

Human Development and Collaboration with Universities in Japan International Research Center for Agricultural Sciences (JIRCAS)

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1. Introduction

Global problems are increasingly impacting world food security. These include continued world population growth, deterioration of environments, and destruction of cultivated lands. The promotion of sustainable agriculture, forestry and fisheries to be in harmony with natural ecologies is a critical need. The demand for food is increasing in many developing countries due to both population increase and improved diets. At the same time, where agricultural and fisheries productivities have remained low, food supplies remain unstable and serious problems of hunger and poverty continue to persist. To address these critical needs, Japan International Research Center for Agricultural Sciences (JIRCAS) promotes research aimed at achieving a stable global food supply and ensuring sustainable agriculture, forestry and fisheries in harmony with the environment. It carries out interdisciplinary researches on biological and social aspects of agriculture, forestry and fisheries, and undertakes collaborative projects with institutions of developing countries as well as international organizations. JIRCAS is making many active contributions internationally to address the agricultural, forestry, fisheries, food and environmental problems of the world, with particular focus on developing regions.

course of the reorganization of the former Tropical Agriculture Research Center (TARC) founded on June 1, 1970. Effective April 1, 2001, JIRCAS operated as an independent administrative institution (IAI) (Fig.1).

The IAI is a newly created public corporation established under the concept of separation of policy planning and implementing, as presented by the Administrative Reform Committee of the Japanese Government. Reorganized into IAIs are the national agricultural research institutes affiliated with Ministry of Agriculture, Forestry and Fisheries (MAFF) and the national research institutes affiliated with other ministries, investigation centers such as National Agricultural Chemicals Inspection Station and educational institutions such as National Farmers' Academy.

The characteristics of the IAI are defined in the General Law of Independent Administrative Institutions enacted in July 1999. The IAI is an independent organization separated from the national government. The government decides the objective (mid-term objective) that should be completed by each IAI within five years through their activities. The IAI then makes a mid-term plan to achieve mid-term objective. A mid-term plan is necessary to be acknowledged by the government. The IAI carries out its activities according to the mid-term plan. The government bears nearly 100% of the cost of the activities. The President of IAI can decide how to use the budget, establish organizational structures, recruit and promote researchers. The external evaluation committee organized by the national government evaluates the efficiency and effect of IAI activities.

The management, organization, treatment of employees under the IAI set-up is completely different from that of the former national research institutes. The IAI is expected to overcome rigidity, bureaucracy and inefficiency that are thought to

