Sustainable Forest Management and Thailand Community Forests: An Economic View

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Abstract

Sustainable Forest Management (SFM) involves multiple stakeholders at different levels dealing with a combination of social, economic, and ecological needs of the present and future generations. However, based on the economics theory of market failure, solutions and practices of SFM may differ significantly, not only horizontally but also vertically. This paper compares and contrasts accomplishments, such as Thailand's common practice of separating forests and people, with the Conservation Forest Decree forbidding people from inhabiting national parks, wildlife sanctuaries and A1 watershed areas. A half-century experience of forest management in Thailand has demonstrated that, on the contrary, typical Thai practices quite far from the general concepts of SFM and have resulted in a significant reduction of Thailand's forest area. Because of nationally-owned forests, undervaluing forests and their products, and illegal logging, to cite only a few examples, Thailand's forest management must be reconsidered in favor of SFM and corrected through approaches used to resolve market failure conditions. Transferring forest ownership status from "nationally-owned to community-owned" is one method of moving toward the objectives as planned by SFM. Enhancing forest benefits through disseminating indirect forest values and monetizing forest benefits could result in higher demand for holding several types of forest areas even by local, urban, or private forest owners. In order to do so, legal enforcement and adaptive governance in Thai forestry will be required.

Keyword: Thailand Forest Management, Economics of Sustainable Forest Management, Forest Values, Adaptive Governance

Introduction

"Institutions are the humanly devised constraints that structure human interaction. They are made up of formal constraints (rules, laws, constitutions), informal constraints (norms of behavior, conventions, and self-imposed codes of conduct), and their enforcement characteristics".

Douglass C. North (Lecture to the memory of Alfred Nobel, December 9, 1993)

Forest resources in Thailand had been significantly declined due to unsustainable management and improper forest policy since 1961. The local inhabitants, who often depend on these resources, have been often accused of being a significant cause of deforestation and degradation even as they have struggled to survive. The conflicts between state agencies and local people with NGOs and academics support have been a long history of forest management and policy implementation. Meanwhile NGOs and academics have tried to illustrate the potential of the locale to manage and conserve natural resources when they have a channel to participate in management. The participatory approach to forest management such as community forest is one means for promoting sustainable forest practices. Together with monetizing forest benefits, private forest owners in Thailand have arisen since the end of "Debt Replacement by Tree Planting" project. However, the private forests in Thailand are not that easy because of legislation even their practices mutually generate societal benefits and private benefits. This paper will illustrate the failure of the forest management policy in the past and discuss the development of community-based

natural resource management and private forest owners in Thailand as tools for sustainable forest management. Adaptive management and adaptive governance together with economic perspective are employed to discuss in the paper. Theoretically, community forest is a solution to solve improper forest management problem by using economic concept of property rights and correcting market failure, which is characteristic components of forest. However, the conflicts between state and local communities relate to the problem of property right transfer that requires more than legislation but negotiation of stakeholders. Therefore, this paper summarizes policy and event relating to community forest in order to lay out the big picture, and discuss in general of the policy using economic framework. Although the Community Forest Act of 2007 and 2015 had been proposed by government agencies, the ideal of community forest and sustainable forest management still has long way to proceed.

The paper is organized into six sections. The second section discusses failures of the Thailand National Forest Policy by illustrating its goals compare to situation, for example, forest cover objective. The third section discusses theoretical concept of adaptive management and adaptive governance. The fourth section, which is the title of this paper, discusses community forest in Thailand and its history. The fifth section illustrates economic characteristics of forest and discuss about economic reasons for community forests. The last section summarizes the paper.

Failures of the Thailand National Forest Policy

The management of natural forests in Thailand has been the responsibility of the Thai government since the establishment of the Royal Forestry Department (RFD) in 1896. Forestland rights, including mountains, watersheds, islands, and mangrove forests, belongs to the state, and the areas cannot be issued deeds or any land titles[1] with an exemption of special legislation such as the Land Act of 1954 and the Agricultural Land Reform Act of 1975. However, government had granted concessions in several parts related to these resources e.g. logging[2], mining, and resort development. Government forest policy in the past mainly emphasized to support trade and agricultural sector that affected directly to deforestation. In 1985, the government approved the Thailand National Forest Policy (TNFP) in order to preserved forested areas, but still maintained all concessions (Box 1). Since 1987, government had been supporting private plantation policy, mostly fast-growing tree such as eucalyptus and other cash crops such as para-rubber, cassava, and sugarcane. Due to the raw material trade, government's logging concession, and private plantation policy, forest cover had reduced continuously since 1961. Thailand's forested area has rapidly declined

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[1] See Box 1 article 16

[2] Thailand had long been a traditional exporter of raw logs and in more recent years had begun to develop a competitive furniture industry. In the past, timber was one of the top ten natural resource exports of Thailand especially for 'Teak or Teck' *(Tectona Grandis).*

from 53.33% of the total land area in 1961 to the lowest of 25.02% in 1999[3] (Table 1).

