Evaluating the capacity of forest governance system for effective and efficient REDD-plus policies in the state of Pahang, peninsular Malaysia

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ABSTRACT

REDD-plus is one of the most important policy tools for promoting sustainable forest management, especially in tropical countries where significantly large net losses of forest area have been observed in recent years. Malaysia is considered as a potential participant country in REDD-plus project particularly in reducing emission from forest degradation. Before engaging the mechanism the country needs to evaluate the capacity of its forest governance in particular because governance issues are emerging concern which could effects the efficiency and effectiveness of REDD-plus policies. In this study we take a particular note on the issue by analyzed the institutional and policy framework of forest governance system of the country using some case study with the focus is on the state of Pahang, peninsular Malaysia. The implication of such forest governance system on the relationship between development, forest and indigenous people conservation was also analyzed. Its implication on biodiversity conservation was explored by assessing the effectiveness of protected areas to restrict deforestation and displacement of deforestation to relatively unprotected area.

Methodology of assessing protected area effectiveness contributes to evaluate emissions reduction and economic incentives for developing countries more correctly, and development of an appropriate governance framework based on participatory approach for forest management makes a good role for decreasing the risks of biodiversity and indigenous life. The results of this study are useful for planners and decision makers to improve framework land use development, protected area establishment and REDD-plus policies.

Keywords: REDD-plus, Leakage, Incentive, Indigenous people right, participatory development

1.0 INTRODUCTION

Deforestation and forest degradation is the global environmental issue that caused concern to biological conservation and human well-being especially in tropical regions (Laurance 1999; Lees and Peres 2006). The main drivers of deforestation and forest degradation include population growth, agricultural intensification, weak institutions, trade liberalization and developmental policies (Laurance 1999; Geist and Lambin 2001). Over the past decades tropical deforestation and forest degradation occurred at unprecedented rate with the highest in tropical Southeast Asia (Achard et al. 2002). This has caused a considerable amount of greenhouse gases (GHGs) especially carbon emitted to the atmosphere which effect climate (Houghton 2003; Achard et al., 2004; Houghton 2004). The most recent estimation revealed that the carbon emission from forest loss is the second largest after fossil fuel combustion (van der Werf et al. 2009).

To curtail the increasing carbon emission and its effect on climate, the Reducing Emissions from Deforestation and forest Degradation (REDD) mechanism was promoted at the Conference of the Parties (COP) of the UN Framework Convention on Climate Change (UNFCCC) in Montreal in 2005 (Corbera et al. 2010; Ghazoul et al. 2010). This mechanism proposed that the developing countries receive compensation from developed nations by implementing activities of reducing deforestation. The developing nations may lost their income opportunities through the activity but receive compensation in the form of carbon credits generated from emission saving which could be purchased by developed countries and used to meet their emission reduction target (Ghazoul et al. 2010). Then, its path forward was outlined in the 13th COP meeting in Bali in 2007 (UNFCCC, 2007). In 2009 COP meeting in Copenhagen the scope of REDD has broadened which then specifically known as REDD-plus where it is not only finance forest conservation but also sustainable forest management, forest fire prevention and reforestation/afforestation/restoration for carbon emission reduction and enhance carbon stock (UNFCCC, 2009).

In the post Kyoto Protocol, the REDD-plus mechanism can be the cost-effective approach to mitigate climate change because except for monitoring it does not require the development of new technology (Stern, 2006). Nevertheless, its implementation is not exceptional from facing many challenges and uncertainties from technical to governance aspects (Skutch and Trines, 2008; Phelps et al. 2010). Despite the constraints the REDD-plus projects are being planned and implemented especially in tropical countries of the Southeast Asian, for example, Indonesia, Cambodia and Laos (UN-REDD, 2008). For promoting the REDD-plus policies in such countries, ITTO (2008) has outlined three major problems that should be addressed. First is the establishment of evaluation methods of reference level which is emissions from deforestation extrapolated from the past trends. Second is the development and improvement of environmental monitoring technology to assess the emissions reduction by implementation of REDD-plus projects while the third is the improvement of governance capacity to control the stakeholder conflicts or reduce the risk of biodiversity by over-expanding of artificial plantation with the implementation of REDD-plus policies. While the first two are considered related to the traditional REDD issues such as carbon stocks, deforestation and degradation rates, the governance issue is the emerging concern that urgently need to evaluate especially the forest governance which could effects the efficiency and effectiveness of REDD-plus policies (Phelps et al. 2010).

Malaysia is one of the tropical Southeast Asian countries has experienced deforestation and forest degradation. Though the country has low deforestation rate and forest degradation compared to its neighboring countries (FAO 2010) it is the potential participant country in REDD-plus project particularly in reducing emission from forest degradation (Phillip and Haron, 2010). In this context, sustainable forest management system which being practice in the country has been identified potential to be the REDD-plus activity (Phillip and Haron, 2010). In addition, protected areas have also been identified as another options to mitigate carbon emission (Wunder, 2005). Many studies revealed that protected areas are effective to avoid deforestation within their boundary (e.g Sanchez-Azofeifa et al., 1999; Bruner et al. 2001; Mas, 2005; Naughton-Treves et al., 2005; Gaveau et al. 2007; Phua et al. 2007). However, the possibility of leakage (i.e displacement of deforestation) may occur to the relatively unprotected area (Clark et al. 2008; Ewers and Rodrigues, 2008; Gaveau et al. 2009). In peninsular Malaysia, protected areas were established as early as 1903 to prevent further impact of agricultural plantations and other land uses that effect biodiversity (Aiken, 1994). However, human land uses activities are gradually intrude inside the protected areas and forest clearance is prevailing at its surrounding (Abdulah et al. 2009; Rafaai, 2011, Reza, 2011). Thus, their effectiveness for not only biodiversity conservation but also to prevent deforestation and forest degradation is still in question.

