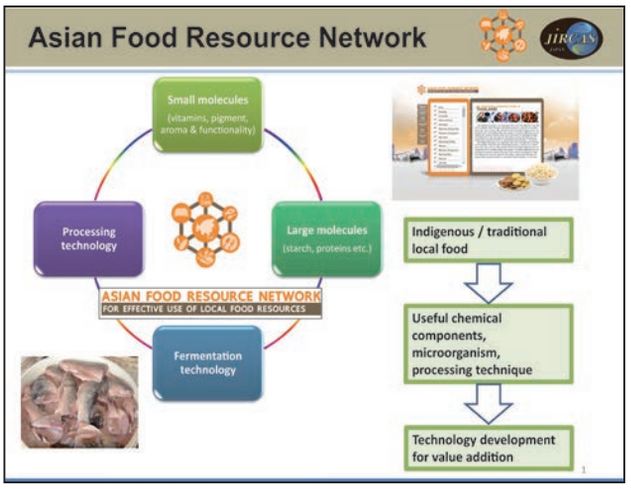
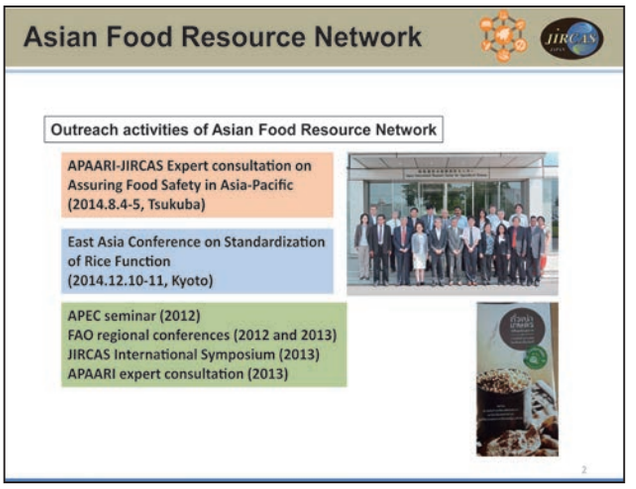
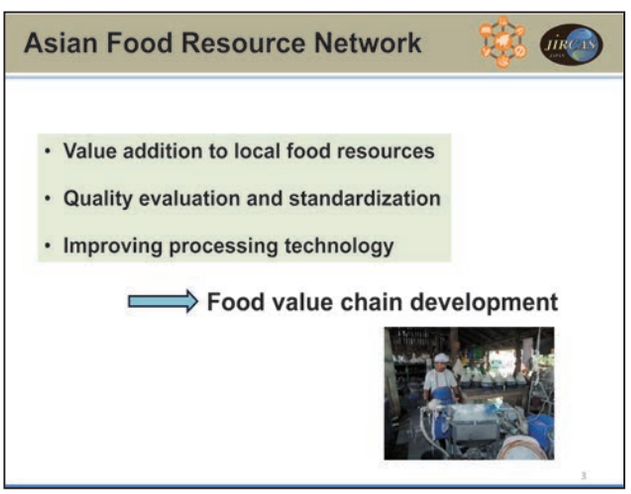

Asian Food Resource Network
Small molecules
(vitamins, pigment, aroma & functionality)
Processing technology
Large molecules
(starch, proteins etc.)
ASIAN FOOD RESOURCE NETWORK
FOR EFFECTIVE USE OF LOCAL FOOD RESOURCES
Fermentation technology
Indigenous / traditional local food
Useful chemical components, microorganism, processing technique
Technology development for value addition
1


Asian Food Resource Network
Outreach activities of Asian Food Resource Network
APAARI-JIRCAS Expert consultation on Assuring Food Safety in Asia-Pacific (2014.8.4-5, Tsukuba)
East Asia Conference on Standardization of Rice Function (2014.12.10-11, Kyoto)
APEC seminar (2012)
FAO regional conferences (2012 and 2013)
JIRCAS International Symposium (2013)
APAARI expert consultation (2013)
2


Asian Food Resource Network
• Value addition to local food resources
• Quality evaluation and standardization
• Improving processing technology
Food value chain development
3

