Managing Natural Resources towards Sustainable Livelihoods Development

Compiled by

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Kyoto University

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Preface

We, students from Kyoto University, organized a workshop entitled "**Managing Natural Resources towards Sustainable Livelihoods Development**" jointly with Kasetsart University in Thailand from February 14-17, 2015. About 30 people participated in the workshop and 17 people joined in field excursions as follow-up activities.

This international workshop aimed to enhance leadership skills and capacity of students in organizing international workshops and to share knowledge and experience among young researchers and to develop a research network in the environmental management fields.

11 resource persons made presentations on their research works on coastal resource management programme, and private ventures of teak and mangroves forests, and livelihoods of rural people focused on Southeast Asia countries. We had close discussions how to manage natural resources to optimize utilization for livelihoods development in a sustainable manner in workshop and we also had learned lessons and practices from three days excursions followed after one day workshop. This report contains a summary of the workshop and some notes and reflections on the field excursions to coastal areas and inland teak plantations.

Acknowledgement

I would like to thank all the participants who attended to the workshop in Faculty of Forestry, Kasetsart University in Thailand. I also would like to express my gratitude to program co-organizers, Dr. Vipak Jintana and Dr. Nittaya Miamint from the Faculty of Forestry, Kasetsart University, Thailand for their collaboration to hold a workshop and field excursion arrangements in Thailand. I would appreciate to Dr. Phatchanuch Wongwhathana Foster and Dr. Surin Onprom for their great support in the trips by facilitating to the students to achieve this workshop program.

I am very thankful to the students from Kasetsart University for their actively participation in workshop and local resource persons who helped us during the field trips as well. My special thanks go to members of the program and students of Kyoto University for their willingness to help me for this workshop program.

I am very grateful to my supervisor, Dr. Shinya Takeda, for his advice to organize this kind of program and for his continuous support to be successful the whole program. In addition, I would like to thank Shien Center of ASAFAS for their generous help since the beginning of the workshop proposal application and Kyoto University for research grant and financial support for this program to achieve as overseas event.

Opening greetings

Good Morning, Distinguished guests, ladies and gentlemen,

Firstly, I would like to express my great pleasure and honor to be in this occasion of opening of this workshop. I would like to briefly explain the background of the workshop. The Graduate School of Asian and African Area Studies (ASAFAS), Kyoto University encouraged the students to organize this kind of workshop aiming to develop leadership skills and to gain experiences. In this regards, I organized this workshop themed on **"Managing Natural Resources towards Sustainable Livelihoods Development"** together with field excursions starting from February 14-17, 2015 in Thailand with the financial support of Kyoto University under Intensive Program for international Research Output Training (IP-IROT),collaborating with the Faculty of Forestry, Kasetsart University, Thailand.

The objectives of this workshop are to develop a research network among the young researchers and to communicate each other in the research activities between universities and research institutions. In this workshop, total eleven presenters including Japanese students and participants from Thailand will discuss their ongoing research works.

I would like to express my great thanks to Dean, Vice Dean of Faculty of Forestry, Kasetsart University for hosting this workshop and I also thank to Dr. Vipak Jintana and Dr. Nittaya Miamint for their great support and arrangements to organize this workshop. As being students-oriented program, the participation of students in the workshop is greatly appreciated for exchanging the ideas, opinions and experiences from each other in the workshop. I sincerely expected to have success from discussions. Furthermore, we would also have a plan of field trips to mangrove plantation areas to Samut Songkhram in Yisan Sub-district and to teak plantation areas in Thong Pha Phum, Kanchanaburi. I also hoped to deepen the relationship among us in the fields. I would like to thank Kyoto University to have this opportunity to take part in the whole program of the workshop.

Thank you very much for your kind attention.

Thinn Thinn (Program manager)

Opening speech by Dr. Kobsak Wanthongchai (Vice Dean, Faculty of Forestry, Kasetsart University)

On behalf of Dean, Dr. Kobsak Wanthongchai from the Faculty of Forestry delivered an opening speech on the workshop. He remarked that this kind of workshop is very important for all students because both students from Japan and Thailand can learn how to organize an international workshop. He also expected his students to organize this kind of workshop in future because this is a very good idea for students to exchange ideas. Then, he appreciated the field trip program to forest areas particularly teak plantation which is very important species in Thailand and mangrove plantations Samut Songkhram after the workshop. He remarked that field excursion is really a great chance to see plantations. He concluded that he hoped today workshop will meet good results. Then, he officially opened the workshop by wishing to have success and to enjoy field trips.

Keynote speech by Dr. Shinya Takeda (Kyoto University)

On behalf of Kyoto University, Dr. Shinya Takeda (Associate Professor) from Graduate School of Asian and African Area Studies addressed a keynote speech at the opening session of the workshop. First, he sincerely thanked to everyone in the workshop especially Dean and Vice Dean of Faculty of Forestry, co-organizers Dr. Vipak Jintana and Dr. Nittaya Miamint, students, participants and those who support to this workshop in Thailand. He explained this idea of student workshop was started in three years ago in ASAFAS to encourage students. He also explained this kind of workshop is very importance because students can learn experiences by doing fieldworks and making workshops. He pointed out the key role of relationship between universities, intuitions and countries. After one day workshop, the field excursion was also a great chance to have look forests, to exchange idea, to deepen our relationship and to get motivation. He concluded his keynote speech by wishing close relationship and collaboration between universities about the research works in the future.

Group photo

Participants and guests of the workshop took group photo together in front of the banner in the meeting room.