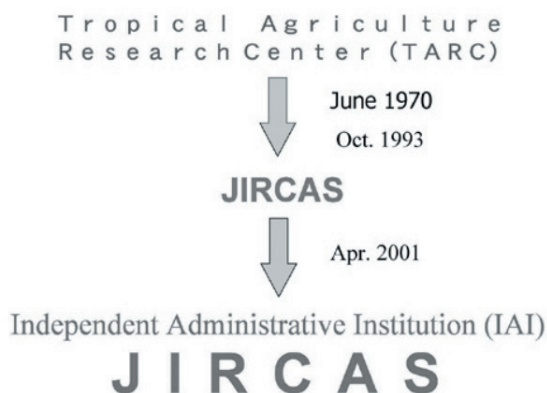


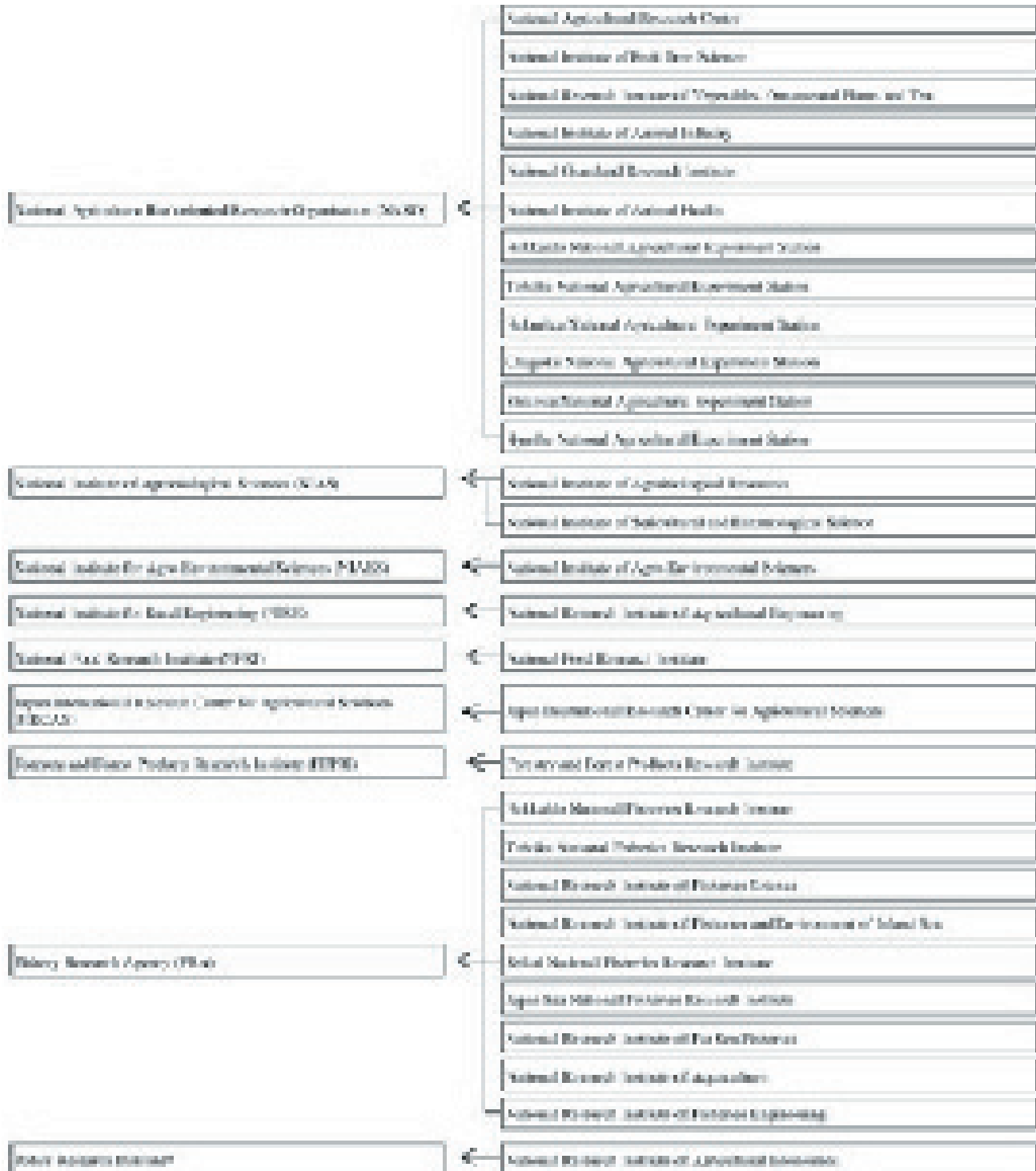
Fig.1 Reorganization of JIRCAS into Independent Administrative Institution

have characterized a governmental organization. On the other hand, we are afraid that the establishment of IAIs causes a decline on agricultural research, which requires long-term investment in terms of time and resources, but is expected to yield a relatively low economical return.

In view of the IAI establishment and considering the circumstances of agriculture in Japan, 29 national agricultural research institutes have been

reorganized into eight IAIs and one national institute (Fig.2).

In line with the reorganization, JIRCAS made a drastic change in its activities. This report will introduce some aspects of new JIRCAS activities concerning human resource development and cooperation with other organizations including universities.



*: National research institute, not IAI

Fig. 2. Reorganization of National agricultural research institutes into IAI

2. JIRCAS International Research Career Network (JIREC) - A project on the development of Japanese human resources for international collaborative agricultural research

(1) Objectives

Technology development in the modern era is a matter of competition and cooperation. It is evident that countries of the world are competing with each other in fields like biotechnology and other ultramodern technologies. At the same time however, it is recognized that international collaboration by combining and sharing the latest knowledge and information in these fields is indispensable for an efficient research program.

On the other hand, the world is presently faced with many problems on a global level in addition to the food and environmental problems, which are due to factors such as population increase. These problems must be grappled with and be solved by devising speedy and efficient technology development. For this purpose, the western as well as the developing countries are seeking a more prominent contribution from Japan. Therefore, Japan should prepare itself to make a far greater human contribution to international agricultural research.

As concerns get associated with international research, skills in conducting research in various fields, the ability to speak and communicate in foreign languages, adaptability to different cultures, living environments and lifestyles, and firm resolve to endure the hardships of international research are very important. Therefore, as a supporter of international research it is essential for Japan to foster and build up a pool of competent human resources to be tapped for international collaborative agricultural researches.

