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“CONSTRUCTING COHERENT & SUSTAINABLE SOCIAL DEVELOPMENT”

November 24-26, 2015, Lombok Indonesia

CERTIFICATE AWARDED TO:

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INTERNATIONAL SOCIAL SCIENCE CONFERENCE



**“CONSTRUCTING COHERENT AND SUSTAINABLE
SOCIAL DEVELOPMENT”**

Mataram, 24-26 November 2015



SUB-THEMES:

- LAW AND GOVERNANCE | ECONOMICS | TOURISM | SOCIAL ENVIRONMENT
- LINGUISTIC | SOCIAL SCIENCE | SOCIAL POLITICS | EDUCATION
- CULTURAL STUDIES | SOCIAL ECONOMIC FISHERY AND MARINE
- SOCIAL ECONOMIC FORESTRY,
AGRICULTURE AND ANIMAL SCIENCE | CONFLICT MANAGEMENT



Mataram University

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“CONSTRUCTING COHERENT AND SUSTAINABLE
SOCIAL DEVELOPMENT”

**International Social Science Conference, Mataram
University, Lombok, Indonesia (24 - 26 November,
2015) "Constructing Coherent and Sustainable
Social Development"
Proceeding**

Editors:

**Prof. H. Taufik Fauzi, Ph.D., Dr. Hj. Sitti Latifah, H. Akhmad Saufi, Ph.D.,
Lalu Adi Permadi, SE., MM, Nurabiah, MMSI., and Elin Erlina Sasanti, SE.,
M.Sc. Ak., CA.**

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PREFACE

Celebrating The 53rd Anniversary of Mataram University, we organised an international conference on social science entitled: *"Constructing Coherence and Sustainable Social Development"*. The main event of the conference conducted on 24 - 26 November 2015 in Mataram University, Lombok Indonesia.

Firstly, we would like to thank the Rector of Mataram University and other university officials who have given tremendous support to the success of the conference programs. We certainly hope that this event can bring new ideas and insights into developing social sciences in the Mataram University.

In this occasion, also we would like to thank the Dean of the Faculty of Economics and Business, Mataram University, who has honoured us through his continuous support, care and supervision.

We also would like to thank the prominent scholars that are Associate Prof. Dr. Azlizam Aziz and Prof. Hashim of Universiti Putra Malaysia, John Suprihanto Ph.D. of Gadjah Mada University, Yogyakarta Indonesia, and Husni Muadz Ph.D. of Mataram University, who have supported the conference by becoming keynote speaker of this conference. Thank you for your friendship and cooperation.

In addition, we also would like to honour and thank the committee members, our colleagues and students who supported this conference by attending and presenting in this conference.

Finally, we would like to give grateful thanks to all those who have actively supported this international research conference since the preparation stage to its completion. Without you this event won't take place.

Thank you,



Akhmad Saufi, PhD
Chairman

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FOREST DEGRADATION AND FOREST ENCROACHMENT; DRIVER AND SOCIAL-ECONOMIC INFLUENCING FACTORS

Sitti Latifah

Mataram University's Forestry Study Program
Jl. Pendidikan No. 62 Mataram 83125
slatifa23@yahoo.com

Abstract

Indonesia experienced a massive deforestation and forest degradation after the fall of New Order administration in 1998. About 1.7 million ha of forestland disappeared averagely per year during 1995-2000. Unfortunately, the trend of deforestation and forest degradation continues in certain part of Indonesian within various scales. This paper is intended to analyze driver factors of deforestation and variables influencing people to encroach forestland. We use Landsat imagery data to figure out the trend of forestland changes during 1990-2010. We also analyze socio-economic research by analyzing population census, other secondary data, and primary data collection in 14 administrative villages within western part Lombok Island Indonesia (around forest unit management "Rinjani Barat") using participatory rural appraisal (PRA) through focus group discussion and in-depth interview with key informants. Besides, we also carry out household survey for 420 households in those villages. Our research findings suggest that approximately 28.6 percent of the total area of forest in Lombok is classified as critical or degraded condition. Driving factors of deforestation and forest degradation include population growth, the use of fuelwood as a primary energy for household, home industry, and larger industry, illegal logging and expansion of infrastructure, the operation of sawmills in forest margin communities, weak regulatory and law enforcement capacity. Meanwhile the significant influence factors for forest encroachment include perception of land tenure (rights) indicating the more secure land tenure perceived by household the less tendency of encroaching forest land. In addition, households who play a role as a formal leader tend to encroach forestland since they have authority in the area. Finally, an economic aspect indicated by the ownership of house can also perceived as an influence factor of forest encroachment. People who have no private house tend to encroach forest not only for establishing settlement but also to cultivate the forestland for economic purposes. Therefore, addressing population growth, improving the general welfare of forest margin community, reducing poverty, and seeking new sources of energy substitute for the dependency on fuelwood use, are all important considerations in developing strategies to reduce pressure on dwindling forest resources.

