

Failure of Forestry Political Economy of Indonesia

Soedarsono Soedomo

Department of Forest Management, Faculty of Forestry, Bogor Agricultural University,
Academic Ring Road, Campus IPB Dramaga, PO Box 168, Bogor, Indonesia 16680

Received May 29, 2017/Accepted August 31, 2017

Abstract

Indonesia's natural forest has been persistently declining, even with the fastest rate in the world, regardless of various efforts to stop the decline or at least to reduce the rate significantly. At the same time, development of plantation forest has been very slow. Amongst the various causes of the natural forest loss that have been identified, financial nonprofitability was not one of them. That being said, the fundamental reason as to why utilization of natural forest for timber production will not survive in the long run is because of financial nonprofitability. In order for a business to stay in the industry of the natural forest utilization, the government should provide financial incentives using public's money. Hence, the public support for the forestry is vital for the survival of the industry?. However, improper implementation of forestry laws can have damaging impacts to the public's perception and support. Moreover, the five policies, namely forest land establishment, fees and royalties, log export ban, certification, and forest management unit establishment, which have failed to deliver sustainable natural production forests, are shortly discussed. Finally, the more appropriate approach of natural forest utilization is basically not as a sustainable forest management but rather as the optimal timber mining, which consequently requires different set of policies.

Keywords: discount rate, profitability, stock growth rate, stumpage price

**Correspondence author, email: ssoedomo@gmail.com, tel.: +62-251-8621256*

Introduction

According to the constitution of the Republic of Indonesia, natural resources are controlled by the state and used for the greatest prosperity of the people. The constitution also mandates that the national economy is performed on the basis of economic democracy with the principles of togetherness, just efficiency, sustainability, environmental consideration, independence, and with maintaining balance of development and national economy unity. These are the foundations of political economy of forestry and other sectors in Indonesia. Those principles should be operationalized through law, government regulations, and ministerial decree. The first political economic question regarding forestry is who should produce forest-based goods and services? To what extent should the government involved in the production process of forest-based goods and services?

The picture of forestry in Indonesia is characterized by two symptoms; they are a persistent degradation of the natural forests and a slow expansion of the plantation forests. Further discussion focuses more on the natural forests. Various causes of the forest loss have been identified, which include social, economic, and institutional factors (Repetto & Gillis 1988; Angelsen & Kaimowitz 1999; Goers *et al.* 2012). Although the proposed recommendations might not

be effective in halting the deforestation, some recommendations have the potential for enhancing government revenue, making the timber harvest more efficient, and promoting the development of plantation forest. Moreover, the loss of natural forests would have been offset by the expansion of plantation forest. Unfortunately, what we have seen is that the loss of natural forests takes place persistently while the plantation forest expands sluggishly.

The fundamental reason as to why the allocation of natural forests for timber production purposes will not survive in the long run is because of financial nonprofitability. There are two main factors contributing to this situation, i.e. the growth rate of natural forest is very low and the increase in timber price, or more precisely in stumpage price, over time is also very low. Those two factors are essential for selecting the optimal standing stock to maximize the discounted perpetual profit; in general, given the increase in the stumpage price, the higher the discount rate the lower the standing stock. As a matter of fact, the utilization of natural forests is profitable only in the first rotation when the forests still contain a huge amount of timber. In other words, the more appropriate approach to natural forest utilization is basically not as a sustainable forest management but rather as the optimal timber mining,

Table 1 Business of natural forest utilization

Year	Number of company	Official area (ha)	Effective area (ha)
1992	580	61.38	42.97
2000	362	39.16	27.41
2005	285	27.72	19.40
2010	304	24.95	17.46
2015	269	20.62	14.43
2016	265	20.88	14.62

Source: APHI (Indonesian Forest Business Association) provided through personal communication with Mr. Herman Prayudi, Deputy of Executive Director, in August 2017

which consequently requires different set of policies. So, it is not surprising when Clark (1973b) suggests that a total liquidation of the entire population may appear as the most attractive. Using a different approach, Hyde (2005) has questioned the sustainability of natural forest management as it has been traditionally thought by foresters.

Having recognized the nonsustainability of natural forest utilization, the government needs to issue appropriate policies, for example, how to optimize timber extraction to maximize the government revenue. In this regard, Repetto and Gillis (1988) outline very nicely how the government policies, both forestry policies and those impinging on the forestry sector, have resulted in economic and fiscal losses while they have contributed to the degradation of forest resources. However, instead of addressing the critical issues, such as property rights, appropriate fiscal policy, incentive system, and inefficient timber processing industry, the government has dedicated its time with improper issues, such as certification.