As a natural reaction in November 1988, there was the worst flooding in Thailand in nearly a century especially for landslides in the south. During the floods, 350 people died and there was $120 million in property losses. Soil erosion caused by deforestation exacerbated the floods, thereby making the damage and loss of lives much worse. On January 10, 1989, Thailand banned harvesting of timber in the country except for plantations and mangrove forests.

Table 1 Forest Cover in Thailand and percentage of the nation's area

Year	Remaining Forest (Rai)	Remaining Forest (%)
1961	171,017,812	53.33
1973	138,578,125	43.21
1975	128,278,755	40.00
1976	124,010,625	38.67
1978	109,515,000	34.15
1982	97,875,000	30.52
1985	94,291,349	29.40
1988	89,877,182	28.03
1989	89,635,625	27.95
1991	85,436,284	26.64
1993	83,470,967	26.03
1995	82,178,161	25.62

[3] In addition, FAO estimated that only 22.8% of the total country area was forested, including mangrove forests and highland forests in 1999 (Mahanty et al., 2006).

Year	Remaining Forest (Rai)	Remaining Forest (%)
1998	81,076,428	25.28
1999	80,242,572	25.02
2000	106,319,239	33.15
2004	104,744,363	32.66
2005	100,625,813	31.38
2006	99,157,869	30.92
2008	107,241,031	33.44
2013	102,119,538	31.57

Source: The Royal Forestry Department

Note 1: 1 hectare is equal to 6.25 rai.

Note 2: The increase of forest cover in 2000 came from changing method of GIS mapping Landsat 5 TM from 1:250,000 to at 1:50,000.

Box 1: Thailand National Forestry Policy (Cabinet Resolution on December 3, 1985)

To achieve a long term and coordinated national forest administration and development and for better understanding between state and private sectors, it is hereby declared as a national forestry policy that

1. Long term guidelines for forest management and development shall be established to maximize national social and economic benefits and national security, with sufficient measures provided for environmental protection. Emphasis shall be placed and harmonized utilization of forest resources and other natural resources.

2. Role and responsibility sharing among various government agencies and the private sector in forest management and development shall be promoted.

3. National forest administration shall be reorganized in line with the changing quality and quantity of forest resources and environment.

4. Forty percent of the country area shall be kept under forests. The forest area shall be divided as follows

4.1 Protected forest: 25% of the country area shall be kept as protection forests for nature conservation, recreation and environmental quality protection.

4.2 Production forest: 15% of the country area shall be designate as production forest of produce timber and other forest prod ucts.

5. Public and private sectors together shall develop and manage the forest are to achieve the objective of providing perpetual direct and indirect benefits to the country.

6. Science and technology to increase the efficiency of agricultural production shall be enhanced to reduce to risk of the forest being destroyed to increase agricultural land.

7. The State shall establish a forest development plan as part of the natural resources development plan in the National Social and Economic Development plan to harmonize a mutual utilization action between forest resources and other natural resources.

8. Efficiency in timber production shall be increased through appropriate forest management techniques using both selection and clear cutting system. In the clear-cutting system, the cleared area shall be replanted immediately.
9. To conserve and protect natural environment, the State shall accelerate the city planning process and designate specific area for forest, residential, rural and agricultural areas in each province to prevent forest land encroachment.
10. National Forest Policy Committee shall be established under the Forest Acts for policy formulation, supervision and management of national forest resources.
11. The State shall undertake extension programs to create public awareness, instill positive attitude, and proper skills on the wise use, as apposite to the negative effects of forest destruction and wasteful use, of forest resources.
12. The State shall promote reforestation by the public and private sectors for domestic industrial consumption. Export of wood and wood products shall be encouraged. Community forestry such as reforestation on public land by private sector, tree planting on marginal agricultural land and establishment of forest woodlot for household consumption shall also be promoted.
13. The State shall encourage integrated wood using and pulp and paper industries to realize the whole-tree utilization concept.