Chairman Saito : Good afternoon, ladies and gentlemen. I'm Masayoshi Saito, Program Director of the Rural Livelihood Improvement Program of JIRCAS. Let me introduce the co-chair of this session, Dr. Kazuhiko Nakahara, Project Leader of JIRCAS. And now let's get started with session C, "Evaluation of the Various Uses of Indigenous Resources and Establishment of Value Chain in Asia ." Today we invited two speakers. One presentation focuses on the indigenous resources in Lao PDR. The other presentation focuses on the value chain in Thailand. We selected two countries in Asia because they are in different stages of development still the key word, value chain, is the essential idea for both countries for the development in agricultural sectors. Let me introduce the first speaker, Dr. Kenichiro Kimura. He specializes in Forestry Management and GIS. He's a senior researcher of the Rural Development Division in JIRCAS. Title of his presentation is "Uses of Non-Timber Forest Products in Lao PDR and Their Values ." Dr. Kimura, please.

Dr. Kenichiro Kimura : Thank you for you kind introduction, Dr. Saito. Good afternoon, everyone. I'm Kenichiro Kimura from the Rural Development Division of JIRCAS. I'm glad to have this opportunity to share with you the result of our recent work on non-timber forest products. Non-timber forest products refer to all animals obtained from forest, excluding timber. We simply call them NTFP. In my talk today I will focus on the various uses of NTFP in Laos and their values.

This slide shows the flow of my presentation. Firstly, I will give some information about Laos, the country where we conducted our research. Next, I'll briefly explain our Indochina project. Then, I will give background information relevant to our research. I will be followed by the important highlight obtained, our future plan, and finally the conclusion.

Here are some pictures introducing the way of living of Lao villagers. Laos is classified as a least developed country by the United Nations and is the only landlocked country in Southeast Asia. It has a land size of 240,000 square kilometers and a population of about 6.5 million. The climate is a tropical monsoon and is very unstable. Eighty percent of the people are farmers, so it is important to develop agricultural technologies for Laos.

Here are some pictures introducing the way of living of Lao villagers. The main and typical means of livelihood is rice farming—the cultivation of rice in the lowlands. In the mountains, they engaged in slash-and-burn farming which is basically down for one year and then followed by a one year follow period.

In addition, villagers routinely collect NTFP from the forest for food such as edible wild plants, bamboo shoots, insects, and others. They also gather firewood for fuel use. We can say that the villagers are very much dependent on natural resources in the forest.

I will explain briefly the concept of our Indochina project. This is a five-year project implemented by JIRCAS since 2011 in Laos. The objective of the project is the establishment of stable and an independent farm household economy. The main target area of this project is a rural village. This project aimed to develop new technologies in which the local natural resources are utilized sufficiently and managed appropriately in a sustainable manner.

Let's move to our forest research topic. Lao villagers rely on rice farming and the gathering of non-timber forest product for their livelihood. The improper use of the forest land and trees, such as commercial logging and shifting cultivation, had led to its deforestation. In the 1980's, 50 percent of the annual revenue was generated from the timber industry indicating that forests have been an important source of revenue in the country. To protect the forest, the Lao government enacted the forest law in 1996 and started the Land and Forest Allocation Program in the same year. In 1999, the Ministry of Agriculture and Forestry prohibited the slash-and-burn syndrome. The limitation in land use caused the shortening of the fallow period, which consequently leads to a decline in soil fertility. For this reason the villager started to shift to the use of conservation forests because they are known to have fertile soil. As a result, deforestation had become even more expanded badly affecting the gathering of NTFP by the villagers.

The objective of our research is to develop a forest management system for sustainable NTFP use. In order to achieve it, we have to know the current situation of how the villagers actually use the NTFP that they collect. We used two approaches to understand the situation. One is a social survey through the interview and questionnaire. In here we determine the kind of NTFP, how much, and when they are collected. The other is a forest ecology study to determine from what kind of trees the particular NTFP are collected.

On study site, the N village is located in a hilly and mountainous area which is about 120 kilometers from the capital. The village population has been increasing rapidly since 1995 due to the immigration policy of Lao government. At present, there is a stable population of about 140 households. These satellite images show the site where the main NTFP were gathered. In 2007 the villagers gathered NTFP from the forest near the center of the village, but in 2011 the gathering points shifted away from the center.

