

## Session 2 General Discussion

**Chair Matsunaga:** Now the three scheduled presentations were finished. I am sure there are many technical questions and comments from the floor to the speakers, but please let me have some time because I would like to focus on a given assignment to this session. So let me ask a question at first to the speakers.

My question to the speakers, how do we contribute to sustainable development of the agriculture and food industry in Asian countries using your presented technologies? First, Dr. Arihara, you may have lots of experience and know-how because your technology is already developed in Asian countries, so let me know your experience for the contribution to Asian countries using your advanced technology. Dr. Arihara, please.

**Dr. Arihara:** To contribute machinery to farmers depends on how we can or they can understand the conditions of growing crops. Especially it is very important to understand the soil conditions, what kind of soil they have or what kind of property their soil has. Most farmers usually cannot differentiate their soil from other soils because they are working only on one soil. In the case of introducing machinery, however, it is very important to understand what kind of soil his farm has. I realized the importance of soil for crop cultivation when I was working in ICRISAT India in the 1980s. Growth of crop plants was so different between two soil types or black cotton soil or Vertisol, and red soil or Alfisol. Mineral nutrients content were different, soil physics were different, the crop adaptation, adaptability was depending different. Some plants grow very well on red soil and some crops grow very well on vertisols. So we have to understand the types of soil farmers are cultivating.

In my presentation, I showed the different type of soils in Tamil Nadu and in Madhya Pradesh. We cannot apply the same method of machinery operation for different type of soils. We should apply the most appropriate methodologies in machinery operations in each area.

We should always try to find out better way or methodologies to operate machinery for preparing soil for crop cultivations. This idea is based on my work in India and in Japan. Last nearly ten years, I have been working to improve soybean productivities rotated with rice on paddy fields. I think it is important to find out the most appropriate way of soil cultivation methodologies for improving productivities of each farmer's lands. Thank you.

**Chair Matsunaga:** Thank you very much, Dr. Arihara. You said it's very important to understand the local condition of the target area. Thank you very much. And secondly, I'd like to ask Dr. Kanno. CRF is on the market in Japan, probably you had a chance to meet farmers or extension workers who are using CRF. So you may have some experience how this technology contributes in Japan, and a perspective for extending to Asian countries, you may have some ideas or comments.

**Dr. Kanno:** In the case of introducing high-performance CRF to farming in Asia, we have to indicate the extra cost of CRF produces more benefits. For example, increasing yield or reducing the application rate, and saving labor cost. This is very important because CRF is very expensive. I think a CRF-specific application method is the key technology to make high-performance CRF economically acceptable. Thank you.

**Chair Matsunaga:** Thank you very much indeed. And the last question to Dr. Noguchi. I remember you raised your hand yesterday, when we were discussing food safety. This is very important. I think the standard of Asian countries for the control of food safety is behind the international and Japanese ones. So you may have some comments, expansion in these technologies to Asian countries, especially associated with food safety.

**Dr. Noguchi:** Well, I think it is a very difficult question to answer. Food safety is a very important issue and to detect such problems, we can find many various methods, such as non-destructive and also the usual chemical analysis, but most of them will require very expensive equipment and also require very long time for analysis. So

at first I must say how can we shorten such necessary time and also reduce the price of the machines? And today therefore I introduced some of the interesting and new techniques with high potential for future use, that is the fluorescence fingerprint.

But at the same time, not only such a technical machine but also we need a kind of information network among the East Asian countries. What kind of problem happened, where, how much, and when, by what reason, and then such a system will provide us the necessary time and system to stand against the possible coming problems. Especially in Japan our food depends on this calorie base, 60 percent or more than that, from outside sources. So we Japanese must pay attention more to this issue, the food safety I guess.

So therefore we are making every effort to develop new and simple and reliable methods without a high price and very simple maintenance and so on. I'm not sure my answer has been a good answer to your question, but anyway, that's all.

**Chair Matsunaga:** Thank you very much. That means we need localization of advanced technology, it may be helpful for the adaptation of advanced technology, to the Asian country. Thank you very much. From the floor any other comments or questions to the speakers? ... Okay. Please.

**Dr. Iwanaga:** First of all, thank you very much to all of the three speakers for a very interesting topics and excellent examples of Japanese technology which might be applicable to other Asian countries. And I think there are no specific questions other than me because they are very much impressed. They are trying to digest.

So to buy time, I'd like to ask a specific question to Prof. Noguchi. Your reference to PLC, low-protein rice, it's very interesting technology and it's already a commercial product on the market. It depends on a particular rice variety or you can utilize the technology for example with all Japanese rice varieties or indica type? The reason why I'm asking is when I was working for the institute we developed a low-protein rice variety aiming for a specific, the same objective, patients with kidney disease, but it had a limited impact. But through your approach I felt that you are getting a much bigger impact, so I'd like to ask, your technology is applicable to cross-over genotypes, including the indica type?

**Dr. Noguchi:** So I must say that there is no restriction as to varieties, so this method is applicable to all varieties. And maybe we can classify this technology, so-called hazard technology, by combining the existing simple technologies to accomplish this system. For example, usual enzyme treatment and also relatively low watt high-pressure cooking, both of them are very simple ones, and if we combined them, maybe this kind of technology can be maybe applicable in other countries, Asian countries. So then we will have that kind of proof, this new product.

And I would say again, there are no restrictions. All varieties, not only rice but all other seed grain can accept this system. And I must add that the cost of preparation or processing, it's very low because enzymes nowadays are not so expensive and the necessary cooking time, only a few minutes. And the system itself is very simple. So I think even in developing regions this system immediately can be acceptable to small scale companies.

**Chair Matsunaga:** Thank you very much, Prof. Noguchi.

I wonder if we have this session in Asian countries, such as Thailand, Vietnam, and Malaysia, a lot of comments and ideas would appear, and matching of stakeholders for future collaboration is smoothly going on.

The time for general discussion is over. So I cannot come to a conclusion. I would like to pass this session's issue to the panel discussion, the last part of this symposium. I hope we could complete our assignment to this session by great contribution of the speakers. Ladies and gentlemen, please give them a big hand again. Thank you very much.