Keywords: deforestation, forest degradation, forest encroachment, land tenure, forest margin community

1. Introduction

Forest degradation can be defined as the declined of forest capacity in providing goods and services. Forest degradation which can lead to forest deforestation classified as two major causes of loss many function of the forest. Forest can be degraded in several perspective including productive and protective capacity, health, biodiversity and carbon storage (Thomson et al, 2012), but how can this loss perceived in social context. Some literature mentioned that forest degradation and deforestation are caused mostly by anthropogenic activities. FAO (2010) stated that 13-16 million Ha

forest in the world lost each year with the highest rate of lost especially in tropical area is between 2000-2005 period.

Indonesia experienced a massive deforestation and forest degradation after the fall of New Order administration in 1998. About 1.7 million ha of forestland disappeared averagely per year during 1995-2000. Unfortunately, the trend of deforestation and forest degradation continues in certain part of Indonesian within various scales.

As a small island ecosystem in eastern part of Indonesia, Lombok relies happily on the existence of good forests as a source of water which is very important for the inhabitants. However, deforestation and forest degradation as a general phenomenon in Indonesia is also a crucial problem in Lombok. Lombok has been experiencing a massive deforestation and forest degradation especially since the fall of New Order Regime in Indonesia also. From 1.069 million hectare of forest area in West Nusa Tenggara there are about 400,000 hectare of critical land within the forest. This situation is a result of illegal logging, log smuggling, and forest conversion.

The main factor driving the rate of deforestation and forest degradation is predictable by human activities (anthropogenic effect). Complex reason including economic, ecological and social aspects influence the encroachment of KPHL Rinjani Barat forest area. Illegal activities such as encroachment and certification of forest land still occurred. Based on KPHL Rinjani Barat data (2012) 21.442 Ha from 40.983 from its area or more than 50% is still occupied by communities legal through government program or illegally. The problem still arises since the occupation area tends to larger every year. Therefore, it is important to analyze the drivers and factors influencing forest encroachment.

2. Methodology

This research used multiple methods for analysis, including an analysing the trend of forestland changes during 1990-2010 using Landsat imagery data, a review of available secondary data, participatory rural appraisal through focus group discussions, individual household surveys, in depth interviews and logistic regression to identify the factors influenced forest encroachment. The use of these multiple-methods helped to validate the varied and sometimes inconsistent sources of secondary data available in community around forest conditions obtained by the KPHL RB, as well as village-level, sub-district, district, and provincial government sources. 14 administrative villages (Desa) from the 38 villages around the KPHL RB were selected for diversity and representation, based on their location, deforestation rates, designated forest function (Production Forest, or HP, and Protection Forest, or HL), and forest governance status.¹ Lack of documentation, limited reliability of demographic data, and low literacy rates are common challenges of socio-economic research in developing countries, and these were certainly important considerations for designing our research methodology in KPHL RB. Due to this limited and inconsistent documentation, validating the results of PRAs and FGDs through 420 household survey and statistical analysis and utilizing available demographic, economic, social and cultural data implemented in this research. Participatory research method through FGDs and PRAs were conducted in 14 villages adjacent to the forest area of KPHL Rinjani Barat attended by at least 25 participants in each village with representatives of gender, age, livelihood activities and income levels, and local/indigenous people and migrants, based on some reasons, which are : (1) the understanding that people living in these communities can provide accurate information about local conditions, including activities related to land use, forest exploitation and encroachment, either by local residents or people from outside, (2). The information can be

¹ Forest governance status includes: Community Forestry, or Hutan Kemasyarakatan (HKM), Industrial Forest Estate, or Hutan Tanaman Industri (HTI), Traditional Forest, or Hutan Adat, and the KPH).

explained by communities on historical trends of forest management in the community, current forest management activities, and general social and economic factors affecting deforestation and forest degradation. Chamber (1994) stated that PRA has a number of important advantages as an exploratory social research method: it is extremely flexible and adaptive, can be used with diverse groups to obtain local insights and knowledge, and it is particularly effective with people with limited educational levels or with individuals who are illiterate. In-depth interview conducted to get specific information and perspective from various stakeholders, so community information can be validated also.

