

Desalination of seawater using a humidification–dehumidification seawater greenhouse

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Received 28 September 2008; Accepted in revised form 11 October 2009

ABSTRACT

Agriculture is the sector that consumes over 70% of all freshwater in the world. Taking into account the dominant phenomena of evaporation in arid regions, there is an overconsumption that is reflected by a very pressing need. To this end, the desalination process exploiting solar energy is a promising alternative with strong analysis of the feasibility has been a series of studies in various research laboratories. The feasibility analysis focused on the influence of operating parameters: the temperature of the seawater, the temperature of moist air, its relative humidity, speed of movement and intensity of solar radiation and for the prototype located in Al-Hail, Muscat, Oman. During the period spanning from 30 April 2005 to 3 May 2005, the results of experimental studies demonstrate the positive impact of solar radiation on the flow of condensate to reach a speed of about 65 l/h for a current of around 800 Wt/m² and that it reaches its minimum value, almost zero, at dusk. In addition, similar behavior emerges for the influence of temperature and relative humidity of air. Although the impact of the temperature of cooling water (seawater) is tested, we note that the trend confirms the negative and shallow this parameter on the flow. For efficient operation of fans in terms of production cost, control conditions in the greenhouse showed that the maximum throughput for a speed of around 7 m/s.

Keywords: Desalination; Greenhouse; Solar radiation; Relative humidity; Temperature; Seawater; Air velocity
