Summary for Overseas Travel WENDI 2018-2019

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	Biomaterial Science					
Grade	M1					
Supervisor's name	Mamoru Kanzaki					
Travel period	February 16-March 23, 2019					
UN agencies / International organization visited	Center of International Forestry Research (CIFOR)					
Theme of overseas travel	Ecological and Economical Assessment of Agarwood Plantation in Central Bangka, Indonesia					

Outline of the activities (4 pages including photos, figures, etc.)

(1) Global leadership

Studying forests is not only related to plants, animals and land but also understands how the existence of forests affects the social structure of surrounding communities, and vice versa. CIFOR is currently working on a working paper on Agarwood known as non-timber products from high-value forests.

As part of this project, I not only researched the tree structure and its economy, but also looked at how the development of the agarwood plantation business has been done by the community together with the regional government in a period of 10 years.

Towards global leadership, or the ability to integrate natural resources and human resources and find solutions to the state, culture, and organization, in my opinion, it is very important to be applied to the events that I encountered while traveling. Of the two project locations planned for the gaharu working paper, I visited one of them, namely Central Bangka Regency. Here the government is very supportive and helps the community to grow crops, vegetables, plantations and forests. For the gaharu itself, the government continues to provide free seedlings, inoculation and harvest costs and product processing tools and materials. It aims to change the livelihoods of the people who were originally just mining tin, to grow crops. However, in the process it did not run smoothly, many activities were slow because the community still did not believe and considered the income from planting business took a long time compared to mining which has more potential as daily income and inoculation techniques that had not been carried out continuously by the community because they waited the success of one of them and waiting for the government.

In contrast to other regions, such as in South Kalimantan, other areas which are planned to be investigated further, the majority of the people do all self-supporting cultivation. This difference underlies and gives me an understanding of how I should behave later when I have a career later. How we as global leaders need to make decisions on various things by considering all aspects and studying them more deeply. A visit to Bangka and discussions with regional authorities and discussions with CIFOR researchers opened the my knowledge wider again regarding the application of the project, such as the cultivation of agarwood which is so difficult and needs careful planning, because it has to connect all aspects and it is certainly not easy.



Me collect the data and have a discussion with farmers



With Mr. Suprapto, owner of one of agarwood plantation and the head of farmer's group in Lubuk Pabrik Village



With some resident in C 2 area, Central Bangka



Agarwood & Rubberwood mixed plantation

(2) Scientific significance

The data obtained from this visit is a map of agarwood potential in Asia, maps and the number of agarwood potential in Central Bangka Regency, gaharu plantation conditions in Central Bangka, Indonesia, income from agarwood and physical conditions of trees and other thesis data.

Furthermore, these data will be processed to create a tree growth model which could be integrated with plantation costs to predict future income. This prediction can be used for decision making on a forest management project or giving a picture to the business actors, especially farmers, about their agarwood.

In addition to the biological and economic aspects that I have examined, it is necessary to have a study further of social aspect in this area which are important to support the willingness of the agarwood planting project.

(3) Originality/Universality

What I saw in agarwood plantation in Central Bangka, they have so many agarwood trees. In 2013, there are 363.133 trees in that regency. Unfortunately it has not been inoculated yet. Maybe just 20 trees in big plantation and it just inoculated for 1-3 meters from ground.

Overall the physical condition of these trees is good, but some treatments such as periodic fertilization and regular pests management will make it even better. They do not have problems to the procurement of seeds and other natural resources.

I tried to make the trees inventory data, record the diameter and height of tree in a mixed plantation. We can see that they already plant the tree with different age and prepare it for harvest rotation. Only one farmer seems to be excited about agarwood and continue to manage his land as plantation since he already had income from natural agarwood product before and has been a agarwood farmer since 1980. Other farmers are still waiting for the best inoculant from government and the success of first farmer.

From some inoculation technique inside plantation area, some farmers said that the best is inoculant from Central Bangka Government. This means that to inducing the resin, we must consider the original interactions between inoculant (fungi and others) from it's region, trees and environment. The result of inoculation technique should be evaluated continuosly, from a month age to yearly. For example, there will be research plot to examine the result, the researcher should evaluate it with quantitative procedure, cut the trees and measure the amount of each product, each class of agarwood. Because from the statement from farmers, for first 3-4 month to a year the result is good but not for the next year. Sometimes wood becomes rotten.

Plot No	Total Tree	Agarwood	Rubber	Other	Age
1	32	12	20	-	5
2	18	6	9	3	5
3	50	23	27	-	3
4	59	27	32	-	9
5	55	25	30	-	9
6	51	27	23	1	10
7	50	22	28	-	10

Number of Trees with Sample Plot

Beside some problems are occured from the farmer motivation, regulation procedure of agarwood is also changing. Agarwood got listed in IUCN and it made the marketing and sales are so hard, including product from cultivated agarwood. Based on the results of interviews, sales with a small amount, for example 1-3 kg, have difficulty obtaining licenses in the distribution of goods, even though they are not from natural agarwood. So this makes it difficult for small farmers to send their products directly and there are some large players who use this by using the theory of elasticity. They accumulate products and wait when

prices are high and supplies are limited. On the one hand this is a strategy but also damages the supply of agarwood and other derivative products that use this material. They buy at very cheap prices from the first chain but sell them overpriced and not in accordance with quality.

During a discussion with CIFOR, we also discussed the reasons of a black market of agarwood, the incomplete market regulation and standard prices. When comparing with income from other regions and even other countries, this is certainly different because it follows the nature of the buyer who determines the price.

It is hard to analyze the plantation economically because it progressed slowly. Before make this market bigger, I think all stakeholders should make the better regulation and standard price, especially for small farmers.

Year	Product					
	Accesoris (pcs)	Oil (ml)	Tea (kg)	Chips (kg)		
2013	-	12	24	80		
2014	50	54	21.68	25		
2015	100	624	50	69		
2016	30	382	25	19		
2017	210	984	54	4.5		

Agarwood Product from Central Bangka, from Natural and Plantation Trees (BAPPELITBANGDA, 2019)



Distribution map of agarwood trees in Central Bangka

(4) Reasons and motivations for visiting UN agencies / International organizations

Coinciding with the plan to complete the thesis data, I also met with researchers at The Center of International Forestry Research (CIFOR). CIFOR has done a lot of research on forests, especially in Southeast Asia. They will arrange a working paper on Agarwood which makes me want to discuss further and share information about the development of this commodity.



Me with Mr. Yusuf and Mr. Tio from CIFOR