Development of a Mathematical Formula for the Calculation of the Optimal Water Distribution in a Territory

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Some natural processes, such as droughts, deprive people from having the appropriate amount of water, which can lead to dehydration, diseases or infections. “Drought is an insidious natural hazard resulting from a deficiency of precipitation that is insufficient to meet the demand of human activities and the environment.” (Wilhite, 2005). During the months of May to November of 2015, Puerto Rico suffered a drought which evidenced that some regions had less water availability than others, specifically, the metropolitan area. A formula was designed to mathematically prove that water is being wrongly distributed among this region. The formula was based on the amount of inhabitants and buildings in the region, the average amount of water consumption of both categories, and the amount of water that arrives to the region from main reservoirs. The results showed that the amount of water in the reservoirs is not enough to supply the water demand in the metropolitan area of Puerto Rico. In average, 52% of the population in each city of the region would have to be displaced in order to ensure enough water availability per inhabitant. Otherwise, an average of 119% more water inflow would be required to supply current water demand for each city. With this data, recommendations can be made to ensure efficient water distribution. With the application of this formula in different territories and countries and proper planning, a region can be more prepared for a drought and less people will have to suffer from the scarcity of water.

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