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**STUDY ON SURFACE-SUBSURFACE HYDROLOGY
IN VAVUNIYA UC LIMITS**

A PROJECT REPORT PRESENTED BY

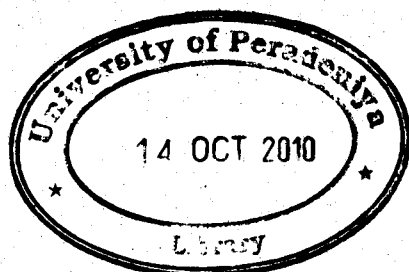
SUKANYAH SHANMUGANATHAN

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STUDY ON SURFACE-SUBSURFACE HYDROLOGY IN VAVUNIYA UC LIMITS

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The interconnected dynamics of surface and sub-surface hydrology are complex and need to be visualized on the spatial domain for developing systems knowledge. This investigation focuses on analyzing the impacts of human induced changes to surface hydrology on the subsurface hydrology within the area of 73km² extent covering Vavuniya UC limits and its peripheries. Particular focus is given to the changes to the small-tank based cascade systems have been maintained as the surface facilities to aid in the recharge of the sub-surface aquifer. As the need for developing an understanding of the system of concern on the spatial domain is realized, this project adopted a GIS based spatial-model building approach involving the spatial mapping of terrain, geometric network modelling. Due to the lack of adequate literature and data for this region, a field-based data gathering exercise was employed as the preliminary part of the model building enterprise. Findings indicate that the groundwater potential of this region highly relies on the overlying tank cascade system which has been affected by human activities. This is reflected by the reduced potential of unconfined aquifer. It is estimated that out of the 73km² areas considered for the investigation (in which 2.5% of the area has been affected by urbanization and subsequent human activities), 1.67km² has been critically affected with very low levels of water potential. Scenario simulations show that the area with reduced ground water potential could increase up-to 4.88km² if further urbanization impacts are felt. Moreover, the movement of the nucleus of reduced water-potential is also found to be moving towards north towards disturbed cascade line and this may cause severe water shortages effects in future. Adopting and integrated water resource management strategy using an ecosystems approach, policing of the unplanned developmental activities occurring along the cascade lines (or in proximal regions) and, the rehabilitation of the small-tank cascade system are proposed as mitigation measures.

[Key Words: spatial, surface, sub-surface, hydrology, model, GIS, management, scenario]

