SLASH AND BURN

Tracking Fire-Related Land Use Change in Kalimantan, Indonesia

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INTRODUCTION

Background

Palm oil is an essential component of a wide variety of modern products, including foods, cosmetics, and biofuels. Indonesia is the world's largest producer of palm oil, providing nearly half of the world's supply of the commodity. Palm oil represents the country's top export and is a significant economic driver.

However, palm oil production has lead to significant deforestation throughout the country, which has the third largest tropical forest in the world. This deforestation and land use change, often conducted through slash-and-burn methods on sequestering peatland, accounts for nearly 80 percent of the country's total greenhouse gas emissions and results in a drastic loss of biodiversity.

Additionally, the smoke associated with the largescale burning is a serious public health hazard, impacting the the wellbeing of both Inonesian citizens and the health of residents of neighboring countries.

Objectives

Indonesia is capable of growing its economy, while also reducing its greenhouse gas emissions and protecting critical land with both environemtnal and social value. By expanding oil palm production onto already degraded land and fully protecting peatland and primary and secondary forest, Indonesia can reduce its carbon emissions by an estimated 35 percent, with a minimal reduction in projected profits.

With that in mind, this study seeks to accomplish two goals:

1. Estimate the most suitable land for future oil palm production in Kalimantan, Indonesia
2. Track 2015 fire-specific land use change to determine the characterstics of the land actually burned to clear space for future oil palm production

Factors

To estimate the suitability of land for oil palm production, various factors were scored based on importance. Those scores were then used to construct the following 3 layers, each representing an aspect of the land's value that indfluences its appropriateness of its allocation for future oil palm production:

- **Environmental:** land that will limit the environmental impact associated with oil palm production
- **Economic:** land that will maximize productivity and allow for the most efficient growth of oil palm
- **Social:** land that meets community and legal needs

The factors associated with each layer and within the scope of this research are as follows:

Environmental	Land Cover
	Peat Depth
	Protected Areas
	Water Body Buffers
Economic	Elevation
	Slope
	Rainfall
	Soil Type
	Soil Depth
	Soil Acidity
	Soil Drainage
Social	Legal Classification of Land
	Current Forest Moratorium
	Logging Concessions
	Timber Concessions
	Oil Palm Concessions
	Indigneous Land Claims