In peninsular Malaysia, some of the protected areas are overlapping with permanent forest reserves which are subjected to sustainable forest management system. This is considered as one of the main constraints for effective forest governance in the country which also affect biodiversity conservation and peoples that depend on forest resources for their livelihood. Therefore, before engaging this mechanism the country needs to evaluate the capacity of its forest governance system to curb not only deforestation and forest degradation but also the capacity to control the conflict between stakeholders and the risk to biodiversity and the livelihood of indigenous peoples. To evaluate the capacity of forest governance system this study firstly analyzed the current institutional and policy framework of forest governance in peninsular Malaysia. The implication of such forest governance system on the relationship between development, forest and indigenous conservation for minimizing stakeholder conflicts and environmental impact was analyzed using some case study where the focus is on the State of Pahang, peninsular Malaysia. How its implication on biodiversity conservation was explored by investigates whether protected areas in Pahang restrict deforestation and quantify displacement of deforestation to the relatively unprotected areas.

2.0 CASE STUDY AREA: THE STATE OF PAHANG

The state of Pahang is located at the east coast of peninsular Malaysia (latitude 3^{o} 45'N and longitude 102^{o} 30'E) (Figure 1). Pahang is selected because it is the largest state in peninsular Malaysia (35 960 km^2) with eight protected areas of different protection status (e.g national park, wildlife reserve) and size (Table 1). The total protected area is 394,588 ha, which is approximately 11% of the total land area of the state. Furthermore, it contained the largest proportion of forest cover in peninsular Malaysia with various types of ecosystems such as the lowland dipterocarp, the hill dipterocarp, the montane, the laurel-ericacous, the peat swamp and the mangrove forests. Two largest natural freshwater ecosystems in peninsular Malaysia; Tasik Chini and Tasik Bera, are also located in this state. There are various types of human land uses covered the Pahang's landscape where oil palm and rubber plantations represent the highest proportion. This provides considerable implication to land use planning and management, and

conservation of protected areas and other natural ecosystems of the state.

Figure 1: The State of Pahang in peninsular Malaysia

Table 1: Protected areas in the state of Pahang, peninsular Malaysia

	Protected area	Year of establishment	Area (ha)	Protection status
1.	Taman Negara Pahang	1939	248 121	National Park
2.	Endau-Rompin Pahang	1986	40 197	Wildlife Reserve
3.	Frazer's Hill	1922	2 000	Wildlife Reserve
4.	Krau	1923	62 395	Wildlife Reserve
5.	Pahang Tua	1954	1 335	Wildlife Reserve
6.	Tasik Bera Reserve	1995	26 000	State Nature Park
7.	Tasik Chini Reserve	1989	5 085	State Nature Park
8.	Tioman Island	1972	9 455	Bird Sanctuary

3.0 METHODS

(a) Policy Review and Interview Survey

The state of Pahang is also important from the perspective of forest governance. Pahang-Selangor water transfer project has already taken off to meet future water demand for Selangor and Wilayah Persekutuan Kuala Lumpur. The total project cost is predicted 1 billion USD, and it will be financed by yen loans from Japanese government. Now, there are serious stakeholder conflicts between central government and Orang Asli, indigenous people in Pahang, should remove by promoting this project. And, some problems of this project, such as impact for ecological system, validity of calculation method for predicting future water demand, lack of alternative proposals, etc, have been pointed out by NGOs and other research organizations. In case of promoting REDD-plus, the participants of the policy will be donor which is mainly a developed country's government, central and local government in a developing country, private companies, NGO, residents and indigenous people in a forest area, so the same kinds of problems with Pahang-Selangor water transfer project, such as biodiversity conservation and guarantee of indigenous peoples rights should be also considered. Hence, it is meaningful to discuss a good governance to be successful REDD-plus policies in developing countries based on the case of Pahang-Selangor water transfer project.

Table 2 : List of organizations supported to interview survey

Government & Research	NGO	Residential
• Forest Department Kuantang • Forest Research Institute Malaysia (FRIM) • Faculty of Forestry, Universiti Putra Malaysia	• Center for Orang Asli Concerns (COAC) • Friend of Earth, Japan • Friend of Earth, Malaysia • Global Environmental Center (GEC) • Third World Network (TWN) • Water Watch Penang (WWP)	• Kuala Gandah, Pahang state "Orang Asli" Village • Kuala Krau, Pendera "Orang Asli" Village

In this study, by reviewing some institutions of forest management in Pahang and interview with NGOs and some research organizations, the current situation of forest management in Pahang, relationship between forest development, and biodiversity and

indigenous conservation are analyzed. Then, from the case study of Pahang-Selangor water transfer project, it is clarified that there are various institutions for saving biodiversity and indigenous people rights such as environmental impact assessment, information sharing and guidelines of project implementation made by the donor country, however those are not really worked. Based on the analyses, we discuss the importance of participatory development to realize a good governance scheme for REDD-plus in developing countries.