14. Amendment of forest acts shall be made to support efficient forest resources conservation and utilization.

15. Wood energy as a substitute of fossil energy shall be promoted through energy plantations.

16. Any land with the slope of 35% or more on an average shall be designated as forest land. No title deed, or land use certificate under the Land Acts shall be issued for the land of this category.

17. Explicit guidelines shall be established to deal with various forest degradation problems e.g. shifting agriculture, forest fires, forest clearing by the hill tribe minorities, etc. Measures on enforcement of law and penalty codes shall be specified and respective due processes shall be established Regional Forestry Law Enforcement Center shall be established. Measures shall also be devised to penalize corrupted government official and influential person.

18. Incentive systems shall be established to promote reforestation by the private sector.

19. Human resources and rural settlement planning must be in conformity with national natural resources management and conservation plans.

Source: The Royal Forestry Department, http://www.forest.go.th/rfd/policy/policy_e.htm

Several articles in TNFP had conflicts with the situation at that time. For example, forested area, as stated in Article 4 in TNFP, that at least 40 percent of the total area should be forested, had declined continuously due to policy disagreement and non-sustainability of forest management policy. Despite the private plantation policy since 1987 and the logging ban policy in 1989, the deforestation had continued. In addition, national efforts for reforestation had not attained this goal. Forest cover statistics shows that the percentage of remaining forest area had reduced from 27% in 1989 to 25.02% in 1999. During 2008-2013, forest cover had declined annually on average 1 million rai a year or the total of 2 percent of nation area which is highly concerned by relating agencies. In addition, these percentages already included plantation and mangrove forests not only for natural forest.

An example of unsustainable forest policy is the Land Act of 1954 initiated by the Thai government. The Act has been authorizing land ownership rights, encouraging the clearing of forestlands as a means to gain title, promoting a policy of monoculture-cropping and continuing to allow logging for export. This act has caused conflicts over land and land rights to increase for over 50 years as people are excluded from land they traditionally used (Mahanty et al., 2006). The Agricultural Land Reform Act, on the other hand, has good objectives to help local landless farmer. However, its poor management and monitoring rules put pressure on deforestation. Because deteriorated forestlands were majority of granted land, farmers had rights on agricultural land without transfer ability. However, most of lands were transferred to capitalist

who develop resorts or operate commercial farms. In addition, some capitalists, who own the areas around the hill, claim their illegal rights over the hill obviously deviating from Article 16 in TNFP without any enforcement.

Traditionally, the two main causes of forest destruction are logging and conversion of forested land to farmland. However, the major problem in Thailand forest is not only deforestation, but also improper policy and unsustainable management. The logging ban was good evidence and also a reflection of the failures of the policy. Despite the ban, forest cover had continued to shrink due to illegal logging and encroachment into national forests for farmland and firewood. Because monitoring, enforcement, protective systems, and corruption bring about more pressures on natural resource management, to relief these pressures requires institutions and their rules cooperating from stakeholders. However, the traditional and dominant top-down bureaucratic models in Thailand has resulted in fragmented decision making, policy gridlock, and in some cases, has even exacerbated conflicts and problems. In the past, because many local people such as hill tribes, northeastern people, and foreign labors migrated to other remote areas, mostly rich forests and watersheds, and started another loop of deforestation and then converted to farmland. They were claimed to be a major problem of forest destruction. If government agencies found the cases, they will force them off. Destructed forestlands mostly were granted for agricultural purposes by the other institutions instead of reforestation. Finally, the lands were illegal transferred to capitalists.

There were a lot of conflicts between state agencies and indigenous people who got supported by NGOs and academics. In addition, the decrease in forest areas at alarming rate forced government agencies to extend the boundary of forests in order to maintain the percentage of country forest area. It resulted in forcing local inhabitants out of forests no matter how long they lived before new legislations, and extended the conflicts between two groups. To stop this loop and its wicked problems, it needs more than legislations and stringent enforcements. Socio-economic solution representing adaptive management and/or adaptive governance concept could be a tentative method toward sustainability of forest management. This paper will discuss theoretical concept of adaptive management and adaptive governance in the next section.

