

DAFTAR ISI

Politik Pengelolaan Lingkungan dan Sumber Daya Alam

1. Wacana Lingkungan dan Pembangunan Berkelanjutan
Dalam Lembaga Swadaya Masyarakat di Indonesia
Nanang Indra Kurniawan 1-15
2. Konflik dalam Penentuan Dana Bagi Hasil antara
Pemerintah Pusat dan Pemerintah Propinsi Kalimantan Timur
Tenti Kurniawati 16-25
3. Sengketa Perebutan Divestasi Saham Newmont Nusa Tenggara:
Analisis Ekonomi Politik (2008-2012)
Hafid Rahardjo 26-44
4. Ekonomi Politik Perminyakan Indonesia:
Analisis Kebijakan Liberalisasi Sektor Hulu Migas Indonesia pasca-1998
Ahmad Rizky Mardhatillah Umar 45-61
5. Konflik Pasir Besi: Pro dan Kontra Rencana Penambangan Pasir Besi
di Kabupaten Kulon Progo
Eka Zuni Lusi Astuti 62-74
6. Pembangunan Berbasis *Waterfront* dan Transformasi Konflik di
Bantaran Sungai: *Sebuah Pemikiran Awal*
Cahyo Seftyono 75-83
7. Does the Pressure of Population and Poverty cause Deforestation?
Pungky Widiaryanto 84-93

Does the Pressure of Population and Poverty cause Deforestation?

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Abstract

Deforestation has created several negative impacts such as reducing biodiversity, decreasing life support system and increasing green house gases emission. Identifying the causes of deforestation is a key to tackle this problem. Various studies have been conducted to investigate the driver of deforestation in the world. Some experts believe that the pressure of population and poverty cause deforestation. On the other hand, the others argue that there is no relationship among the pressure of population, poverty and deforestation. This paper tries to examine the link of pressure of population, poverty and deforestation by reviewing some recent studies.

Key Words:

deforestation, population, poverty

Abstraksi

Kerusakan hutan yang terjadi di dunia telah mengakibatkan beberapa dampak negatif seperti kehilangan keanekaragaman hayati, penurunan sistem pendukung kehidupan dan peningkatan emisi gas rumah kaca. Identifikasi penyebab kerusakan hutan menjadi penting untuk dikaji dalam menangani kerusakan hutan. Beberapa penelitian telah dilakukan untuk mengeksplorasi penyebab kerusakan hutan, salah satunya adalah tekanan penduduk dan kemiskinan. Sebagian peneliti berpendapat bahwa tekanan penduduk dan kemiskinan telah mengakibatkan kerusakan hutan. Akan tetapi, beberapa peneliti lainnya mempunyai pendapat bahwa tidak ada hubungan antara tekanan penduduk, kemiskinan dan kerusakan hutan. Oleh karena itu, artikel ini mencoba untuk mengupas perdebatan hubungan fenomena ini dengan mengkaji penelitian-penelitian yang pernah dikaji sebelumnya.

Kata Kunci:

kerusakan hutan, tekanan penduduk, kemiskinan

Introduction

Deforestation in developing countries has generated serious environmental degradation such as biodiversity loss, soil degradation and emissions implicated in global climate change. The Economic activity of a nation including livelihood and cultural integrity are also affected by the deforestation

(Culas, 2007). The massive deforestation in tropical countries is major contributor to global greenhouse gases (GHG). Tropical deforestation produces emission 0.8 – 2.4 Giga tons (Gt) to total global GHG emissions, even though this figure varies due to uncertainty estimations and debates among several researchers (Fearnside and Laurance, 2004).

This amount contributes 17% of total GHG emissions as the third largest contribution after energy supply (26%) and industry (19%) (Intergovernmental Panel on Climate Change, 2007). Because of the immense social economic consequences of these deforestation related processes, there is now a considerable need to enhance our understanding of linkage of deforestation and socio-economic condition.