(b) Effectiveness of protected areas in reducing deforestation

Mapping land use/land cover

In this study, first, land use/land cover map in 1966 and 1996 was developed. Land use/land cover map of 1966 was developed by geocoding, rectifying and digitizing the hard copy of land use map of 1966 produced by the Department of Agriculture Malaysia. The 1966 (c. 1960s) was selected as a baseline year because the earnest clearance of forest for development especially the large-scale agricultural scheme of rubber and oil palm was commenced during the decade. Moreover, studies by Abdullah et al. (in preparation) revealed that between the 1960s and the 1970s deforestation rate in peninsular Malaysia is approximately 15% whereas between the 1940s and the 1950s it was only 4%. Using the thumb-rule in biodiversity conservation, less than 10% changes is not significant. Therefore, deforestation rate before the 1960s is considered negligible. With that assumption, protected areas established before the 1960s are justify to be included in the analysis.

The land use/land cover map of 1996 (c.1990s) was developed using a set of LANDSAT TM images of that year with 30 m resolution which processed and analyzed using ERDAS Imagine 9.3. Supervised classification was used to determined land use/land cover types of the study area which then validated through ground truthing using Global Positioning System (GPS) and land use maps (scale 1: 50,000) of the study area produced by the Department of Agriculture Malaysia. After the verification process a total of seven land use/land cover types have been identified; built-up area, cleared land, commercial agriculture, wetland, other agriculture, forest and water body. In this study, forest is refers to old-growth natural forest with the canopy cover is more than 50%, either undisturbed or partially degraded by selective logging (Gaveau et al. 2009) but all plantation forests are considered as non-forests. While deforestation is defined as a long-term conversion of forest areas to other land uses.

Deforestation rate and deforestation mapping

The deforestation rate between 1966 and 1996 was calculated for the whole study area, inside each protected area and the 5 km zone outside the boundary of each protected area. To calculate the deforestation rate inside and the 5 km zone outside, the digital boundary of each protected area obtained from the Department of Wildlife and National Park Malaysia was overlaid on the land use/land cover maps of 1966 and 1996 using intersection command in ArcGIS 9.2. Then, the 5 km zone was developed for each protected area using buffer technique of ArcGIS 9.2. The calculation of deforestation rate using the formula developed by Puyravaud

(2003) as follows:

$$r = [1/(t_2-t_1)] \times \ln (A_2/A_1)] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

where, t_2-t_1 is time interval and, A_1 and A_2 is the total forest cover in time t_1 and t_2, respectively. Finally, the land use/land cover map of the 1996 was intersected with land use/land cover map of 1966 to produce a deforestation map of the state of Pahang in three decades (1966-1996).

Leakage

Leakage of deforestation at the surrounding protected areas was measured by comparing the deforestation rate inside and the 5 km zone outside with a baseline (Ewers and Rodrigues, 2008). For an ideal comparison, the baseline level should be a time-series of deforestation before the establishment of protected areas (Ewers and Rodrigues 2008). However, in peninsular Malaysia such kind of data is unavailable. Thus, deforestation rate of the wider landscape was used as a baseline (Ewers and Rodrigues 2008; Gaveau et al. 2009). To obtain the deforestation rate at the wider landscape, a grid system of the dimension 5 km x 5 km was developed and overlaid on the land use/land cover map of 1966 and 1996. In this study, a total of 146 grids in map of 1966 were selected randomly and in map of 1996 the same grids were used to calculate deforestation rate at the wider landscape. The selected grids represent about 10% of the total land area of the state of Pahang. In each grid the deforestation rate between 1966 and 1996 was calculated using the above equation. The rate of deforestation of each protected area was summed up and divided by the number of grids selected to give the deforestation rate of the wider landscape. In this analysis, if the deforestation rate inside is lower than that of the wider landscape, the protected area is effectively reduced deforestation. Leakage is occurs when deforestation rate at the 5 km zone outside is higher than that of the wider landscape.

Leakage affected by different protection status

To explore whether leakage affected by protection status the deforestation rate of wildlife protected areas with the same protection status was summed up and divided by the number of wildlife protected areas in the same category. There are three types of protection status; national park, wildlife reserve and state nature park. Bird sanctuary was omitted since the only wildlife protected area fall under this category is Tioman Island which its exclusion study was explained previously. Then the leakage was determined using the same procedure as explained before.

4.0 RESULTS

(a) Current problems of forest management in peninsular Malaysia

While Malaysian government and some of the international agencies recognize the country's improvement and efforts toward sustainable forest management, there are still major factors causing poor forest management to be overcome.

The problem of forest management seems to be related more to the socials aspects rather than the apparent natural science issues that may seek innovative solutions for the ecological conservation. Simply, poor forestry governance lies as part of the core problem, which in practice constitutes a very complex matter.

First we are encountered with regions (Peninsular Malaysia, Sarawak and Sabah) that have variations among parallel areas of governance, specifically regarding the strictness and scope of applications of statutes as the Environmental Impact Assessment (EIA).

Other aspects include the difference of terminology concerning various types of forest at the regional level, creating difficulties for understanding forestry data at the federal level. This clearly may create problems when working on definitions and statistics. In fact, fragmentation may be a problem for statistics, but if you engage in good management and bureaucracy, this should not become a constraint.