Adaptive management and adaptive governance

Adaptive Management (AM) techniques are one of the principal tools proposed by environmental decision makers to provide flexible and responsive management approaches to resource management over time. The concept is developed from ecological theories of resilience (Holling, 1978; Holling et al., 1995; Walters, 1986). AM acknowledges the deep uncertainties of resource management and attempts to treat those uncertainties over time by process of using management actions as experiments to test policy (Walters, 1986). Therefore, AM requires data collection, response to evaluate performance and, where necessary, feedback learning and improved understanding

into revised goals, strategies, and tactics. However, the management often requires a specific set of social, economic and governance factors for implementation.

Unfortunately, many environmental systems and natural resources are not adaptively managed, therefore the record of successful applications is small (Gregory et al., 2006). This may be because the managers lack the means or resources to apply the necessary control tools, as is the case in many poor countries, or because the goals have never been explicitly stated or have been corrupted. Also, some environmental goals may be in conflict with social or economic goals. In many cases, managers lack the will, time, or resources to monitor or evaluate their strategies. Further, where monitoring and evaluation does occur, managers may be prevented from change by institutional inertia, or by vested interests that may be disadvantaged by proposed changes (Grafton et al., 2004).

While AM still be challenged by its successful, Adaptive Governance (AG) is an emergent framework for the management of complex environmental issues. Dietz et al. (2003) used the phrase to describe the social and human context for the application of adaptive management. Brunner (2005) provide a rich set of examples to illustrate the emergence of adaptive governance as a way of solving problems created by top-down control of decision making. AG in the sense of Brunner (2005) is relating community-based initiatives, civic environmentalism, collaborative conservation, and other labels for consensus-based policy making. The authors describe AG as operating in a situation where

the science is contextual, and knowledge is incomplete. In addition, multiple ways of knowing and understanding are present with policy implementation dealing with modest steps. Finally, unintended consequences and decision making is both top-down and bottom-up (Brunner, 2005; Gunderson and Light, 2006). As such, adaptive governance is aimed at integrating science, policy and decision making in systems that assume and manage for change, rather than against change. Adaptive governance deals with the complex human interactions that have been obstacles to the implementation of adaptive management (Gunderson and Light, 2006).

Community forests and private forest owners in Thailand

Sustainable Forest Management (SFM) involves multiple stakeholders at different levels dealing with a combination of social, economic, and ecological needs of the present and future generations. The main idea of SFM implants the definition of forest which is not only the collections of tree but includes environmental services. Sustainable forestry practices have received increasing attention as a means to counter deforestation. They offer an alternative that may result in the generation of long-run forest-related income or monetizing forest and forest products, while maintaining forested land. SFM in Thailand generally focus on two different types of work. One is the practice focusing on the sustainable management of pre-existing forests with reforestation efforts. The other of the practice focuses on commercial forest plantation.

After the logging ban, which could be seen as an adaptively managed policy, rural communities, NGOs and academics have believed that sustainable management of the diverse forests was considered to be impossible for the government agencies alone. The logging ban slowed down deforestation; however illegal logging could not be stopped entirely. In other word, adaptive management did not solve forest destruction issues due to basic economics characteristics of forest, complex structure and human interactions of the problems. Therefore, there were several calls for new ways of forest management to deal with the danger of forest cover loss and degradation in order to have sustainable forests. Efforts for sustainable forestry should attempt to discourage practices that are damaging to the forest, while helping the local inhabitants adopt other methods to generate income. There have been several projects after the logging ban including community forestry[4] and improved agricultural methods. Community forestry projects usually try to encourage locals to take part in reforestation efforts while helping them to gain income and resources from the forest in a low-impact manner. Other types of community forestry projects encourage community wood lots that act as subsistence-level tree farms, and which offer an alternative to the collection of wood from established forests, generally eucalyptus plantations. Improved agricultural methods include projects such as implanting alternatives to traditional slash-and-burn techniques. In response to several calls, community forestry was officially introduced

[4] Community forestry mentioned here is totally different to Article 12 of TNFP.

in Thailand in 1991. This is a rejection of the belief that forest had only timber value and should be managed to support exports or commercial forestry. In fact, forests have multiple values including life-supporting in terms of community settlement, socio-cultural development, and life maintenance. Community practices e.g. respect and reciprocity, enhance probability of sustained forests and biodiversity (Wichawutipong, 2006). In addition, villagers believe that community subsistence is not possible if the forest is not well taken care of. Therefore, community forests (CFs) have been seen as an alternative tool to economic, stakeholder oriented, and scientific forestry for sustainable forest management, which basically the combination of adaptive management and adaptive governance.

