

## General Comment 2

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I would like to discuss various aspects relating to Japan's historical experience in agriculture.

1. I will first outline problems relating to consumption in Japan, with emphasis placed on rice consumption. The consumption of rice per capita in Japan reached a peak in 1962. Thereafter the consumption has tended to decrease. As a result, more than 20% of the area devoted to rice cultivation was diverted to the cultivation of other crops. However, the diversion program was not successful because the objective was to reduce rice production but not to increase substantially the production of other crops. The Japanese policy put too much emphasis on rice quality resulting in the increase of the rice price but not of that of other products, in line with the economic development of the country.
2. In this regard, I believe that the strategy for the development of technology should take account of the economic development of a country and not only of agroecological factors. Regarding rice direct seeding culture and mechanization of rice transplanting, Japan was successful in implementing the mechanization of rice transplanting mainly because the price of rice remained very high. In terms of transfer of technology, obviously the level of economic development is of paramount importance.
3. I would like to discuss some aspects relating to the comparative advantage in agriculture. In the course of the rapid economic development and industrialization, Japan lost its overall comparative advantage in agriculture. When Japan liberalized the market of agricultural products, the production of feedgrains was abandoned and the country is currently almost entirely dependent on imports of feedgrains. Obviously, such a situation will not apply to large countries such as India and China when they liberalize the import of grain.
4. As for the conversion of land cultivated to rice into the cultivation of other crops, half of such land is actually not used for agriculture any longer, being either abandoned like in mountainous and sloping areas or utilized for housing and industrial purposes. If other Asian countries such as presently Taiwan and Korea follow the Japanese pattern, in case of market liberalization, marginal land will completely lose its comparative advantage for agriculture, resulting in degradation and exodus of the younger strata of population.
5. As for the strategy for the development of technology, in Japan, emphasis was placed on monoculture and expansion of scale of operation. Research on mixed farming systems including the livestock sector which is presently very limited should be further promoted at the farm or regional level.

**Other major comments :**

M. Iwamoto (National Agriculture Research Center, Japan) mentioned that research on farming systems is currently being promoted in Japan to address the problems faced by Japanese agriculture. Regarding the sustainable development of paddy field agriculture in Japan from a technological point of view, Dr. Iwamoto indicated that during the last fifty-year period, overall rice productivity increased by about 10 times due to the breeding of new rice varieties, development of mechanization as well as application of fertilizers and chemicals. However, to maintain the beneficial function of paddy field agriculture, it is necessary to reduce the amount of chemicals used from the angle of environmental protection. Land utilization for farming which is presently lower by 20 points compared with the figures of twenty years ago should be increased. Also the self-sufficiency rate in food is very low (30% in 1995) and 26 million tons of grain, including animal feed are being imported each year. Therefore, to diversify the utilization of paddy fields, Dr. Iwamoto pointed out that it will be important for Japan to produce animal feed in paddy fields and that for this purpose specific rice varieties have been bred that can yield as much as 12 tons/ha. To further improve sustainable production of crops, in October 1996, the Ministry of Agriculture, Forestry and Fisheries decided that research for the development of integrated farming systems should be actively promoted based on the new technology accumulated in various fields in the past 20 years.

K. P. Rao (National Institute of Agricultural Extension Management, India) pointed out that although the total yield of recent rice cultivars may be on the decline, these cultivars are economically valuable due to their resistance to biotic or abiotic factors.

George H. L. Rothschild (Director General, International Rice Research Institute, The Philippines) emphasized that there is a difference between productivity decline in intensively farmed areas and yield ceiling of the rice plant itself. There is a potential for yield increase through the improvement of the rice plant. However, productivity decline depends on factors related to nutrient supply problems for the rice plant. For example in the case of continuous cultivation of rice under flooding, due to the anaerobic conditions, the amount of nitrogen available to the plant decreases. In reference to the comment made by Dr. Coyle on the excessive emphasis placed on the cultivation of cereal crops, Dr. Rothschild pointed out that although crop diversification was desirable, it was still important to cultivate cereals as staple commodities in view of the projected increase of the population in Asia, which is likely to be centered on low-income consumers and the uncertainty of other sources of supply of these crops.

K. Takase (International Development Institute) pointed out that agricultural development involves rural development which requires an approach whereby technological achievements are integrated with socio-economic and ecological aspects as well as considerations about the environment.

In this regard, Y. Kaida (Center for Southeast Asian Studies, Kyoto University, Japan) mentioned that some research issues that are related to rural development, including family strategy to maximize the income from both in and off farm activities, rural community studies, rural institution-building studies, strengthening of local government institutions and agricultural extension, land-use zoning had been only partially discussed during the symposium. He asked how far JIRCAS had conducted such rural development-related studies and how

further such themes would be taken up in the future. Dr. Kaida suggested that JIRCAS should conduct integrated studies involving both technical and socio-economic aspects to promote rural development.

K. Ohga (Director of Research Planning and Coordination Division, JIRCAS) mentioned that as far as integrated research on rural development is concerned, when JIRCAS was established 4 years ago, studies on rural development were added to the JIRCAS program, including socio-economic fields. JIRCAS plans to send a researcher to Indonesia to carry out studies on farming systems and rural development. Incidentally, the definition of farming systems should include two dimensions, a narrow one corresponding to cropping systems and a broader one including rural development and institution or community research. Also one researcher is engaged in such studies in Vietnam. Mr. Ohga added that JIRCAS's experience in these fields in developing countries is still limited.