Research Activity Report

Taikichi Mori Memorial Research Fund

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Research Title:

Mapping Peatland Vulnerability to Wild Fire Based on Citizen Perception: Case Study in Sambas Regency, Indonesia.

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Introduction

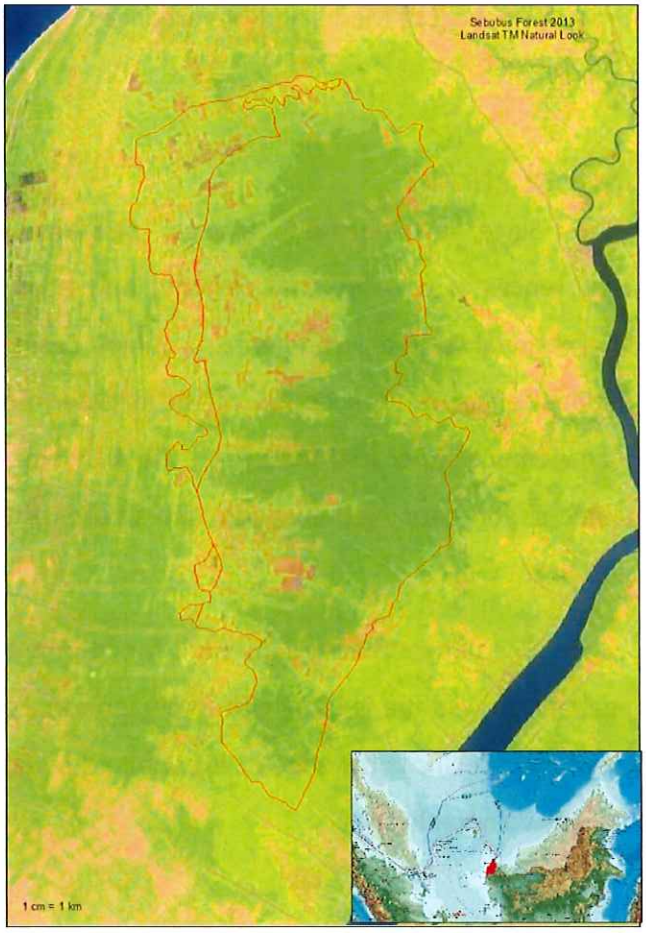
Since last decades, tropical peatland areas in Indonesia experienced increasing occurrences of wild fire that cost not only economic life of the country, but also resulted in international scale environmental problem. Beside international cooperation for mitigation and national effort for prevention of the disaster, community level involvements on the disaster management are crucial for solving the problem. This research is trying to figure out some key elements for mapping the vulnerability of the tropical peatland area to repetitive occurrences of wild fire.

One of hypothesized methods for figuring out key elements of the vulnerability of tropical peatland to wild fire is using citizen perception. Local people live in tropical peatland must have their own specific knowledge or experiences towards wild fire occurrences which can be used to identify vulnerable area.

Research Site

Sambas Regency in West Kalimantan Province of Indonesia has several tropical peatland ecosystems. Those areas experience regular wild fire events that cost much of economic and social losses. One of the tropical peatland ecosystems which has increasing experience of wild fire is Sebubus Forest.

Sebubus Forest consists of an area around 14.100 hectares. It lies between Natuna sea on its west side and Sambas River on its East Side. It is legally stated as *production forest*/ Hutan Produksi (HP) based on Indonesia regulation (Ministry of Forestry, 2014). Around 5.000 ha of the forest area is categorized as deep peat soil (more than 6-meter depth) [9]. It is unique peatland area, since it is surrounded by paddy fields and local agriculture land. According to administrative map of Sambas Regency, Sebubus Peat Forest is situated within 21 villages in four subdistricts namely Kecamatan Tekarang, Kecamatan Teluk Keramat, Kecamatan Jawai, and Kecamatan Tangaran.



Activities:

Activity 1: Laboratory Research

First part of this research is including reviewing literatures related to the topic and analysis of remote sensing data which was conducted in the Eco-GIS Laboratory at Keio University, Shonan Fujisawa Campus.

Literature review was conducted to deepen understanding on current issues and theoretical background of the topic. Some literature including government regulations have been scrutinized. One of the most crucial regulation is Indonesian Government Regulation Number 71 Year

2014 about Protection and Management of Peat Ecosystem. This regulation defines some very critical point about tropical peatland in Indonesia. Some maps identifying peat soil were also collected and reviewed as basis for further analysis which included satellite images analysis.

For remote sensing analysis, some satellite images from Landsat have been collected and analyzed to find out what has happened in Sebubus Forest since last decades. Remote sensing gives a powerful tool in hand for wild fire vulnerability research. However, at this point, focus has been emphasized on land cover and its change in the tropical peatland area.