Photo: Group photo of participants at workshop

Workshop Program: International Workshop on "Managing Natural Resources towards Sustainable Livelihoods Development"

Organized by Graduate School of Asian and African Area Studies, Kyoto University, Japan and Faculty of Forestry, Kasetsart University, Thailand

Date: February 14–17, 2015
Venue: Faculty of Forestry, Kasetsart University, Thailand

Day 1: February 14, 2015 Workshop

09:30–09:40	Opening greetings by Thinn Thinn (Program Manager)
09:40–09:45	Opening remarks by Vice-Dean of Faculty of Forestry
09:45–09:50	Keynote speech by Shinya Takeda (Kyoto University)
09:55–10:15	Participatory Land-use Mapping in a Mangrove Forest: A case study in the Kadonkani Reserved Forest of the Ayeyarwady Delta, Myanmar *by Thinn Thinn and Shinya Takeda (Kyoto University*)
10:15–10:35	Mangrove Community Forest as a Safety Net for the Poor: the Case of Pred Nai Village, Trat Province, Thailand *by Surin Onprom (Kasetsart University)*
10:35–10:50	Coffee break
10:50–11:10	An Important Role of Middlemen in Managing Coastal Resource for Sustainable Development in Indonesia *by Fumiko Furukawa (Kobe University)*
11:10–11:30	Quantitative Study on Demand and Supply of Mangrove Wood in Sam Chong Tai Village, Phang-nga Province, Southern Thailand *by Vipak Jintana (Kasetsarty University)*
11:30–11:50	General discussions
12:00–13:30	Lunch break
13:30–13:50	Ethnic Groups, Transition in their Indigenous Uses of Forest Resources and Current Trend in Fallow Forests

	Recovery: Case Studies in Myanmar and Laos *by Nyein Chan and Shinya Takeda (Kyoto University)*
13:50–14:10	Teak Plantations as a Tool for Rehabilitating Degraded Mixed Deciduous Forests in Myanmar *by Ei and Shinya Takeda (Kyoto University)*
14:10–14:30	Teak Growth Variation and Climate Change: The Opportunities for Dendroclimatology in Northern Thailand *by Pichit Lumyai (Kasetsart University)*
14:30–14:50	The Long-term Appraisal for Coastal Zone Change at Chao Samran Beach, Thailand *by Siriluk Prukpitikul (Kasetsart University)*
14:50–15:00	Coffee break
5:00–15:20	River's Edge Landscape Patterns in Mueang District, UthaiThani Province *by Natsiporn Sangyuan, Ruangrai Tokrisna, Danai Thaitakoo and Puntip Jongkroy (Kasetsart University)*
15:20–15:40	Livelihood Transition and Adaptive Bamboo Forest Management: A Case Study in Salak Phra Wildlife Sanctuary, Thailand *by Nittaya Mianmit (Kasetsart University)*
15:40–16:00	Current Status and Future Prospects of Forest Certification in Myanmar *by Ei Thandar Bol (Kyoto University)*
16:00–16:20	General discussions and comments
16:20–16:30	Closing remarks *by Vipak Jintana (Kasetsart University)*
18:00 – 20:00	Workshop dinner

Day 2: February 15, 2015 Field trip to mangrove plantations

08:00	Leave for Samut Songkhram
10:00	Study on mangroves plantations at Yisan Sub-district
12:00–13:30	Lunch break

13:30–14:30	Field research discussions
16:30	Arrival at Kanchranaburi
17:00–18:30	Dinner at Kancharanaburi
20:30	Arrive at Thong Pha Phum Teak Plantation sites

Day 3: February 16, 2015 Field trip to Thong Pha Phum Teak plantations

7:30–8:30	Breakfast at Thong Pha Phum Teak Plantation sites
9:00–12:00	Field observation of Thong Pha Phum Teak Plantation Sites
12:00–13:00	Lunch at Thong Pha Phum
13:00–16:30	Field discussions at Thong Pha Phum
18:00–17:30	Dinner at Thong Pha Phum Teak Plantation sites

Day 4: February 17, 2015 Field return trip

7:30–8:30	Breakfast at Thong Pha Phum Teak Plantation sites
8:30	Leave for Bangkok from Thong Pha Phum Teak Plantation Sites
12:00	Arrival at Bangkok

Participants list for the Workshop

1. Takeda Shinya (Kyoto University)
2. Thinn Thinn (Kyoto University)
3. Nyein Chan (Kyoto University)
4. Ei (Kyoto University)
5. Fumiko Furukawa (Kobe University)
6. Ei Thandar Bol (Kyoto University)
7. Kobsak Wanthongchai (Faculty of Forestry, Kasetsart University)
8. Vipak Jintana (Faculty of Forestry, Kasetsart University)
9. Surin On-prom (Faculty of Forestry, Kasetsart University)
10. Nittaya Miamit (Faculty of Forestry, Kasetsart University)
11. Pichit Lumyai (Faculty of Forestry, Kasetsart University)
12. Siriluk Prukpitikul (SLUSE/KU, Kasetsart University)
13. Natsiporn Sangyuan (SLUSE/KU, Kasetsart University)
14. Sunisa Amnatpook (Faculty of Forestry, Kasetsart University)
15. Chokdee Khantawan (Faculty of Forestry, Kasetsart University)
16. Tueanjai Sochaiyon (Faculty of Forestry, Kasetsart University)
17. Thanatorn Parnpikul (Faculty of Forestry, Kasetsart University)
18. Sasima Saesahet (Faculty of Forestry, Kasetsart University)
19. Narapong Sangram (Faculty of Forestry, Kasetsart University)
20. Songdej Songkitipisan (Faculty of Forestry, Kasetsart University)
21. Kittipon Permpoon (Faculty of Forestry, Kasetsart University)
22. Dokrak Marod (Faculty of Forestry, Kasetsart University)
23. Mr Kham Phaeng (Faculty of Forestry, Kasetsart University)
24. Innerrvt Somannawong (Faculty of Forestry, Kasetsart University)
25. Sewitree Sawangrat (Faculty of Forestry, Kasetsart University)
26. Hongpha Baibong (Faculty of Forestry, Kasetsart University)
27. Akpaporn Thongsangiam (Faculty of Forestry, Kasetsart University)
28. Min Myat Aung (Mahidol University)
29. Yu Ya Aye (Faculty of Agriculture, Naresuan University)
30. Kenta Shiki (Kasetsart University joint program)