Participation of local people in the management of forest resources seems to be a promising way to conserve remaining forest areas. A community forest (CF) was identified as a "forest where local people can collect forest products to meet their local needs. Community forestry means that local people have the right to make their own decisions about how and what a forest is managed for, as long as it is in a sustainable manner" (Wichawutipong, 2006). A growing number of villages claim their ability to manage forest land within the community as CFs. NGOs working in rural development and conservation, scientists and Royal Forest Department have been negotiating the draft of a community forestry bill. This is the process of adaptive governance dealing with the complex human interactions. Timeline of key events and legislated policies relating to CF management is presented in Box 2.

The development of the CF network in Thailand can be divided into two stages, before and after 1991. The first stage stems from the failure of the state monopoly to properly manage forestland and resources. The ideologies of commercial forestry had come to a deadlock during 1988-1989 when protests of local people against logging had spread throughout Thailand. The success of this protest led to a total logging ban inside the natural forests in January 1989 with the exception of the mangrove forests. Consequently, the movement also prompted the attention of NGOs and academics to the significance of local participation in forest management as a way to save Thailand's remaining forest area. Ground survey and data collection conducted by NGOs and social scientists during 1989-1990, for example, indicated that there were more than 140 community forests managed by local people in the northern region (Luangaramsi, 1997).

Box 2: Timeline of Community Forests in Thailand

1991	The Royal Forest Department (RFD) began a process to develop a draft of Community Forest Act to involve local communities in managing communal forests. The draft bill recognizes the legal status of communities living around Thailand's National Forest Reserves and proposes the establishment of CFs by rural communities to manage forest areas in cooperation with the RFD.

1992	The draft bill was first approved in concept by the cabinet, and then passed through for legislative review by the office of the Council of the State.
1992-1995	The draft bill had been revised and reconsidered through appointed committee and public hearings.
1993	People drafted CF Bill
1994	People campaigned for government to accept the Bill.
1996	The government assigned the National Economic and Social Development Board (NESDB) to organize and draft a new version of the CF Bill, with participation of representatives from government, NGOs, academics, and grassroots communities. A joint committee meeting comprising representatives from RFD, governmental agencies, academics, lawyers, NGOs and villagers was organized to draft a CF Bill at Suan Bua, Chiang Mai. This NESDB version was approved subsequently by the Parliament, but remained controversial among NGOs principally with respect to issues related to permitting community forests within protected forest areas. This led to a public hearing concluding that CFs in the protected areas were allowed on condition that communities proved that they settled before 1993 (using large scale aerial photographs as evidence of residence) and showed their ability to protect forests.

	1) Urban Elite Conservationists movement against Suan Bua CF Bill and the Minister of Ministry of Agriculture and Cooperative ordered to modify the Suan Bua version. Constitutional reform. 2) Cabinet approved CF Bill, the Ministry version. 3) Local communities all over the country opposed the Ministry version. A Joint Committee revised the drafted Ministry version. Prime Minister assigned Ministry of Agriculture and Cooperatives to submit the CF Bill, the drafted that recently revised to cabinet for consideration.
2000	The nationwide community forestry network announced the intention to collect 50,000 signatures to submit a people's version to the Parliament according to Article 170 of the 1997 Constitution.
2001	CF Bill was approved by the Lower House. New Government confirmed to continue the consideration of CF People's version.
2002	CF Bill was revised by the Senate. The Senate's revision is to delete the most crucial clause of the Bill to allow people settled in protected areas. Implementation of CFs and use of forest products in CFs must follow the existing forest laws. CF Bill sent back to Lower House to consider the Senate's revision.
2005	The CF Bill was almost approved by the joint committee. Debates remained focused around issues of people

	settled in protected areas. While CF legislation was not yet available in Thailand, the RFD has been working to support local community management of its forests. The Bureau of Community Forest Management was designated in 2003 to serve the RFD in regard to CFs' issues outside of protected areas. The Bureau comprises three major sections including the Administration Section, the Community Forestry Promotion and Management Division, and the Community Forestry Development Division.
2007	On November 21, 2007, the Community Forest Act finally passed the National Legislative Assembly. However, the controversy surrounds two articles. Article 25 is on the qualifications of a community necessary to obtain rights. To qualify for rights a community has to be older than ten years. 20,000 communities on the edge of the forest are excluded. Article 34 defines the rights communities get if they qualify. There are strict guidelines on the use of protected forest.
2011	The government proposed the concept of life reverence landscape, biodiversity conservation, and reduction of government agencies in forest management.
2015	The National Reform Council proposed the draft of the Community Forest Act, but the Network of the Community Forest Act disputes it.