To achieve its purposes, the project "JIRCAS Research Career Network (JIREC)," which is operational from 2001 to 2004, has an ongoing survey of employed as well as retired researchers in order to identify competent human resources who possess the necessary dispositions and are interested to work for international collaborative agricultural researches. These researchers shall be advised of appropriate opportunities available to them for participation in international researches to utilize their expertise. In addition, the project shall

make inquiry and analysis of the mechanisms and operational conditions in the implementation of international collaborative agricultural researches being conducted by international and national research institutes in foreign countries.

(2) Contents

This project is implemented by JIRCAS under the sponsorship of MAFF. There are two main activities of the project.

1) JIREC Database (JIREC-DB)

This activity involves the establishment of a database of Japanese aspirants to international research positions (including working and retired researchers of National Institutes, independent administrative institutions, prefectural agricultural institutes and other private institutes).

In FY2001, about 3,000 sheets of questionnaires were distributed to the national research institutes and IAs affiliated to MAFF. A total of 878 researchers including post-doctoral researchers answered the questionnaire and registered with JIREC-DB. JIREC adopted almost the same format and survey questions among the basic items as those contained in the database questionnaire of Nagoya University International Cooperation Center for Agricultural Education (ICCAE), for the convenience of linking the two databases in the future.

Below is the summary of responses:

a. Age of respondents

Majority of the respondents (34%) are from the 30 to 39-age bracket, followed by those with ages ranging from 40 to 49 (32%), and finally, from 50 to 59 years of age (24%) (Fig.3).

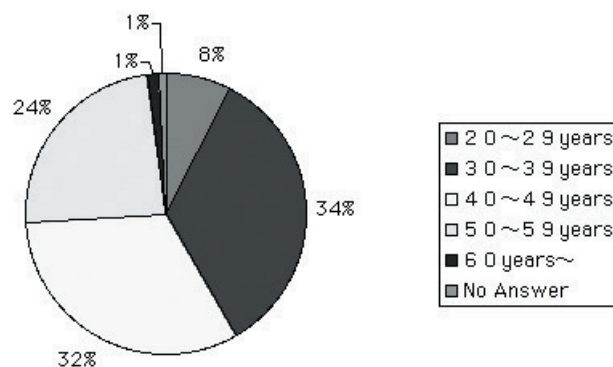


Fig.3 Age of respondents

b. Specialization of respondents

The respondents were asked to indicate their fields of expertise by selecting from among the 9 major agricultural fields listed in the questionnaire as follows: Agronomy, Agricultural Engineering, Forestry and Forest production, Animal Science and Veterinary Science, Fisheries, Agricultural Chemistry, Food Science, Agricultural Economics, Regional Agriculture. Those whose fields of specialization do not fall within any of the major fields listed have to indicate their fields under Others. Majority of the respondents indicated Agronomy as their field of specialization, followed by Agricultural Chemistry, and Animal science and Veterinary. The registered personnel of the DB covers almost all the fields of agricultural sciences (Fig.4).

