

Title: Collaborative Research – A Way to Maximize Research Potentials

Author: Osamu Koyama

Address: Japan International Research Center for Agricultural Sciences (JIRCAS),  
1-1 Ohwashi, Tsukuba, 305-8686 Japan

Phone: +81-29-838-6313

Email: [koyama@affrc.go.jp](mailto:koyama@affrc.go.jp)

## **Collaborative Research – A Way to Maximize Research Potentials**

### **ABSTRACT**

The paper describes the unique activities of JIRCAS in the field of agricultural technology development. Targeting Africa and other developing regions, JIRCAS tries to enhance innovation capacity through the conduct of equal-footing collaborative research projects with national agricultural research centers, universities and international agricultural research centers. JIRCAS is one of the advanced research institutes affiliated with the Japanese government, and contributes mainly to the developing regions.

In bilateral aid programs, in general, new technologies are transferred to the recipient countries in an efficient manner. However, in the long run sometimes the technologies are not assimilated down among the target local users due to the lack of capacities to handle and maintain these technologies. Collaborative research projects involve not only local researchers but also local administrators and potential users. Although the projects often require longer time and larger combined efforts before the results are realized as they are processed by mutual actions, they gradually enrich the mutual understanding and eventually the practical research capacity of the involved people from both sides.

The experiences in Africa have not yet been sufficiently accumulated, and JIRCAS finds that the collaboration with local institutions in Africa is not as easy as in other regions. However, there is a strong will that JIRCAS will be able to strengthen the activities in Africa in the coming years. The paper tries to show the concepts, effects and shortcomings of the collaborative research by introducing several cases that JIRCAS has experienced so far in Africa and other regions.

Key words: collaborative research, agricultural research, capacity-building, Africa, agricultural development

## **Collaborative Research – A Way to Maximize Research Potentials**

### **INTRODUCTION**

The Japan International Research Center for Agriculture (JIRCAS) was established in 1993. However, it inherits a long history of collaborative research from its predecessor, the Tropical Agriculture Research Center (TARC). TARC was established in 1970 under the Ministry of Agriculture and Forestry (currently the Ministry of Agriculture, Forestry and Fisheries (MAFF)) of Japan. The mission of TARC was to conduct agricultural research in foreign countries, particularly in tropical Asia, for the purpose of initiating development programs. Japan, at that time, had been making rapid economic growth and recovering from the wartime damages, and it was trying to be a donor country. The Japanese government placed priority in the field of agricultural research for the reason that essential knowledge of local agriculture in the tropics was missing, which was indispensable for agricultural development, deemed as the most important basis for sound economic growth.

In the early years of TARC, the concept of collaborative research was not fully established. A number of researchers of various research fields were dispatched to Thailand, Malaysia, India, Philippines etc., and simply stayed at local research stations for several years. However, knowledge on tropical agriculture had been gradually accumulated and some useful research results were generated. Furthermore, good relationships between Japanese researchers and local researchers were established and these lead to formal partnerships between the institutes through the signing of Memoranda of Agreements and the start of research exchanges.

The manner of collaboration was improved based on the experiences. Invitation and fellowship programs were added in order for the local researchers to experience working in the Japanese research environment. Formal agreements that define equal partnership including the equal share of intellectual properties were signed between institutes and, in some cases, between governments. By the time of the reorganization of TARC into JIRCAS, the targeted research areas were expanded to include all developing countries and the collaboration in the field of fisheries was added. JIRCAS currently sends more than 250 researchers to foreign countries a year either on a long or short-term basis. Likewise, nearly 100 invited guests, including research managers and long-term research fellows, visit JIRCAS in Japan every year.

### **CHARACTERISTICS OF COLLABORATIVE RESEARCH**

By accumulating experiences, a way of collaborative research has been gradually established in JIRCAS. The main characteristics of collaboration are summarized in the following three points. Firstly, the collaboration is made on an equal-footing partnership. Resources are provided from both sides and research results are equally shared between the collaborating research institutes. Secondly, the contents of research collaboration are determined by the reciprocal interests of participating institutes. The collaboration starts only if both parties mutually agree on the need for research subjects which can be matched with their respective research mandates. The sites of research activities tend to be in the counterpart countries, as such programs fit well within the mandate of JIRCAS. Thirdly, the collaboration is committed within a long period in general. It continues for a minimum of several years, although the individual research periods depend on the contents and nature of the researches.

The process of the collaboration is described in Figure 1. General contributions from both parties are often made flexible under different items, as agricultural research institutes including universities in the developing countries, often face various constraints in the implementation of research. Through the collaboration, particularly while conducting field and laboratory experiments hand-in-hand, researchers from both sides exchange ideas which often differ and learn from each other.