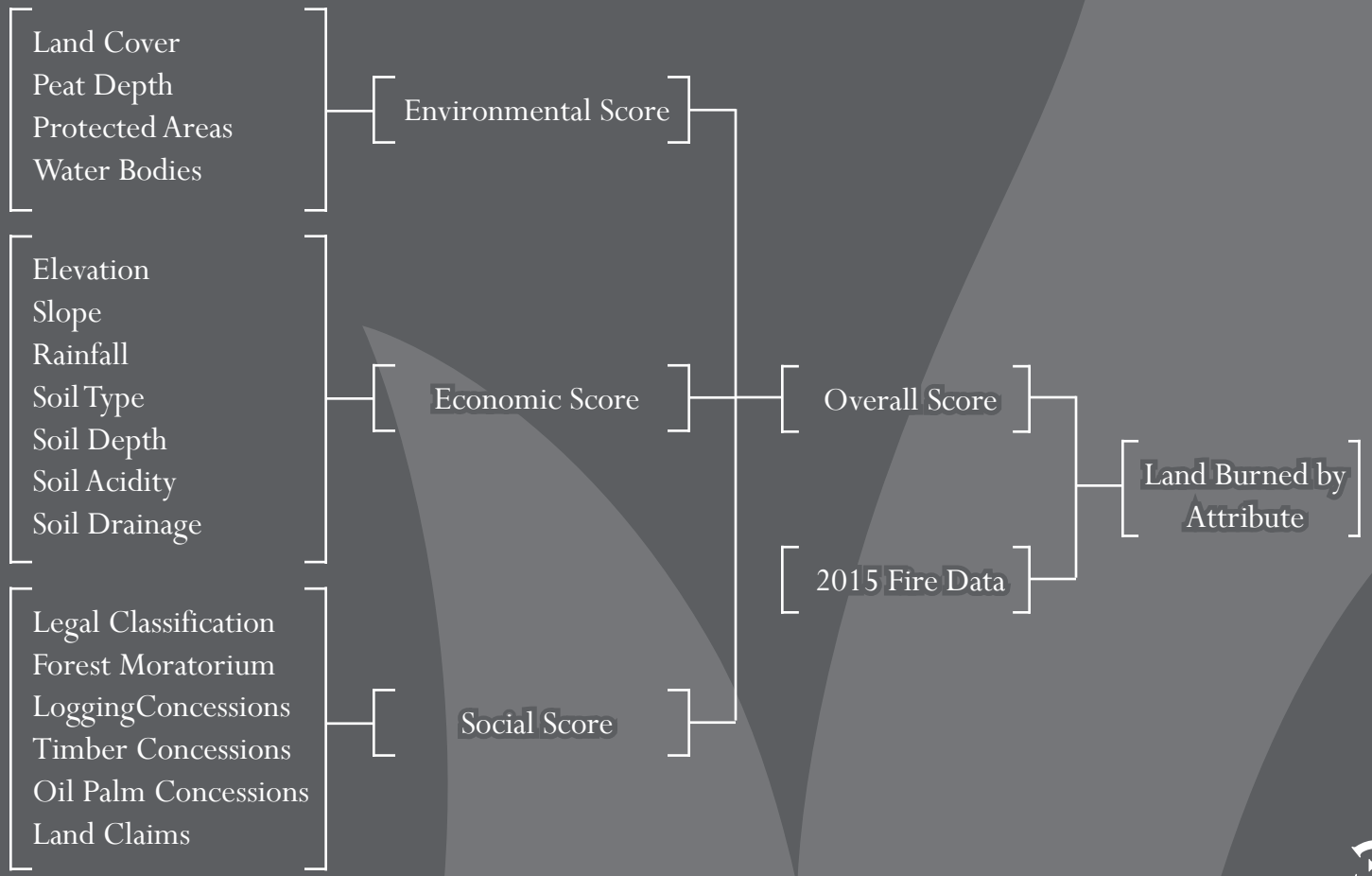
Methodology

For each of the 3 base layers, factors were scored conditionally using Python script on a 1-3 scale:

- **1:** land that is suitable for oil palm production
- 2: land that may be suitable for oil palm production
- 3: land that is not suitable for oil palm production

Inputs for each layer were then combined and scores summed spatially to determine the areas most and least suited for future palm oil production for that layer.

The environmental, economic, and social layers were then combined to provide overall scores across the region. This combined layer was then overlain with 2015 fire data for the region in order to calculate the total impacted area and to determine the characteristics of the land burned this year.



Data Presentation

Map Display Features:

- North Arrows
- Scales
- Text
- Neatlines
- Legends

Kalimantan is the Indonesian portion of the island of Borneo in Southeast Asia.

It is divided into 56 districts across four provinces:

1. Kalimantan Barat
2. Kalimantan Tengah
3. Kalimantan Timur
4. Kalimantan Selatan

Layer Display Features:

