

2003
June

ISSN 0919-8822

No.35

JIRCAS Newsletter

for
INTERNATIONAL COLLABORATION



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JIRCAS

JAPAN INTERNATIONAL RESEARCH CENTER FOR AGRICULTURAL SCIENCES

New Perspectives for JIRCAS International Collaborative Research

I highly value my appointment, on April 1, 2003, as President of JIRCAS, which has contributed significantly to international agricultural development along with its predecessor, the Tropical Agricultural Research Center (TARC) since 1970. Recently, as a result of an institutional change, JIRCAS has become more autonomous and independent in administrative operation than before. And, this year, we celebrate the 10th anniversary of JIRCAS since its reorganization in 1993.

JIRCAS is carrying out its mandate by conducting basic, and applied, research and development aimed at the development of sustainable agriculture, forestry and fisheries activities in harmony with the environment to stabilize the world supply and demand of food, with emphasis placed on the reduction of hunger and poverty in the developing regions. Moreover, JIRCAS has forged close relationships over a long period of time with collaborating institutions, including the international research centers affiliated to the Consultative Group on International Agricultural Research (CGIAR).

The research projects implemented by JIRCAS are certainly important for the international community. However, at the same time, JIRCAS always considers the situation of agriculture in Japan. In particular, the drastic decline in the food self-sufficiency rate (from over 70% 30 years ago to 40% in calorie-equivalent at present) can be singled out as the most important issue to be borne in mind. Such a situation has resulted from the gradual westernization of Japanese dietary habits, the increase in imports of low-price agricultural products, including wheat, soybean, corn, and feed, and the emphasis placed on agricultural production centered on commodities with a comparative advantage. Against this background, the Japanese government decided to reverse the trend and achieve a 45% self-sufficiency rate by 2010 by implementing the program outlined in the Basic Law of Food, Agriculture, and Rural Areas enacted in 2000.

Japan's very low food self-sufficiency rate can also be considered within an environmental context. Indeed, a large amount of materials such as nitrogen and phosphorus is flowing to and accumulates in the Japanese archipelago from the world farmlands through the import of agricultural commodities. As a result, Japan has been faced with various environmental problems such as pollution of lakes, sea and underground water. To address these problems, the government has enacted stricter regulations and attempts will be made to increase domestic production to replace the imports, to promote agriculture of the recycling type for the return to land of organic wastes for their reutilization, and to develop technologies in order to design systems for recycling-oriented farming.

At the same time, the excessive reliance on imports of food and feed mirrors that on natural resources and the environment in the exporting countries, resulting in the depletion of natural resources and imposing a heavy load on the environment. Actually, Japan relies on approximately 12 million ha of foreign farmland, an area 2.5 times as large as her own farmland (4.8 million ha), for food and feed supply. The exports of agricultural products had originated mainly from advanced countries. However,



President: Dr. Mutsuo Iwamoto

recently, developing countries have increased the export of their products. In these countries, too, the shift to export-oriented and mono-culture large-scale production has frequently resulted in the decrease in productivity and sustainability of food production systems and the environment, as a result of the emphasis placed on productivity alone. In addition, such systems are very sensitive to climatic changes.

Furthermore, a new concept, 'virtual water,' has emerged, reflecting the increased dependency on groundwater resources for agriculture in many exporting countries. Also, even in monsoon Asia, where it had been considered that the water resources were abundant, many regions have started to experience water shortages because of the rapid pace of industrialization and urbanization. In this regard, the International Food Policy Research Institute and International Water Management Institute have estimated that approximately 350 million tons of cereal production, which exceeds that by the United States, could be phased out annually by 2025 if appropriate measures for water resources management are not implemented.