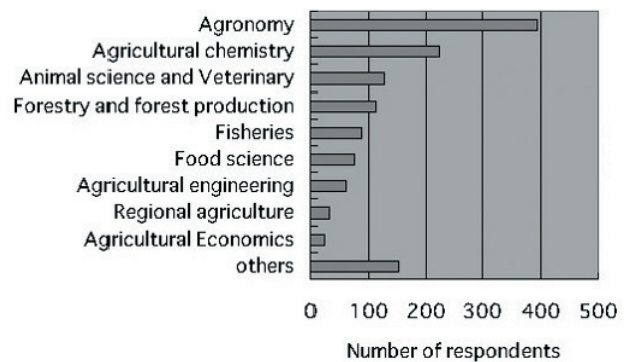


Fig.4. Fields of Specialization of respondents

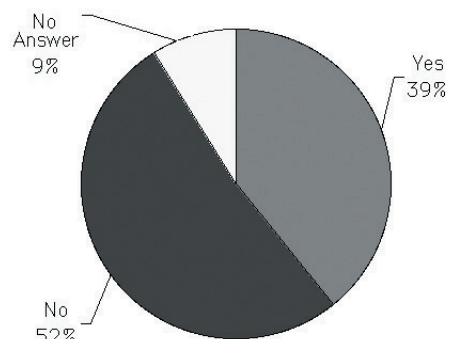


Fig.5 Experience of research in developing regions

c. Experience of research in developing regions

Thirty-nine percent (39%) (343 persons) of all the respondents have experiences in doing research activities in developing regions (Fig.5). On the frequency of being dispatched to developing regions, 140 persons indicated that they were dispatched only once, while 38 persons indicated five times (Fig.6). On the places where researchers are dispatched, majority (83) indicated Thailand. The second country indicated as most visited by a number of respondents for the conduct of research is People’s Republic of China, while a third larger group indicated as having conducted researches in Malaysia (Table 1)

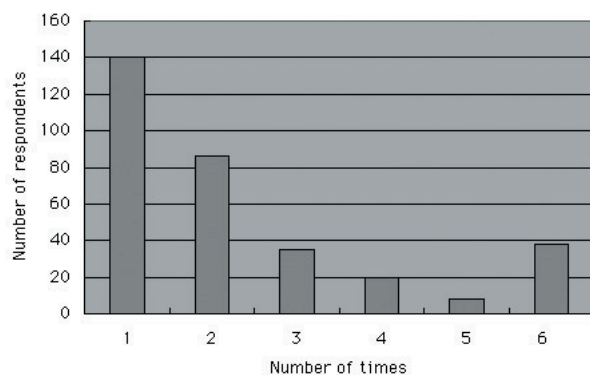


Fig.6 Number of times (experience of research in developing regions)

Table 1. International collaborative projects in JIRCAS (Comprehensive projects)

Time Frame	Project Title	Research Site
1 1996 - 2002	Comprehensive studies on the development of a sustainable agro-pastoral system in the sub-tropical zone of Brazil	Brazil
2 1997 - 2003	Development of sustainable production and utilization of major food resources in China	People’s Republic of China
3 1997 - 2006	Comprehensive soybean research project in South America (multinational)	Paraguay, Brazil, Argentina
4 1998 - 2002	Evaluation and improvement of regional farming systems in Indonesia	Indonesia
5 1998 - 2002	Improving food security in West Africa through increased productivity in rainfed rice systems	Cote d’Ivoire
6 1999 - 2003	Development of new technologies and their practice for sustainable farming systems in the Mekong Delta (Phase)	Vietnam
7 2000 - 2004	Development of low-input technology for reducing postharvest losses of staples in Southeast Asia	Thailand
8 2000 - 2006	Development of agroforestry technology for conservation of tropical forest	Malaysia, Philippines
9 2001 - 2005	Studies on sustainable production systems of aquatic animals in brackish mangrove areas	Malaysia, Thailand
10 2002 - 2008	Increasing economic options in rainfed agriculture in Indochina through efficient use of water resources	Thailand, Laos

d. Experience of research collaboration with invited researchers from developing regions

Fifty-seven percent (501 persons) of all the respondents indicated that they have experience in research collaboration with invited researchers from developing regions (cooperative experiment, fieldwork, seminar etc.) (Fig.7).

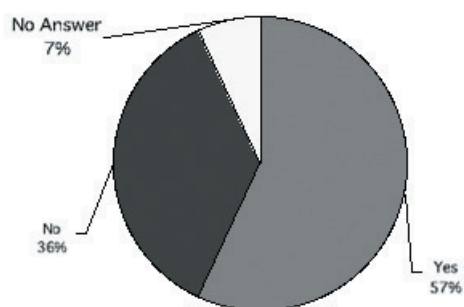


Fig.7 Experience of research collaboration with invited researchers from developing regions

e. The possibility of participation in international research collaboration

Seventy-one percent (71%) of the total respondents gave positive answers to question on possibility of participation in international research collaboration conducted in developing regions. Of this total, nine percent (83 persons) of all the respondents answered that they can participate in research activities in developing regions right away. Other positive answers include “If the conditions allow, I can” (47%), and “I can in the near future,” (15%) (Fig.8). Twenty-two percent (22%) had a “No” answer, while 7% did not answer the question.

