EROSION AND LAND USE IN THE POHANGINA REGION: A STUDY USING GIS AND REMOTE SENSING

A thesis presented in partial fulfilment of the requirement for the Degree of Master of Applied Science in Soil Science, Massey University, Palmerston North, New Zealand.

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ABSTRACT

In this study a combined remote sensing and GIS approach, using aerial photographs, a SPOT satellite image and a digital elevation model was employed to extract hillslope units and watershed boundary maps. The acquired data were also used to investigate relationships between topographical features (slope angles and slope aspects) and soil slip erosion and land management practices in the Pohangina region.

The procedures were first developed on a representative area. It was typical of the district in term of the climate, topography, soils, geology and land management practices. These methods were then used to identify those areas most susceptible to soil slip erosion in the Pohangina region.

A raster GIS and image processing package (IDRISI for Windows) was used to analyse the remotely sensed data/digital elevation model and to create different maps for investigation.

A simple technique for extracting watershed boundaries and mapping hillslope units was also developed.

The slope aspects facing N & NE are more susceptible to soil slip erosion than other aspects. It was also found that this erosion occurs equally on all slope classes. Four major land management practices were used in the representative area. These were pasture, exotic forest, spaced planting and reversion to bush. Nearly 95 % of erosion has occurred in pasture, 4.1 % in space planted areas, 1.3 % in exotic forest, and no erosion occurred in areas reverted to bush.

The soil slip susceptibility map of the Pohangina region was created to assist in the allocation of soil conservation practices. This study has shown nearly 90% of the areas susceptible to slip erosion (2850 hectares) are presently not covered with suitable vegetation.

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" Dedicated to my parents"

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