The serious impacts of deforestation have motivated some researchers to investigate the underlying cause of deforestation. One of the drivers of deforestation is socio-economic that can be defined as population and poverty, particularly in rural area. The relationship between poverty and deforestation is introduced in the “sustainable development” discussion (Lele, 1991). The connection among population, poverty and environmental degradation is categorized as the vicious circle model (VCM) (Sherbinin, et al. 2008). For example an increase in poverty encourages higher population because individuals need their children to be laborers in their fields. This will stimulate population growth, which further increases demand for food and resources from an essentially static resource base.

Therefore, this paper examines this issue with a narrow focus on poverty, population pressure and environmental degradation that is defined as deforestation. I outline three sections to explain about this connection. First, I will explore some evidence about this linkage from several countries. Second, I will explain why poverty-stricken cause deforestation. Third, I will describe if deforestation is not affected by poverty but population pressure. Finally, I will try to present some alternative policies when poverty does not cause deforestation.

Some cases in several countries about the relationship between deforestation and poverty

This chapter reviews the literature concerning the relationship of deforestation, poverty and population. Some of studies believe that deforestation is determined by poverty. However, the other experts argue that deforestation is caused by population pressure.

a) An Inquiry into Well-Being and Destitution by Dasgupta (1993)

The first literature that explains the link between deforestation and poverty was conducted by Dasgupta in 1993. In his book “An inquiry into well-being and destitution,” Dasgupta (1993) tries to explain the population dynamic in rural communities that can lead environmental degradation specifically deforestation. In the rural communities of developing countries, people most likely miss credit, capital and insurance that make them depend on exploitation of common property resources for their income and daily needs (Dasgupta, 1993). Moreover, if the labor markets cannot provide jobs for the poor people, the poor will be tend to exploit the natural resources as their main activity to support their main income.

He goes on to say that we should consider an economy that is neither rich in assets nor vastly poor (Dasgupta, 1993). The theory to be developed will show that, were such an economy to rely on the market mechanism, the initial question is whether or not all citizens have their basic need met (Dasgupta, 1993). For example, we will confirm that, if a large part of the population were to be asset less, markets on their own would be incapable of enabling all to obtain an adequate diet. On the other hand, were the distributions of assets sufficiently equal, the labor market would be capable of absorbing all, and

no one would suffer from malnutrition (Dasgupta, 1993).

Dasgupta (1993) concludes that it is clear that such a labor surplus economy neutralize by spreading asset less people around job markets. Because of the combination of the lack of assets and work, the fraction of the landless that is involuntarily unemployed are forced to "live on common property resources" (Dasgupta, 1993). It seems because these individuals are destitute, they are unable to meet their nutritional requirements from living just off common property resources. Because they are chronically weak, the unemployed landless are unable to compete in the labor market, particularly compared to an individual with assets (land) (Dasgupta, 1993). Therefore, Dasgupta (1993) calls "economic disfranchisement" or "the inability to participate in the labor market," is the direct consequence of an inequitable distribution of assets in the economy. Increased disfranchisement in turn leads more and more of the "assetless" poor in the economy to become dependent on exploitation of common property environmental resources (Dasgupta, 1993).

- b) *Poverty, population and environmental degradation in China by Rozelle, Huang and Zhang (1997)*

In this study, the authors find progress in building new forests from farmland in poor counties in China has declined throughout the 1980s (Rozelle, Huang and Zhang, 1997). The authors believe it may be that richer rural residents and their leaders are more willing and able than their poorer counterparts to forgo the immediate benefits from marginal land's food output, and have begun to invest in forest activities (Rozelle, Huang and Zhang, 1997).

In terms of building up national forest resources, richer provinces have been able to rely less on cropping, and reduced agricultural expansion has increased forest cover (Rozelle, Huang and Zhang, 1997). The main cause of this phenomenon is similar with Sunderlin and Resosudarmo (1999) that people in areas with high population growth rates apparently adopt increasingly intensive agricultural technologies.

- c) *Environmental Motivations for Migration: Population Pressure, Poverty, and Deforestation in the Philippines by Amacher et al. (1998)*

According to this study, the upland resource availability is a more important migration attractant than expected income (Amacher et al., 1998). Also, it would be a most reasonable finding for immigrants whose subsistence agricultural opportunities are more important than their participation in the cash economy. It confirms the initial expectations that it is the uplands attracting migrants in the Philippines, and those regions which display lower population density and larger areas of insecurely tenured lands are especially attractive (Amacher et al., 1998). Settlement of these areas implies deforestation, and the difficulties the settlers have in establishing their own long-term rights to these lands implies a preference for short-term management practices that would create potentially important erosion and off-site environmental degradation (Amacher et al., 1998).