Source: Wichawutipong (2006), Fernquest (2007), and http://www.citizenthaipbs.net/node/5588

This early stage of the community forest initiative contributed to a wide range of debates concerning local rights and access to resources. It was, however, not yet a social, or to be more specific, a local movement. Most of the negotiations on the reforestation policy and the campaign towards community forest law were initiated by NGOs and academics. Even though the process of baseline studies on diverse and complex lowland community forest management done by NGOs and social scientists essentially revealed the socio-cultural relation of local forestry, this did not contribute to the development of a community forest network among the lowland communities (Luangaramsi, 1997). More importantly, as the perceptions of community forestry in this early period were based on a lowland community forestry model, the management of forest area in highland watershed areas by ethnic minorities was left out.

Although the negotiation between NGOs and the Royal Forestry Department over acceptable community forest areas continued to be unresolved, the state rapidly expanded protected areas creating more conflicts between the state and forest dependent communities. The resettlement of local inhabitants to the buffer zone was the results for the expanding protected area policy; however there were some critical problems after resettlement which adversely affected attempts at community development and sustainable forest management (Kijtawachakul, 1997).

Expanding protected area policy was not only the state assertion of territorial independence in the form of absolute control over

forestland. Actually, it was the reassertion of the state power, which was undermined by the failure of commercial forestry over the past two decades, under the umbrella of conservation. The tools to achieve the conservation goal includes the annexation of forest reserves to protected areas, the restriction of resource use by local people, and the eviction of people out of forest areas (Luangaramsi, 1997).

The second stage of the community forest movement developed from communities striving for rights to local livelihood security, access and control of local resources. This was a response to the state's control of forestland, and provides a challenge to the theories of dominant forestry science and management. The second stage of the CF initiative could be seen together in detail in Box 2. The debate over community forestry in Thailand has intensified in the last decade, becoming an increasingly politicized issue. The discourse of community forestry in Thailand extends between a centralized government controlled forest management scheme, which promotes reforestation and commercial tree plantations on former croplands, to a decentralized process, based on concepts of community rights and common property systems. This approach is strongly promoted by civil society organizations and academics, involving conservation oriented, community-based forest management by forest communities in marginal areas (Mahanty et al., 2006). For approximately fifteen years, local inhabitant organizations have had to be patient while waiting for community forestry debates to be resolved and for the community approach to become codified into law. The community-based resource management approach has

become increasingly accepted in the past fifteen years as a means for local inhabitant organizations and the government sector to motivate diverse stakeholders to become involved in natural resource management at both national and community levels. However, the debate continued over how to properly involve and encourage participation from various stakeholders and to increase the equity of access to natural resources among poor users (Mahanty et al., 2006).

Finally, on November 21, 2007, the National Legislative Assembly passed the Community Forest Act of 2007. However, in 2010, the Constitution Court rejected it due to number of meeting member. The draft act had major problem because there were some conflicts between the Act objectives and its statutory articles in particular Article 25 and Article 34. The purpose of the new law is to help forest communities preserve and manage forest land surrounding their communities, and to transfer the rights to manage natural forest resources from the government to local communities. Article 25 laid down the qualifications of a community to be eligible to obtain rights to manage and use protected forest while Article 34 stipulated the rights of the communities. However, the Act limited community rights to original forest tenants with strict guidelines for the use of protected forest. By limiting eligibility to original inhabitants, “those who have lived in the forest for at least 10 years before the bill is promulgated”, the law excluded about 20,000 communities scattered on the rim of protected forests countrywide (Walker, 2007). On the other hand, the Act could be seen as the transition of power from state to local communities, and the government has

to go slowly in transferring right to local communities (Fernquest, 2007). In the mid-2015, the National Reform Council proposed the Draft Act of the Community Forest. However, the draft still be missing the concept of AG especially for human interaction and societal aspects. At least, from optimistic views, the latter two draft acts were an incidence of developing adaptive governance for sustainable forest management, by including local participation and several dimensions to solve deforestation problems.