Therefore, the rapid decline in the food self-sufficiency rate exerts a considerable impact on the environment on a global scale. Furthermore, such a decline in the food self-sufficiency rate due to the changes in the socio-economic conditions associated with the globalization of the economy, has become very common in many countries, especially in Asia and Africa. Experiencing such a situation, Japan could implement research programs to address the problems of food and agriculture on a global scale and promote the development of policies to assist and to collaborate with the countries confronted with such issues.

Japan has contributed to international cooperation to a large extent, and expectation from many stakeholders still continues to increase. Cooperation in research and development is one of the areas to which Japan has made a major contribution. In particular, Japan has funded the CGIAR centers to a large extent, and JIRCAS and its predecessor TARC have been engaged in collaborative research with developing countries for more than 30 years. We are now facing a rapid decline in funding for official development assistance programs, including those for the CGIAR centers. More effort should be made to retain and

Cover photo: Nerore cattle on the pasture of the National Beef Cattle Research Center (EMBRAPA-Gado de Corte), Brazil (Photo by T. Taniguchi)

even enhance our contribution in more diversified ways. In this regard, last year, Dr. Masaru Iwanaga, a former Director of a Division of JIRCAS, became the first Japanese as well as Asian to be appointed as Director-General of CIMMYT. This favorable development indicates that Japanese scientists are highly qualified to implement research programs in collaboration with the CGIAR centers.

In a recent publication, Dr. Ian Johnson, the CGIAR Chairman, wrote that 'agriculture and the environment are two sides of the same coin.' This statement seems to correspond to the concept of 'sustainability of agriculture' (for agriculture) and 'multi-functionality of agriculture' (for the environment) which the above-mentioned Japanese law strongly advocates. In this regard, since the sustainability of paddy field agriculture has become a major issue in Japan and is also a major theme for international collaborative research in monsoon Asia, Japan may have a comparative advantage in addressing this problem.

Against this background, I believe that JIRCAS could contribute to the international community by acting as a national center involved in collaborative research to address various problems related to agriculture, forestry and fisheries in developing regions. Accordingly, JIRCAS activities should be focused on the following five areas in the future.

First, it is important that the planning of the JIRCAS activities be based on thorough collection and analysis of information pertaining to the technological and socio-economic conditions prevailing in the respective countries to implement appropriate research programs. A special team has already been selected to achieve this mission and is expecting to develop a mid-term strategy.

Second, it is also essential that JIRCAS strengthen the research capacity and basic research required for international research collaboration. For example basic research carried out at JIRCAS for the development of plant resistance/tolerance to various abiotic stresses such as high temperature, drought, etc. through biotechnological procedures has gained an international recognition. Collaborative research with more than 20 partners including CIMMYT and IRRI is being conducted for the development of resistant/tolerant crops. This type of research is costly and requires a long period of time to achieve results. However, it is essential to foster outstanding researchers for the future and to achieve technology breakthroughs.

Third, most of the agriculture, forestry and fisheries activities in developing regions are operated on a family basis and the farmers may depend on various income sources. Such a situation will remain unchanged for a long time because it is very difficult for these countries to implement the rapid structural reforms which a limited number of developed countries have successfully adopted. It is thus very important that a comprehensive approach from the research and development phase to the extension of technology be adopted for research in these regions to enhance the sustainability of agriculture and the communities. Such an integrated approach can be typified by farming systems research and extension as well as participatory research and development, although the methodologies and performance are still at an emerging stage. In the future, it will be necessary to develop a more sophisticated and field-based methodology and to foster experts.

Fourth, a more comprehensive and integrated approach for research encompassing pre-and-post harvest stages of

agricultural production has become very important in order to cope with various problems. Consumers are increasingly interested in food safety and the environment even in many developing countries and the use of agricultural chemicals and synthetic fertilizers has become a cause for concern. This situation is also reflected in the gradual leveling off of the yield increase of many crops. Furthermore, the delay in the development of distribution systems and related technologies in the developing regions has resulted in huge losses of agricultural products at the post-harvest stage. Therefore, research on both pre- and post-harvest constraints has become essential in order to improve the techniques for the processing and distribution of agricultural commodities for loss reduction as well as value addition. It is also important to promote research for biomass utilization of agricultural products undergoing post-harvest deterioration.