There are still problems of corruptions and rent-seeking behaviors in states like Pahang, that were evidenced in Fadzilah Majid Cooke books, factors which contribute to a poor forest management.

Another problematic element commonly mentioned among the interviewees, is that often times, federal policies do not go down to state level. Until the federal government does not compensate the states, the states will always justify the usage of the forest as a way to develop. In other words, state has autonomy and jurisdiction over the forest where we find a federal government without much authority when deciding the usage of the land. The autonomy of the state government to manage its forest areas can often times prioritize development over forest conservation depending on the state economic condition and its need to obtain financial resources. If there are states that are poor, for instance the state will have to depend on logging as a main source of income. So, if some states rely on logging, they will find very hard to adopt the federal legislations to protect forests.

Some forest areas may have the overlapping functions of different agencies, and government departments. Therefore, there is a need for a better institutional arrangement, including an improvement in the communication mechanism among different departments (example: state department, wildlife department, forestry department, the tourism unit, the water service department, the logging companies under the primary industry, so forth).

(b) Relationship between development, forest conservation and indigenous peoples

Indigenous activities are not part of the major negative factor harming the forest instead most of the communities help to protect the forest as they see it as part of their tradition to develop their lives there. Forest conservation benefits indigenous communities. However, forest

conservation (with the aim to guarantee economic benefits) falls into a higher priority when compared to indigenous right conservation.

Under the constitution article 34, all land is own by the state, indigenous have no rights to own the forest land. This lack of recognition of indigenous rights over their lands is what often times creates conflict between the government and the indigenous, especially when the Orang Asli claim that their lands are taken away and given to others for commercial purposes, while on the other hand, the government claims its fear of third parties manipulations if ownership given.

As far as the constitution concerns, the Orang Asli have rights to enter to forest areas. But there are many acts and departments that rule different forest areas in different ways as the wildlife department, forest department and others. In reality there are areas where they have no access, depending on which type of forest they enter to and under which department and rules is managed by.

Until last year with the introduction of 'Wild life Conservation Act' (2010), indigenous could go use the fauna and flora in a sustainable way, in other words hunt anything they want for their subsistence. After the act, there is a limitation for the number and species of animals they can hunt. Regarding other resources (like rattan, bamboo, and timber), indigenous do not need any permit if used for their own livelihood. For those extracting forest resources like middleman, they will require a permit/license given each year by the forest department.

Although the law states that Malaysian government recognizes indigenous rights (to roam around the forest but not to posses any land), in practice indigenous rights are quiet often infringed upon, especially in Sabah and Sarawak, where there are many cases of logging and moving into the indigenous people traditional habitat.

In many cases where dams were proposed and built, indigenous people had to be relocated, encountering some problems that highlight that indigenous rights have low priority. Similar situation happens when logging take place, unless the area is designated/gazette as permanent forest reserve areas.

(c) Problems of governance in the case of Pahang-Selangor Reservoir project

Stakeholders such as donor, central government and local government in Malaysia, residents, indigenous and NGOs are involved, in this project. Donor, in this case Japanese government, has already launched the guideline for implementation of public works to minimize environmental impacts and stakeholders conflicts. Then, EIA (Environmental Impact Assessment) has already done in projected area by central government in Malaysia. However, there are a lot of stakeholders conflicts in this project.

Essentially this project had a serious impact on the Kelau River ecosystem, clearing out

vast areas of forests and requiring the resettlement of 325 indigenous people and 120 Malay farmers affecting their lives. In this regards various environmental and social NGOs were working toward the environment and indigenous right protection, while the central government and private companies involved in the project seemed to impel toward their interests regardless the opposition.

First of all, the proposal and justification given for this project is that demand for water in Selangor and Kula Lumpur will exceed capacity in the near future. Thus, the dam is proposed to meet water demands, transferring around 1.5 billion liters of water per day from Kelau River in Pahang state to the Langat River in Selangor state. Yet, this justification is not clear since studies by Malaysian NGOs attest that current water supply in Selangor state is wasteful, more than 40 percent of the amount of water is lost. Additionally the system is inefficient proving that water consumption in Selangor and Kuala Lumpur is among the highest in the world (even surpassing major cities as Tokyo).

The approach of transferring water from one state to another state is not the solution. Various approaches and alternatives for water demand management (including rainwater harvesting, installation of water-saving and efficient devices, and others) were proposed to reduce people consumption and strive for a sustainable use in the future. Despite all the recommendations, authorities refused to implement a different alternative. Furthermore, this project was supposed to be completed some years ago, but still (by 2011) only approximately 40-60 percent of it is completed. Clearly this reflects that projections were not accurate at all, since currently Selangor and Kula Lumpur have no problems of water shortage.

The social impact of this project is noteworthy regarding the displacement of the Orang Asli. Although the project proponents claim that indigenous are agreeable to resettle, FOE-Malaysia reported that the Center for Orang Asli Concerns (COAC) found that affected people did not give their free, prior and informed consent to relocation. While resettlement plans may sound attractive, actual implementations in other projects in the country have been poorly practiced. Besides compensation, there are different factors that affect the indigenous communities when resettlements are done, like culture, lifestyle and others that are commonly not taken into account by the authorities. Until today, the Malaysian government has not resolved the compensation issue with the indigenous people. As obviously seen, human rights are very poor and often infringed in Malaysia, especially among the minorities, indigenous groups.

