An Alternative Design of a Rainwater Harvesting System: Mitigating the Effects of the Drought in the Semiarid Region of Brazil

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The Brazilian semiarid region has 27 million inhabitants who depend on rainwater for subsistence activities such as agriculture and livestock. With average rainfall of 800 mm annually and limited financial resources, living with scarce water resources in this region is becoming increasingly challenging. To present a solution to this problem, a new rainwater harvesting system was developed using easily accessible recycled materials such as cardboard boxes, adhesive tape, PVC pipes, plastic sheeting, and discarded satellite dishes. The first prototype was built in the rural area of Mossoró, Northeast Brazil, with a capacity of 500L of water using a 1.7m diameter satellite dish as the collector. The second model underwent adjustments and was built by a family that is already using the system, with a 3m diameter satellite dish and a capacity of 1000L. Both models underwent tests during three different rainfall events, which showed that the smaller antenna can collect up to 3L of water per millimeter of rain, and the larger one can collect 5L for each millimeter. Based on meteorological data and the obtained tests, the system can collect up to 4000 liters annually, making it a viable alternative in combating drought. Questionnaires were applied to families to attest the feasibility of the system. In order to expand access to water for those in need, a tutorial was developed through a leaflet to help build new reservoirs. A collection point for discarded materials for construction in the community was created. We believe this system will be of great importance to people who face daily problems related to water scarcity in a sustainable and practical way.

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