N village covers an area about 3,000 hectares. Its original vegetation was mainly dry dipterocarp forests and mixed deciduous forests. The land in the village has been categorized into two forest and agriculture zones, according to the Forest Land Allocation program. This area is the agriculture zone: there are paddies in the lowlands and farmland in the mountains. The forest areas are divided into five types. These forests are fallow forest but they have different lengths of fallow period.

This table shows the economic value of NTFP gathered in the N village in one year. Villagers gathered many kind of NTFP, about 300 kinds of plant origin and 120 kinds of animal origin. 90 percent of plant NTFP and all animals NTFP were used as food for self-consumption. These results indicated that NTFP are important in enduring food security for the villagers. Some NTFP were used to extract fiber and resin which were then sold for cash income. We learned the fiber accounted for 30 percent of the economic value of plant NTFP and that it is the main income source in N village. The economic value of plant NTFP was 49,000 US dollars and that animal NTFP was 22,000 US dollars. Converting this value on a per household basis, the plant NTFP was found to have a value equivalent to about 500 US dollars and the animal NTFP about 200 US dollars giving a total economic value of about 700 US dollars per household.

Even now the firewood is a main fuel used in Laos. Villagers stock firewood under the floor as shown in this picture. Villagers prefer Cratoxylum and Peltophorum trees because they have strong heating power. We investigated the firewood consumption in 10 households in one year and learned that each household used the firewood at an average of 2.2 tons in one year. Firewood costs 2 US dollars per 20 kilograms. The economic value of firewood is estimated to be about 200 US dollars per household.

Now we know the value of main NTFP in the village, we tried to compare them with that of rice. The NTFP gathered by one household had a total value of about 7 million kip. Our survey result shows that most villagers own the average 0.5 hectare paddy field and 1.3 hectare upland field. However, many villagers do not have any paddy field. Dr. Ando of Utsunomiya University reported that villagers earn 4.6 million kip in one year for selling agriculture products. Considering this information, we could understand that NTFP has higher economic value. This economic value is equivalent to rice produced from 0.7 hectares of paddy field or two hectares of upland rice field. These results clearly indicated that NTFP has huge economic value when compared with rice production. I think it is especially important for farmers who produce only upland rice. We therefore recognize the need for appropriate use and management of forest land in the villages.

Next, I'd like to talk about the type of forests and their characteristics. These fallow forests where classified based on vegetation characteristics and length of fallow period. By using cluster analysis we were able to divide them into three large groups. Based on the number of years they were fallowed. Analysis of the results is still ongoing. In this analysis the one to two years old young fallow forest where not included so I add them to these result and treated it as one group increasing the total number of groups to four. Let's see this satellite image. They are surrounded by a pink line, is the agriculture zone. The forest areas refer to the area of agriculture zone excluding paddy field, upland, residence and pond. It covered a total forest area of 986 hectares. Then, we distinguished the old fallow forest from the young fallow forest by satellite imaging and Ground Truth. The young fallow forest is colored light green and the old fallow forest dark green. We name the young fallow type I, the middle fallow type II, and old fallow type III. Type II forests are the predominant forest in the agriculture zone.

This slide shows the characteristics of each type of forest. Type I forest has mainly herb and coppiced tree stamp. Type II has thicket, bushes, and bamboos. Type III has many large trees. These forests also differ in the kind of NTFPs they produced. From type I forests many edible wild herbs and bloom grass can be collected. Type II has mostly bamboo shoots and has little variety. It is difficult for villagers to enter this type of forest. Type III has many large trees and understory plants such as Cardamom. Our result shows that only very few NTFP are collected from type II forests. It is therefore expected that improving the current and unused type II forests would contribute to the increase in the villagers' income.

Next I'd like to talk about mushrooms. I would like to focus on the mushroom because it considered as one

of the most important NTFP in the village. Villagers collect about 4,000 kilogram in one year and all are used for self-consumption. Six kinds of mushrooms occupy the 95 percent of the total amount gathered. Lentinus polychrous and Lentinus squarrosulus were the main mushrooms occupying 60 percent of total the amount. We found that these mushrooms are parasitic to trees belonging to Dipterocarpaceae family. Lentinus grows on old fallen trees and stumps as shown in the picture.

