these islands are covered with a semi-permanent fog layer during seven months along the year; an opportunity to take advantage of fog as a potential source of water supply.

In this context, the feasibility of fog collection for domestic consumption and irrigation has been investigated using two one-meter-square standard fog collectors (SFC) of polyethylene mesh with shade coefficient of 50% (50-SFC) and 35% (35-SFC), and a cylindrical fog net (CFN) of 40 cm high and 12 cm in diameter. The study was conducted from June to July 2016, using a weather station located at 600 m asl in San Cristóbal Island. The method consists in a trigonometric model which separates orographic rainfall from fog, and uses variables such as precipitation, wind speed and direction.

As a result, it was obtained that CFN captured 105 mm of fog, 50-SFC collected 280 mm and 35-SFC captured 496 mm, which is equivalent to an intensity of 2.2 mm/day, 5.8 mm/day and 10.3 mm/day, respectively. 35-SFC is the most efficient respect to the fog collection.

The domestic water supply in rural zones is 200 liters per person per day, using 3 35-SFC of 24 m² each, 100% of the demand would be covered for a farm of five inhabitants. Irrigation water deficit in San Cristóbal is 14.3 L/s, using 500 35-SFC of 50 m² each, 28% of the deficit would be covered. Each farm could install a system of collectors according to its needs. Based on these results, it is noticed that the use of this type of collectors could contribute to improve the inhabitants water supply.