Fifth, JIRCAS has a station in Ishigaki, one of the Okinawa islands, which is located in the subtropical climate zone. Considering the impacts of global climatic and environmental changes, the branch should serve as a key research station for the sustainability of the insular environment, with emphasis placed on the world tropical and subtropical islands.

In order to address the above-mentioned and newly emerging issues, I believe that, since it is not possible for JIRCAS to handle all these problems by itself, it is essential to strengthen partnerships not only with the CGIAR centers but also with other research institutions and universities in Japan and abroad.

Dr. Iwamoto's Profile

Dr. Mutsuo Iwamoto was appointed as President of Japan International Research Center for Agricultural Sciences (JIRCAS) on April 1, 2003, succeeding Dr. Takahiro Inoue. He had previously served as the Director-General of the Agriculture, Forestry and Fisheries Research Council (AFFRC) Secretariat under the jurisdiction of the Ministry of Agriculture, Forestry and Fisheries (MAFF) in Tokyo from 2001 to 2003.

He started his academic career at the Dept. of Agricultural Process Engineering in Kyushu University and obtained Master's and Doctor's degrees at the university. After working as a research associate at the university, he joined the National Food Research Institute in 1973 and was engaged in technology development for quality control of food and agricultural products in the post-harvest process. After having served as Director of Food Engineering in the Institute from 1989 to 1993, he moved to the Headquarters of MAFF for executing his responsibility in planning and management of R & D programs, and thereafter for personnel management at the AFFRC Secretariat. Following this, he served as the Director-General of MAFF's Administration Office in the Tokai Region from 1999 to 2001.

Dr. Iwamoto is a person with a singular capacity for integrating opinions and views from various sectors of the community to overcome obstacles confronted by the agricultural sector and has always been considering ways by which R & D can contribute to this objective.

He wishes to take the opportunity, as President of JIRCAS, to strengthen the relationship of not only JIRCAS, but also the entire Japanese science community with the international community, for enhancing agricultural research for development.

Activity and Future Direction of Research in Animal and Grassland Sciences by JIRCAS

Livestock are an important source of protein-rich food, income and savings in developing countries, and can be grazed in arid and/or semi-arid lands where no crops can be cultivated. They also play an important role in the agricultural farming system, especially in nutrient recycling, where livestock wastes are used as organic fertilizer for infertile land. On the other hand, over-grazing frequently causes deterioration and desertification of natural grasslands. The method of raising livestock varies widely depending on the natural and social environmental characteristics. Therefore, an appropriate method of livestock management should be adopted corresponding to the natural resources available, and the social and economic conditions of each developing region. Efficient forage production, to secure good quality feed, is also important. Furthermore, the control of livestock diseases causing reduction in productivity, and the establishment of an environmentally sound and recycling-type of livestock husbandry system are essential in order to maintain and promote stable and sustainable livestock production.

In order to address these issues, the Animal Production and Grassland Division has been conducting research in three fields, including feed production, livestock production, and livestock health. Under the present JIRCAS Mid-Term Plan, the Division research has been focused on: 1) eco-physiological characteristics and evaluation of pasture grasses adaptable to the agro-pastoral system in Brazil, 2) evaluation of nutrient value and preparation of by-products as feed in Thailand and China, 3) evaluation of nutritional and physiological characteristics of cattle and swine in Thailand and Vietnam, and 4) infection and development mechanisms of trypanosomiasis in cattle. Not only have comprehensive projects been carried out in Brazil, China, Vietnam, and Thailand, but an individual research project on "Trypanosomiasis" has also been conducted in collaboration with the International Livestock Research Institute. Fruitful results have already been obtained, and they include 1) forage productivity and quality of *Panicum maximum* in two agro-pastoral systems in Brazil, 2) availability of sugarcane stalk as a roughage source for dairy cattle, 3) effect of admixing synthetic antioxidants

and sesame with rice bran on feed efficiency of swine in Mekong Delta, Vietnam, 4) energy requirements for maintenance of cattle in northeast Thailand, and 5) role of tumor necrosis factor- α in genetic resistance of mice to *Trypanosoma congolense* infection.