These are the Landsat images of the forest in the village. The green areas are forest and the pink color indicates degraded or deforested areas. These images clearly show that the forest area continued to shrink between 2000 and 2011 due to increasing deforestation. This graph shows the various large trees that appear during the fallow period. Trees belonging to Dipterocarpaceae family act as hosts to mushrooms. They grow in natural forests. In younger forests, however, no tree could as a host for mushrooms. At present there are still many stumps from trees belonging to Dipterocarpaceae indicating that a large amount of mushrooms can still be collected. However, it is possible that these mushrooms may disappear in the near future when these host trees are completely eliminated by deforestation.

So far our project has already come up with some outcomes. We already have data on NTFP gathering, firewood consumption, and the comparison of economic value of NTFP with rice farming. We also made a database of trees that grow in fallow forests. These outcomes are used in various fields. In the industry, some organizations could use this data as reference material for searching new regional resources. In the field of forest conservation, the data are used as evidence for REDD-plus safeguard. In the field of policymaking, an international NGO, Land Issue Working Group, used these data to prepare policy recommendations on food security.

This is a current system of fallowing and usage of land made arable by slash-and-burn agriculture. With this system villagers can earn income only once a year. We intended to conduct research to find a way of enriching these type II forests by growing trees and crops which have high economic value such as Cratoxylum and Rattan.

We believe that proper management and improvement of low value forests is important to increase the villagers' income. Local residents do not fully understand the importance of their local natural resources, so they use them as they like, and they do not have any system to manage them. If we add value to these local natural resources and the villagers could earn good income from them, then we could expect that the villager would be motivated to start managing their natural resource. For example, in this research, we found that Cratoxylum, a fast-growing tree, could be made into good charcoal. It is possible to make high-quality charcoal to export to foreign countries. At present, this tree is used only as firewood. However, if they make charcoal from this tree, then they can get good income in addition, Cratoxylum could become white charcoal, which has a better heating power than black charcoal. If they can make white charcoal, they can export it abroad. So I think we need to develop the technology for local resources based on actual local circumstances.

Finally, I'd like to present the conclusion of our research. NTFP are very important food resources as well as good income sources for the villagers. Forest degradation and deforestation had threatened food security in the village. Appropriate location and suitable management of forests and farmlands are important to attain sustainable land use in developing countries like Laos.

This concludes my presentation. I would like to explain my sincere thanks to everyone who helped my in my research. Thank you very much for your kind attention.

Chairman Saito : Thank you very much, Dr. Kimura. We understand his research has been taking several years to get detailed information. Now he showed clear evidence of the importance of NTFPs. It means indigenous resources play an important role in the region and, for the villagers, it's very important to manage the forest and the resources to get benefit for local resources. Thank you very much. And today our partner researcher from Laos is here. Dr. Viengsakoun is an awardee of the Japan International Award for Young Agricultural Researchers. Yesterday we had a ceremony and most of us listened to his excellent presentation of the prize. Today we'd like to ask him about some more information on indigenous resources and animal feeding as well as your research activities to the audience. Please, Dr. Viengsakoun.

Viengsakoun : Hello. Thank you very much, Mr. Chairman. Yes and thank you very much for Dr. Kimura that you show us the great result from the non-forest the products. That's why our combination is very close with non-forest timber products, so integration that the important and how it can be manage the non-forest

timber products to increase their value. So, in my opinion, that relates to the animal feed. I saw so many things in the forest that can be used to the feed the animals. For example, for some specie of the forest, following or some legumes in the forest so we can make it increase the value for animal feed, increase the protein source for animal feeds or fibers something like that and some forest trees like bamboo, we have some leaves, or some stems of bamboo which can be produced the valuable for feeding to the animal as well. So in integration for the non-forest products and animal should be concerned more about this point. Yes, thank you very much.

Chairman Saito : Thank you very much, Dr. Viengsakoun, and thank you very much, Dr. Kimura. Thank you very much for your excellent presentation. Now let me invite the second speaker, Professor Patcharee, Director of Institute of Food Research and Product Development, IFRPD, Kasetsart University. She is a well-known expert of rice quality and product research. We have been collaborating for long time on research of wide area concerning food science and technology. And now she is a key person of food value chains in Thailand. The title of her presentation is “Effort in Thailand for Value Chain Establishment and International Collaboration .” Professor Patcharee, please.

Prof. Patcharee Tungtrakul : Thank you very much, Chairman. Good afternoon, ladies and gentlemen. Today I will be sharing with you the experience of the effort in Thailand for value chain establishment and international collaboration.