The purpose of this article is to show that utilization of the natural forests in Indonesia is not sustainable since it is hardly or not profitable in the long term. As depicted in Table 1, the trend of the business of natural forest utilization declines persistently. Of 265 business units recorded in 2016, only 199 units are actively running their business. Following this introduction, the Section 3 discusses necessary conditions for sustainability, covering the price, the growth rate of standing stock, and property rights. Section 4 is a discussion of the policies that have failed to deliver the outcome expected. Finally, Section 5 is conclusion).

Methods

This paper is basically a synthesis of the literature and the experience gained from years of interaction with various relevant parties, such as government officials, entrepreneurs, academics, forest communities, and non-governmental organizations. In essence, it is a participant observation supported by theoretical and empirical findings. Some literature provides a theoretical review of the necessary conditions that must be met for the maximum benefit in the long term. Businesses that are not profitable will not be able to survive in the long term. The results of theoretical reviews are then faced with the realities that are obtained from the literatures that are more empirical. Often it is very difficult to obtain data required to verify the theoretical results. In this situation, consulting forest practitioners becomes a way out. If this is the case, then information obtained and the party consulted will be provided. My colleague asked me if I employed the bricolage approach in writing this article.

When I was asked I had not heard the term bricolage. Having read a few materials regarding the bricolage, I do not mind if the approach I am using is essentially a bricolage, even though I do not make any claim. Bricolage is an approach to qualitative inquiry. The bricolage allows researchers to embrace flexibility and plurality by amalgamating multiple disciplines, multiple methodologies, and varying theoretical perspectives (Rogers 2012).

The political economy outlined in the constitution is translated into more operational policies. These more operational policies are the real form of political economy. Furthermore, the success and failure of a policy of political economy can be seen from a variety of ways and discipline. Testing the success of the political economy of forestry in Indonesia should include aspects of social welfare, sustainability, environment, and justice. In this context, bricolage is best suited for use as an analytical approach. Even though this paper is more toward policy evaluation rather than policy analysis, they share with each other in multiple tools employed (Knoepfel *et al.* 2007). The core theories employed as a framework in this paper essentially include economics of renewable natural resource utilization, institutional economics, and administrative theory. Who benefits and loses from each policy is identified.

Necessary conditions for sustainability Sustainability of renewable natural resource management is determined by biological, economic, and institutional factors (Piazza & Roy 2015). The biological factors include growth rate and size of the renewable natural resource. The economic factors include discount rate, price level, and rate of the price change. The institutional factor refers to rule of the game under which the natural resource management is executed; however, in this paper only property right regime will be discussed. If one of those factors is not satisfied, then it is sufficient to say that the natural resource management will not be sustainable.

Price: Level and change The role of the price level and the price change can be seen easily in a dynamic optimization choosing the optimal extraction rate and optimal stock level of the renewable natural resource to maximize the discounted perpetual net benefit flow (Clark 1973b; 1979; Levhari *et al.* 1981; Cropper 1988; Swanson 1994; Ackerman 1994; Brown 2000; Mitra & Roy 2006). The first condition says that the price of the harvested timber must equal the user cost-in forestry it is well known as stumpage price-plus the marginal cost. This condition is required to ensure the profit of a natural resource management is being

maximized; the lower the price, the lower the profit. However, it is possible that the price is too low so that there is no harvest rate that satisfies the condition. Furthermore, in this case the resource will not be exploited and hence it will never go extinct (Clark 1973b). However, if a renewable natural resource is not profitable, then it will potentially be excluded from the human portfolio asset. Exclusion from the human portfolio of biological assets is a sufficient condition for biological extinction via conversion (Swanson 1994).

Based on data on the current prices of meranti sawlogs released by ITTO from 1998–2016, the average growth rate of the price is 8.9% annually. During the same period, the inflation rate, based on the data on the GDP deflator published by the World Bank, is 10.7%. Hence, the real price of meranti sawlogs declines by 1.8% during 1998–2016.

The log export ban has been heavily distorting the domestic log prices. In the mid of 1997, for example, the average price of meranti groups was USD112.5 m³ in the domestic market, while it was USD200.0–235.0 m³ in the international market. Furthermore, the international price of sawn timber was USD1.500 m³, while the domestic price was only USD600 m³. It has been expected that the sawn timber is allowed to be exported, but unfortunately the export of logs and sawn timber is still banned. The gap between the price of round wood in the international and domestic markets failed to contract and the rent were not collected properly by the government but accumulated unexpectedly in the hands of players in the black market for round wood (Kato 2005).