- d) *A theoretical model using socio-economic and physio-geographic information to explain lower poverty results in lower deforestation in Mexico by Deininger and Minten (1999)*

An empirical study conducted by Deininger and Minten (1999) describes

the impact of three factors -poverty, government policies and the associated price incentives, and the security of property rights- in determining to deforestation in Mexico. Particularly with the factor of poverty, the authors find that poverty is related with higher level of deforestation. The model that is used to examine this relationship is through the presence or absence of alternative economic opportunities (on or off farm) that will lead poor people to undertake activities with very low marginal returns to labor, including unsustainable exploitation of marginal lands (Deininger and Minten, 1999).

The result of this study shows that the quality of agricultural endowments is the most important and significant as a determinant of poverty and it is of much less relevance for predicting average income or the municipal dependency ratio (Deininger and Minten, 1999). Also, the authors find that lower levels of poverty are significantly associated with reduced deforestation (Deininger and Minten, 1999). This implies that policies that enhance incomes in poor areas would, other things being equal; also provide environmental benefits by reducing deforestation.

- e) *Effect of population and migration on forest cover in Indonesia by Sunderlin and Resosudarmo (1999)*

Other study conducted by Sunderlin and Resosudarmo (1999) finds a sharp decline in the rate of growth of rural population in certain provinces in Indonesia is not matched by a clear decline in the rate of deforestation and forest degradation. According to this study, there are two factors population pressure in deforestation i.e. push factor and pull factor (Sunderlin and Resosudarmo, 1999). The push factor is defined as tech-

nological change has transform people to exploit the forest more rapidly. For example, previously people use axe to cut trees then currently they use chain saw to harvest the forest resource. This transformation obviously has pushed communities to cut down the trees rapidly. Moreover, the authors also describe that there are also pull factors, such as availability of infrastructure, that lead people move to forest area (Sunderlin and Resosudarmo, 1999). However, Sunderlin and Resosudarmo, (1999) also argue deforestation is not only a result from land clearing by rural small landholders but also from a development program for increasing international and per capita domestic.

- f) *Poverty and environment in Latin America: concepts, evidence and policy implication by Swinton, Escobar and Reardon (2003)*

A study, conducted by Swinton, Escobar, Reardon (2003) explores that the non-poor and the poor are the main player in resource degradation from across Latin America. The rural poor are no more responsible for natural resource degradation than the non-poor. The authors further go to say when there is a lack of proper incentive; the capacity for responsible Natural Resource Management (NRM) becomes irrelevant (Swinton, Escobar, Reardon, 2003).

- g) *The deforestation of rural areas in the lower Congo Province by Iloweka (2004)*

Other study conducted by Iloweka (2004) explains that in order to better understand the cause of deforestation in the Lower Congo Province, it is important to examine human activities in each of the ecological settings. The author also proposes that the poverty, marginalization and serious scarcity of

land increase the pressure on communities to change the forest area into other land use that can benefit them (Iloweka, 2004).

Moreover, this study also presents that the demography condition in the Democratic Republic of Congo also leads deforestation. Since this country is a vast country with about 60 million inhabitants, including 45 million who are considered poor and living below the poverty line, most of rural communities live depend on natural resources extraction (Iloweka, 2004). They use forest products such as wood to supply their fuel, to build their home and to fulfill their daily needs (Iloweka, 2004).

Iloweka (2004) also argue that the community's practice of intensive agriculture with short periods of soil rest while using slash and burn methods to clear lands. Generally, this study implies that the socio economic condition in rural area has contributed greatly to deforestation.