Most of the overseas research on livestock production is usually undertaken to solve the problems of small-scale farmers raising various livestock, and farmers and the livestock industry will expect a feedback of the results in the near future. Therefore, an ante-assessment of the research subject will become more imperative and studies on various aspects of livestock and grassland research will become necessary. Recycling of resources and effective use of by-products or livestock excrement are the subjects which need to be focused on in the Division. Moreover, more research efforts would be required on conservation and recovery of the damaged grasslands, and the control of greenhouse gas emissions from livestock. In addition, controlling the diseases adversely affecting productivity is still an essential part of livestock husbandry. Rapid diagnosis and prevention of acute infectious diseases such as foot and mouth disease, hog cholera and high pathogenic avian influenza remain important in many developing countries. These are internationally recognized as fatal diseases of the livestock industry. There is a growing interest in quality and safety of livestock products in developing regions, and research on livestock feed and product quality is also gradually being prioritized. Accordingly, a better combination of livestock husbandry development and related research activities will continue to contribute greatly to the development of many developing countries.

Toshiaki Taniguchi
 Director, Animal Production and Grassland Division,
 JIRCAS



Dairy cattle feeding on forage crop in Northeast Thailand.



Beef cattle feeding on silage and supplement.

JIRCAS Project “Comprehensive Studies on the Development of Sustainable Agro-Pastoral Systems in the Subtropical Zone of Brazil”: Workshop and Final Evaluation Meeting

A workshop and final evaluation meeting for the JIRCAS project entitled “Comprehensive Studies on the Development of Sustainable Agro-pastoral Systems in the Subtropical Zone of Brazil” was held at Tsukuba on March 18-19, 2003 in order to review the results obtained during the implementation of the project, and to discuss future prospects of the agro-pastoral systems in Brazil.

This project was initiated in 1996 in collaboration with the National Beef Cattle Research Center (EMBRAPA-Gado de Corte), Campo Grande, Mato Grosso Do Sul, Brazil. The subtropical region of Brazil has been typified by continuous large-scale field crop production and extensive cattle grazing, and is at present extremely important to the food supply of the world, as well as the economy of Brazil. In these areas, agricultural production has been increased mainly by the aggressive expansion of arable land, and most of the fertile land has experienced only minimum inputs. As a result, most of the land has become environmentally vulnerable and its productivity has fluctuated. In particular, crop growth retardation associated with continuous cropping, outbreaks of diseases and pests, and soil erosion threaten the region. Therefore, the JIRCAS project has placed more focus on the development of sustainable farming systems with high productivity in environmentally degraded areas, with special emphasis on sustainable land utilization through crop-pasture rotation systems.

For the meeting, we invited Dr. Peter C. Kerridge, former Coordinator of the International Center for Tropical Agriculture (CIAT)-Asia, Prof. Kazuo Kawano, Kobe University, Prof. Makie Kokubun, Tohoku University and Dr. Muneo Oikawa, Director of Research Division, Japan Grassland Farming Forage Seed Association as commentators.

At the beginning of the workshop Dr. Takahiro Inoue, President of JIRCAS delivered an opening address, and Dr. Marcio C. M. Porto, Head of Secretariat for International Cooperation, EMBRAPA presented a key note speech on the importance of agro-pastoral systems in Brazil. Thirteen papers were presented in two sessions and approximately fifty scientists from Brazil and Japan participated in the workshop.

The final evaluation meeting was held following the

workshop. Dr. Akinori Oshibe, International Research Coordinator and the coordinator of this project, outlined the relevance of the research project.