Presentations of the workshop

Participatory land-use mapping in a mangrove forest: A case study from the Kadonkani Reserved Forest in the Ayeyarwady Delta, Myanmar

Thinn Thinn[1] *and Shinya Takeda*[2]

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Abstract

This study aimed to investigate land-use practices in the Kadonkani Reserved Forest in the Ayeyarwady Delta, Myanmar. An interview survey, using semi-structured questionnaires, in a small village in a mangrove forest was conducted during November and December 2014. Participatory mapping was carried out to identify land use at household level. Paddy cultivation started in the cut-over areas of mangrove forests used for charcoal and firewood production and it became the dominant land use since around 1992. The household survey showed that 96.4% of respondents were engaged in farming on two categories of land: secure and insecure agricultural lands. Of those households who practiced paddy cultivation, 21.8% were farming on secure land, and 78.2% on insecure land located in the mangrove forest protected by the Forest Department. Although most households had been involved in agricultural practices within the protected mangrove forest, they had recently been forced to stop paddy cultivation, which resulted in constraints on their livelihood. However, these households have not yet received support via the provision of alternative land from the Forest Department, and current plots of paddy cultivation may be targeted for mangrove rehabilitation in the future. This paper will discuss possible measures for responding to this dilemma.

Keywords: Land use, mapping, mangroves, the Ayeyarwady Delta, Myanmar

Mangrove Community Forest as a Safety Net for the Poor: the Case of Pred NaiVillage, Trat Province, Thailand

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Abstract

This article discusses community-based mangrove forest management and the functions of a community forest as a safety net for the poor, drawing on the case study of Pred Nai village in Trat province, near the Cambodian border in southeast Thailand. Here,1,920 hectares of mangrove forest, previously converted into shrimp aquaculture ponds in the mid-1980s, were successfully reforested. Moreover, the village has set up a community forest committee and a community resource use plan to regulate, control, and manage the use of the forest by community members. In the process of community-based mangrove forest management, local villagers have been encouraged to participate in every single step of forest planning and management. It is the active involvement of the local people together with the support of the relevant authorities and national institutions that make the Pred Nai case a success. At present, Pred Nai community forest functions as a safety net for the livelihood of poor: the non-timber forest products (NTFP) from the community forest are commonly used by poor households to sustain their daily life and cope with agricultural risk. This article concludes by highlighting the importance of a regulatory framework in supporting the management of a safety net for the community's livelihood.

Keywords: community forest, safety net, participation, local livelihood

The Important Role of Middlemen in Managing Coastal Resources for Sustainable Development in Indonesia

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Abstract

Natural coastal resources with a high international market value are developed dramatically for the export industry. With the increasing demand from international markets, mud crabs (*Scylla* spp.) have emerged as important fishery resources in Indonesia since the early 1980s. In this study, we describe the status of mud crab fishing in three regions of Indonesia, where production is high: Sinjai and Palopo of South Sulawesi, and Walirou Island of Maluku in Indonesia. The results show that it is difficult to apply intensive methods to mud crab fishing due to the physical structure of mangroves; thus, traditional fishing equipment is still used, despite the increase in production. Mud crab fishing can be easily undertaken, requiring no specialist fishing skills, and so provides the opportunity for a new source of income to local people in coastal areas. However, mud crab production showed a declining trend in Palopo and Sinjai, due to increased fishing pressure, especially since small creatures, previously of insufficient value to the market, have become fishing targets. Therefore, it is believed that imposing size restrictions on mud crabs purchased by middlemen would be an effective management strategy for conserving the resource.

Keywords: fishery resources management, South Sulawesi, Maluku, mud crab fishing, middlemen

A Quantitative Study on the Supply and Demand of Mangrove Wood in Sam Chong Tai Village, Phang-nga Province, Southern Thailand

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Abstract

A census was conducted of all users of mangrove wood in Sam Chong Tai village, Phang-nga province, southern Thailand; the quantity of poles used per household was determined using systematic sampling; the central diameter and total length was used to survey the growing stock of the mangrove community forest (MCF). Each transect consisted of 10×10 meter sample plots established continuously from the baseline to the MCF's boundary.

The results revealed that more than two-third of all in the village used mangrove wood for house construction, bridges, and fishing gear, giving a total demand for wood as 10.1m^3yr^{-1}. The most common species used were *Ceriops tagal* (8.4 m^3yr^{-1}) followed by *Rhizophora apiculata* (1.3 m^3yr^{-1}); other species – namely *Xylocarpus granatum*, *X. moluccensis* and *Bruguiera cylindrica* – were less than 0.5 m^3yr^{-1}. The MCF comprised 13 tree species dominated by *R. apiculata, X. granatum* and *C. tagal* (Important Value Index [IVI] = 134, 73 and 54, respectively). The growing stock of all species was 10.5 m^3rai^{-1}(1 rai = 0.16 ha), of which *R. apiculata* was the highest (5.9 m^3rai^{-1}) followed by *X. granatum* and *C. tagal* with 2.8 and 1.2 m^3rai^{-1}, respectively. In comparison with the total area of the MCF, it can be concluded that wood demand in the village is much lower than the wood supply.