This project, which is highly expensive clears up extensive forest areas for the dam construction and also needs to clear more forest areas to establish a new resettlement. All these issues are obviously contrary to conservation. NGOs express their concerns on the environmental assessments, which have been ignoring quiet number of important factors affecting both flora

and fauna and causing a high impact on biodiversity.

Not only justifications for the dam approval seem irrational, but also the government considerations procedures toward all this project. NGOs are convinced that this project cannot be justified given the high cost involved and the social and environmental trade-offs that have to be made when other alternatives were not adequately considered because their proponents' decision were already made.

Another weak point is considered from the donor side, in this case the Japanese government who relied completely on the Malaysia government statements. The donor accepted the EIA impact assessments, the social impact assessments including the valuation and acceptance from the indigenous people side, despites all the complaints the NGOs made regarding indigenous people right and environmental concerns. In such a project where huge amounts of money are involved, meaning a big business opportunities for some companies and Pahang state, it will be unacceptable the donor' naiveness. Instead, donor should prove its serious commitment toward transparency and consideration toward commonly neglected aspects such as indigenous rights and environmental conservation.

(d) Risk for biodiversity and indigenous peoples life by promoting REDD-plus

Malaysia has not yet approved the REDD-Plus mechanism. Once the policy makers design a plan for implementation, the different departments will be committed towards its application. The forest department, as part of its duties, has been doing activities related to conservation, forest rehabilitation, replanting and others that may be similar to what REDD-Plus proposes. Normally 40-50 percent of the department annual budget is designated to such activities (harvesting, patrolling, regeneration, etc).

Implementing REDD-Plus will require lots of funds and that is where controversies may arise. This scheme tries to gather funds from the international markets for forest conservation, and the concern is about the stability of the market and the historical responsibility. Transferring the responsibility to the market will mean having nobody responsible for what is done. How feasible will the application be? it will also depend on how the Malaysian government manage conservation versus development since Malaysia wants to become a developed country by 2020 and has already converted vast forest lands for economic benefits. Ideally it is very important to engage in conservation as much as possible and engage into REDD-Plus, however it is important to look at the current trends (or reality): the increase of population, increased need for food production, conflict for space, need to resolve poverty issues, etc. So, the government needs to respond to these immediate needs of the population. In order to solve those immediate needs, the government may not be acting in accordance with REDD Plus.

The Malaysia law on natives right is not strong (the rights of indigenous have not been recognized properly). Although there is a very strong mechanism at the international level, this will still be subject to the national law, and that may be problematic. As long as the land rights are not settled, this will not benefit the indigenous people. Often times community participation is not transparent because when you deal with forest, you deal with the state and the forest department, you do not deal directly with the Orang Asli.

(e) Protected area effectiveness in reducing deforestation

Deforestation rate

Over the three decades, forest was the main land use/land cover of the state. The proportion of forest however reduced by about 33% from 79.5% of the total land area in 1966 to 52.8% in 1996 (Figure 2). Other land use/land cover was less than ten percent over the decades except commercial agriculture which mainly oil palm rubber plantations where it increased up to 30% of total land area by 1996. Built-up area and other agriculture also increased but it was vice versa for wetland. The distribution of land use/land cover in 1966 and 1996 is shown in Figure 3. The deforestation rate in the thirty-year period is about 0.0138 mil. ha/year (Figure 4)

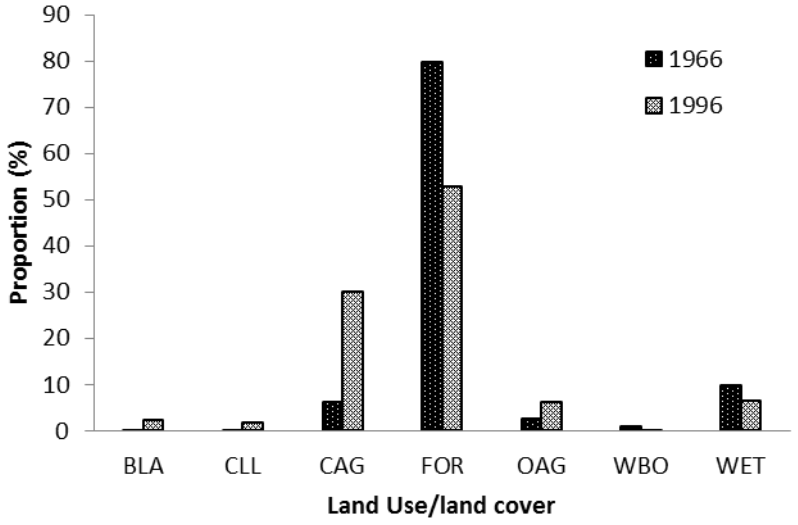

Figure 2: Proportion of land use/land cover of the state of Pahang in 1966 and 1996

BLA – Built-up area; CLL – Cleared land; CAG – Commercial agriculture; FOR – Forest; OAG – Other agriculture; WBO – Water body; WET - Wetland