We used linear multiple regression analysis to analyse the determinants of forest encroachment. The independent variables consist of perception of land tenure, formal leader, the ownership of house, the use firewood, household size, educational attainment, and household income. Meanwhile, the dependent variable is forest encroachment as a dummy variable. Model used is below:

$$Y=(p=1)=f(X1, X2, X3, X4, X5, \dots, Xn)$$

Where :

Y=(p=1) as probability of forestland encroachment

X1 = distance from house to forestland

X2 = educational attainment

X3 = formal leadership in community

X4 = house of ownership

X5 = area of house-floor

X6 = land ownership

X7 = total household income

X8 = perception of land tenure security

X9 = time from house to forestland by foot

3. Result and Discussion

3.1. Forest Cover Change

Bae, et al (2014) analysed that with the average loss-rate of 1.4%/year (1990-2010), forest land in Lombok Island has been decreased by 47.363 Ha (28.6%) over the past 20 years and the most significantly within period of 2000-2005 (2.09% average loss). The forest has been converted to non-forest land, mostly to cropland and shrubland. Similar pattern found in the area of KPHL Rinjani Barat. Our research findings that with deforestation average of 0.75%, KPHL Rinjani Barat has lost approximately 7.130 Ha (18.0%) forest area. Decreasing the forest cover caused directly to forest carbon stock. Research result shows carbon stock in KPHL Rinjani Barat decreased dramatically from 4.729.236 tC to 3.410.636 tC within 1990-1995. It means the vegetation change directly from primary forest to other form, such as secondary forest, shrubland, ect.

3.2. Drivers of Forest Degradation

Driving factors of deforestation and forest degradation particularly in Lombok Island can be classified into direct and underlying causes. Forest encroachment, wood extraction and infrastructure developments can be classified as direct causes, since those activities directly change the structure of the forest cover. Meanwhile, population growth, poverty and weak of law enforcement influence also the rate of deforestation and degradation and can be classified as underlying drivers.

3.2.1. Direct Drivers

3.2.1.1. Wood extraction and agricultural expansion, including encroachment, occupation, and settlement

As discussed in the analysis of forest cover change, approximately 5,139 ha of forest land in KPHL Rinjani Barat was converted to shrubland, and 1,664 ha became cropland (appendix 1). Conversion to shrubland implicates large-scale wood extraction, both legal and illegal, but conversion to cropland is largely due to agricultural expansion (Bae, et.al, 2012). Our study shows that encroachment occurred in 14 sample village (100%) and the average distributed forest land for each farmer varies between 0.25 - 1.35 Ha. In most of the study villages, local community residents and outsiders (immigrants) entered into forest areas, occupying particular lands with the intention of expanding agricultural production. This is a common phenomenon in the history of deforestation and forest degradation in the KPHL RB. It is found that more than 40% sample villages (6 out of 14) the land has been handover to other farmer illegally also. The community encroached the area individually or in a group. There are 2 type of distribution pattern, which are : (1). Farmer enters and distributes the area by themselves and (2). Farmer enters and distributed by government through government program. Distributed forest land have been managed intensively and legally through government program, such as HKm or not intensive and most of them are illegal (appendix 2).

Bae, et al. (2014) confirmed that local resident use fuel-wood for domestic and industrial purposes. Almost 95.8% families around KPHL Rinjani Barat gather fuelwood from nearby area. It is reported also the fuelwood consumption by household varies between 0.025 m³ and 0.092 m³/day. Some families reported the consumption more than 0.1 m³/day, but confirmed using for local homeindustries, such as tofu, palmsugar, tempeh and candies. Based on Agusdin (2012), the largest fuelwood consumers are tobacco industries. Around 17.000 giant tobacco ovens using fuelwood as source of energy, spread out in Lombok Island. It is found that the demand of fuelwood for agricultural products has significant impacts on forest condition (Lee, et.al, 2015).

3.2.1.2. Illegal logging and Infrastructure Development

Our research shows a positive correlation between the present and expansion of infrastructure, such as roads, markets and sawmills industries and loss of forest cover. All village study sites and forest areas are now accessible by road and those connected by provincial roads (Sambik Elen, Sigar Penjalin, Pemenang Barat, Malaka, and Senggigi) have experienced greatest forest cover loss with average greater than two percent per year (appendix 3) (Bae, et.al, 2014). Beside roads, present of markets, drives people to access and purchase goods produced from the forest and sawmill industries drives the increasing of illegal logging, which directly influences the change of forest structure significantly.

3.2.2. Underlying Drivers

3.2.2.1. Population growth

All village study site shows positive correlation between population growth and forest cover change. Bae, et. Al (2014) stated that average population growth around KPHL Rinjani Barat is about 1.7%/year and average forest cover change reach 1.5%/year. This result shows that the population increase is clearly an important driver of forest deforestation and degradation.