Keywords: Mangrove forest, wood utilization, growing stock, Sam Chong Tai village

Ethnic groups, transition in their indigenous use of forest resources and the current trend in fallow forest recovery: Case studies in Myanmar and Laos

Nyein Chan[1] *and Shinya Takeda*[2]

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Abstract

We studied four ethnic groups in Myanmar and Laos: Karen, Zotung, Matu and Khmu. They are forest-dependent people, practicing swidden cultivation for their livelihood. Since the late 20th century, their indigenous use of forest resources has been in transition, some obvious examples being: the introduction of an agroforestry-based community forest system in the Karen area in 2014; out-migration of swidden cultivators, development of terrace farming, and the introduction of *Amorphophallus* sp. to old fallows in the Zotung and Matu areas; and shortening the fallow period in 2013, and an increase in commercialized maize production in the swidden area by the Khmu. Therefore, the transition in indigenous uses of forest resources by different ethnic groups could be documented in this study. In addition, we chronosequentially assessed the biomass accumulation in fallow forest by establishing site-specific allometries in the respective villages. In a Karen village, the aboveground biomass (AGB) accumulation in 30-year-old fallows is about 83% of the total AGB in the old forests, whereas the average AGB of the ≥9-year-old fallows in a Khmu village is about 93% of the total AGB in the conservation forests; the biomass recovery rate is relatively slower than this in the Zotung and Matu areas. However, the increase in biomass accumulation in their fallow forests in Zotung and Matu areas may possibly be because of out-migration and the introduction of *Amorphophallus* sp. in the old fallows. Therefore, further research is necessary in the Khmu and Karen areas due to the transition in indigenous uses of forest resources.

Keywords: forest-dwellers, swidden cultivation, forest transition, REDD+

Teak plantations as a tool for rehabilitating degraded mixed deciduous forests in Myanmar

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Abstract

Over the long rotation period of commercial teak (*Tectona grandis* L.) plantations in Myanmar, other woody species have naturally established themselves in monoculture stands. From a holistic ecosystem–level perspective, it is important to recognize tree regeneration as an external benefit of commercial timber plantations. This study was conducted across a range of developmental stages—11-, 16-, 21-, 26- and 31-year-old teak stands—at three reforestation sites in the Bago Mountains, Myanmar, to document the composition of the teak population and its associates. Species diversities of tree regeneration in chronosequence of the teak plantations were similar to teak-bearing secondary forests, comprising characteristic species of mixed deciduous forests in Bago Region. Regeneration of teak associates did not appear to interfere with the planted teak and its regeneration as the distribution of teak stems in size classes specified by diameter at breast height resulted in a reverse-J shape. The proportions of the teak in relation to tree regeneration in the stand density and basal area were considerably higher than those naturally occurring in mixed deciduous forests. The study revealed that teak plantations thrived on colonization by associated tree regeneration, which might help restore forest ecosystems on degraded lands, and gradually turned into mixed deciduous forest environments.

Keywords: Tree regeneration, forest ecosystem, mixed deciduous forests, teak plantation

Teak Growth Variation and Climate Change: The Opportunities for Dendroclimatology in Northern Thailand

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Abstract

The purpose of this research was to investigate the relationship between teak growth and climate data from local and regional scales. The standard techniques of dendrochronological study were used to analyze 36 sample cores from Thampathai National Park, and the cross-dated ring-width data could be extended back 125 years (1888-2012). In Umphang Wildlife Sanctuary, the ring-width data of 35 cores from 20 trees were successfully cross-dated and could be extended back 124 years in 1889-2012. The relationship between ring-width index and climate data from local, regional, and global scales indicated positive correlations between teak growth and rainfall in April–May for Thampathai National Parkland and rainfall in June for Umphang Wildlife Sanctuary. Results revealed that the beginning of the rainy season affected teak growth in northern Thailand. In the case of tree growth–regional and global climatic relationship, the Southern Oscillation Index (SOI) and Sea Surface Temperature (SST) were significantly correlated with teak growth in Umphang Wildlife Sanctuary, but had no significant correlation with that in Thampathai National Park. Therefore, teak is a reliable indicator of rainfall during the beginning of the rainy season, and thus can be applied to investigations into droughts and periods of great reduction in the past.

Keyword: Climate change, growth, tree ring, teak, Northern Thailand

The Long-term Appraisal of Coastal Zone Change at Chao Samran Beach, Thailand

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Abstract

This paper investigates the relationship between coastal zone change, natural and man-made factors, and the impact on economy and society along the Chao Samran Beach in Thailand over the past 12 years. The fact that Chao Samran Beach is straight means that it is directly influenced by the monsoons; thus, monsoon variability is very important for coastal zone change in this area. From 1999 to 2011, land use changed significantly, especially in the urban, aquaculture, salt flat, and bare land areas. Only those areas used for agriculture and rice farming decreased. We also noted that the density distribution of communities along the coast was in accordance with the economic and social development plan of the municipal district, population density increasing continuously since 2004. An investigation of the physical landscape indicated a severe erosion of the beach during 2005–2006 and 2009–2010 and evidence of accretion in 2004–2005 and 2008–2009. As a result of the threat to land and buildings, the total economic loss was approximately 177.69 million baht. This study therefore concludes that to understand coastal zone development, we need to consider the long-term physical, social, and economic losses.

Keywords: Long-term appraisal, Coastal zone change

River's Edge Landscape Patterns in Mueang District, UthaiThani Province

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Abstract

Urban development has caused changes to river's edge landscapes. Specifically, the relationship between the agricultural and residential areas changes with regard to the amount of riparian forest cover, which causes changes in physical perspectives, human activities, and land utilization along the river's edge from what was in the original landscape. This study examined the river's edge landscape in Mueang district, Uthai Thani province, with the aim of presenting its relationship to human activities and land utilization, including changes in the riparian buffer zone along the river. Therefore, the methods of landscape mapping and landscape characterization were used for this research, the results of which reveal the physical characteristics of the transition zone and current landscape functions, or land utilization.