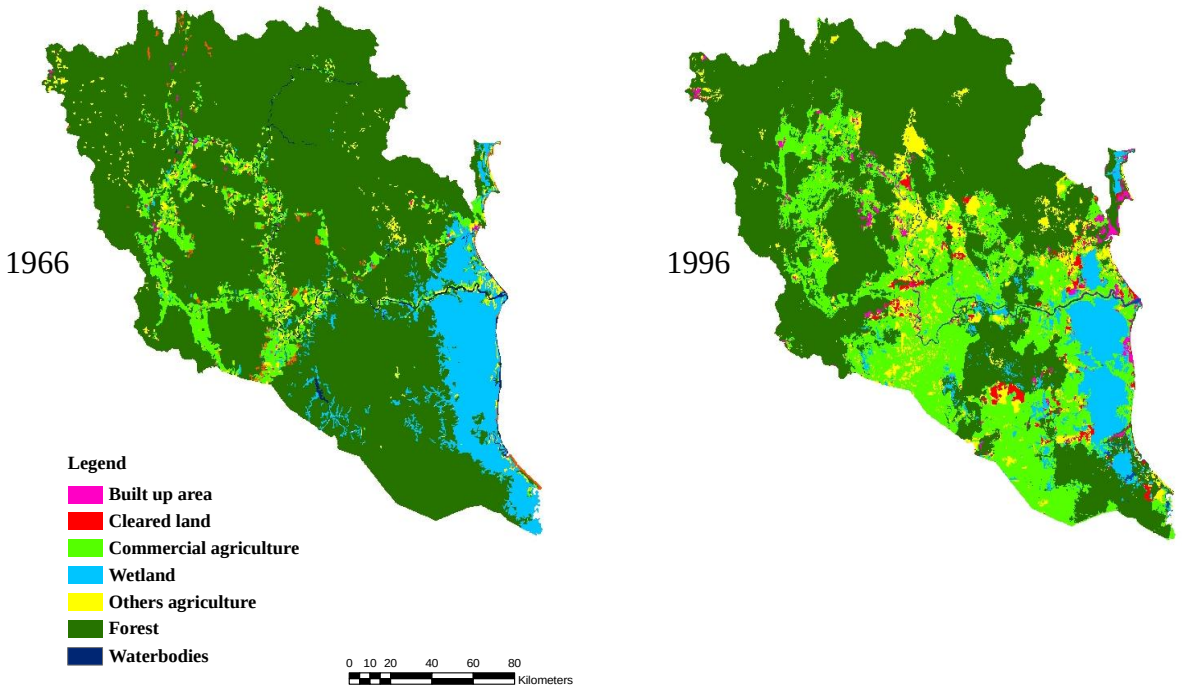

Figure 3: Distribution of land use/land cover of the state of Pahang in 1966 and 1996

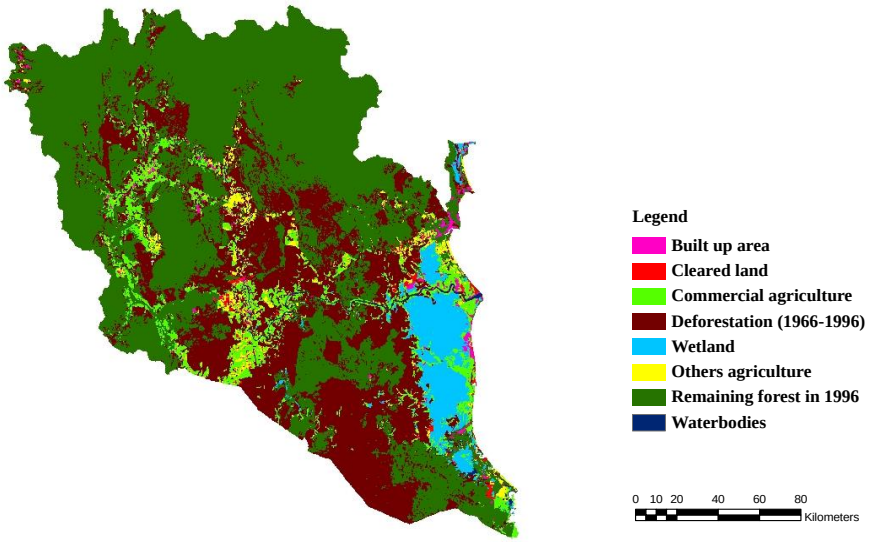

Figure 4: Deforestation map of the state of Pahang between 1966 and 1996

Leakage

Leakage did not appear when the calculation considered the mean deforestation rate inside and the 5 km zone of protected areas (Figure 5). The individual calculation (each protected area) revealed that each wildlife protected area effective to protect forest at the inside (Figure 6a). However, leakage occurred at two wildlife protected areas, that is, Tasik Chini and Tasik Bera where the deforestation rate at the 5 km zone outside was higher than that of the wider landscape (Figure 6b).