So I will present the background of the IFRPD, our institute, and case success of the international collaboration on a like public-private partnership in Thailand. So IFRPD functions in the research and development also the technology transfer, and training cause and food analysis to the public and private. We have four research divisions and pilot plants, two pilot plants that certify TMP. Also we have the outlet in the institute, in the university, to sell some of the pilot products to show to the food industry.

So the research work, the research and development work, the emerging food innovation and technology in Thailand. So because the consumer trends nowadays they want ready meal, quick food, convenience, and healthy they want to be to look young and not to be old, getting old, so we have to do a lot of research work on the how to value added in the agricultural produce.

And also we have a processing study on the extruded food products, snacks, breakfast cereal or instant drink, dry food, frozen chilled food, and thermal and non-thermal process like sterilization and pasteurization.

And the another is the functional food so we make like a natural sources, gluten-free, chemicals-free products and healthy products, have to research a low-fat, low-sugar, low-calories and low-salt. Especially for the elderly persons and with the good condition contains the disease of NCD disease, diabetic contro, healthy glycemic index products, and organic products.

This is our pilot plant for the extrusion technology.

The second is like a thermal and a non-thermal processing.

The food quality assurance center we provide the technical, provide the food quality analysis to anybody that like a making service, we certify like a good how to make standard quality of the food. When the food manufacturer wants to have a new product, they have to certify to register to the Thai FDA food organization. So they have to analyze and get certification, so our institute can assure this certify them, analysing their functional components, nutritional and food safety evaluation, and thermal process evaluation.

And this is the new items, food allergen analysis. Our institute is the first to analyze food allergen in Thailand and the research work since 2007 under the supported by STAFF Japan under the Ministry of Agriculture in Japan. And we call research with Morinaga, we have a research collaboration on food allergen. Though we have not only research work, but also we set up analysis service because every exported food product has to be analyzed food allergen before exporting to Japan or to the United States. So the Japanese government helps us to set up this laboratory.

And the under the function we have a service, public-private partnership initiative service output for food industry. We provide a service on a research, research collaboration, coaching and capacity building, and also consultant and supervising.

Under the infrastructure that I told you for the research lab and two pilot plants, we have 52 researchers. This center food quality assurance center or a technical advisor, training course we are making to the domestic partners and the international partners—JIRCAS, JICA, FAO—and we have the all food value chain. Raw material quality, post-harvest management, food processing, food safety, value addition, sensory evaluation, and shelf life study: this work strengthens local industries of agriculture.

So IFRPD and JIRCAS have continued the collaborative projects for more than 20 years. The various topics that we implemented around the food value chain like a prevention of postharvest loss of staple cereals, especially on rice, exploring the functionality of Thai indigenous plants, development of functional food, upgrading traditional fermented products and advance application of food resources in Asia.

So rice is the world's most important crop, and in Thailand, rice is staple food.

We want to make value additions of rice like branding. We have Q mark food safety and a geographical. Because nowadays we try to set up special varieties of rice should cultivate it in early in that area, so we make a geographical rice image also in the branding. Now we have two geographical varieties of rice in Thailand and support technology for rice product we research on the rice products. And rice by-products from the rice bran like rice oil, or the rice oil is concentrated and the product diversification.

The GABA rice the work, the first GABA rice we supported by the Dr. Mori and Dr. Yoshihashi, they support us a lot on the study of GABA rice on the Thai rice is the germinated rice and we study GABA content in the germinated rice. And this research were we combine, we technology transfer to the local farmers that they have the parboil rice or Hang rice it like a local wisdom in the northeast of Thailand. So and then we try to make a new products on the germinated rice. Throughout the country since the 2005 we have the 49 products on the GABA rice for 26 producers especially for the local farmers and SME, small and medium enterprise in the 19 provinces. The rice products they were very popular because it's very healthy.

The second example of the case success with JIRCAS is the indigenous plants in Thailand.

We have a lot of biodiversity of indigenous plants and Dr. Nakahara and his team Dr. Kasumi and their team study on the antimutagenicity, antioxidant activity. Many functional components that have been study more than 2,050 varieties items of the indigenous plant have been study and they public in the journal, the scientific journal.