Growth rate of standing stock The second condition requires that the growth rate of the renewable natural resource plus the change in the user cost is equal to the discount rate. The growth rate of the renewable natural resource is dependent on the stock level of the resource. Moreover, the manager of the natural resource attempts to find out the stock level of the resource that satisfies this second condition; the higher the discount rate, the lower the stock level of the natural resource. In other words, a higher discount rate generally associates with rapid extraction. For economically valuable renewable natural resource that possesses low reproductive capacities, profit maximization may lead to the extinction of the resource (Clark 1973a). In addition, Clark (1973b) suggests that extermination of the entire population of a natural resource may appear as the most attractive policy. However, those relations hold when capital is absent in the analysis; when capital is required for extraction then the influence of the rate of interest on the depletion rate is not so clear (Gordon 1966), or at least nonmonotonic (Lozada 1993). Nevertheless, some environmentalists regard the use of a positive discount rate for social choice as misguided and unethical (Jaeger 1995).

After logging the residual stands still contain so much timber ranging from 121.1–292.8 m³ ha⁻¹ as shown by Saridan and Soegiharto (2012). Meanwhile, for all species, the growth rate of the residual stand varies, 1.8 m³ per ha per year (Silva *et al.* 1995), 3.3 m³ ha⁻¹ year⁻¹ (Wahjono 2007), and 1.7 m³ ha⁻¹ year⁻¹ (Ayuningtyas 2015). In percentage, the growth rate of the residual stand ranges from 0.6–2.7%, or 1.7% on average. With a different expression, Favrichon *et*

al. (2001) shows that the time required for the forest to recover and return to the initial state is very long and that a felling cycle of 35 years as recommended in TPTI is clearly too short.

In sum, the growth rates of the price and of the resource stock add up to -0.1%. Certainly, this figure is not attractive for a private enterprise that usually employs a positive discount rate or it is much less than the interest rate as an opportunity cost for keeping the residual standing stock in the field. In general, private entities, which are more market-oriented, employ a positive and higher discount rate than public entities (Cowen 2004, Jagannathan *et al.* 2016), which are less market-oriented, do, so that private entities require a higher growth rate of the resource stock than public entities do for a given growth rate of the forest product price. This requirement leads to a lower resource stock when the natural forests are managed by private entities. Furthermore, it is not surprising when van Gardingen *et al.* (2003) found that the conventional Indonesian Selective Cutting and Planting (TPTI) management system failed to achieve criteria of sustainability for timber yield and financial performance. Under an extreme situation, no change in price and the maximum growth rate of the forest is less than the discount rate then extinction is more profitable than continuous harvesting (Cropper 1988). Gifford Pinchot, generally regarded as the father of American conservation, concluded that "The forests which are most profitably used are the forests which are best preserved" (Balogh 2002). This conclusion does not imply that under commercial utilization profitable forests will definitely survive, but certainly unprofitable forests will not survive at all; the profitability of the forests still needs to be compared to the profitability of alternative land use as the opportunity cost.

Property rights A property right regime under which a management of renewable natural resources is performed determines the performance of the management. In general, common-property regime may lead to overexploitation that in turn the resource destruction (Gordon 1954; Hardin 1968; Clark 1973a; Newbery 1975; Levhari & Mirman 1980; Ostrom 1990; Mendelsohn 1994; Ostrom *et al.* 1999; Ferreira 2004; de Oliveira, 2008; Dasgupta 2005). Moreover, the easiest solution, if it is possible, in case of private goods for instance, is to privatize the resource (Hardin 1968; Grafton *et al.* 2000). What I meant by if it is possible is that when the resource addressed is private good. However, when the resource at hand is common-pool resource, then privatization becomes out of the question. In contrast to privatization, in some places the management of renewable natural resources under common-property regime has been very successful (Ostrom 1990; Ostrom *et al.* 1999); the resource is managed collectively without the tragedy as predicted. As a matter of fact, to manage renewable natural resources effectively, we need to combine various elements of privatization, government control, local control, and managerial techniques (Acheson 2006).

The property right of the forest lands in Indonesia is not well-defined or hardly enforced due to the incapacity of the government to protect its property. Moreover, Robinson *et al.* (2014) suggest that land tenure security is associated with

less deforestation. It is a consequence of the low license fee that provides an incentive for the business entities to acquire forest as much as possible, even exceeding the capacity of the entities to prevent the forest from being extracted by other entities who have no permit. In addition, the capacity of the government to enforce the law, particularly the one related to the property right, is very weak. As a result, the right given to the business entities is not ironclad secured, which discourages business owners in managing the forest properly. However, I believe the relationship is dependent upon who obtains the land tenure. If it is given to the indigenous people then less deforestation might be very likely; unfortunately, the Government Regulation 6 of 2007 article 45 limits the amount of timber that can be extracted only up to 50 cubic meter by a household a year for non-commercial purposes. While, it will not be the case if the land tenure is given to private companies seeking for profits; well-defined property right is not sufficient for sustainable management (Piazza & Roy 2015). Clearly, the indigenous people have been treated unjustly by the government.

