

Geospatial Technology for Hydropower Site Selection and Rural Electrification Supply-Demand Analysis - A Case Study in the Yabem/Mape Rural of Finschhafen District, Papua New Guinea

Tingneyuc Sekac (Papua New Guinea), Jana Sujoy Kumar (India), Nosare Maika and Sammy Aiau (Papua New Guinea)

Key words: Cartography; Hydrography; Photogrammetry; Positioning; Remote sensing; Spatial planning; Rural Electrification; Hydro Power; Geospatial; SWAT Model; Energy Demand.

SUMMARY

The pathways to increase rural electrification supply through means of renewable energy, off grid, grid and hybrid systems are still in deep need of assessment and evaluation since most of the rural places especially in developing countries are isolated and located on rugged terrain zones with less availability of basic services and needs. Some rural places or communities in Papua New Guinea (PNG) are not easy to reach and interact with when it comes to infrastructure development. This are due to lack of road infrastructures, unsolved customary land issues, communities minimal willingness to support and participate in infrastructure development, low income, etc... Such challenging factors need close evaluation and monitoring if it means for rural electrification following the stated PNG national pillars to increase electrification to rural places. Data acquisition and planning is one approach here if it means for rural electrification to increase. The current study approach is to assess and seek possible ways where rural electrification pathways can be formulated. That is by assessing the already available resources to estimate the potential of power possible at each site and assessing to make available the information on household electricity load demand and socio-economic statuses. The possible sites within the Mape catchment were evaluated for future hydro potential by utilizing Geospatial technology and including assessment of power supply demand and economic statuses. The Soil and Water Assessment Tool (SWAT) coupling with QGIS were involved for flow discharge estimation and Shuttle RADAR Topographic Mission (SRTM) Digital Elevation Model (DEM) was incorporate for potential head or sites identification within the study region. Field survey was conducted on the sites and all possible river network was verified. Environmental factors and communities responses were further analyzed for selection of most potential sites for mini to large hydropower construction and development. The household socio-economic survey was conducted to asses power supply and demand including sustainability factors. The economic strength are all evaluated and the results are presented for decision making. Twenty nine (29) most feasible potential hydro sites where selected. The amount of power at few

Geospatial Technology for Hydropower Site Selection and Rural Electrification Supply-Demand Analysis - A Case Study in the Yabem/Mape Rural of Finschhafen District, Papua New Guinea (11822)
Tingneyuc Sekac (Papua New Guinea), Jana Sujoy Kumar (India), Nosare Maika and Sammy Aiau (Papua New Guinea)

FIG Working Week 2023
Protecting Our World, Conquering New Frontiers
Orlando, Florida, USA, 28 May–1 June 2023

sites are found to be reasonable for supply to nearby communities in line with their respective energy demand and level of economic strength.

Geospatial Technology for Hydropower Site Selection and Rural Electrification Supply-Demand Analysis - A Case Study in the Yabem/Mape Rural of Finschhafen District, Papua New Guinea (11822)
Tingneyuc Sekac (Papua New Guinea), Jana Sujoy Kumar (India), Nosare Maika and Sammy Aiau (Papua New Guinea)

FIG Working Week 2023
Protecting Our World, Conquering New Frontiers
Orlando, Florida, USA, 28 May–1 June 2023