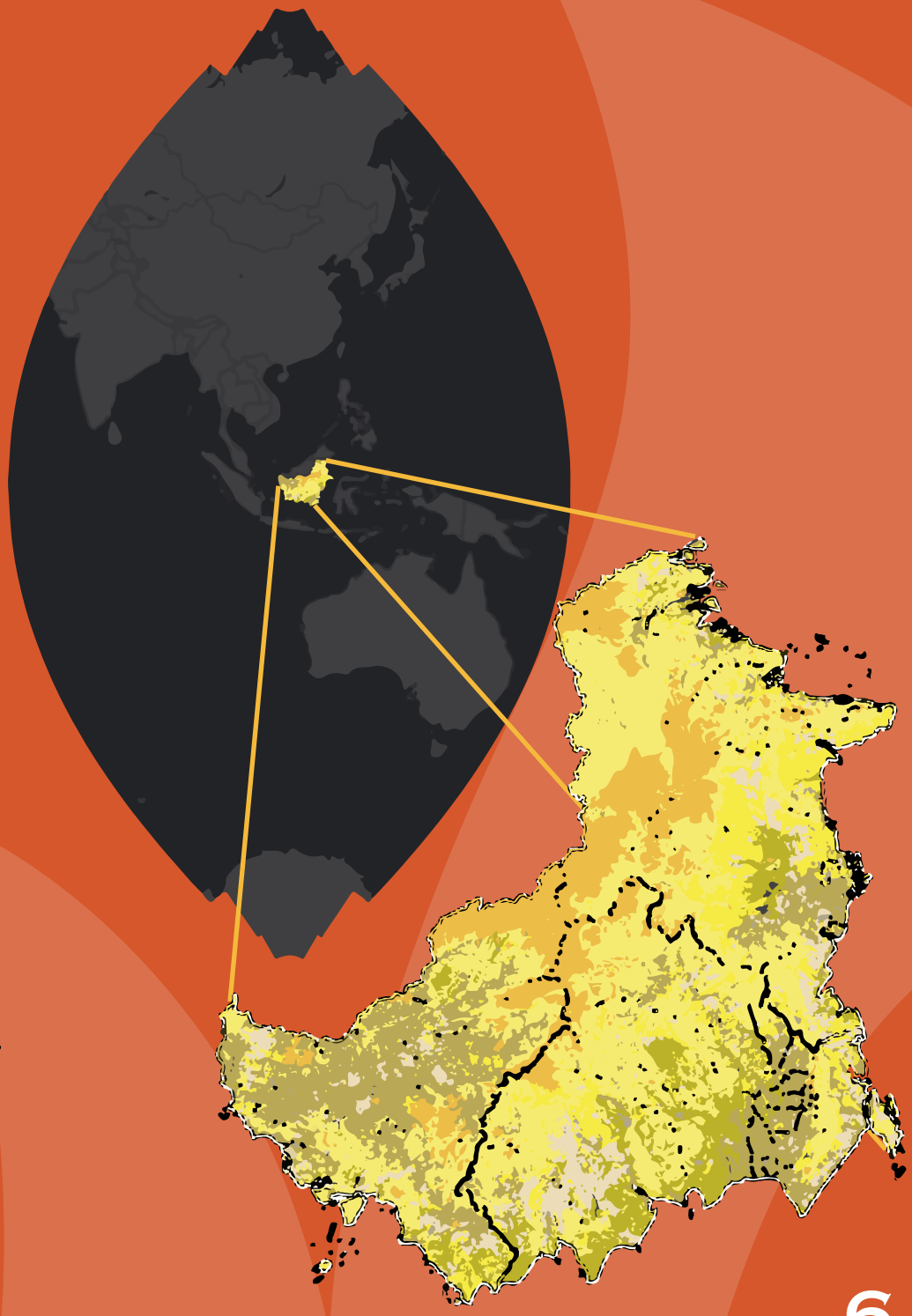
- Symbology
- Transparency
- Labels

Frame Display Features

- Reprojecting
- Clipping
- Rotating
- Annotation Grouping

Kalimantan is covered in en-vironemtnally, economically, and socially valuable land.

The primary and secondary forest on the island amounts to the world's third largest tropical fores.



Scene Display Features

- Base Heights
- Offsets
- Shading

Elevation

- Kalimantan's elevation ranges from 0 to 2,294 meters

Slope

- Kalimantan's slope ranges from 0% to 80%

Population Density

- Generally low with some increased density in coastal cities
- Balikpapan has the highest population density

Rainfall

- Precipitation ranges from 15,000 to 34,000 mm/year