- h) *Population, Land Use and Deforestation in the Pan Amazon Basin: A Comparison of Brazil, Bolivia, Colombia, Ecuador, Peru and Venezuela by Perz, Aramburu and Bremner (2005)*

In this study, the authors try to explain that the major cause of deforestation in the Pan Amazon Basin is population pressure and net migration (Perz, Aramburu and Bremner, 2005). The authors also describe that these conditions occur because of the effect of development policies that also influence land cover change (Perz, Aramburu and Bremner, 2005). It seems that deforestation in the Amazon reflects many processes, beginning with household land use, which reflects local population change and responds to national and external political and economic circumstances.

Perz, Aramburu and Bremner (2005) also raise questions about less-studied aspects of land cover change in the Pan Amazon. For one thing, the researchers also suggest examining closely in micro level processes that more directly influence land use and land cover change. Therefore, it can be defined that deforestation reflects first and foremost the decision of a social actor to cut trees down.

- i) *Natural resources and economic development by Barbier (2005)*

The cause of deforestation because of poverty is also explained by Barbier (2005). He describes that an important aspect of natural resource and economic development in poor countries, namely that much of population in low and middle income economies is concentrated in rural areas and remains dependent on agricultural and other renewable resources for their livelihoods (Barbier, 2005). It is as important implications for an economic approach to improve resource management for sustainable development in poor countries (Barbier, 2005).

According to Barbier (2005) there are two types of "dualism" in patterns of resource use within developing countries that are relevant to the problem of resource degradation and poverty. The first concerns combined resources use and dependency within the global economy (Barbier, 2005). "The main concern with this type of dualism is the trend of resource-based development in many low and middle-income countries to be correlated with poor economic performance and development prospects" (Barbier, 2005). The second concerns aggregate resource use and dependency within a developing economy (Barbier, 2005). "The main concern with

this type of dualism is the tendency for a large number of concentrated in marginal frontier areas and on ecologically “fragile” land, while any rents generated through exploitation of valuable natural resource accrue largely to wealthier households” (Barbier, 2005).

Inequality in access to valuable natural resources is therefore an important component of the “cumulative causative” environment-poverty trap found in many rural areas of poor countries (Barbier, 2005). Inequalities in wealth between rural households seem to have an important impact on the land degradation and deforestation process, which in turn appear to have a greater impact on the livelihoods of the rural poor (Barbier, 2005). More powerful groups use their social and economic power to secure greater access to valuable environmental resources, including land, minerals, energy, gems, water and even fuel wood (Barbier, 2005).

Barbier (2005) also demonstrates that the role that inequality in the allocation of land resources is a good example for explaining why poor people render in diminishing the forest resource. First, poorer households are often unable to compete with wealthier households in land markets for existing agricultural land (Barbier, 2005). We can imply that the wealthier rural communities who dominate the land base markets have made the poor cannot compete with them. As a result, the poor people use less productive land or migrate to marginal lands.

Second, although poorer households may be the initial occupiers of converted forestland they are rarely able to sustain their ownership (Barbier, 2005). As the frontier develops economically and property rights are established, the increase in economic opportunities and

potential rents make ownership of the land more attractive to wealthier households. Because of their better access to capital and credit markets, they can easily bid current owners off the land who in turn may migrate to other frontier regions or marginal lands (Barbier, 2005). Third, because of their economic and political importance, wealthier households are able to lobby and influence government officials to ensure that resource management policies favorable to them continue (Barbier, 2005). This means that policy reform is very difficult to implement or sustain.

j) *Does poverty constrain deforestation? Econometric evidence from Peru by Zwane (2007)*

This paper analyzes the interaction between poverty and land use change in the Peruvian Selva. The author takes as a benchmark hypothesis the claim that reductions in poverty will be correlated with less land clearing, as households are able to intensify agriculture on previously cleared plots or make other investments Zwane (2007). In contrast to this claim, the author shows that under plausible conditions that are common in rural areas of countries such as Peru this hypothesis need not hold Zwane (2007). In empirical analysis, the author shows that, in the Peruvian Selva, the correlation between income and land clearing is initially positive but non-monotonic Zwane (2007). This result remains intact through a variety of robustness checks, although the estimates of the income elasticity of land clearing are fairly small. This suggests that there are more important drivers of deforestation than income levels and poverty.