Keywords: River's Edge landscape, landscape characterization, transition zone, land utilization

Livelihood Transition and Adaptive Bamboo Forest Management: A Case Study in Salak Phra Wildlife Sanctuary, Thailand

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Abstract

The connection between livelihood transition and adaptive bamboo forest management was investigated in a village adjoining Salak Phra Wildlife Sanctuary, Kanchaburi province, where three species of bamboo—*Dendrocalamus membranaceus*, *Bambusa bambos*, and *Thyrsostachys siamensis*—were collected by villagers. From January to October 2014, about 155,835 culms of bamboo were harvested, generating a total income up to 1,349,653 baht. Of the respondents surveyed, 46.4% had already stopped bamboo cutting, 39.6% retiring between 31 and 45 years of age. The main reasons for their retirement were: changing to a new occupation (52.7%), maintaining the stability of their household (76.9%), improving their income elsewhere (67.0%), and safety for their life (58.6%). Today, only 14.8% of respondents are still bamboo cutters, and their declining numbers mean that the bamboo forest continues to degrade in Salak Phra Wildlife Sanctuary, due to the area of bamboo forest and access to it being limited. In 2005, the local community established new customary regulations and bamboo forest zoning to sustain production and services, particularly bamboo culms. This paper discusses the transition in villagers' livelihoods and bamboo culm utilization as adaptive bamboo forest management by the local people.

Keywords: Livelihood transition, adaptive forest management, bamboo forest, Salak Phra Wildlife sanctuary, Thailand

Current Status and Future Prospects of Forest Certification in Myanmar

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Abstract

Myanmar has been practicing Sustainable Forest Management since 1856, but despite this long history, Myanmar does not hold any internationally recognized certification standard, such as those from the Forest Stewardship Council (FSC) or Programme for the Endorsement of Forest Certification (PEFC). Today, attaining Forest Certification is the aim of our Sustainable Forest Management, and Myanmar is preparing for potential negotiations with the European Union (EU), Association of Southeast Asian Nations (ASEAN), and international organizations in the field of sustainable forest management. The main purpose of this study is to analyze the level of progress in Myanmar Forest Certification and identify the key elements for the development and implementation of timber legality in Myanmar, by using qualitative research methodology.

Myanmar began the Timber Certification process in 1988 and succeeded to some extent. However, there is still a long way to go, especially to comply with the standards (Criteria and Indicators [C&I]) for Forest Management Certification. This analysis will also deal with the real situation of Forest Certification in Myanmar, based on the Chain of Custody's (COC) timber legality tracking system, market functionality, status of C&I, policy, and remedial measures.

This study concludes that Myanmar is in the pioneer stage of Forest Certification and moving the topic to a national level. According to forest management systems, an adaptation of biodiversity conservation practices, Reduced Impact Logging (RIL), the Code of Forest Harvesting, Community Forest Instructions, and the Timber Legality Assurance System are some major achievements.

Keywords: Sustainable Forest Management, Forest Certification, Timber Legality Tracking System

Summary of the workshop

Preparation of the workshop

We, the group members, from the Kyoto University, under the supervision of Dr. Shinya Takeda, initiated the project of a workshop in August 2014. We discussed the theme of the workshop, the date and the place to be held, and the participants of the workshop as well as any other logistics related to the organization of the workshop. Next, we contacted Kasetsart University and invited Dr. Nittaya Miamint as a co-organizer to collaborate in the workshop between Kasetsart University and Kyoto University. During the preparation phase, which was held at Kyoto University, we discussed the workshop's program and the participants and finalized the organization of the program. The workshop included two activities: (1) One day workshop at Kasetsart University and (2) A three-day-long field excursion to mangrove management and teak plantations in Thailand.

Day 1: 14 February, 2015. Workshop at Kasetsart University, Thailand

The students-oriented workshop, which was a collaboration between the universities, focused on "**Managing Natural Resources towards Sustainable Livelihoods Development**" was held at the Faculty of Forestry, Kasetsart University, Bangkok, Thailand on 14 February, 2015. This workshop was held under the outreach program of ASAFAS and the Faculty of Forestry, Kasetsart University. The collaborative workshop aimed to share research knowledge and discuss research methods in the field of natural forest resources to optimize their production and utilization in order to support the sustainable livelihoods development.

The purpose of the workshop was to share ideas and experiences between young researchers and to develop a research network in the fields of environmental sciences. Presentations were the source of discussion among participants who were interested in diverse perspectives of natural resources management. A total of 11 participants made presentations on different topics related to mangrove and teak forests and the livelihoods of rural people. During the morning

session, the participants discussed mainly the mangrove forests with the specifics related to the plantations establishment and mangrove-related land utilization and fisheries, particularly to mud crabs and mangroves as a safety net for the livelihoods of local people who inhabit zones close to the coastal areas.

During the afternoon session, the resource persons presented important topics such as biomass recovery in swidden cultivation areas practiced by diverse ethnic groups, teak mono-culture as a tool for rehabilitation, variation in teak growth based on dendroclimatology methods, bamboo resources management, coastal areas management, timber certification, etc. This session was concluded by many questions, comments, and suggestions.

About 30 participants joined the workshop, which was successfully carried out. We discussed and shared experiences and lessons mainly on mangroves forests and teak plantations management in relation to the sustainable livelihoods in Southeast Asian countries. Students from the Kyoto University acted as facilitators in each session.

Photos: Presentations at workshop

Photos: Traditional performance by a student before workshop dinner

Notes from the field trips

by Thinn Thinn (Ph.D. student, ASAFAS)

Day 2: February 15, 2015, Field trip to Yisan, Samut Songkhram Province, Thailand

After the one-day workshop, we visited mangrove and teak plantations (*Tectona grandis*) to observe and study the practices applied in the management of the plantations. A total of 17 participants took part in the field trips, which were organized by Kasetsart University.

First, we visited the well-known charcoal production area, Yisan Sub-district in Samut Songkhram, located in central Thailand. High quality charcoal is produced sustainably by private owners, and many local households have been involved in this business. The process of charcoal production is systematically managed by local private owners.

