

**Lumban-Tobing, Pago Leonardo** 2004 The effects of land use changes on forest fires in major islands of Indonesia, PhD Dissertation, Oregon State University

## **Abstract**

The study examines the effect of forest clearance on fire occurrences in major islands of Indonesia, namely: Borneo, Sumatra, Sulawesi and Irian Jaya. The working hypothesis of the study is that forest clearing is a necessary predecessor for extensive fires to occur. The study is designed to test the idea that an increase in fire frequency occurs only after the site has experienced a forest degradation process. Testing the hypothesis requires mapping fire occurrences and forest cover degradation. The analysis relies on remotely-sensed data using the NOAA (National Oceanic Atmospheric Administration) AVHRR (Advanced Very High Resolution Radiometer). The AVHRR thermal channels provide a means to detect the occurrences of hot objects over remote areas. The visible and infra-red channels can be utilized to quantify vegetation coverage. The first part of the study maps the occurrences of active fires over the study area during a 20-year period. Monitoring over a long period of time reveals spatial and temporal pattern of active fires. The second part of the study maps changes in land cover types. The third part of the study correlates the spatial and temporal patterns of fires with the pattern of forest cover changes. Correlating land use changes with wildland fires shows that extensive wildland fires occur mostly within degraded forest cover types. Fires also vary among islands and by latitude. Sumatra has the largest fire events and fire occurs less frequently further away from the equator. Further study to test the results on the ground is necessary. The study also shows the difficulties in utilizing remote sensing data for monitoring long-term land cover changes. In addition, the AVHRR PathFinder data are more sensitive towards large, extensive fires.

**The Effects of Land Use Changes on Forest Fires in Major Islands of Indonesia**

by  
**Pago Lumban-Tobing**

**A THESIS  
submitted to**

**Oregon State University**

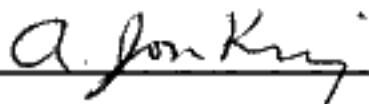
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degree of**

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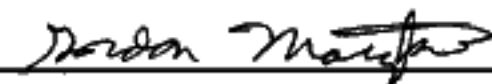
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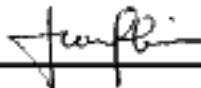
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