



Feasibility study of a desalination plant powered by combined renewable energy system to mitigate impact on river networks in a tropical island : study case of Jamaica.

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Water shortage is slowly becoming a problem worldwide and more specifically for developing countries such as Jamaica, a medium sized, tropical island. Climate change and population growth all have adverse effects on the demand for water.

Climate change effects such as increasing surface temperature and change in rainfall patterns will mean rainwater harvesting will become more difficult. Therefore, traditional sources of fresh water are threatened by the new, larger demand placed on by the increasing global population.

Desalination is considered as the main solution to this problem of lack of freshwater. The earth contains a large percentage of water which is about 71% and sea water accounts for about 96.5%. Caribbean Islands are in prime position to utilize the desalination process due to their access to the resource of sea water and issue to have a sustainable hydrological regime. However, one main drawback of the process is that is very energy intensive. This is where the use of renewable energy sources comes into place. Tropical islands are suited to use renewable energy sources such as solar and wind sources.

The goal of this study was to develop a model of a desalination plant that can be implemented in the tropical belt, in a medium sized island such as Jamaica, powered by renewable energy sources thus providing alternative sources of freshwater to a high water risk country. To do such, conditions of the energy (solar radiation, wind speed) and salt/fresh water resources (water current, temperature and salinity) have been evaluated for the study case of Jamaica. Statistical data have been used in a numerical model to assess production and distribution of desalination plant powering by solar-wind mix.

First results show a feasibility of technological solutions but at a high cost and the need of monitoring at a small scale needs and resources. These results will be used to evaluate the economical feasibility and impact on coastal ecosystem of medium size island.