

DESIGN, DEVELOPMENT AND EVALUATION OF A COLLAPSIBLE RAIN WATER HARVESTING SYSTEM FOR DRY ZONE

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With increasing population and climate change, water is becoming a scarce resource in dry zone of Sri Lanka. To overcome the problem of limited water availability for drinking and cultivation, rain water harvesting and storage can be used as a good solution. Although some rain water harvesting systems are presently practiced in the dry zone, they are not efficient and popular among farmers. Therefore, this study aimed to introduce an efficient collapsible rain water harvesting system for dry zone. After investigating the available rain water harvesting systems and associated problems with them, the new system was designed and developed. Major components of the system were collapsible collectors, collecting pipes, posts and storage tanks. In order to determine the appropriate size which is suitable for the heavy wind condition

in dry zone, three sizes of collectors were designed with different areas 0.8 m² (T1), 1.5 m² (T2) and 2.2 m² (T3). Collectors were designed in collapsible manner and they could remove and reinstalled easily when necessary. Poly Vinyl Chloride (PVC) pipe was used to carry the water from collector to storage tank. Collectors were evaluated under different rainfall intensities and wind conditions at the upland field in Faculty of Agriculture, Rajarata University of Sri Lanka. The Average attachment and detachment times for T1, T2, and T3 were 86 s, 95 s, 98 s and 26 s, 24 s, 27 s respectively. Rainwater harvesting efficiency of the collectors for T1, T2, and T3 were 91.1%, 88.6% and 86.7% respectively. The optimum size for the collector with sufficient efficiency and ability to withstand for heavy wind was 1.5 m².

Key Words: Collapsible, Collectors, Dry zone, Rainwater harvest