3.2.2.2. Poverty

Some poverty variables, including ownership of house and land, are used in this research. Analysis shows that the ownership of house has negative impact on forest encroachment as one significantly cause of deforestation and forest degradation. People has no house tends to encroach the forest land, as they need for living source.

3.2.2.3. Weak of law enforcement

Question arises everywhere since fall of Suharto era, why people now has courage and strength to encroach the forest area more? Why people tend to break the law? Fact shows that the highest rate of forest degradation in Indonesia occurred between 1995-2000, as well as in Lombok Island and KPHL Rinjani Barat area. Ambiguity condition and unfairness feeling among Indonesian community towards the weak law enforcement and unfairness distribution in forest resource management is a significantly drivers to deforestation and forest degradation.

3.3. The significant influence factors for forest encroachment

Conversion to cropland is largely due to agricultural expansion illegally consists of encroachment, occupation, and settlement of forest areas. Starting in 1990 period and reached the highest point in 1998 when political riots accoutred in all over Indonesia. Forest as one of significantly covered Indonesia become the most open natural resources that can be accessed by everybody. KPHL Rinjani Barat has experienced significantly to this condition, which is approximately 18.000 Ha (nearly 40 %) of its area occupied by more than 24.000 household. Community entered the forest legally through government program or mostly illegal, individually or in groups, distributed the forest land in many ways so each farmer in average 0.25- 2.00 Ha. They started to open from adjacent area to the village and penetrated into the deep of the jungle.

The forest area were opened and cultivated mostly by agricultural crops firstly for their own life. But, the situation changed since the size of family grows, need of cash increase, their piece of land quality decreased so it couldn't as productive as before, made the forestland become economical and political goods that can be transferred to other people. Some factors were tested further to confirm which ones may influence the encroachment activities during those periods. The distance and time from their home to the forest may be expected as the factors, since the community inform that they can open the forest as they like, based on their strength. The education background can be also influenced, since we assume that education can form good perspective that encroachment is illegal. Another factor is formal leader, as we perceived in relating with the culture that the formal leaders should be respected and can influence the way of community's life. The poverty factor including land house ownership and income are also estimated as influence factors since mostly farmers live in poor condition and we presumed that farmer will rely on economic motives most. The knowledge and perception of land tenure have allegedly impact on encroachment motivation, so we include in the model.

Based on statistical analysis, the combination of variables together are not significantly influence the forest encroachment, but if we paid attention more on some variables, it is found that variables of formal leader, house ownership and land tenure perspective are significantly influence to the probability that community will encroach the forest land. Result shows that perception of land tenure (rights) indicating the more secure land tenure perceived by household the less tendency of encroaching forest land. In addition, households who play a role as a formal leader tend to encroach

forestland since they have authority in the area. Finally, an economic aspect indicated by the ownership of house can also perceived as an influence factor of forest encroachment. People who have no private house tend to encroach forest not only for establishing settlement but also to cultivate the forestland for economic purposes. The result can be seen in the following table:

Table 2. Logistic regression result on Probability of forest encroachment

	B	S.E.	Wald	df	Sig.	Exp(B)
DISTANCE	.000	.000	1.133	1	.287	1.000
SCHOOL	.000	.032	.000	1	.992	1.000
FLEADER	.799	.419	3.640	1	.056	2.224
HOUSE	-.519	.311	2.780	1	.095	.595
FLOOR	.008	.008	.970	1	.325	1.008
LAND	-19.044	28199.813	.000	1	.999	.000
TINCOME	.000	.000	.001	1	.976	1.000
PRIGHTS	-1.079	.198	29.757	1	.000	.340
TIME1	.004	.003	1.242	1	.265	1.004
Constant	23.398	28199.813	.000	1	.999	14504668 698.794

4. Conclusion

Our research findings suggest that during the period 1990-2010 approximately 25 percent of the total area of forest in Lombok is classified as critical or degraded condition with 1.5% forest cover change per year which is comparatively higher than the national average (1.0%) during the same time period. Our analysis confirms that the driving factors of deforestation and forest degradation include population growth, the use of fuel wood as a primary energy for household, home industry, and larger industry, illegal logging and expansion of infrastructure, the operation of sawmills in forest margin communities, weak regulatory and law enforcement capacity. Meanwhile the significant influence factors for forest encroachment include perception of land tenure (rights) indicating the more secure land tenure perceived by household the less tendency of encroaching forest land. In addition, households who play a role as a formal leader tend to encroach forestland since they have authority in the area. Finally, an economic aspect indicated by the ownership of house can also perceived as an influence factor of forest encroachment. People who have no private house tend to encroach forest not only for establishing settlement but also to cultivate the forestland for economic purposes. Therefore, addressing population growth, improving the general welfare of forest margin community, reducing poverty, and seeking new sources of energy substitute for the dependency on fuel wood use, are all important considerations in developing strategies to reduce pressure on dwindling forest resources.