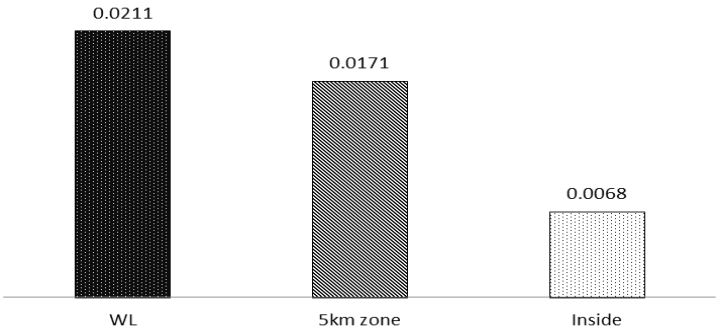

Figure 5a: Comparison of deforestation rate (mil.ha/year) inside and the 5 km zone with the wider landscape

WL - wider landscape

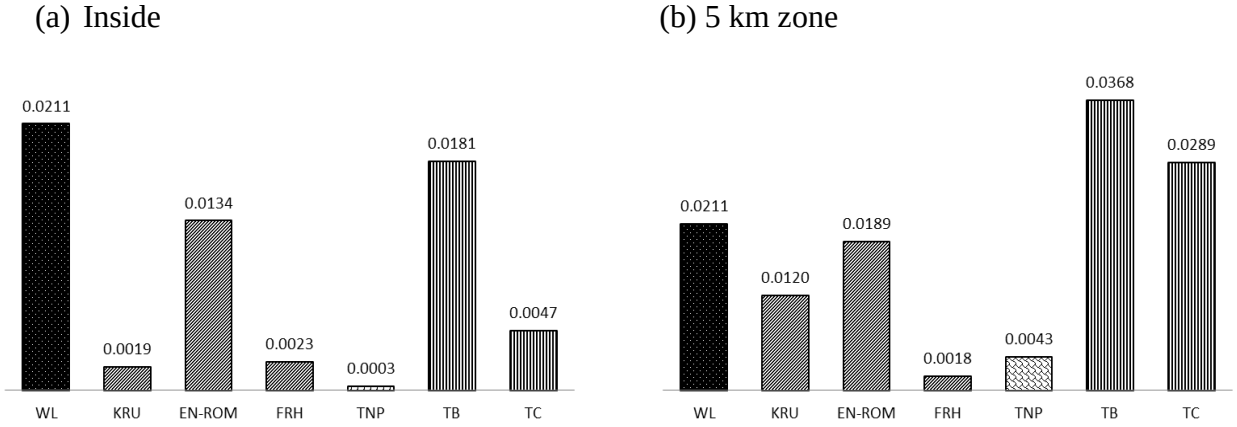

Figure 6: Deforestation rate (mil.ha/year) (a) inside and (b) the 5 km zone of each of protected area compared with the wider landscape

WL – Wider landscape; KRU – Krau; EN-ROM – Endau Rompin; FRH – Fraser's Hill; TNP – Taman Negara Pahang; TB – Tasik Bera; TC – Tasik Chin

Leakage affected by different protection status

Generally, each protection status is effective to restrict deforestation at the inside (Figure 7a). National park and wildlife reserve has effective to avoid leakage but not for state nature park where the deforestation rate at the 5 km zone was higher than that of the wider landscape (Figure 7b).

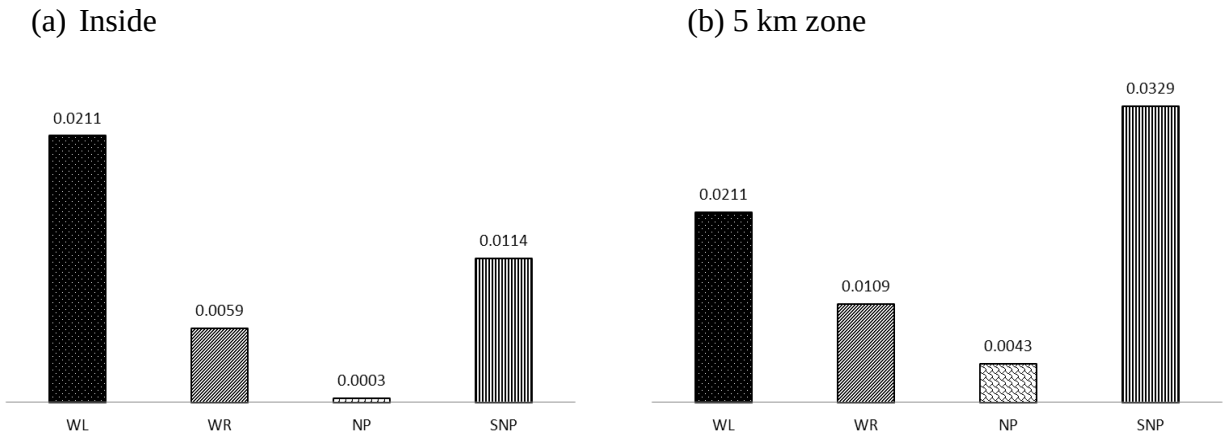

Figure 7: Deforestation rate (mil.ha/year) (a) inside and (b) the 5 km zone of wildlife protected areas based on their protection status compared with the wider landscape

WL – Wider landscape; WR – Wildlife reserve; NP – National park; SNP – State nature park

5.0 **DISCUSSION & CONCLUSION**

REDD-plus is one of the most important policy tools for promoting sustainable forest management, especially in tropical countries where significantly large net losses of forest area have been observed in recent years. For promoting REDD-plus policies in such countries, we have the following three major problems should be overcome, 1) establishment of evaluation methods of reference level which is emissions from deforestation extrapolated from past trends, 2) development and improvement of environmental monitoring technology to assess the emissions reduction by implementation of REDD-plus projects, 3) improvement of governance capacity to control the stakeholders conflicts or reduce the risk of biodiversity by overexpanding of artificial plantation with implementation of REDD-plus policies. In this study, we take particular note of governance issue by addressing the matter of 2) and 3), based on forest management system in the State of Pahang, Peninsular Malaysia.