- k) *Poverty and forest: Multi-country analysis of spatial association and proposed policy solutions by Sunderlin, Dewi., and Puntodewo (2008)*

In this study, the authors analyze relationship between poverty rates, poverty densities, and forest cover in seven countries (Brazil, Honduras, Indonesia, Malawi, Mozambique, Uganda, and Vietnam) (Sunderlin, Dewi., and Puntodewo (2008). In three of seven countries, they find a significant positive correlation, at the district level, between poverty rates and forest cover (Sunderlin, Dewi., and Puntodewo (2008). Vietnam is an example of this phenomena where high poverty rates, low population densities, and high forest cover in the remote mountain regions of the north and central parts of the country (Sunderlin, Dewi., and Puntodewo (2008). In other three countries there is no significant relationship.

Brazil is the only country that has a significant negative relationship (Sunderlin, Dewi., and Puntodewo (2008). At the national level, across types, the relationship is negative because the semi-arid region of northeast Brazil has high poverty rates and low population rates and low forest cover – while the wealthy southernmost part of the country, well into the forest transition, has low poverty rates and high forest cover (Sunderlin, Dewi., and Puntodewo (2008). This national-level correlation result obscures the relationship evident in remote western Amazonian forests have high poverty rates and high forest cover.

This study also finds that only a small percentage of the countries' populations of poor people live in areas characterized as high forest and high poverty rate. The range is from a low of about 3% for Uganda and Indonesia to

about 12% for Vietnam (Sunderlin, Dewi., and Puntodewo (2008). For all countries with the exception of Mozambique, there are as many or more poor people in the "low forest – High poverty rate" zone as there are in the "high forest – high poverty rate" zone (Sunderlin, Dewi., and Puntodewo (2008).

Synthesizing literatures

As mentioned in several studies concerning this topic, we can synthesize many studies do not provide a clear conclusion to whether or not poverty has led to deforestation. Some experts clearly state that there is no relationship between deforestation and poverty (Sunderlin, Dewi and Puntodewo, 2008; Swinton, Escobar and Reardon, 2003). They argue that deforestation is not only caused by poor people but also the non-people. Swinton et al. (2003) also argue that lack of proper incentive contribute to further forest destruction both for poor and non-poor. Moreover, the affluent are more responsible for deforestation because they have more power in transforming the forest to other land use (Swinton et al., 2003).

In addition, Sunderlin et al. (2008) find that there is no significant correlation between poverty and deforestation in seven countries (Brazil, Honduras, Indonesia, Malawi, Mozambique, Uganda and Vietnam). It appears that these countries are located in tropical developing regions that currently face massive deforestation. Even Barbier (2005) argues that the mid and low-income countries depend on natural resources for their economic development which does not imply all poverty-stricken living in developing regions destroy the forest area. The forest destruction is more likely caused by population pressure (Sunderlin and Resosudarmo, 1999; Angelsen and Kaimowitz, 1999). On the other hand, some researchers believe that rural poor people

have caused deforestation in Pan Basin Amazon, Congo, China, Mexico (Barbier, 2005;; Perz, Arumburu and Bremner, 2005; Iloweka, 2004; Deininger, Minten, 1999, Dasgupta, 1993).

However, few experts have made a critical finding in the connection between poor people's lack of assets and skills and diminishing of natural resource. Three factors of population dynamics that may cause deforestation in developing countries are population growth, economic policy and property right.

a) *The growth of population*

Even though we cannot firmly conclude the link of poverty and deforestation, the pressure of population is likely a major driver of deforestation. The demand for forest product and other land use is influenced by population pressure. Both the poor and the rich have already contributed the further deforestation. Poor people use forest resources as their major income and for fulfilling daily needs. On the other hand, the rich people want to expand their business or economic activity by converting forest area to other land use. This result is consistent with study conducted by Dasgupta et al. (2004) that finds overall population pressure is a major determinant of deforestation in Cambodia. His study also suggests that forest clearing by poor people is neither more nor less intensive than forest clearing by the general population. This finding is also consistent with a study by Swinton et al. (2003) concludes both poor and rich people have already contributed to deforestation in Latin America.