The raw material for charcoal comprises mangrove trees. Mangrove plantations have been traditionally managed by local efforts for the past 80 years. Mangrove species particularly from the genus *Rhizophora* are preferred for charcoal production. We have learned the history of the land use in these areas, the methods used to develop mangrove plantations, and the process of charcoal making, such as the availability of firewood from mangrove plantations, transportation of wood, and management of charcoal kilns for sustainable production. The manager of a charcoal kiln explained step by step the process of high quality charcoal production in the local Thai language and professors from Kasetsart University translated his explanations into English to the participants of the trip. After learning about the management of the good quality charcoal, we could directly observe the charcoal kilns of various sizes, the firewood poles, and the process of stripping of the bark in the production area.

Afterwards, our group visited mangrove plantations maintained by the Klong Kone communities at the seaside. In this area, we observed the multi-functionality of mangrove plantations in protection from erosion by sea tides, their contribution toward the greenery of the landscape, production of charcoal from the trees, etc. The findings by the local

community and their efforts to improve their own business are also very impressive in contributing toward tourism development and in earning cash income from fisheries and oyster culture. Local tourists and foreigners also enjoy touring these areas because they can marvel at the green landscape and take pleasure in feeding bananas to long-tailed monkeys inhabiting the mangrove forests. In my opinion, private ventures play an important role in the development of ecotourism and sustainable livelihoods. In addition, these mangrove plantations grant opportunities for scientific studies and research activities as well.


Photos: Bamboo poles to breakdown waves


Photos: Long-tailed macaque at mangroves and peeling of mangrove woods

Day 3: February 16, 2015, Field trip to the Thong Pha Phum teak plantation

Our groups arrived at the Thong Pha Phum teak plantation, which is located in Thong Pha Phum District, Kanchanaburi Province in western Thailand, in the evening of February 15, 2015. Diverse landscapes ranging from low swamp forests to high limestone mountains can be found in the Thong Pha Phum area. Agroforestry systems are well

established and adjacent to the teak plantation areas to earn income from cash crops.

The Officer of the Thong Pha Phum teak plantation explained the history of the plantation area, the plantation's establishment, and the management mechanisms. He explained the main activities that include how to maintain a plantation by weeding and thinning and how to harvest teak timber. He added that there are rubber plantations in the area that produce latex from rubber trees. In addition, he talked about the measures that provide fire protection, and also measures to prevent illegal timber logging in the plantation.

After the Officer's presentation, we visited the teak plantation by car. We observed logging and distribution of timber logs from the plantation to the saw mills and furniture factory. In addition, we also learned the ways plantations provide social services and economic benefits to forest villages adjacent to the teak planation by engaging the villagers in planting activities and by employing them in agroforestry (rubber and cassava plantations). Thus, one of the ways of subsistence for rural people in the Thong Pha Phum teak plantation area is a trade-off between the activities related to the forest and their livelihoods. Tourism and research studies on logging and sustainable timber production from plantations are allowed in the plantations. We also visited the swamp forest conservation area located nearby the teak plantation, where we learned about the conservation of distinct plant species in swamp forests.

Field trips are important for providing an opportunity for direct contact with local resource persons. In addition, post-graduate students can share their experiences and opinions obtained during their studies in field trips. The present field-based workshop program is a valuable program for students because of the diversity of group discussions with field experts and teachers. As a final remark, the landscapes were quite interesting during the whole trip, reflecting the nature modified by humans for sustainable development.


Photos: Explanation by forest officer from Thong Pha Phum teak plantation


Photos: Excursion to teak plantations

Reflections on the workshop program

by Nyein Chan (Ph.D. student, Kyoto University)

I had a great opportunity to share my research with experts and professionals in forestry-related disciplines. I received a lot of comments and questions at the workshop, which will contribute to the improvement of my future research. The following points represent my experience and reflections on this workshop.

February 14, 2015: Workshop Day

- There were 11 resource persons in total from ASAFAS, Kyoto University, and from the Faculty of Forestry, Kasetsart University. I learned a diverse spectrum of study fields related to the sustainable livelihoods development. In addition, I observed similar environmental issues related to livelihood development in Thailand and Myanmar. Therefore, by sharing the research outputs from both sides, we learned the lessons from each other on how to contribute to the management of natural resources toward sustainable livelihoods development.

February 15, 2015: Study tour to charcoal production cottage and mangrove conservation site

- We visited the village Yisan in Samut Songkhram that produces charcoal by sustainable utilization of mangrove. We learned about the history of the village related to the degradation of natural resources, how to rehabilitate the area to be greener, how to manage private mangrove areas in a sustainable way, and the whole process of charcoal production.
- We also visited the famous mangrove conservation site maintained by the Klong Kone community. It is a site of green tourism, with many local tourism-related industries, beautiful scenery, and traditional fisheries. We learned the important role of tourism plays in the local community livelihood by conserving the natural resources. Additionally, we learned about the erosion control measures that can be applied at the seaside not only by planting the mangroves but also by bamboo pillars.

February 16, 2015: Study tour to the Thong Pha Phum teak plantation site

- We camped at the Thong Pha Phum teak plantation. With the comprehensive management of the Forest Industry Organization (FIO), the plantation program has been successful. We gained significant knowledge from this study tour about the plantation area: the history of the plantation, the silvicultural management system and harvesting techniques, and the contribution of the local livelihood. Moreover, we visited the swamp forest natural conservation site located near the plantation to learn how to conserve the swamp forest.

From this collaborative workshop, I would like to share my reflections on teak plantation coppice management. According to the information that we obtained during the field trip, the coppice stands are seven years old and the rotation of teak plantation is 30 years, during which period, thinning is conducted using mechanical and silvicultural methods depending on the age of plantation (mechanical thinning is used after 10 years and silvicultural thinning after 20–23 years). A large number of coppices appear from thinned stumps because teak has a high coppicing power. If the coppices are well-managed, a multi-

storied teak plantation is expected to develop. Also, we can reduce the cost for regeneration of stocks. On the other hand, we need to consider the soil erosion issue in a multi-storied teak plantation.