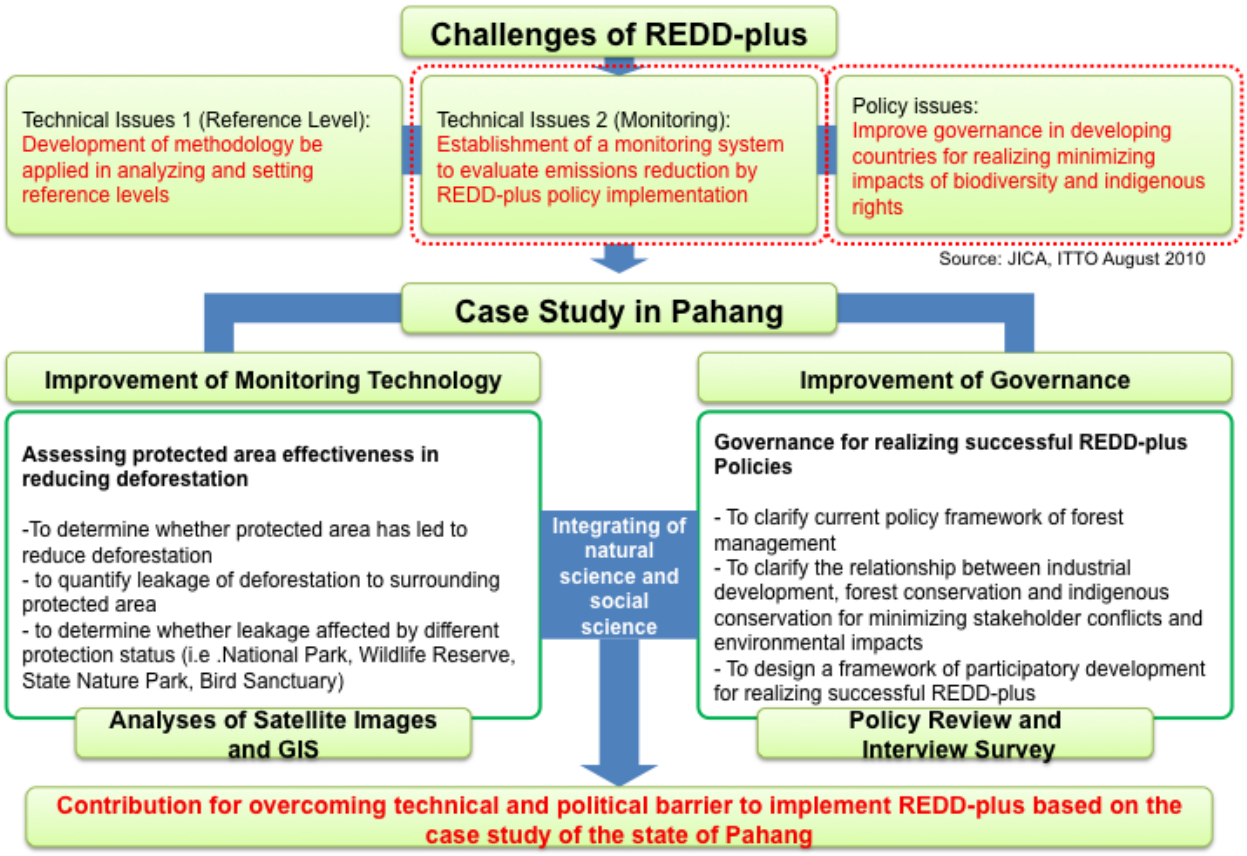

Figure 8: Discussion framework

To be successful REDD-plus policy, the followings are important.

- Maximize the benefit for developing country (in this case, Malaysia)
- Benefit from REDD-plus, allocated appropriately for stakeholders, such as foreign government (donor), central and local government, private company, indigenous, etc.

In this study, it is clarified that there are various leakage effect by developing monitoring technology based on satellite picture analysis. In case of "leakage effect" is taken into consider for evaluating forest conservation effect, it is contributed to increasing benefit from carbon-trading market for developing countries.

To allocate the benefit from REDD-plus policy appropriately, followings are important.

- An independent organization, which can evaluate validity of the REDD-plus policy, should be developed
- To make clear that stakeholder roles by developing the methodology of Participatory Approaces.
- More knowledge and understanding should be spread about this topic. Even some leaders

are not clear about it and even among civil society organization REDD-Plus is not fully understood.

- Not only international organization but also national government (in this case, Malaysia), should take a clear stance to guarantee of land rights to indigenous. It is important to recognize that indigenous' activity is sustainable for forest management.

One of the most important conditions for successful participatory approach is commitment from government and industry to recognize the rights of indigenous people (which are very well documented in the United Nations declaration for indigenous people). One of the most important elements of the mentioned declaration is the 'free- prior- informed -consent'. But the industry and government think that consent is not necessary as long as consultation is done. There is a big different between consultation (to talk and have many meeting about some specific topic/issue even if they do not agree) and consent. If the lands of Orang Asli are not recognized, the benefits of forest resources are not theirs, but instead the state owns those benefits. We need the government to give the first step to recognize indigenous rights. There is a case of co-forest management between the government and people, which is a great model to keep implementing.

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