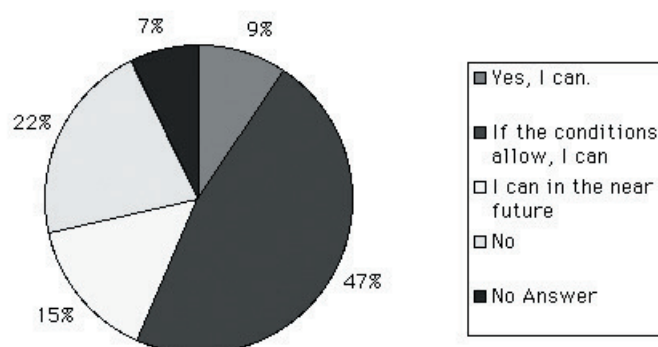


Fig.8. Participation in international research collaboration in developing regions

Sixteen percent (16%) (137 persons) of the total number of respondents indicated that they could accept researchers from developing regions into their laboratory right away. A total of 68% of all the respondents gave positive answers to the item on collaboration with invited researchers from developing regions (Fig.9).

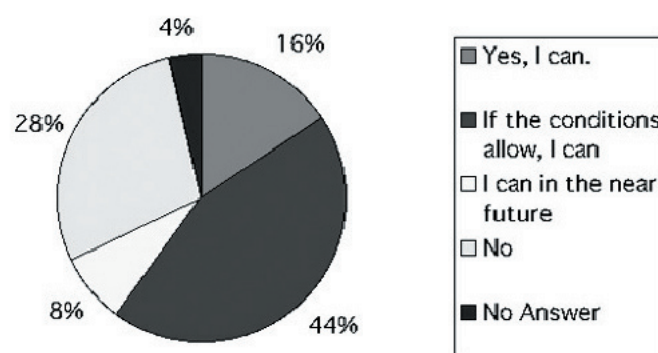


Fig.9. Participation in international research collaboration with invited researchers from developing regions

2) Collection and analysis of information

The purpose of this program is collection and analysis of information pertaining to operational mechanisms and enforcement of conditions for international collaborative agricultural researches, which are being carried out by foreign countries and by reputed international institutes participating with the CGIAR (Consultative Group on International Agricultural Research). Collection of information on employment opportunities in international agricultural research institutes is also being carried out through this project.

In 2001, JIRCAS dispatched its researchers to international agricultural research institutes such as the International Rice Research Institute (IRRI); Australian Center for International Agricultural Research (ACIAR), etc. and a funding agency for technical cooperation, the Asian Development Bank (ADB). The researchers interviewed the program managers in those institutes and gathered useful information for the formulation of international research collaboration strategies. The information collected was published the “JIREC Report,” which shall be provided to researchers registered in JIREC DB.

(3) Future activities

From FY2002, we are expanding the target of JIREC-DB from researchers in national research institutes and IAIs to those in prefectural agricultural research institutes, as well as private research institutes. We have continued collecting and analyzing information about operational mechanisms of international agricultural research institutes. In 2002, we are planning to dispatch JIRCAS researchers to institutes engaged in research concerning Africa, which is one of the priority regions in JIRCAS research collaboration.

To establish a network of researchers who have interest in international research collaboration, it is necessary to provide appropriate information and opportunity to exchange opinion among the researchers registered in JIREC-DB. We consider possible activities to achieve this objective such as sending newsletters to registered researchers, constructing Internet forum, holding a workshop etc.

We believe that one of the most effective means to foster young researchers who wish to participate in research activities in developing regions is to establish an internship program. Through this program, we dispatch young researchers to the research

collaboration sites in developing regions to carry out researches under the leadership of senior researchers. As mentioned, JIRCAS implements comprehensive international research projects in developing regions. JIRCAS believes that it can provide young researchers appropriate opportunities to experience research in developing regions through visit to the Center's research project sites.

3. Collaboration with universities and other institutes

As a result of reorganization into an IAI, JIRCAS got wider freedom to implement activities, but bearing in mind that the result of the research activities are strictly evaluated. Making research activities more efficient is an urgent task for JIRCAS. The Center aims not only to improve the research ability of individual researchers but also to develop an organizational structure that can promote research activities more effectively. Establishment of new methods of project management is also needed in order to utilize more efficiently the limited budget and human resources available to the Center.