Reflections on the workshop program

by Ei Thandar Bol (Ph.D. student, Kyoto University)

This was a great opportunity to be involved in both the workshop on the topic of "Managing Natural Resources towards Sustainable Livelihoods Development" and the field trips to mangrove plantations at Yisan Sub-district and Teak plantations at Thong Pha Phum.

My involvement, as a participant and also a presenter in this workshop has allowed me to witness and participate in the positive review of my research in natural resources management (NRM).

February 14, 2015, Workshop day

- Eleven participants from the Kyoto University and the Kasetsart University presented their current academic research on a multiplicity of research areas. The experience gained from this initiative workshop introduced some knowledge and deep understanding of a new field of research on natural resource management in Myanmar, Thailand and some other Southeast Asian countries. An ever-expanding community of practice has since developed among social and biophysical scientists and other practitioners working at the community level. Furthermore, it stretches beyond the research collaboration and management and it also offers expansion of research knowledge on the sustainable ways of natural resources management for the development at a local level.

February 15, 2015, Field trip to the Wetland Management Sites

- First, we stopped at Yisan in Samut Songkhram to learning about the charcoal production through sustainable utilization of mangrove. We gained some knowledge about the traditional production of charcoal in a kiln and effective ways of rehabilitating the resources needed for charcoal production in that area.

- Next, we continued our field trip to the successful mangrove conservation site, situated in the Klong Kone community. It is also a well-known for green tourism site. We observed the ways they developed the tourist areas by conserving the mangrove ecosystems and also reducing the damages caused by tides and erosion by bamboo pillars.

February 16, 2015, Field trip to the Thong Pha Phum teak plantations

- Our group visited to the Thong Pha Phum teak plantation that has been established and managed by the Forest Industry Organization (FIO). In this plantation area, there are zones planted with teak with 30 years rotation cycle and also zones planted with rubber that provide an extra income. From this study site, we learned about the four main activities of that plantation site:
  (1) silvicultural treatment,
  (2) rubber harvesting,
  (3) thinning and
  (4)tourism activity as well. Among four places of attractions of that site, we had a chance to cover the swamp forest conservation area, the tourism activity area.

Photo: Swamp forest conservation

This workshop broadened my knowledge and understanding of the objectives of this program. Through the field trip at the teak plantation area, I would like to add some findings related to the management of those areas. Although a proper plantation management plan has been practiced, the question of “How can they maintain those plantation areas long term by practicing repeated rotation cycles?” is still not clear. Teak is one of the broad leaves species and it has severe effects on soil erosion. The practice of repeated rotation cycles will lead to the decreasing the nutrient cycle in the near future. If they can add the more rules and regulations for fixing fallow period in their plantation management plan, it can reduce the problems of decreasing of nutrients in soil.

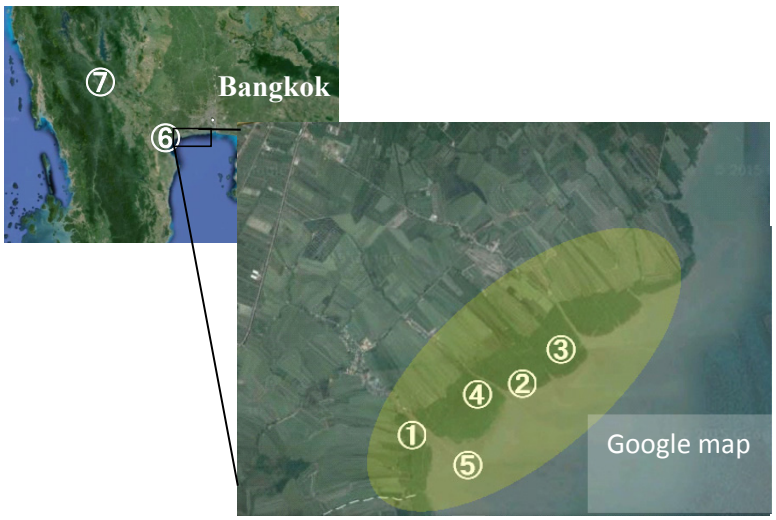
Reflections on the workshop program

Mangrove eco-tourism, Klong Kone sub-district and Yisan sub-district

by Fumiko Furukawa (Assistant Professor, Kobe University)

We joined the mangrove eco-tour in Samut Songkhram, Amphawa District on February 15, 2015. This eco-tour by boat lasted less than an hour from the pier of the local community into the Gulf of Thailand along the mangrove coastal area（yellow sections on the map below）.

Vast salt and shrimp farming lands spread inland from the coastal area and pile dwellings are found along the river. On the other hand, coastal area of the Klong Kone sub-district includes the mangrove area and it is conserved as the Klong Kone Mangrove Forest Conservation Area. Some research institutions have been conducting research on mangrove ecosystems and plantation techniques in this area. I have divided the eco-tour route into seven areas (Klong Kone Sub-district: ①－②－③－④－⑤; Yisan Sub-district : ⑥; Thong Pha Phum: ⑦) and summarized my findings for each area.