In short, the natural forests face a dilemma; when the demand for timber rises then the natural forests will be exploited excessively due to ill-defined property rights, on the contrary when the demand for timber falls then the natural forests tend to be converted to other land uses, which are more profitable. Above all, the slow growth rates of the residual standing stock and the timber price are the culprit of the situation, so that a persistent decline of the natural forests is unavoidable. In other words, the nonsustainability of the natural forest utilization in Indonesia is not a matter of probability but rather a certainty. So, the export ban has not only failed to promote a sustainable timber industry, but also failed to deliver an incentive for the development of plantation forest, which would have enabled the government to collect a higher revenue.

Result and Discussion

Naturally, the natural forests have a very low growth rate so that a commercial utilization will not be sustainable in the long run. Hence, removing policy distortions that disfavor forestry over agriculture will not necessarily help to slow natural forest conversion as suggested by Hazell (1995). Unfortunately, instead of addressing the sustainability problem, the government has launched inappropriate and unnecessary policies as if the natural forests can be utilized in a sustainable manner for timber production purpose. Having known that the forest utilization is not sustainable in the long term, the government has at least two options, namely the mining of natural forest products optimally just like nonrenewable resources and/or ask for public's assistance in maintaining natural forest utilization. Sadly, the Indonesian people in general have not been satisfied with the existing policies as well as the condition of the forestry. When natural forests were abundant, the abundance benefited a small group of people, who was close to the center of power and capital. People who live in the abundant forest were only a spectator. "Rich forest, poor people" as written by Peluso (1992) occurs not only in Java but also elsewhere in Indonesia until today.

State forest land establishment The massive exploitation of natural forests in Indonesia was begun in 1967 following the issuance of Law 5 of 1967 (Basic Forestry Law). This Law gave the government a huge power to claim most Indonesia's lands as state forest lands (*Kawasan Hutan*). As a result, most forested lands at that time were claimed as state forest lands, within which there have been so many settlements (*kampung*) of indigenous people. As a matter of fact, the seed of land conflicts has been sown and unfair intimidating terminologies have emerged, such as illegal settlers, encroachment of state forest land, illegal occupation, illegal farming, etc. Even more, the most deadly label to whoever disagreed with the government was "a member or sympathizer of the Communist Party of Indonesia" (PKI). This kind of character assassination was commonly practiced in the era of the New Order regime running from 1966 to 1998 and has become common knowledge in Indonesia. That traumatic experience was one side of the Law 5 of 1967. For this reason, in general indigenous people hate forestry and its related activities. Hence, the public support for the forestry in Indonesia is very weak. Replacement of Law 5 of 1967 with Law 41 of 1999 has not practically changed anything but the concession period from 20 years to 55 years. Just recently, in 2016, the government launched a social forestry program to address issues of inequality in access to forest or land resources through Ministerial Regulation NUMBER P.83/MENLHK/SETJEN/KUM.1/10/2016. But the licensing scheme is still a major issue, which by many parties is predicted to fail because of the difficult requirements that participants must meet. The permit will be issued by the minister regardless of the size of the forest. This shows that the bureaucratic nature of forest governance remains strong.

This policy is advantageous for large scale private business and government officials associated with permit issuance and monitoring tasks, but very devastating for the indigenous people. Virgin forests have been awarded to hundreds of the private businesses that are close to the inner circle of political power, in the form of forest utilization rights before 1999 and permit for forest product utilization since 1999. The process, leading to the issuance of the right and the permit, has not been transparent. There is opportunity for the government officials to seek private rent. At the same time, the indigenous people have been alienated since the forests were awarded to the private businesses; they have been treated as an enemy of the forestry. In monitoring, it is a common practice that the government officials seek another rent instead of finding the violations and rectifying them.

Fees and royalties The Law 41 of 1999 obligates that each company that is granted a permit to utilize timber from state forest land must pay four types of fee, namely license fee, reforestation fund (DR), forest resource provision (PSDH), and performance guarantee fund. However, the government imposes only the first three without any explanation to the public why the government does what it does. Whereas, prior to 1999 the government collected the performance guarantee fund, which was called the reforestation guarantee fund (DJR). The DR is wrongly thought as the continuation of the DJR.

The license fee is paid once upfront. According to the Government Regulation 12 of 2014, the tariffs are IDR3,750.00 ha⁻¹ year⁻¹ for Sumatera, Sulawesi, and Papua, IDR5,000.00 ha⁻¹ year⁻¹ for Kalimantan and Maluku Islands, IDR2,000.00 ha⁻¹ year⁻¹ for Nusa Tenggara. These tariffs are considered too low so that they tend to encourage the private companies to acquire as big forest land as possible, more frequently larger than the size that those companies can manage and control effectively. In addition, the government does not have enough capacity to enforce the right already given to the companies. As a result, the property right is not well-defined in this case, which has a serious implication when the demand for timber increases.

