

## **Estimated DEM uncertainty in creating a 3-D of the UPM's Ayer Hitam Forest reserve in Selangor, Malaysia.**

### **ABSTRACT**

The GIS capabilities in resource management and planning promise a large scale influence on how geographic features are spatially distributed. The visualizations of the geographical features in three dimensions (3-D) form part of the result of a GIS application available for management and planning purposes. This paper, however, presents a procedure and results which were obtained from the generation of a 3-D model and estimates the uncertainty of an elevation data in creating a DEM of the UPM's (Universiti Putra Malaysia) Ayer Hitam Forest Reserve (AHFR) in Selangor, Malaysia. The forest reserve has been granted for 80 years by the Selangor government to be managed by the Faculty of Forestry, UPM since 1996, as an important 'outdoor laboratory' for teaching, practical research and extension activities related to forestry and other environmental programmes. The databases of AHFR developed by the Faculty were further processed in the ArcGIS 9.0 version in order to make the data format usable, and finally, a 3-D model representation of the area was generated. Based on the 20 m DEM resolution analysis, the RMSE result for uncertainty estimation was 0.33 respectively. While the final result was a 3-D model flexible enough to view and render the AHFR from any perspective including the distribution of soil series, hydrological networks, road networks, etc., it was also useful in supporting the development programme of AHFR as a research forest for UPM and the State of Selangor.

**Keyword:** 3-D model; DEM resolution analysis; Elevation data; Forestry; GIS; Management and planning.