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Appendix 1. Forest Cover Change in KPHL Rinjani Barat

1990	2010							Total
	Forest	Shrubland	Cropland	Highland grassland	Wetland	Settlement	Others	
Forest	31,356.9	5,139.4	1,664.3	393.0	0.0	1.3	54.8	38,609.6
Shrubland	36.9	145.8	10.0	19.6	0.0	0.0	9.3	221.7
Cropland	183.1	83.2	118.8	25.1	0.0	0.4	0.9	411.5
Highland grassland	22.6	11.3	1.2	42.4	0.0	0.0	1.9	79.4
Wetland	4.9	0.0	0.0	0.0	0.0	0.0	0.8	5.7
Settlement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Others	32.9	1.4	0.1	0.5	0.0	0.0	17.4	52.4
Total	31,637.4	5,381.1	1,794.4	480.6	0.0	1.7	85.1	39,380.3

Appendix 2. Pattern of Forest Encroachment

No.	Desa	Cover change rate (%)	Forest encroachment	area/hh (ha)	right transferred	enter the forest pattern	Distribution pattern	Forest area Management
1	S. Elen	-2.2	√	0.56	√	groups	distributed by farmers	Not intensive
2	Salut	-1.91	√	0.57	-	groups		Intensive, HKm
3	S. Bangkol	-0.76	√	1.2	-	groups-start from adjacent village	width 33 m	Intensive
4	Genggelang	-0.97	√	0.89	-	groups	set and distributed by gov.	Intensive PHTUL
5	Jenggala	-1.47	√	1.07	-	groups	1.298 Ha for 765 petani farmers	Intensive , HKm
6	Bentek	-0.5	√	1.11	-	groups	distributed 0.35 -1 Ha/farmer	Intensive
7	S. Perjalin	-2.17	√	0.5	√	groups-start from adjacent village	160 Ha and 135 Ha, divided into 2 villages	Intensive
						groups	700 Ha for 1000 farmers	Intensive
9	Malaka	-2.99	√	1.1	√	individual and groups	as farmer can	Not intensive
10	Senggigi	-2.59	√	0.61	√	individual and groups	as farmer can	Not intensive
11	Kekait	-0.74	√	0.52	√	groups	100 Ha divided to 200 farmers (each 0.3-2Ha)	Intensive
12	G. Macan	-0.82	√	0.26	√	individual	+147 farmers (each 0.25 Ha)	Intensive
13	D. Griya	-0.47	√	0.48	-	through gov. program	400 ha for 130 petani (0.3 Ha/farmer)	Intensive
14	B. Mekar	-0.49	√	1.35	-	individual and groups	distributed by farmers	Intensive

		(994.4)								
2	Salut	-	Yes	3	1	0	0	3650	2605	-1.91
3	Sambik Bangkol	-	Yes	7	1	0	0	2943	2609	-0.76
4	Genggelang	-	Yes	0	1	0	0	6683	5710	-0.97
5	Bentek	-	Yes	0	1	0	0	2503	1950	-1.47
6	Jenggala	-	Yes	4	0	0	0	4823	4463	-0.50
7	Sigar Perjalin	-	Yes	7	0	0	0	821	553	-2.17
8	Pemenang Barat	Yes (7.1)	Yes	10	0	7	0	3193	1761	-2.99
9	Malaka	Yes (32.4)	Yes	11	0	0	0			
10	Senggigi	Yes (46.9)	Yes	1	0	2	0	1055	645	-2.59
11	Kekait ²	-	Yes	3	0	0	2	2472	2197	-0.74
12	Guntur Macan	-	Yes	1	1	0	0	776	680	-0.82
13	Dasan Griya	-	Yes	0	1	0	0	158	147	-0.47
14	Batu Mekar	-	Yes	1	1	0	0	5422	5023	-0.49

Appendix 3. Infrastructure around KPHL Rinjani Barat

no.	Village name	Connect		Market		Sawmill		Forest area		Forest change (%/yr)
		Provincial road(m)	Sub-district road	Regular	On site	regular	On site	1995	2010	
1	Sambik Elen	Yes	Yes	4	1	0	5	2699	1817	-2.18