

The Art of Fresh Water Assurance: the impact on the semi-arid Island of Aruba

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Summary

In arid or semi-arid areas, especially small Islands with practically no natural fresh water resources, provision of the basic needs of men was always a daily challenging endeavor. Management of groundwater and surface water in rainy seasons was since the primitive men of imminent importance to assure drinking water and food security guaranteeing a decent quality of life. Different primitive techniques have been developed and later on engineered as an art to assure those basic needs in arid and semi-arid areas. With the development of the innovative seawater desalination technologies many Small Islands Developing States (SIDS) such as Aruba have solved their water shortage problems and consequently attracting different industrial activities booming the economy and increasing life's quality. However, little by little the developed rainwater harvesting techniques, the importance of a green environmental infrastructure and subsequently the water cycle management had been neglected. The last decades the increasing global consciousness of the impact of climate changes and the vulnerability and the risks for especially SIDS have directed once again the attention to the importance of sustainability introducing the concept of Eco-engineering. This paper will elaborate on the historic endeavor in Aruba to manage surface water and groundwater, the intense exploration activities for groundwater and the geological composition of the Island influencing groundwater aquifer infiltration and its influence on the quantity and quality of the groundwater. The history of the Aruban desalination activities will be briefly described including its socioeconomic and environmental impact. Furthermore this paper will elaborate on the intended upcoming researches to support the vision of the Aruban Government toward a Green Sustainable Island: (1) evaluation of the economic value of water according to The Economy of Environment and Biodiversity (TEEB) model to justify construction of a rainwater harvesting infrastructure in semi-arid Islands; (2) the importance of constructed wetlands for sustainable agriculture, Island greening and environmental improvement; (3) surface water retention and groundwater infiltration.