

Abstract

With the high rate of deforestation in tropical forests in most countries over the last decade, the rapid collection of information on the status of forests is vital in order to assist governments and landowners in monitoring the forest area. Tropical forest assessments using remote sensing techniques have become an important component of forest inventory research, due to the lack of detailed spatial information on forest resources. The aim of this study was to establish an efficient sampling model for the collection of forest information in tropical forests and to investigate the potential of remote sensing to estimate forest parameters to supplement the ground truth data. A dry evergreen forest in Khao Ang Runai Wildlife Sanctuary in eastern Thailand was selected as the research site for the study.

The results of the study showed that a concentric sample plot with a radius of 18 m is optimal for the collection of forest parameters. It represents a slight difference to the sample plot (17.84 m) proposed by Loetsch (1957a) and sample plot with a radius of 17.48, which is presently used in the Thai national forest inventory. The L-shape cluster and several alternative plot arrangements were investigated and analysed in terms of the tree species capture capability, relative efficiency using the calculation of the intracluster correlation coefficient and a cost function. The corner cluster consists of four plots and is the best model for ground data collection.

Band 5 minus band 3 of the Landsat-5 TM provided a useful technique to establish the connection between the pixel values and the percent crown cover derived from forest inventory plots, better than for the other forest parameters. The creation of 3 by 3 and 5 by 5 pixel windows covering the sample plot location proved a highly efficient technique for relating forest inventory and remote sensing data.

Keywords: Forest inventory, Cluster sampling, Intracluster correlation coefficient, Relative efficiency, Remote sensing.