Next, I summarized the major outputs and future problems of the project: 1) the agro-pastoral systems effectively improved continuous cropping of soybean and animal productivity on pastures, and the results obtained for animal productivity can be directly applied for technology improvement of private farms, 2) maintenance of soil nitrogen fertility and adequate grazing frequency are keys for the sustainability of the agro-pastoral systems, 3) degraded pasture could be rehabilitated by potassium fertilizer application, 4) physiological characteristics of grasses will provide useful information for genetic improvement of tropical grasses to adapt them to low nutrient soils, 5) research results will be used to improve the agro-pastoral system in Brazil, 6) evaluation of the agro-pastoral system through soybean farms is further needed, and 7) on-farm participatory research on agro-pastoral systems including crop and livestock productivity and economical evaluation should be strengthened.

Finally, Dr. Oshibe proposed the three research subjects namely ‘identification of genetic stocks of *Brachiaria humidicola* with high levels of nitrification ability’, ‘on-farm research of agro-pastoral systems’ and ‘nutrient cycling in agro-pastoral systems’ to be included in the project entitled “Comprehensive studies on development of sustainable soybean production technology using agro-pastoral systems in South America,” as follow-up research.

At the end of the meeting, favorable comments and recommendations were received from all four reviewers. They emphasized that 1) the three areas suggested for follow-up research seem relevant and will have the support of EMBRAPA and JIRCAS, 2) the Brazilian scientists of the Beef Cattle Research Center and the Soybean Research Center of EMBRAPA, the EMBRAPA-Agrobiology Center and CIAT should be involved in the research project, and 3) appropriate procedures for sharing of results need to be implemented.

Toshiaki Taniguchi
*Director, Animal Production and Grassland Division,
 JIRCAS*



Participants in the Workshop on the Agro-Pastoral Project.

Nitrogen Utilization of Tropical Grasses (*Brachiaria* species) Grown in Brazilian Cerrados

Brachiaria is the predominant grass species in the Brazilian Cerrados and is planted on 85% of the grassland area. It was introduced to 40 million hectares of grassland area in the 1970s and has since contributed to beef cattle production in this region. *Brachiaria decumbens* (BD), *B. brizantha* (BB) and *B. humidicola* (BH) are the main species, and it is empirically known that nutrient requirement increases in the following order: BB > BD > BH. However, the physiological characteristics of *Brachiaria* species have hardly been studied. Poor soil nutrient status is the main limiting factor for grass productivity in Brazilian Cerrados. The agropastoral (crop-pasture rotation) system with high fertilizer input has resulted in high quality grass and is expected to improve soil fertility.

The response of grasses to a wide range of nutrients was studied. In particular, we compared the characteristics of N utilization of BD, BB and BH grown under different N levels. We also compared grass fields of *Panicum maximum*, BB and BD in which N (50 kg N ha⁻¹) was applied 4 years prior to the study, with that of BH in which no N had been applied for more than two decades (Photo). BH was greener than the other grasses indicating that it could grow under low N conditions.

BB, BD, and BH were grown under different levels of N (0, 50, and 150 kg N ha⁻¹) in a pot experiment. The dry matter weight was higher in BH than in BD and BB when no N was applied (Fig. 1). In BD and BB, the dry matter weight increased with applied N levels, with the dry matter weights being higher than that of BH under sufficient N conditions. On the other hand, the dry matter weight of BH did not increase with N application. These data suggest that BH is better adapted to limited N conditions than the other 2 grasses. BD and BB showed high productivity under sufficient N conditions because of their higher responsiveness to applied N.



Photo. Grass fields of *Panicum maximum*, *Brachiaria brizantha*, *B. decumbens* and *B. humidicola*.