Activity 2: Fieldwork in the Research Site

Purpose of this field work is to observe the real condition in the research site and do interview with key respondents.

Observation of the real condition is used to clarify some findings from laboratory research. This is important to give a comprehensive perspective of research problems under investigation. Land cover changes depicted from satellite image for example, requires on site confirmation about what is actually existing on the ground.

Observation was conducted between December 2016 until January 2017. Some locations were visited to find out the real condition of the site. Among interesting findings of the observation were that artificial canals have been penetrating deeper to the forest area. For green area as depicted by remote sensing, ground check indicated that it was rubber three plantation and community's forestry. Those areas were well protected as local people did much effort to prevent their properties from wild fire

Interview is one of the most crucial parts of this research. It is required to formulize a valid interpretation of citizen perception about vulnerability. Key respondents were interviewed using in-depth interview method.

Furthermore, main objective of this fieldwork is to capture citizen perception about vulnerable area within or around Sebubus Forest. This filed work is also used for collecting data whether in local government repositories or within local communities.

Activity 3: Data collection and visitation to Indonesia Geospatial Information Agency and LAPAN

Indonesia has developed a network of Geospatial Information System and Infrastructure. BIG is the institution which has responsible to manage the system and infrastructure. Visiting the agency will beneficial for exploring any possibility of data mining from the institution. The other important institution is LAPAN (National Institute of Aeronautics and Space). This institution has units which managing remote sensing data for various area in Indonesia.

Results:

For the first activity, a research paper has been written with title: Land Cover Changes from 1995 to 2016 in Sebubus Forest of Sambas Regency, Indonesia. This paper was presented at International Electronic Symposium, 29-30 September 2016 in Bali. This paper explains spatio-temporal changes of land cover in Sebubus forest from 1995 util 2016. It figure out that most of the original forest in the research site has been changed into agriculture or bareland.

Land Cover/ Year	1995	2000	2005	2009	2013	2016
Water /Cloud	2	317	975	4	400	1,133
	0.1	*2.18*	*6.75*	*0.03*	*2.76*	*7.82*
Bare Land	953	966	179	3,267	5,079	1,287
	6.57	*6.66*	*1.24*	*22.53*	*35.03*	*8.88*
Shrub	1,895	1,674	1,470	1,429	1,355	10,404
	13.07	*11.54*	*10.14*	*9.58*	*9.34*	*71.75*
Forest	11,651	11,545	11,877	9,802	7,667	1,677
	80.35	*79.61*	*81.90*	*67.59*	*52.87*	*11.56*

Below is table depicting transitional change of land cover in the Sebubus Forest. It depicts that until 2016, not more than 12% of the total area can be categorized as forest (Muriadi and Yan, 2016)

For the second activity, data were collected and brought to laboratory for further analysis. The data can be categorized as several parts; observation result, interview result, and secondary data collection. For the last one, databases from local government institutions were copied. Those databases are stored in several types of platform.

Below are databases gathered and ready for further analysis.

Database name	Administrator	Structure	Type	Platform
Development planning proposal	Local Development Planning Agency	Aggregated by village	Qualitative and quantitative	Microsoft Access
Village financial report	Community and Village Governance Empowerment Agency	Aggregated by village	Qualitative and quantitative	Microsoft Excel
Agriculture production	Agriculture and Husbandry Dept	Aggregated by sub district	Qualitative and quantitative	Microsoft Excel
Population Registry	Registry Office	Aggregated by village	Qualitative and quantitative	SIAK/Microsoft Access (Converted)
Local Government Maps Database	Local Development Planning Agency		Qualitative and quantitative	ArcGIS
Health Profile	Health Department	Aggregated By Health Center	Qualitative and quantitative	Microsoft Access

Current and Further works

With data in hand and analysis are going on, this research will hopefully produce some academic papers in near future. Some of prospective papers under discussion are:

- Investigating Artificial Canals in the Tropical Peatlands Using High Resolution Satellite Images: Case Study of Sebubus Forest, Indonesia. (70%)
- A Review on Opportunities and Challenges on the Use of public administrative data for geoenvironment research: A case study in Sambas Regency. (30%)
- Importance of Appropriate Base Maps and Geocoding System in Public Adminstrative Data Management; Lessons Learnt from Degraded Sebubus (Tropical Peat) Forest, Indonesia (10%)

On the other hand, some other works still need to be done. Those are including a distribution of questionnaire.

References:

Ministry of Forestry, R. of I. Keputusan Menteri Kehutanan Republik Indonesia Nomor 733/menhut-II/2014 Tentang Kawasan Hutan dan Konservasi Perairan Provinsi Kalimantan Barat (2014). Indonesia.