In 1980s, the tariff of the DJR was USD4 m⁻³. As a comparison, the economic rent in 1973–1974 was USD45 m⁻³ (Repetto & Gillis 1988). Assuming that the average harvest was 50 m³ ha⁻¹, then the DJR generated was USD200 ha⁻¹ of virgin natural forest. The fact that most concession holders preferred to leave the DJR money on the hand of the government but free from the reforestation responsibility indicates that the tariff of the DJR at that time was too low. Recently, according to the Government Regulation Number 12 of 2014, the tariffs of the DR for the most common timber range from USD10.5–USD16.5 m⁻³, depending on diameter, species, and location, whereas the domestic timber prices range from USD110–USD150 m⁻³.

Choosing not to execute the performance guarantee fund has a serious consequence. The most important risk is that this decision sends signal to the public that the value of a forest ecosystem is very low. Furthermore, the claim, particularly done by the government, that a forest ecosystem has high value can easily be challenged. If it is true that a forest ecosystem has a high value, then why does the government give a right to utilize such a valuable resource to private enterprise without any deposit fund? The fact that the government does not enforce the law regarding the performance guarantee fund could be interpreted that a forest ecosystem has a low value. By doing so, in essence, the government does not encourage vigilant behavior on the part of the private enterprises that get a right to utilize a forest ecosystem.

The private businesses certainly benefit from the existing fee and royalty system. The distribution of the forest rent between the businesses and the government as the representation of the people is not fair. In 2014, the government issued the government regulation Number 12/2014 that introduces a new terminology, i.e. compensation for stumpage value. It is an additional charge that must be paid by businesses that must clear the existing forest in running their business, such as mining companies and non-forestry plantation companies; so those companies should pay for the compensation for stumpage value in addition to PSDH and DR. The regulation shows that the government basically recognizes that there is uncaptured economic rent in the timber regardless of who harvest the timber. This uncaptured rent has been being enjoyed by the forest businesses that has rights to harvest timber from the natural forests.

Log export ban Export bans were introduced in the 1980s

and 1990s to increase economic value added in Indonesia, and to ensure a timber supply for the local industry. A log export ban was introduced in 1985; a rough sawn wood ban was introduced in 1992. As a result, production capacity in the plywood industry rose from 2 million m³ yearly in 1980 to 13 million m³ yearly in 1995. Today the plywood industry consumed 50% of Indonesia's forest output; the other 50% was consumed by pulp and paper industry 30% and sawmills 20%. However, encouraging domestic processing by setting low forest levies and restricting trade creates inefficiency and does not encourage processors to install equipment which will make efficient use of forest resource (Whiteman and Scotland, 1999). To make things even worse, the most domestic timber processing plants are vertically integrated with its sources of the round woods processed. As the result, competitive markets of logs cannot emerge.

The impact or result of inefficient timber processing plants will show its clearer face over time; gradually, they decline in number due to a shortage in raw material and a lack of competitiveness in acquiring the raw material. Most of the timber processing plants used to rely on the natural forests whose right-to-harvest is usually owned by the same party. The transfer price can be set so low so that it is unfairly profitable for the processing plant but certainly compromising the natural forest. Furthermore, as the capacity of the natural forest in producing logs as the raw material falls, the management of the processing plant cannot compete in acquiring the raw material from free markets.

Who benefits and who loses due to the log export ban policy? This policy only benefits the inefficient wood processing industry, while harming the natural forest business. In the long run, log production will be no longer attractive so the wood processing industry will also experience difficulties in obtaining the raw material. In other words, as long as the inefficiency of the wood processing industry is not improved, this policy will not save natural forests and at the same time will hamper the growth of plantations.

Certification Can timber and forest certifications in Indonesia stop the nonsustainability of the natural forest utilization? Although Damette and Delacote (2011) suggest that timber certification seems to have a positive impact on harvesting sustainability, my short answer is a big no. Simply, the certification itself cannot increase the growth rate of standing stock as a fundamental element of the long term profitability and hence sustainability. Hence, from this perspective, the timber and forest certification is definitely not the answer to the nonsustainability. As a matter of fact, the certification has been derived from wrong identification of the underlying cause of the nonsustainability. The empirical data confirm this conclusion.

There are two types of certification in Indonesia, namely voluntary and mandatory. The mandatory certification scheme was established in 2009 by the government comprising of Sustainable Production Forest Management (PHPL) and legal timber verification program (SVLK). These certification schemes must be implemented by each Forest Utilization Unit (FUU) working in natural as well as plantation forests. Until March of 2014, 92 FUUs (10.4

million ha) out of 273 units of natural FUU received PHPL certification and 21 units received the SVLK certification.

There are strange phenomena associated with the certification, the PHPL as well as the SVLK. The PHPL certification did not ensure the sustainability of the forests certified. It can be indicated by the fact that many companies who have active PHPL certification are not working regularly or have already stopped their operation, meaning unsustainable. The main reason is that the operation is not profitable. In other words, there are problems with the PHPL certification system. In addition, the certification does not eliminate or even reduce the transaction costs. Unfortunately, there is no official data presenting this phenomenon. Nurrochmat *et al.* (2016) conclude that the international forest regime, such as SVLK, is not effective for community forest.