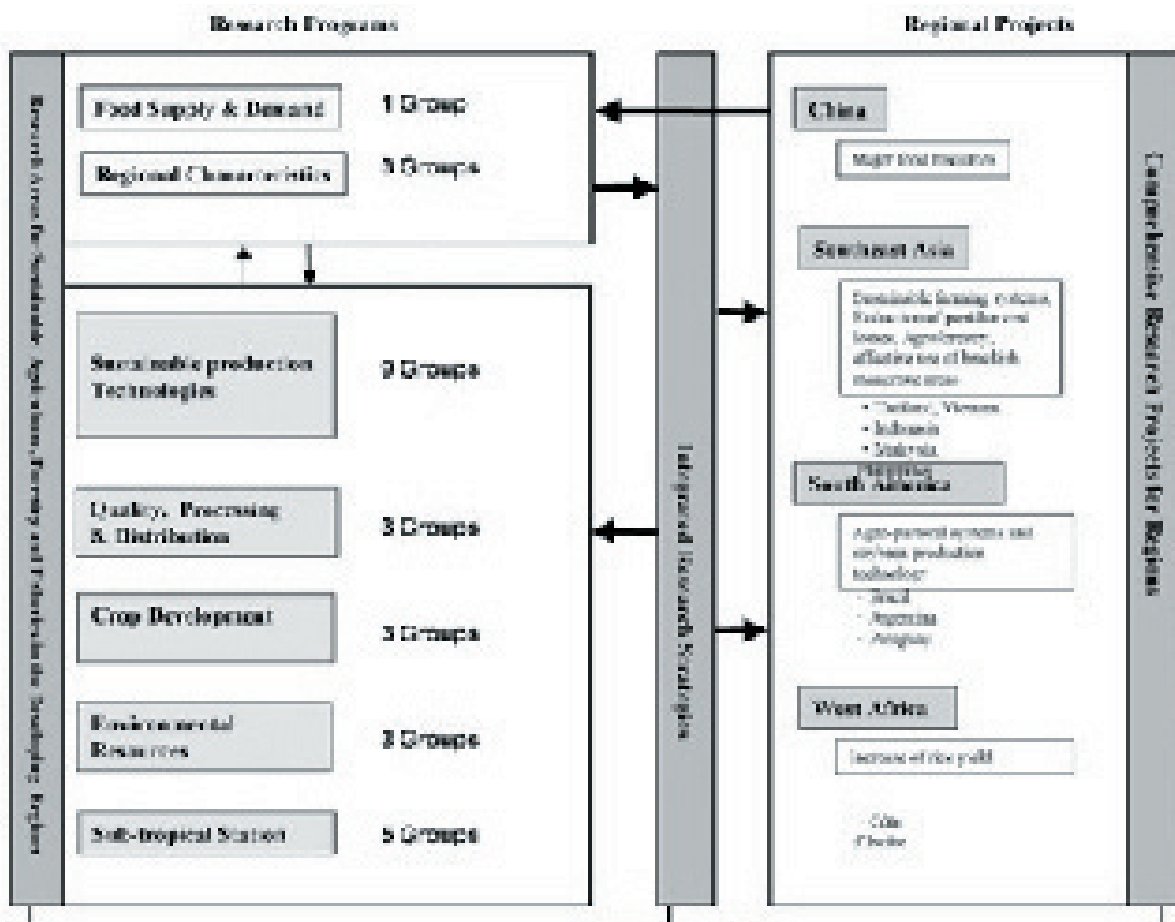


Fig.10 Research programs and regional projects of JIRCAS

(1) Organizational operation after the reorganization

In the organizational operation of JIRCAS, two components are important in order to increase the research ability of the whole institute. These are:

- 1) Human resource development through long-term research activities
- 2) Concentration of human resources to important short-term comprehensive research projects

Considering these two components, JIRCAS adopted matrix systems after the reorganization. Twenty-seven (27) research groups were established under seven research programs (Fig.10). These are as follows:

Research Program 1: Food Supply and Demand

- (1): Food supply and demand

Research program 2: Regional Characteristics

- (1) Information systems
- (2) Regional trend
- (3) Farming systems

Research program 3: Sustainable Production Technologies

- (1) Crop management
- (2) Plant nutrition and physiology
- (3) Pest management
- (4) Material cycling
- (5) Animal production
- (6) Feed production
- (7) Animal health in tropical area
- (8) Water resource management
- (9) Aquaculture

Research program 4: Quality, Processing and Distribution

- (1) Food quality
- (2) Food distribution and processing
- (3) Forestry resource management

Research program 5: Crop Development

- (1) Genetic resource utilization
- (2) Genetic engineering
- (3) Breeding methodology

Research program 6: Environmental Resources

- (1) Forestry
- (2) Fishery resource management
- (3) Coastal environment

Research program 7: Sub-tropical Station

- (1) Stress tolerance crop
- (2) Germplasm development
- (3) Tropical fruits
- (4) Integrated pest management
- (5) Islands environment

Researchers implement research activities related to their major fields in each research group. Project teams were also organized to promote comprehensive research projects (Table 2). Most of the researchers participate as members of the project team that carries out Project researches under their respective groups. There are seven research divisions and one subtropical station in JIRCAS (Fig.11). Directors of research divisions are also designated as leaders of the comprehensive research projects. The Vice President supervises all the project teams. Research Coordinators are assigned to help the Vice President coordinate the projects.