The growth of population brings a consequence the need for more land in order to supply their lives with items, such as food, house, fuel wood, timber and other forest products. This implies that the demand of harvesting forest product and converting forest area to other land use also increases (Angelsen and Kaimowitz, 1999). Particu-

larly in rural communities, the increase of land use demand, which accelerates the reducing forest resources, has been indicated in several countries such as in Peru, Congo, Philippines, China and some countries in Pan Basin Amazon (Rozelle, Huang and Zhang, 1997; Amacher et al., 1998; Iloweka, 2004; Perz, Arumburu and Bremner, 2005; Zwane, 2007).

In addition, David (2004) believes that the role of population in driving deforestation is complex. Demands for forest resources are produced, both local and regional. The former will play an increasingly greater role as the developing world becomes urbanized. Reducing population pressure on scarce remaining forest areas is a priority that should be shared by rural developers, proponents of free trade, family planning advocates, and conservationists.

Growing populations also affect labor markets, especially in land use based economic business. This economic activity renders two negative effects. First, because there are many labor supplies, the company can benefit from inexpensive labor which can boost their business. The expansion of this business requires forest area to be converted to other land use. Second, the unskilled laborers that cannot compete in labor markets will utilize and exploit the resource to fulfill their daily needs. Moreover, Dasgupta (1993) argues that the unskilled laborers that do not have land or are near landless will only depend on exploitation of common property resources. It is clear that the contribution of population increase in diminishing the forest resource is significant.

b) *Economic demand*

At the local and regional levels, the government policies to improving population quality life by increasing income per capita also worsen the forest destruction. These policies are integrated into the economic development program that mostly need more land use change (Sunderlin and Resosudarmo,

1999). Moreover, the low and middle-income countries concerns aggregate resource use and dependency within a developing economy (Barbier, 2005). Economic development based on natural resources particularly in tropical developing countries has made these developing nations boost their development within several years. However, Barbier (2005) argues that any economic income generated from resource exploitation has contributed to creating an equal distribution among population.

The gap between the wealthier and the poor is significant. Inequality of economic distribution yields a major impact on land degradation and deforestation (Barbier, 2005). The wealthier groups use their social and economic power to occupy larger access in valuable natural resources; the poorer do not have enough access to the resources (Barbier, 2005). It is also consistent with a study by Deininger and Minten (1999) explaining that the high poverty levels are significantly associated with high deforestation.

c) *Lack of property*

The willingness to exploit and to change the land use is not only because of the poor people cannot compete with other who have abilities in labor markets, but it mostly caused by lack of property.

The poverty-stricken in rural communities depend more upon exploitation of natural resources (Dasgupta, 1993). They are unable to survive without utilizing natural resources. Consequently, the forest degradation cannot be avoided. As Barbier (2005) mentioned, the lack of property right is generated by inequality of economic distribution.

Conclusion

Finally, even some findings explain that there is no relationship between deforestation and poverty, a future detailed study in identifying poverty and the linkage to deforestation in every area should be conducted. Forests are potentially very important for na-

tional poverty alleviation strategies for several reasons. First, almost all people living in and around forest area depend on forests as their main income. This fact is important when we consider that population densities will increase in open forest more than in closed forest.

Second, high poverty rate is often linked with high severity of poverty and long duration poverty. Therefore, if there is a national program to eradicate nodes of poverty that are the most difficult to address, then it may make sense to target high forest areas, because the communities are likely to demonstrate these kinds of poverty.

Third, there is likely a relatively high dependence on forests for livelihoods in areas of high forest and high poverty alleviation strategy in those places. Promising opportunities of this kind are in places where non-forest livelihoods alternatives are few and where sustainable use of forest resources is possible among other preconditions. It is important to note that lands without forests are potentially vital for tree-based poverty alleviation strategies. The reason is that some areas without forest are often wood deficit areas where the poor can base their livelihoods on supplying the need for timber, firewood, charcoal and wood crafts through smallholder plantations and small-scale industries (Sunderlin, Dewi and Puntodewo, 2007). The poor who live in areas of low forest and high poverty rate are potential beneficiaries of investments in such strategies.

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