Preparation of Groundwater Potential Map for Periyamadu Village, Mannar, Sri Lanka - A QGIS based participatory approach

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It had been identified that groundwater levels in Sri Lanka are being declined over the years and make many difficulties in different contexts. Especially this condition is worsening the areas under dry zone of Sri Lanka where drought is directly affected to the livelihood of people. Farmers in the dry zone highly dependent on storm water in rainy seasons and groundwater in drought seasons. Both seasons make problematic situations due to unpredictable climate conditions. In drought seasons; farmers in the dry zone cultivate tropical crops with depending on the ground water in their agro and domestic wells. Hence the drought is taking longer; over-exploitation is happening which drags farmers in to worsen situation. As a long run solution for the above situation, sustainable groundwater recharging practices can be introduced. Until then a proper mechanism or an approach should be introduced to keep farmers to maintain sustainable depths for their wells which would ensure the every farmer receive continuous ground water supply and not to happen over-exploitation until the drought is end.

Since local NGOs, CBO are limited with technical knowledge in finding aquifers in their areas, they inquire assistant form outside consultants. Forecasting or the finding aquifer using tools such as vertical electric sounding (VES) resistivity surveying (commonly used in SL) in a particular location is highly costing which cannot be afforded by local NGOs or CBOs. In the above context, a simple, comprehensive and inexpensive approach was developed to identify average ground water levels in wells which will be resulted with recommendations for well deepening in order to sustain the entire area during the drought.

This is a micro level study to map groundwater potential in Periyamadu Village, Mannar which is located at dry zone in Sri Lanka. The study includes key parameters such as location of surface wells (boreholes), depth of boreholes and groundwater levels of boreholes. Primary data collection is time taking where each and every borehole have to be tracked with location and water level. Data collection is strengthening when incorporating the local knowledge through participatory mapping and discussions. Secondly, the collected water levels are analysed using QGIS interpolation and hydrology analysis.

Accuracy of the study will be high when the study area divided in to small parcels such as watersheds or basis and the number of boreholes sample is high. Since the approach required rational methods to increase the accuracy, QGIS watershed delineation is appropriate when parcelling the study area which results watersheds/ basins of the area. At the initial stage groundwater potential map can be prepared to the entire study area without simplifying to basins which gives low accuracy result. QGIS interpolation plug-in and IDW tool is applicable in simplifying the groundwater levels in the area. The groundwater levels are displayed as feet below ground level (FBGL). Eventually the result will be the groundwater contour map/maps for the study area with potential aquifers. Farmers/ local NGOs/ CBOs now have a basis on deepening their wells in sustainable manner and they can control over the excavating wells beyond the recommended/ average groundwater levels.

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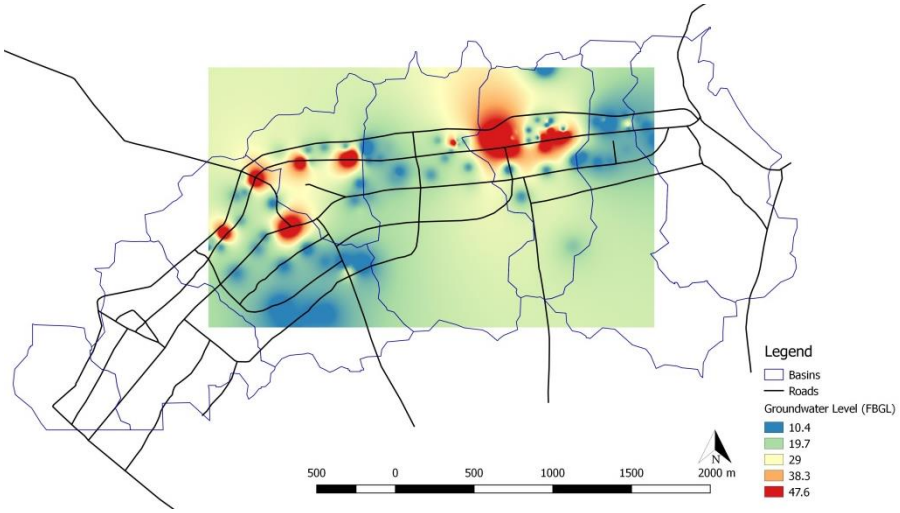

Figure 1-: Groundwater Potential Map – Periyamadu Village, Mannar, Sri Lanka