The newly established Development Research Division gathers and analyzes information and data on the natural and social environments, economic aspects, and the agriculture, forestry and fisheries sectors of developing regions throughout the world. Using these data, the Division carries out research aimed at developing a global food security data collection system and a world food supply and demand forecasting model. Another activity of this division is the assessment of current farming system and the development of improved systems in representative priority regions. The division also carries out researches to identify the directions of technology development most likely to meet future needs, and contribute to the establishment of a comprehensive research strategy for JIRCAS.

In order to attract excellent researchers, recruitment is open to highly qualified personnel within and outside Japan through apply- and-review basic recruitment procedure.



Fig.11 Organization of JIRCAS

Table 2. International collaborative projects in JIRCAS (Comprehensive projects)

Time Frame	Project Title	Research Site
1 1996 - 2002	Comprehensive studies on the development of a sustainable agro-pastoral system in the sub-tropical zone of Brazil	Brazil
2 1997 - 2003	Development of sustainable production and utilization of major food resources in China	People's Republic of China
3 1997 - 2006	Comprehensive soybean research project in South America (multinational)	Paraguay, Brazil, Argentina
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5 1998 - 2002	Improving food security in West Africa through increased productivity in rainfed rice systems	Côte d'Ivoire
6 1999 - 2003	Development of new technologies and their practice for sustainable farming systems in the Mekong Delta (Phase II)	Vietnam
7 2000 - 2004	Development of low-input technology for reducing postharvest losses of staples in Southeast Asia	Thailand
8 2000 - 2006	Development of agroforestry technology for conservation of tropical forest	Malaysia, Philippines
9 2001 - 2005	Studies on sustainable production systems of aquatic animals in brackish mangrove areas	Malaysia, Thailand
10 2002 - 2008	Increasing economic options in rainfed agriculture in Indochina through efficient use of water resources	Thailand, Laos

(2) Collaboration with universities and other institutes

JIRCAS endeavors to develop human resources and improve research capacity. Faced with budget and personnel limitation, JIRCAS aims to explore other collaborative schemes through stronger linkage with other institutes including universities and research institutes in developing regions in the near future.

a. Strengthening the linkage with universities and other institutes

After the reorganization of JIRCAS into an IAI, it became relatively easier to make collaboration with other institutes due to the deregulation of various governmental rules, which were applied to governmental organizations. For example, before the reorganization, prior approval of government was necessary to conclude research cooperation contracts with other institutes. Nowadays IAIs can make such decision for collaboration. To use the budget and human resources effectively, JIRCAS should strengthen its linkage with universities, other IAIs, JICA, international research institutes, advanced research institutes and the private sector. Sharing of facilities, personnel, information and budget to promote research activities in the field of agriculture in developing regions shall be explored with existing linkages.

In FY2001, JIRCAS dispatched five researchers from Japanese universities to developing regions to participate in JIRCAS research cooperation projects. Such number is small compared to the total number of dispatched researchers to the JIRCAS project of about 200 persons per year. Before the reorganization, university researchers rarely get engaged in JIRCAS projects. JIRCAS hopes that more and more university researchers participate in its researches. The possibility to dispatch postdoctoral researchers in universities, and graduate students to the research sites of JIRCAS international collaboration shall be explored. A system of contracting researches to other research institutes shall also be considered. Sharing of facilities has been arranged with JICA in some of JIRCAS' research projects. Adequate application of research results and its diffusion is expected through the close linkage with JICA and private sector. JICA's experience in handling technical cooperation projects is seen as a big help in strengthening JIRCAS capability. In promoting such linkage, especially with private sector, attention should be given to the basic policy of handling research results and information in order to avoid problems related to violation of intellectual property rights.