With that basic knowledge on the functional components of the indigenous plant so we make a development on the food products like a nuggets, rice nuggets, curry with the many kinds of indigenous plant and they're ready to eat meal, ready-to-eat in a retort rice with the like a the plants the indigenous plant that contain very high functional. So this is worldwide also to the SME producer they got a lot of the market chain.

And the third case is the improvement of technology in the Thua-Nao production. The pure culture in Thua-Nao, Thua-Nao is the fermented soybean like a natto in Japan but Thua-Nao is the special only in the north of Thailand, not part of Thailand. So the Thua-Nao is very high, very high function. High in the vitamin B12 also so with JIRCAS and our staff study pure culture in the Thua-Nao fermentation and that not only improve process efficiency but also improve product quality and consistency. So the Bacillus subtilis that far of could effectively be used as inoculum and fermentation within the 48 hours or less.

This mostly comes from the north part of Thailand and we try to expand the products to consume as regular dishes.

Very high in protein content, and this is the activities that the research team go out to the villages and to the small farmers to technology transfer and make new products, to help them.

And the other example is the fermented rice noodle Kanom Jeen. They use the starter culture to reduce the spoilage losses. This is the traditional food product, but how to make is the quite not continue as so they try to make a constant fermentation process and the quality of the product, improve the physical and chemical properties. The activities that they go out into the SME, this is the fermented rice noodle product.

So the linkage with food industry the Morinaga partner for food allergen test kit is the first joint venture

company in the University. We make in our Kasetsart University in our institute Morinaga we setting up the new business together. Morinaga institute, Morinaga Bio-science Thailand so produce the test kit, the Kasetsart University 30 percent share and the Japanese 70 percent.

This is the first joint venture in the university, in our university—The MOU that we signed with the Morinaga. This is the Otagai project with the, when the Thailand has the Mekong flood four years ago so the Otagai project has the network with the Ministry of Industry and then they come to our university to make a rice valley forum. So this is in the making with Niigata University on rice. So we try to make a rice security in the both country when we have this as the with the crisis management and preparedness organization in Japan.

And the new ways network that collaborate with the JIRCAS and our Asian country we try to set up a network on glutinous rice in the Greater Mekong sub-region. So now we connect with Vietnam Quang Tri, Lao PDR, and Savannakhet University.

As the glutinous rice even is not a major staple but the glutinous rice is very important in our culture in the we especially in the religious ceremony or in the wedding ceremony or with the culture and the especially we found that in the germplasm of a glutinous rice we have a lot of glutinous rice germplasm in the Lao, Thailand, and Indonesia, Japan also 123.

So we make like corridor not only the economic corridor but we try to make a glutinous rice corridor between our country in Asia. So you will see the culture and the way of how to eat glutinous rice.

This so we have a consultative meeting on a cooperative research and networking since a 2014. And we have a second time in the Lao and Vietnam and so next week we will have world conference on the glutinous rice.

So the kind of the KU we make a KU food science park, we connect our facility and institute, facility of a agriculture, facility of a economics, facility of business administration also to make a like PPP, public-private partnership, along the food value chain. So the industry economic strategy partnership will be a very essential for our economic growth. And since a KU so we make a MOU agreement with the Thailand science park so the Thailand science park they have a lot of area that have to be incubation area for the SME or the food industry, domestic or international they are very welcome to this work public private partnership for food research and innovation in Thailand. So we aim to be the research and development and innovation have for our same food value chain together with the JIRCAS. So I would like to say special thanks to our partner Dr. Saito, Dr. Nakahara and Dr. Yoshihashi, Dr. Marui and our IFRPD team and also special grateful thanks to the Professor Iwanaka the President of a JIRCAS. Thank you very much for your attention.

Chairman Saito : Thank you very much, Professor Patcharee. Before we accept questions and comments from the floor, we'd like to briefly introduce JIRCAS activities on food value chain. Dr. Nakahara, Project Leader of Advanced Application of Local Food Resources in Asia, will summarize our collaborative activities on food value chains. Dr. Nakahara.