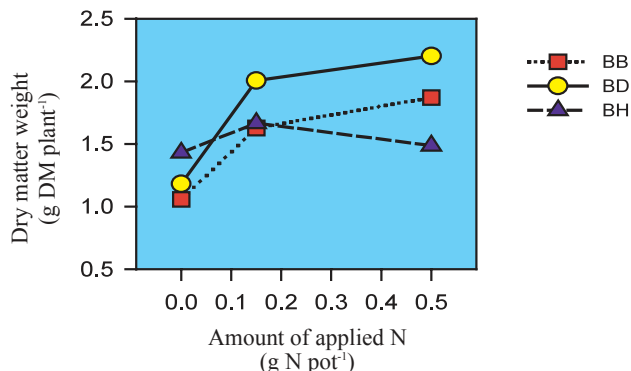


Fig. 1. Dry matter weight of grasses grown under different levels of applied N.

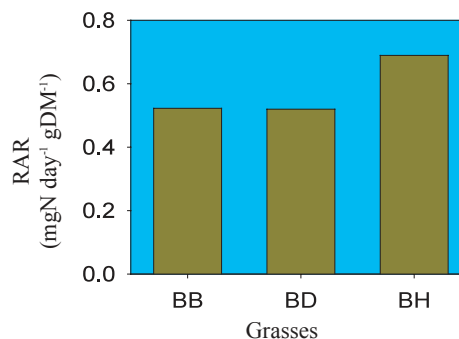


Fig. 2. Relative N absorption rate (RAR) in grasses without N treatment.

In the treatment without N application, relative N absorption rate (RAR) was higher in BH than in the other 2 grasses (Fig. 2). The smaller reduction in dry matter weight of BH under low N conditions could be due to high N absorption rate. These physiological traits of grasses provide useful information for genetic improvement of tropical grasses to adapt them to low nutrient conditions in Cerrados.

Takuji Nakamura
Crop Production and Environment Division, JIRCAS
(Present, National Institute of Crop Science)



Development of World Forest Products Model (WFPM)

The relationship between forest products trade and preservation of forest areas is a key issue of the trade negotiations at the World Trade Organization (WTO). Some countries have already been analyzing, with quantitative methods, the effect of trade liberalization of forest products on the natural environment.

The Japanese government is also trying to analyze the relationship between trade liberalization and the sustainability of forest resources, and to compare it with that from other such analyses. Under the auspices of the government, a project team consisting of researchers from JIRCAS and the Forestry and Forest Products Research Institute developed a world-wide quantitative simulation model, World Forest Products Model (WFPM), dealing with the trade of forest products, placing emphasis on the Pacific countries which export a large quantity of forest products to Japan. The effects of tariff rate reduction on the forest products were analyzed.

The WFPM is a comprehensive and practical model for the analyses of trade and environmental policies built on the basis of existing leading world models, such as the Global Forest Products Model (GFPM) of the FAO or the Global Trade Model (GTM) of the International Institute for Applied Systems Analysis (IIASA). It is a simultaneous equation model, similar in structure to the World Food Model (WFM) of the FAO and the International Food Policy Simulation Model (IFPSIM) of JIRCAS. While the other world forest products models are based on mathematical programming, the present model has adopted the simultaneous equation structure, which has commonly been used in the agricultural models.

The model also has the following characteristics: 1) a partial equilibrium model focusing only on the forest products sector, 2) a multi-products model determining equilibrium prices of products, which relate to each other simultaneously, 3) a multi-country or regional model determining trades of all regions simultaneously, 4) a dynamic model using lagged variables and forecasting changes of variables, and 5) a policy simulation model analyzing the effects of policy changes such as the change in tariff rates.