In the case of small scale private forest, the certification has no use at all. In terms of legality, there is no forest that is more legal than private forest. Tree species planted in the private forests are different from tree species extracted from natural forest; distinguishing them is very easy. A costly complicated certification scheme is not needed. It would be sufficient if certain several species are automatically declared as certified timber because those species are planted regularly. Moreover, because the size is small sustainability criteria and indicators are not suitable to evaluating the sustainability of the private forest. In the meantime, the promised premium price has rarely materialized; farmer group of Wana Lestari Menoreh in Kulon Progo Regency, certified under Forest Stewardship Council (FSC) scheme, has obtained the premium price, while farmer group of Enggal Mulyo in Ponorogo, certified under FSC scheme, obtained the premium price IDR50,000 cubic⁻¹ meter only for Albazia but not for Pine and Mahogany, and finally farmer group of Catur Giri Manunggal in Wonogiri Regency, certified under Indonesian Ecolabel Institute (LEI) scheme, is still waiting for the premium price. The additional revenue cannot cover the cost of the certification. Surprisingly, many donors and certification bodies under the LEI scheme offer certification services.

Forest management unit Since the private enterprises are very unlikely attracted in the long-term business in a natural forest, then the only hope is put on the Forest Management Unit (KPH in Indonesian). Whereas, the discount rate has an implication for intergenerational justice, which is a positive discount rate in natural resource management implies that the benefits of these natural resources are more reserved for the present generation than for the future generations. Thus, who should manage forest resources, private based-entity or government-based entity, is essentially a question of political economy. A KPH might be willing to employ a very low or even zero discount rate, but they do not have capacities to do what they are supposed to do. It is a quasi-government body; providing public services and running business at the same time. Hence, it is not surprising when a big doubt has been expressed by many people regarding the effectiveness of KPH in the forest utilization. As a comparison, five state-owned forestry enterprises focusing on running business only have failed to sustain profitably. Ruzicka (2010)

suggests that based on experiences where the forest management is done by the state itself, the theoretical advantages of the long term management perspective are quickly undermined by inefficient management of a bureaucracy as commonly found. However, certainly there are people who believe that the KPH will be successful. Finally, the time will tell which position is correct. Shortly, Indonesia's forest management faces a dilemma, which is between being more efficient but sacrificing intergenerational justice and less efficient but intergenerational justice is not sacrificed.

So far KPHs have not provided any benefit to the society and the businesses. The only party benefiting from the existence of the KPHs are their own officials. The government has provided office and operational vehicles, but most KPHs have produced nothing yet. The future of the KPHs is still questionable since there is resistance from some of the existing forestry organizations. After a couple of months of joining the KPH WhatsApp group, I can grasp the uncertainty of the KPH's future raised by most Heads of the KPH. Issues often raised are lack of support from the government, lack of acceptance from the local government, and mismatch between training materials and real problems found in the field.

Conclusion

The natural forests allocated for timber production purpose will eventually vanish, mainly because the growth rate is too low to support a sustainable profitable business. This trend is intensified by ill-defined property right that to some degree is promoted by the government policy, such as the license fee that is set too low. The DJR that has been set too low would not create an incentive for the companies to conduct reforestation on their working areas. Instead of easing the situation, the government policies put additional burdens on the businesses, such as log export ban strongly distorting the log prices, inefficient revenue system especially reforestation guarantee fund leads to irresponsible behavior on the part of the companies, and timber and forest certification raising the production costs without generating sufficient additional revenue to the companies. In short, the forestry political economy of Indonesia has failed to deliver the promised outcome, even has failed to recognize the most fundamental issues.

Acknowledgements

I would like to thank Mr. Azis Khan for helpful comments and critics and my Daughter Komala Lituahayu for language matter.

References

- Acheson JM. 2006. Institutional failure in resource management. *Annual Review of Anthropology* 35:117–134. <https://doi.org/10.1146/annurev.anthro.35.081705.123238>.
- Ackerman F. 1994. The natural interest rate of the forest: Macroeconomic requirements for sustainable development. *Ecological Economics* 10(1):21–26.