① Water transportation

Boat is the major transportation for this community, since each pile dwelling along this river owns at least one wooden or speed boat. According to its shape, the wooden boat is utilized for small-scale fisheries and aquaculture around the mangrove area. This wooden boat is made from teak wood and timber from *Avicennia* species. The boat is equipped with a modified motor, which is made in Japan. The daily life and the livelihood of the community are still related to mangrove resources.【Photo：①－1】

② Small-scale fishery using gill nets

It exits from the estuary and proceeds along the mangrove, as observed by the poles bearing a flag and located at a mouth of the creek and the sea. The local people set the gill nets at a place near the creek since they are mainly used for fishing of prawns using tide water. However, the gill nets are set vertically toward the mangrove. Is this style of fishing made to reduce the impact of the waves? I have seen similar fishing method being applied in mangrove areas of Indonesia.【Photo：①－1】

③ Bamboo breakwater

It exits from the estuary and proceeds along the mangrove, as observed by the breakwater made from bamboo poles. The topside of the poles is painted white, which indicates the position of the bamboo breakwater to the fisherman at night. Mangrove of this area has been damaged by the waves, and the bamboo breakwater protects the mangrove plantation from the impact of the waves. However, I was informed that some local people are opposed to the construction of breakwater, because bamboo breakwaters interfere with the fishing in this area.【Photo：③－1】

④ Watching long-tailed macaque

When we entered the mangrove creek from ④, we encountered long-tailed macaques. When the monkeys saw the eco-tour boat, they approached the boat because many tourists feed them bananas or snacks from the boat. The long-tailed macaque is well-known as a crab-eating monkey. However, they are omnivores and they feed on a

variety of plants and animals, such as leaves, flowers, roots, bird, lizards, fish, etc. The population size depends on the abundance of food. I am certain that watching of macaque in mangrove is one of the attractions in this mangrove eco-tour. However, at times, I believe that over-population of the long-tailed macaque in this region of the mangrove area has a negative impact on the mangrove ecosystem including mangrove plantation and aquaculture. 【photo:④－1】

⑤ Shellfish aquaculture and fisherman's shelter "Krateng"

We could see the aquaculture area surrounded by mangrove and bamboo poles in the coastal area which is 200–300 m away from the fringe of the mangrove. A fisherman's shelter called "Krateng" is constructed using teak, bamboo, and mangrove, and there is one for each individual aquaculture. At that time, however, we could not observe the culture system directly, because the eco-tour boat is available only during high tide. I was informed that the main culture in this area is shellfish (cockle). We observed nursery fields of cockle spats along the mangrove. This nursery field is protected from the sun light using nets for shielding light. Produce from this aquaculture field is distributed only to local markets and it is not exported to foreign countries. Cockle is sold at 30 baht per kilogram at a local market. 【photo：⑤－1】

⑥ Mangrove charcoal production in Yisan Sub-district

Yisan Sub-district in Amphawa, Samut Songkhram, is about 20 minutes away by car from the Klong Kone Sub-district. This area is known for mangrove charcoal production. The mangrove is provided from the private *Rhizophora* plantation area. Production process still follows the traditional method. The pre-treatment takes about a month and it includes four processes: sawing, cutting 1.3m-long poles, drying, and stripping of the bark. Then, it takes 5 days to prepare the charcoal kiln and 10 days to fire the mangrove poles inside the charcoal kiln. Of all the processes, the most difficult one is the control of the fire conditions inside the charcoal kiln. The production capacity is about 6 t per kiln, and good quality charcoal made from straight part of the trunk is exported to Hong Kong, Taiwan, Korea, and Japan. On the other

hand, charcoal made from root parts is sold at the local market, at 5–10 baht per kilogram. 【photo：⑥－1・⑥－2】

⑦ Local fresh market in Thong Pha Phum

After the mangrove eco-tour, we stopped at the local market in Thong Pha Phum. The fish products, mainly fresh water fish such as silver carp, grass carp, and tilapia, are sold at this local market. A type of carp and catfish that are sold are kept alive in tanks, whereas fish of the family *Carangidae*, garfish, and others that inhabit brackish waters are sold as smoked or fermented products. Prato is caught in the Meklong River in Samut Songkhram Province. 【photo: ⑦－1・⑦－2】

【Discussion】Mangrove resource management

Mangrove forests in these areas have diminished since 1985 due to their conversion into ponds for shrimp farming. At present, however, more than 3,840 ha of mangrove forest have been restored by planting (W. Chaiyasarn & V. Jintana). I believe that this eco-tourism is an example of successful use of the characteristics of local resources and culture, which is further emphasized by the proximity to Bangkok.

This eco-tour incorporates mangrove rehabilitation activities, local livelihood of shellfish aquaculture or mangrove charcoal production and water transportation by boat. This district area is not only conserving the mangrove ecosystem but also utilizes mangrove resources. This means that the daily life and the income of this community are related to the mangrove conditions through business of eco-tourism, mangrove charcoal production, and small-scale fishery. I believe that this relationship between the local community and mangrove resources serves as a motivation to plant and conserve the mangrove ecosystem. This in turn leads to sustainable mangrove resource management.

About 70% of the community population comprises fishermen, many of whom would like to join the eco-tourism business rather than to be involved in fishery. I consider that local fishery including aquaculture is important part of the eco-tourism because local livelihood and culture make the landscape of this area. Therefore, it is important to

support not only mangrove planting activities but also fisheries in order to develop mangrove eco-tourism.

At the same time, success of the eco-tourism may cause new problems such as the relationship between humans and long tailed macaque (④) and the negative impact of the eco-tour boat on the mangrove (③). During our boat ride, we could see only the coastal conditions during high tide. Hence, I would like to visit this area again during a low tide to find more details about the small-scale fisheries and the shellfish aquaculture.

Photo①－1：Boats for transportation

Photo③－1：Bamboo poles in mangrove plantation area

Photo④－1：Long tailed macaque

Photo⑤－1：Shellfish aquaculture area and fisherman’s shelter “Krateng”

Photo⑤－2：Nursery field of shellfish

Photo⑥－1：Mangrove poles from plantations

Photo⑥－2：Dome-shaped charcoal kiln

Photo⑦－1：Local fresh market in Thong Pha Phum (Freshwater fish)

Photo⑦－2：Local fresh market in Thong Pha Phum (Brackish and saltwater fish)