The model analyzes round wood for industrial use, sawn wood, panels, board, pulp, and paper, and also forest

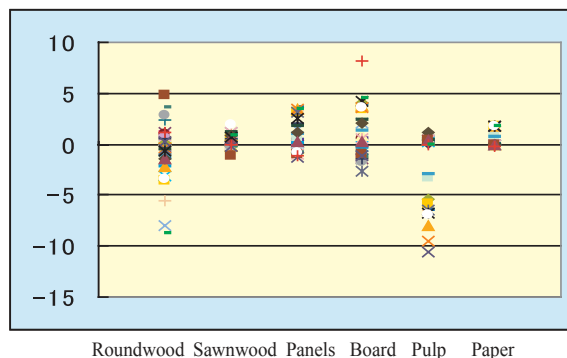


Fig. 2. Changes in demand of forest products by tariff removal.

Note: Each mark represents the differences (%) between the cases without tariff and the cases with continuous tariffs in 2010 for each of the 35 regions.

resources (Fig. 1), and produces time-series data on a yearly basis which are aggregated from the FAOSTAT (FAO, 2002) data base. The model covers 35 regions comprising 24 countries, 10 country groups, and "the rest of the world" for trade adjustment. The parameters of the model consist of behavioral equations such as demand or supply functions, technological linkage functions such as conversions between pulp and paper, and identities such that the total supply is the production plus net imports minus stock change. Weighted averages of the behavioral equation and linkage function parameters of GFPM or GTM, which are being used at the trade negotiations, were used for comparison of the results among the models. The effects of tariff rate changes on supply and demand were tentatively measured as a sensitivity test, with the tariff rates designated as zero in 2005. Figure 2 shows the change in the demand of products. The demand for forest products is foreseen to be greatly affected at regional market level. However, very little price change is foreseen between -0.5% and 2.4%, as the tariff rates are already small. In future, efforts will continue to improve the model, especially for variable selection and parameter estimations.