- [https://doi.org/10.1016/0921-8009\(94\)90033-7](https://doi.org/10.1016/0921-8009(94)90033-7).
- Angelsen A, Kaimowitz D. 1999. Rethinking the causes of deforestation: Lessons from economic models. *The World Bank Research Observer* 14(1):73–98. <https://doi.org/10.1093/wbro/14.1.73>.
- Ayuningtyas A. 2015. Riap diameter dan volume tegakan hutan alam di IUPHHK HA PT Gunung Gajah Abadi Kalimantan Timur [Undergraduated thesis]. Bogor: Bogor Agricultural University.
- Brown GM. 2000. Renewable natural resource management and use without markets. *Journal of Economic Literature* 38(4):875–914. <https://doi.org/10.1257/jel.38.4.875>.
- Clark CW. 1973a. The economics of overexploitation. *Science* 181(4100):630–634. <https://doi.org/10.1126/science.181.4100.630>.
- Clark CW. 1973b. Profit maximization and the extinction of animal species. *Journal of Political Economy* 81(4):950–961. <https://doi.org/10.1086/260090>.
- Clark CW. 1979. Mathematical models in the economics of renewable resources. *SIAM Review* 21(1):81–99. <https://doi.org/10.1137/1021006>.
- Cowen, T. 2004. Policy implications of zero discounting: An Exploration in Politics and Morality. In: Paul E, Miller F, Paul J Jr, Editors. *Morality and Politics* (Social Philosophy and Policy, Pp. 121–140). Cambridge: Cambridge University Press.
- Cropper ML. 1988. A note on the extinction of renewable resources. *Journal of Environmental Economics and Management* 15:64–70. [https://doi.org/10.1016/0095-0696\(88\)90028-9](https://doi.org/10.1016/0095-0696(88)90028-9).
- Damette O, Delacote P. 2011. Unsustainable timber harvesting, deforestation and the role of certification. *Ecological Economics* 70(6):1211–1219. <https://doi.org/10.1016/j.ecolecon.2011.01.025>.
- Dasgupta P. 2005. Common property resources: Economic analytics. *Economic and Political Weekly* 40(16):1610–1622.
- de Oliveira JAP. 2008. Property rights, land conflicts and deforestation in the Eastern Amazon. *Forest Policy and Economics* 10(5):303–315. <https://doi.org/10.1016/j.forpol.2007.11.008>.
- Favrichon V, Nguyen-The N, Enggelina A. 2001. Estimation of the harvestable potential after logging in a lowland mixed dipterocarp forest of East Kalimantan”. *Journal of Tropical Forest Science* 13(1):62–75.
- Ferreira S. 2004. Deforestation, property rights, and international trade. *Land Economics* 80(2):174–193. <https://doi.org/10.2307/3654737>.
- Goers L, Lawson J, Garen, E. 2012. *Economic drivers of tropical deforestation for agriculture*. In: Ashton MS, Tyrrell ML, Spalding D, Gentry B, Editors, *Managing Forest Carbon in a Changing Climate*. New York: Springer. https://doi.org/10.1007/978-94-007-2232-3_14.
- Gordon HS. 1954. The economic theory of a common-property resource: The fishery. *The Journal of Political Economy* 62(2):124–142. <https://doi.org/10.1086/257497>.
- Gordon RL. 1966. Conservation and the theory of exhaustible resources. *The Canadian Journal of Economics and Political Science* 32(3):319–326. <https://doi.org/10.2307/139990>.
- Grafton RQ, Squires D, Fox KJ. 2000. Private property and economic efficiency: A study of a common-pool resource. *Journal of Law and Economics* 43(2):679–713. <https://doi.org/10.1086/467469>.
- Hardin, G. 1968. The tragedy of the commons. *Science* 162(3859):1243–1248. <https://doi.org/10.1126/science.162.3859.1243>.
- Hazell PBR. 1995. Priorities for forest policy research. *The Commonwealth Forestry Review* 74(3):244–245.
- Hyde WF. 2005. Limitations of sustainable forest management: An economics perspective. In: Kant S & Berry RA, editors, *Institutions, Sustainability, and Natural Resources: Institutions for Sustainable Forest Management*. Dordrecht: Springer. https://doi.org/10.1007/1-4020-3519-5_9.
- Jaeger WK. 1995. Is sustainability optimal? Examining the differences between economists and environmentalists. *Ecological Economics* 15(1):43–57. [https://doi.org/10.1016/0921-8009\(95\)00040-G](https://doi.org/10.1016/0921-8009(95)00040-G).
- Jagannathan R, Matsa DA, Meier I, Tarhan V. 2016. Why do firms use high discount rates? *Journal of Financial Economics* 120(3):445–463. <https://doi.org/10.1016/j.jfineco.2016.01.012>.
- Kato G. 2005. Forestry sector reform and distributional change of natural resource rent in Indonesia. *The Developing Economies* 43(1):149–170. <https://doi.org/10.1111/j.1746-1049.2005.tb00256.x>.
- Knoepfel P, Larrue C, Varone F, Hill M. 2007. *Public Policy Analysis*. UK: The Policy Press, University of Brist.
- Levhari D, Michener R, Mirman LJ. 1981. Dynamic programming models of fishing: Competition. *American Economic Review* 71(4):649–661.
- Levhari D, Mirman LJ. 1980. The great fish war: An example using a dynamic Cournot-Nash solution. *The Bell Journal of Economics* 11(1):322–334. <https://doi.org/10.2307/3003416>.