By laws, private forest owners in Thailand normally plant trees for commercial purpose such as Eucalyptus, Para-rubber, or teak. The arising of the "Tree Bank" after the end of "Debt Replacement by Tree Planting" project in 2007 glows an alternative solution of SFM in Thailand. Based on "Tree Bank", planting multiple types of trees in private land should be seen as investment and government should support not only by legislations but also by financing. Without any supports from government or its agencies, most of "Tree Bank" members now maintain good forest management. In contrast, the government bans logging in private land in case land owners plant some trees in protection list which discourage land owners to plant high value timber in the list such as Thailand Rose Wood (Dalbergia cochinchinensis Pierre). Based on AG, the government still believe that banning is the most successful conservation which is not true particular in past experience.

Consider Thailand community forest with economic lens

This section will discuss economic characteristic of forest, and then discuss Thailand community forest using natural resource economic perspective. Ultimately, the big question of forest management is whether the management under community forest scheme will better utilize and allocate forest or not.

Economic characteristic of forest

Forests are natural resources of critical economic importance. They are analyzed separately from other renewable resources due to their importance to the economy and natural environment. In addition, forests possess characteristics of both renewable and nonrenewable resources. Therefore, economic problems relating to forest management and sustainability are complicated. Forests hold special characteristics of market failure: externalities, public goods[5], common property resources, and hidden information. Economists make use of the term 'pure' and 'impure' public goods. The difference is that a pure public good is both non-excludability and non-rivalness in consumption. An impure public good contains either non-excludability or non-rivalness in consumption but not both. Climate change protection, ozone layer, biodiversity, and the high seas are examples of a pure public good in which the benefits

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[5] Actually a public good could be considered as a special form of an externality. A public good exists when a person cannot be excluded from its provision and when one person's consumption of the good does not reduce its availability to anyone else. These two conditions of non-excludability and non-rival consumption separate a public good from a private good, which is excludable and rival.

accrue to all those around the globe. Common property and club goods, for example, rivers, local parks, lakes, are impure public goods because the benefits can be excluded from non-members of the group who owns the resource. The inefficient managed common property would make it tragedy[6] (Crowe, 1969; Gordon, 1954; Hardin, 1968). Because of free-riding, common property can end up to the classic and well-known case of the prisoner's dilemma, the social trap or the tragedy of the commons (Hanley et al., 2001, 2007; Hardin, 1968). The dilemma exists when people find that their individual incentives lead them to the worst outcome possible for themselves and society[7].

In general, market failure comes about (1) when people cannot define property rights clearly; (2) when we cannot transfer rights freely; (3) when we cannot exclude others from using the good; or (4) when we cannot protect our rights to use the good (Hanley et al., 2001, 2007). Under these conditions, free exchange does not lead to a socially desirable outcome. Because everyone 'owns' the right to clean air and good climates and biodiversity, nobody owns the right (Gordon, 1954). Therefore, it is impossible for a market to exist so people can trade freely. The market system is incomplete, and we have the problem of missing markets. Therefore by relying only on the market without correcting those problems, we could end up with economic inefficiency.

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[6] If one person's use reduces the total available to all, everyone has an incentive to capture the benefits as quickly as possible before someone else gets them. This free-for-all leads to the economically inefficient use of the resource.

[7] As stated in Hanley et al. (2001), "a person looking out for his own self-interest and who is fully aware that other people are doing the same, still cannot avoid shooting himself in the foot".

These economic characteristics of forests are also different between plantation forests and natural forests.

The ownerships or property rights are the key to alternative solutions of some market failure components, particular in externalities and public goods (Coase, 1960). However, due to the difficulties of revealing of market failure components and of well-defined property rights, sustainable forest management may end up with the second best theory requiring both horizontal and vertical bargaining and institutional aspects.

Problem of the commons, community forests are a solution?

From the past, the logging ban is not a sufficient policy for improvement from deforestation. This is an example that using only adaptive management may or may not solve the natural resource problem. Because forest in Thailand contains the common and local public good characteristics, to solve these market failure problems, assigning property rights is an economic solution. Theoretically, community forests, where local inhabitants have their rights to plan and manage their direct effects or stakes are a tentative solution for conservation, but the rights belong to the state, and it is very difficult to pass these rights. Except for the right transfer, the success of community forests and networks rely significantly on the ability to utilize and manipulate the dominant forestry science and technology by learning and incorporating what is useful while selecting and abandoning the unwanted parts. These are the process of adaptive management incorporating economic goal with information.

