

Development of Low-Cost Efficient Device/ Method to Utilize Groundwater Resource for Cultivation in Sri Lanka

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ABSTRACT

Plant earth is covered with water than land. Percentage wise it is 97% of oceans and 3% of freshwater. Freshwater is again separated as 79% of ice and glaciers, 29% of groundwater and, 1% surface water. Sri Lanka is a tropical country where it receives an average rainfall of 2000 mm annually [1]. The Northern part of Sri Lanka is recognized as the dry zone of the country based on annual rainfall records and it solely depend on the rain and ground water while the other parts depend on man-made tanks, canals etc. [1].

In general practice, electrical and fuel pumps are used to bring groundwater to the surface. However, such pumps are associated with key drawbacks such as high initial cost and higher maintenance cost. [2]. In that context, there is an urgent need to find an alternative for electrical and fuel pumps. Use of windmill water pumps are considered as one of the cheapest methods to pump ground water to the surface. Moreover, this method is environmentally friendly and therefore named as an effective alternative for electrical and fuel pumps. Nevertheless, this technique is rarely used for water utilization. In this study, a 1:10 scale water windmill was developed using mostly reusable materials. It was comparatively low cost device to utilize this readily available energy source. The model designed is able to collect and distribute water utilizing the gravity. A feasibility study identified Jaffna peninsula of northern of Sri Lanka as the best location based on the requirement of water and the availability of groundwater for cultivation purposes. More in depth work on the use of windmill could provide farmers in Northern Sri Lanka a method to be sustained through ground water rather than depending on rain water.

Keywords: *rainfall, windmill, utilization*

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