- Lozada GA. 1993. The conservationist's dilemma. *International Economic Review* 34(3):647–662. <https://doi.org/10.2307/2527186>.
- Mendelsohn R. 1994. Property rights and tropical deforestation. *Oxford Economic Papers, New Series* 46:750–756. Special Issue on Environmental. https://doi.org/10.1093/oeq/46.Supplement_1.750.
- Mitra T, Roy S. 2006. Optimal exploitation of renewable resources under uncertainty and the extinction of species. *Economic Theory* 28(1):1–23. <https://doi.org/10.1007/s00199-005-0618-5>.
- Newbery DMG. 1975. Congestion and over-exploitation of free access resources. *Economica* 42(167):243–260. <https://doi.org/10.2307/2553821>.
- Nurochmat DR, Dharmawan, AH, Obidzinski K, Dermawan, A, Erbaugh JT. 2016. Contesting national and international forest regimes: Case of timber legality certification for community forests in Central Java, Indonesia. *Forest Policy and Economics* 68:54–64. <https://doi.org/10.1016/j.forpol.2014.09.008>
- Ostrom, E. 1990. *Governing the Commons: The Evolution of Institutions for Collective Action*. Cambridge: Cambridge University Press. <https://doi.org/10.1017/CBO9780511807763>.
- Ostrom E, Burger J, Field CB, Norgaard RB, Policansky D. 1999. Revisiting the commons: Local lessons, global challenges. *Science* 284(5412):278–282. <https://doi.org/10.1126/science.284.5412.278>.
- Peluso NL. 1992. *Rich Forests, Poor People: Resource Control and Resistance in Java*. California: University of California Press. <https://doi.org/10.1525/california/9780520073777.001.0001>.
- Piazza A, Roy S. 2015. Deforestation and optimal management. *Journal of Economic Dynamics and Control* 53:15–27. <https://doi.org/10.1016/j.jedc.2015.01.004>.
- Repetto, R. and Gillis, M. 1988. *Public policy and the misuse of forest resources*. World Resources Institute, Washington, DC. <https://doi.org/10.1017/CBO9780511601125>.
- Robinson BE, Holland MB, Naughton-Treves L. 2014. Does secure land tenure save forests? A meta-analysis of the relationship between land tenure and tropical deforestation. *Global Environmental Change* 29:281–293. <https://doi.org/10.1016/j.gloenvcha.2013.05.012>.
- Rogers, M. 2012. Contextualizing Theories and Practices of Bricolage Research. *The Qualitative Report* 17:1–17.
- Ruzicka I. 2010. Taxation of tropical forests: search for generalizations after half a century of trying. *The International Forestry Review* 12(2): 181–186. <https://doi.org/10.1505/ifer.12.2.181>.
- Saridan A, Soegiharto S. 2012. Struktur tegakan tinggal pada uji coba pemanenan di hutan penelitian labanan, Kalimantan Timur. *Jurnal Penelitian Hutan dan Konservasi Alam* 9(3):239–249. <https://doi.org/10.20886/jphka.2012.9.3.239-249>.
- Silva J, de Carvalho J, Lopes JC, de Almeida B, Costa D, de Oliveira L, Vanclay J, Skovsgaard J. 1995. Growth and yield of a tropical rain forest in the Brazilian Amazon 13 years after logging. *Forest Ecology and Management* 71(3):267–274. [https://doi.org/10.1016/0378-1127\(94\)06106-S](https://doi.org/10.1016/0378-1127(94)06106-S).
- Swanson TM. 1994. The economics of extinction revisited and revised: A generalised framework for the analysis of the problems of endangered species and biodiversity losses. *Oxford Economic Papers* 46:800–821. https://doi.org/10.1093/oeq/46.Supplement_1.800.
- van Gardingen PR, McLeish MJ, Phillips PD, Fadilah D, Tyrie G, Yasman I. 2003. Financial and ecological analysis of management options for logged-over dipterocarp forests in Indonesian Borneo. *Forest Ecology and Management* 183(1–3):1–29. [https://doi.org/10.1016/S0378-1127\(03\)00097-5](https://doi.org/10.1016/S0378-1127(03)00097-5)
- Wahjono, D. 2007. Pertumbuhan dan riap tegakan tinggal di beberapa unit pengelolaan hutan alam produksi. *Info Hutan pada Pusat Penelitian dan Pengembangan Hutan dan Konservasi Alam* 4(5):419–428.
- Whiteman A, Scotland N. 1999. Forestry policy and the development of the solidwood processing industry in Indonesia. *The International Forestry Review* 1(1): 22–29.