As discussed in earlier sections, the rise of the community forestry movement has been a learning process in which the adaptation of outside tools and knowledge has allowed the movement to become more flexible and dynamic. This process allows the possibilities to create more space for local ways of managing the forests. It cannot be denied that the community forests in Thailand have developed from adaptive management to emergence of adaptive governance with the sustainable forest management goal. The local discourse of community forestry has essentially de-legitimized and undermined the state concept of community forestry and become the significant counter-discourse that links forest dwellers throughout the country. In addition, community forests in Thailand show the role of local manipulative strategy in reconstructing traditional knowledge of forest and land use in countering the dominant conservation paradigm. In contrast, the state, in the name of conservation, does not agree totally with this scheme.

However, the draft of Community Forest Act of 2007 and 2015 has blocked community rights to fully participate in community forest management. The controversy of property rights between state agencies and local communities has continued because the law now puts constraints on community rights and reduces the communities' potential role in forest management. Kanchanaphan said that "all people managing community forests in the lowlands will be affected, but maybe not that much for the highlanders. The law has been tailored for those living on the mountains in the conservation forests. Now, with this law, they will no longer be allowed to take part in that since they do not

live in the conservation forests" (Udomittipong, 2007). In addition, due to Kanchanaphan, having the law is not an answer, a solution, and an ultimate goal. Although the law passed, the problem will not end, but in fact, it is just the beginning. "The term community forest has now been included in the dictionary and the general public has been made aware. Despite some confusion and misunderstanding, it is now impossible to deny the existence of community forests since it has become part of the discourse in Thai society" (Udomittipong, 2007).

Utilization and allocation of forest resources have not been efficient based on economic theory of first best solution due to market failure of forests. Therefore, sustainable forest could never been reached unless correct the problems. Due to the difficulties of revealing market failure components, well defined property rights, and large number of stakeholders, managing forest resources may end up with the second best solution requiring both horizontal and vertical bargaining and institutional aspects. In addition, the concept of community forest is derived from equity ground not efficiency. To reach the first best solution or the efficient outcome is only by chance. However, the second best outcome of well manage community forest is better than the unsustainable forest policy and practices in the history of Thailand.

While the community forest may result in the second best outcome as discussed above, promoting "Tree Bank" along with forest legislation amendment toward SFM should be proceeded. Based on "Tree Bank" information, members of "Tree Bank" already plant forest trees in their agricultural farm within 5 years. The numbers of their trees

are more than the numbers of ten years tree planting by government agencies. Trees in "Tree Bank" are excellent not only as asset for the owners, but also indirect benefits for society and help promote SFM in Thailand.

Concluding remarks

The paper objectives are to discuss the community forest as a tool to solve forest resource problems in Thailand and to apply economic theory to the problem. A half-century experience of forest management in Thailand has demonstrated that, on the contrary, typical Thai practices quite far from the general concepts of SFM, have resulted in a significant reduction of Thailand's forest area. The long history of community forest in Thailand since 1991 has represented the process of natural resource management. In general, community forest is a tentative solution for SFM. Managing forest resources in Thailand under community forest scheme is just a beginning and represents the development of adaptive governance. Because of nationally-owned forests, undervaluing forests and their products, and illegal logging, to cite only a few examples, Thailand's forest management must be reconsidered in favor of SFM and corrected through approaches used to resolve market failure conditions. Transferring forest ownership status from "nationally-owned to community-owned" is one method of moving toward the objectives as planned by SFM. However, due to the problem of property right transfer, the Community Forest Act is not an ultimate goal. Based on economic theory, allocation and

utilization of forest resources under community forest scheme may end up with the second best outcome which is better than Thailand forest management outcome in the past. Enhancing forest benefits through disseminating indirect forest values and economic value information could result in higher demand for several types of forest areas even by local, urban, and private forest owners. In order to do so, legal enforcement and adaptive governance in Thai forestry will be required. Monetizing forest benefits scheme should be promoted particular in private forest owners likes “Tree Bank”. In addition, allowing “Tree Bank” members to plant and cut their planting trees even those trees are in the banning list will accelerate Thailand SFM. The paper begins with a quote of the Douglass C. North, the Nobel Laureate in economics particular in institutions. This paper found the benefit of ending the paper for his quote also. “Creating the institutions that will alter the benefit/cost ratios in favor of cooperation in impersonal exchange is a complex process because it not only entails the creation of economic institutions but requires that they be under girded by appropriate political institutions” (North, 1993).

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