b. Participation of researchers in developing regions

More active participation of researchers from developing regions to JIRCAS projects should also be considered. Although JIRCAS projects are basically collaborative projects with developing regions, the conventional project management practice tend to forget the active participation of foreign counterpart researchers who have useful knowledge and experience about the region. To improve this situation, three schemes shall be implemented:

a) Coordinator scheme

Through this scheme, JIRCAS dispatches its researcher to a selected country in a developing region as a project coordinator. The coordinator makes project proposals to the research institutes in the region and forms the project team mainly composed of researchers in the region. In initial stage of the project, it is necessary for JIRCAS to dispatch the coordinator on a long-term basis. After the research activity takes off, the JIRCAS coordinator visits the research site on a short-term basis, i.e., once or twice a year for discussion with counterpart researchers and evaluation of the research plan and result. It is expected that efficiency on the use of resources is maximized with the utilization of minimum research manpower of JIRCAS by entrusting most of the actual research activities to researchers in the developing regions.

b) Multilateral cooperation scheme

This is similar to the “Coordinator scheme”. The difference is in the number of counterpart countries. In coordinator scheme, one country in a developing region participates in the project, which is carried out under a bilateral agreement. In the multilateral scheme, more than two countries in developing regions participate in the research. Therefore, the management of the project would be more complex than that of the coordinator scheme. JIRCAS has already established some offices in developing regions, namely: Bangkok in Thailand, Beijing in P. R. China, and Londrina in Brazil. In addition to the research coordinator from JIRCAS, these offices will be expected to work as core centers of multilateral research cooperation whenever JIRCAS decides implement the multilateral cooperation scheme.

c) Invitation scheme

One of the important activities of JIRCAS is the invitation program for foreign researchers from developing regions. Every year, JIRCAS invites about 100 researchers from developing regions under various invitation programs such as counterpart researcher invitation, research manager invitation and JIRCAS fellowship programs. Graduates are also being considered for involvement in these invitation programs for research projects. This scheme is best illustrated as follows: First, JIRCAS invites researchers from developing regions to participate in the training program to study advanced research methods in Japan. Upon completion of the program, the participants are requested to make research proposals on agriculture focused on their respective countries. After evaluation of the research proposals, a group of researchers are selected from among the invited researchers to carry out a project on a research theme in their countries to be funded by JIRCAS, which contributes to JIRCAS objectives of achieving a stable global food supply and ensuring sustainable development of agriculture (Fig.12).

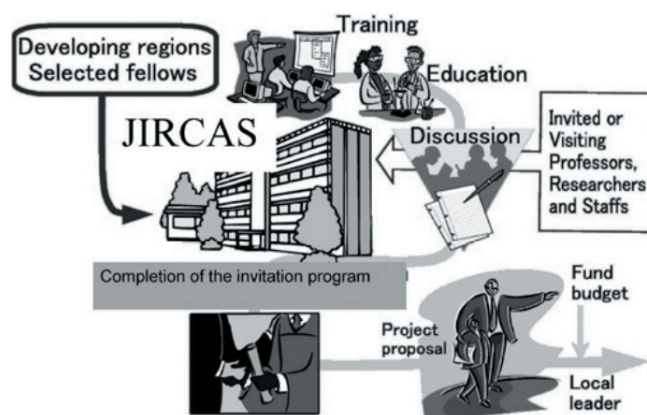


Fig.12 The concept of invitation method

The Coordinator scheme, multi-lateral cooperation scheme and invitation scheme have the following advantages:

- 1) Reduction in travel expenses of Japanese researchers, and therefore, savings on the budget allocation
- 2) Promotion of research that suits the environment and social condition of the developing regions, and establishment of appropriate technologies.
- 3) Decrease the problem of dispatched Japanese researchers encountering difficulty due to change of living circumstances.

In the management of research projects, there should be clear delineation of roles and sharing of responsibilities between JIRCAS and counterpart institutes. Appropriate research personnel in the regions are also selected to manage the project efficiently. The experiences of other international research institutes, which already adopted similar methods, like ACIAR and ESCAP CAPSA (Center for Alleviation of Poverty through Secondary Crops Development in Asia and the Pacific) will be useful to establish new project management Policy. Collection of data in the regions also considers the advantage of JIRCAS as an information center for research activities in the developing regions.

4. Conclusions

Human resource development and collaboration with universities play important roles in the promotion of JIRCAS activities. JIRCAS could become more responsive to technological needs from developing regions, especially through close cooperation with university and its personnel.

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