Chairman Nakahara : So, in connection with the two presentations at this session, session C, I will introduce our effort on the JIRCAS research project and entitled "Advanced Application of Local Food Resources ." And as Prof. Patcharee introduced, for many years we have the collaborative studies and we had a several joint research projects for evaluation and use of local food resources in Asia. And in the current mid-term plan of JIRCAS, with respect to the use of local food resources and traditional technology, we set up a network named Asian Food Resource Network. And in 2013, two years ago, we issued a joint declaration on this network at an International conference in Bangkok and we have been invited to participate with this network widely. Under this network we also have a research collaboration and with the research institutions in China, Thailand, Laos, and other countries, too. And in this network project research, we have the utilization of various components present in the local food resources. The small molecules so like polyphenols and also the large molecules starch and proteins and so on. And number two is characteristics of the microorganism in the fermented traditional food. Like fish, fermented fish, or fermented soybeans, and many others have unique microorganisms. And number three is a scientific analysis of traditional processed food, food processing technology, like, rice fermented noodle or tofu, soybean curd in China and so on. And we have several result during this project and this obtained result has been utilized for actual technological development that leads to value addition to the food. In some cases our research results are used for the real industrial production already. And, in addition to that, we participated to the various international meetings such as International organization and we suggested about the importance of a possibility of international contribution through this

network and on the other hand international awareness about local food resources in Asia or traditional food is quite low. And it was discussed that there are many issues such as quality assessment and safety management. And our research goes into this network for example one is value addition to regional food resources. We have successful results in this aim I think. And second, establishment and standardization of quality assessment methods—We have a little bit of homework to do here. And number three, improvement and application of traditional processing technology: This one is okay. And these three components are expected to contribute to the development of the overall food value chain and we will try to connect our results to the food value chain in the next phase.

Chairman Saito : Thank you, Dr. Nakahara. In Professor Patcharee's presentation, she mentioned the technology development for value addition is very important and also she emphasized the public-private partnership, PPP, is very important for the utilization of resources, value addition, and establishing a value chain. So now, I'd like to invite questions or comments from the floor. Any questions or comments, please, to Professor Patcharee. So I have one question. You mention the collaboration between Japanese companies and your university so is there any systematic support for the collaboration of public private partnership in your university or do you try to start case by case any information, please?

Prof. Patcharee Tungtrakul : It's like starting case by case. And, when a company is set up in the our country, we ask for the support from the BOI, the Board of Investment, in Thailand. So they have a tax examination for eight years and then for another five years we have the some percentage of a reduction of tax also, so in total, 13 years. So this is the benefit of setting up a company in Thailand and we share the business by through shares. Yeah, a 30 percent share. So this is the first case I think in the University at we try to promote like this, if we have the connection of a researcher, so we can spin off the company. I think this will help SME and economic growth in Thailand.

Chairman Saito : Thank you very much.

Prof. Patcharee Tungtrakul : Thank you very much.

Chairman Saito : Yes, please.

Koyama : My name is Koyama from JIRCAS. Thank you very much for your presentation. Relating to the point raised by Dr. Saito, I'd like to know what specific role do you play in that joint project with Morinaga for example on the university side. What was the specific role of Kasetsart University in that joint activity?

Prof. Patcharee Tungtrakul : So thank you for the your question. It's not the common in this case. It is the first case and the only case. So these businesses come from research work together under STAFF Japan, so they support project research project plan to Morinaga and to our institute and then we have doneresearch work together since the 2007, seven years ago. After that Morinaga would like to set up business in the Thailand to make a product, this food allergen kit, test kit, so the we study and they would like to share between us the research team and the university and the company so they ask to join venture. So maybe there is no specific role but the now our government, the new government they said this is the very success case, public private like a triple helix the government would like to make this kind of business between university and the industry. Not only domestic, international industry also can make like this. They said they would like to be more so we ask the benefit for the food industry to get so maybe the BOI, because of Morinaga, this new company can get support from both of investment, the tax exemption. So this is like a benefit also for them and for us to research more.

Chairman Saito : Thank you very much and thank you very much, Professor Patcharee, for your excellent presentation as well as your contribution to our partnership. Thank you very much, Professor Patcharee. So in this session we invited two speakers. Both of the presentations mentioned the importance of indigenous resources and adding value to them through establishing value chains. JIRCAS is working in this field through our international research network. And now it's time to close this session but I hope in the next wrap-up session we will discuss more about quality, which is a main theme of this symposium, and we try to clarify the role of international collaboration and a research network supporting establishment of value chains in the area. Thank you very much for your contribution and please join me in giving a big applause to the two speakers. Thank you very much.