

Session 3 General Discussion

Chair Saito: Since our time is limited, we'd like to wrap up this session. First, I'd like to emphasize two points of this session, Sustainable Income Sources. The first point is for rural development, a sustainable rural income source is essential, and it is important to utilize resources sustainably.

At JIRCAS we have many research projects, especially in Southeast Asian countries, and are working with many counterpart institutions for long-term collaboration, and are developing practical technology to utilize resources sustainably. And of course our partnerships are very important and we have to strengthen our partnerships among our counterparts.

The second point is when we think about resource utilization, recycling or sustainability is an important point. And resource management is not only one industry's issue. I mean fisheries, forestry, exist not alone; they combine with other industries and other material resources. So we have to work closely with each industry, especially on the utilization of resources.

In this sense, in this session we introduced fisheries, forestry, and biomass utilization. And we have to work closely together. We collaborate closely in each industry to utilize resources efficiently and sustainably, and as a result we may contribute to increase the income of rural areas.

I mentioned two important points and I'd like to invite comments from the floor on the session or maybe on each speaker. Are there any comments, questions from the floor? Yes, Dr. Noguchi, please.

Dr. Noguchi: Thank you, Chairman. My question is for Prof. Othman, and my question is a kind of the breaking strength of the particle board. I think when we change the thickness of the particle board the outside of the board would be maybe very strong, but the mid part would be a little bit weak I guess. So when we think totally, the particleboard will have some limitation for use I guess.

And the next question is a kind of sound insulator. Because of the particles or void spaces in the board, I think the resulting board will have very good properties to cut the sound, so a so-called sound insulator. So if we use this kind of wood in house building, maybe the thin wall will be a very good sound insulator and we can maybe enjoy a nice atmosphere. So please give me some comments or opinions to these questions.

Dr. Sulaiman: Very interesting questions. You know oil palm trunk, the density of oil palm within the board, when you cut it, it has high variability. The density gradient of oil palm trunk is very high, meaning that the density at the outer part of the trunk and the inner part are highly different. The outer part of the trunk can be as high as 0.4-0.5 g/cm³ and inner part may be 0.2 g/cm³ in terms of density, but when we compress it, the density gradient is less, almost the same. So when we compress the oil palm trunk, the variability become very low. So it is not very much different from the top and the middle and the outer part. When you cut the board this size, definitely some of them will be from the inner part or some of them from the outer part, so the compression will help reducing this variability.

In terms of an insulator, probably you don't need to do any more compression. Definitely you can use the trunk as it is, however, you must remember the oil palm trunk contains a lot of starch and also a high amount of sugar, and this will be a big problem in terms of durability. However, when you compressed the oil palm trunk, it will involve heat and also involve pressure or steam. The sugar structure probably changes when the heat is added. The durability is probably better because hygroscopicity changes when you do the compression or heat.

But if you use it for insulation, it is possible, but in terms of durability, it will be a big problem because it will

invite a lot of biodegradation agent, especially fungal, bacteria and beetle. It will be attacked in no time because starch is there, raw starch will be there. It will be very vulnerable because you are inviting everything there. Thank you.

Chair Saito: Thank you. And Dr. Nakagawa, please.

Dr. Nakagawa: Dr. Tsutsui, thank you for your very interesting presentation. As a consumer I like your shrimp because it's environmentally friendly while keeping the environmental condition, bio-ecosystem in the pond. And I guess your shrimp would appeal to consumers or chefs of restaurants.

And let me ask you two questions. One is you showed the individual shrimp, the size and the quality of the shrimp. It's very nice. And how about the total amount? Generally speaking, the quality and productivity are sometimes different. And how about that? Maybe the total amount of this shrimp in your environmentally-friendly pond is lower than the intense fish culture now they are doing in these areas. This is one question.

The next one is, what are the constraints or problems you are facing to extend your environmental-friendly fish culture in these areas?

Dr. Tsutsui: Thank you very much for asking. For the productivity, just only I showed the figure as a growth rate, but for example that differentiation is only two grams per each individual. But usually we culture more than 1,000 or 10,000 individuals in one pond, so 2 grams of differentiation is much, much bigger than the profit for shrimp farmers.

And then big shrimp can get the big profit and small ones are not so, cannot get the profit. So I think just 1 or 2 grams of differentiation, but I think I expect that that one can get the high profit, higher profit, I think in our aquaculture system, it might.

Chair Saito: I'd like to ask Dr. Noda for some more information on technology transfer to farmers or group of farmers or industry in your collaboration with RFD or other counterpart institutions. Some more information, how to increase income or how to transfer technology to our result?

Dr. Noda: Yes, that is very hard to answer quickly. But in my idea, in the field we must contact farmers, so it means we must create the chance to contact farmers. For example, last year we had a field seminar. Actually we were surprised by the response from farmers. So farmers, also extension staff of RFD were also pleased to have such a chance. I think we must pay attention to such opportunities to contact each other.

Chair Saito: Thank you very much. And Dr. Kosugi, some more information on the relationship between other industries and biomass utilization, especially for aquaculture, forestry, or other agricultural sectors. Is there any specific important point to collaborate with other industries for biomass utilization?

Dr. Kosugi: I think many companies are very interested in the utilization of biomass. I showed you in my presentation three periods, so among these periods, I think the economy is very important to connect productivity and sustainability. Sometimes, though, it becomes to provide an incentive for there, such as farmer income.

So I think the biomass utilization, yes, including that, companies also, the food industry also, become more importantly connected between them.

Chair Saito: Thank you very much. I'm sorry we don't have enough time for general discussion but in this session we covered aquaculture, forestry, and biomass utilization. JIRCAS as a research institute, there are many strong points, and one strong point is we have the division of fisheries and forestry and of course other agricultural

research and a processing research division. So it's good for us to work together, different industries, different research areas together, to go forward to the same goal, I mean to increase the income and contribute to rural development.

And another strong point of JIRCAS is we are based on the long-term partnerships of each research institute, so today Prof. Othman introduced our long-term collaboration, and of course other research projects, other research areas, there are many good collaborations for our research projects, so I believe it's a very strong point of JIRCAS. In this session, the "Sustainable Rural Income Sources," we introduced from four presenters, and we would like to thank again with big applause for their contribution.