Jun Furuya
Development Research Division, JIRCAS

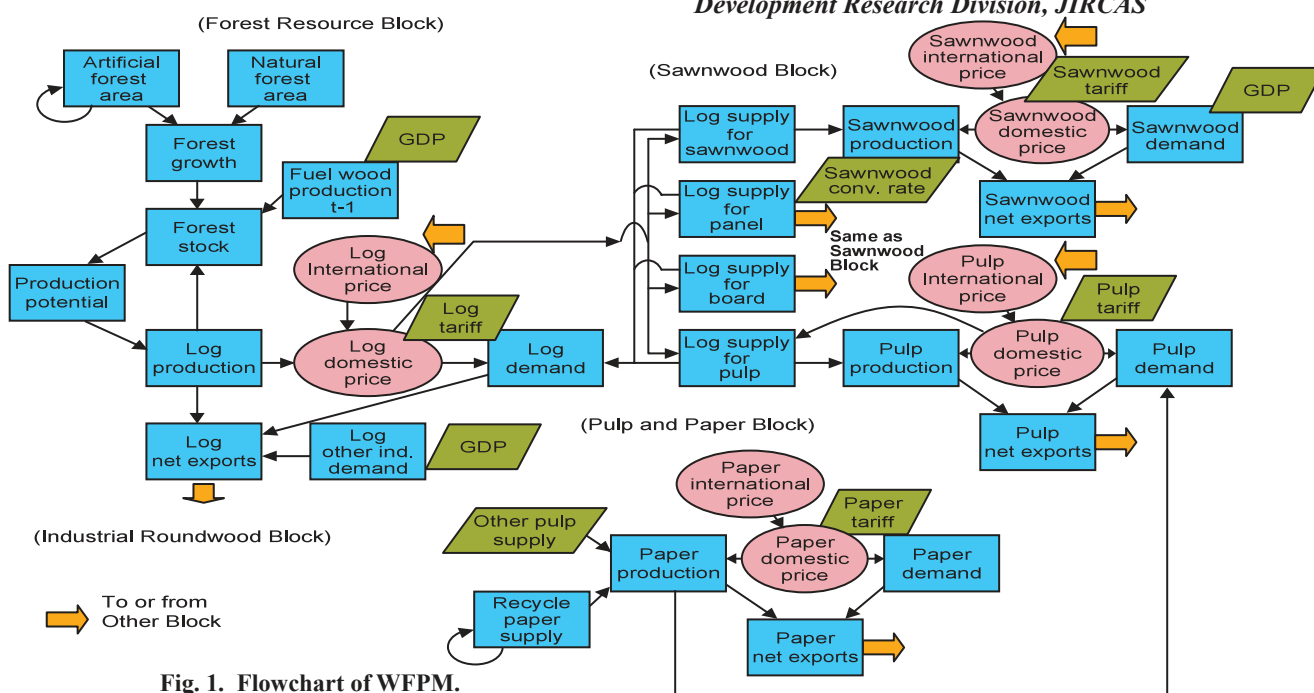


Fig. 1. Flowchart of WFPM.

The 10th Anniversary JIRCAS International Symposium

“Prospects for Food Security and Agricultural Sustainability in Developing Regions –New Roles of International Collaborative Research–”

This year, JIRCAS will hold a special international symposium in cooperation with United Nations University on “Prospects for Food Security and Agricultural Sustainability in Developing Regions -New Roles of International Collaborative Research-”, November 18-20 in Tokyo, to celebrate the 10th anniversary of its reorganization.

Objectives

The symposium is aimed at discussing relationships between global development and international cooperation and collaborative research activities for development pertaining to agriculture, forestry, and fisheries, and their livelihoods and environment. Special emphasis will be placed on the effects of globalization, natural resource and environment changes, and technological innovation on the sustainability and diversity of developing countries. New dimensions and perspectives for international collaborative research activities will be sought by multi- and interdisciplinary approaches and by inviting various stakeholders from the international arena.

Date and Venue

- November 18-20 (two-day open symposium + one-day closed workshop)
- U Thant International Conference Hall of United Nations University for the symposium and JIRCAS for the workshop

Main Issues to Be Discussed

- Socio-economic development and role of agriculture, forestry, and fisheries
- Development and international agricultural research centers
- Perspectives for achieving the international development goals
- Perspectives and issues for sustainable development of agriculture, forestry, and fisheries in developing regions
- Strategies for international collaborative research activities
- Strategic themes for international collaborative research activities (natural resource management, forestry,

fisheries and aquaculture, regional studies, participatory research and development, advanced technologies)

Expected Outputs

- The Proceedings of the symposium will be published later.
- A follow-up workshop is being held after the symposium in order to discuss and examine the feasibility of developing a new framework for international collaborative research programs and/or projects between Japanese and foreign institutions based on the discussions in the symposium.
- A forum or network will be proposed to strengthen the partnerships between various stakeholders in Japan for international agricultural research for development.

Expected Presenters and Participants

- Approximately 15-20 relevant presenters will be invited from both advanced countries including Japan, and developing countries. Moreover, some persons will be welcome to join the symposium as commentators and session chairs.
- The symposium (300 seats) will be open to the general public, and various media such as the homepage, e-mail, newspapers/magazines, TV, academic journals, and posters will be used for announcement of the symposium.

Organizing Committee, etc.

- A organizing committee will be established as soon as possible.
- JIRCAS will serve as the secretariat.

Homepage

More detailed information will be provided through the JIRCAS website <http://ss.jircas.affrc.go.jp/index.html>.

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PEOPLE

Mr. Norio Kikuchi was appointed as Director of the Administration Division on April 1, 2003, succeeding Mr. Katsuyuki Kiryu. Prior to joining JIRCAS, he served at the National Agricultural Research Center for Kyushu Okinawa Region under the National Agricultural Research Organization.

This is his second posting at JIRCAS, and he is looking forward to working with everyone not only at JIRCAS, but also outside of JIRCAS making full use of his previous experience.



JIRCAS Newsletter

Japan International Research Center for Agricultural Sciences (JIRCAS)



June 2003-No.35
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