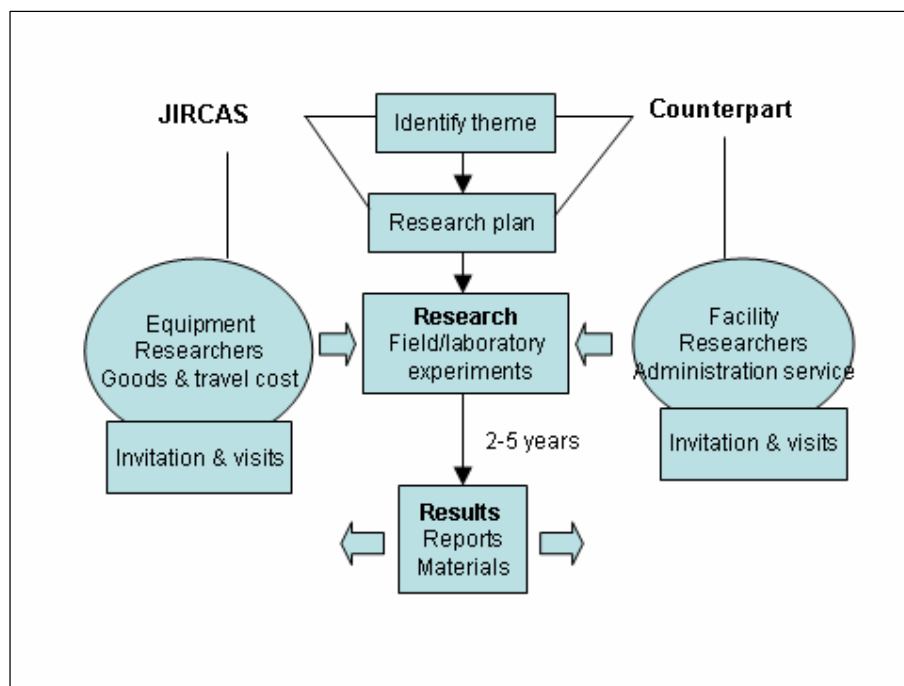


Fig. 1 The process of JIRCAS collaborative research

The nature of collaborative research has quite a unique aspect compared to other research programs providing only funds or aid programs simply transferring technologies. It requires stronger and more spontaneous commitment on the part of counterpart institutes or universities than those other programs. Therefore, it should be able to elicit the deeper involvement of local researchers in the projects, and should be more effective in capacity-building.

## **ENHANCEMENT OF RESEARCH PROJECTS - EXPERIENCES IN ASIA**

The way of implementing the collaborative research has been altered according to the flow of methodological development and to the unique situation of existing research capabilities in each particular region. In Asia, JIRCAS has carried out several types of collaborative research projects. The following is a brief introduction of the purposes, targets and outcomes of those types of research collaboration.

### ***Field-oriented activities***

The most direct way to find research themes is to identify specific technological problems which local farmers are facing and in which the collaborative researchers have expertise. Most of the research activities made during the early stages of TARC/JIRCAS are classified into this type. Plant protection from various kinds of pests, post-harvest treatments for reducing losses and the breeding of varieties for specific soil/climatic conditions are the good examples. Capacities in specific technical fields are developed for the reciprocal benefits of researchers and research institutes from both sides.

This type of research has the merit of providing visible solutions to the local beneficiaries. In fact, some of the research projects were successful and achieved the improvement of lives of the local population. Low temperature-tolerant rice varieties in Yunnan Province in China won dominance among the rice crops planted. Toxic fungi on various food products were carefully studied and the market values of the improved products were raised in Southeast Asia. However, the scope of this type of research is limited to the technological aspects and it often becomes irrelevant when the surrounding situation changes. For example, the market demand for a product varies in accordance with the fluctuation in the consumers' income, and technologies such as pesticide application are also often rapidly renewed in order to meet regulations and market situations.

### ***Comprehensive projects***

The second type of project was initiated in order to reinforce the weakness of the

problem-solving type activity mentioned above. These so-called comprehensive projects usually consist of multiple research themes and cover several academic fields. The aim of this type of project is that the solution of a problem must be comprehensive and not only technical but more expanded to include the use of socio-economic and multidisciplinary approaches. JIRCAS has conducted a number of projects of this kind. In Mekong Delta, Vietnam, a farming system which combines rice, fruits, livestock and aquaculture was studied from various academic viewpoints. In the Northeast region of Thailand, a technology package was tried in order to raise both the efficiency of resource utilization and the villagers' income.

This type of project has plenty of merits. First of all, it involves many local people including those in the agricultural extension and administration sections, thus the targeted end-result of capacity-building is also comprehensive. Secondly, the members of a multidisciplinary team can exert influence on each other and empowered to find new solutions. Thirdly, the results obtained are generally more robust than the ones obtained through mono-disciplinary approaches. However, management of this kind of project is not an easy task, and it may often produce a simple compilation of various research subjects without having enough integration.

### ***Participatory approaches***

The third type of research project is still under development, however. JIRCAS already has made several trials. In the above two types of projects, the selection of research themes tends to be determined by the preference of participating researchers. Researchers may put priorities on academic importance and innovative values, although the actual beneficiaries may have different priorities. JIRCAS has initiated several activities based on the farming system research extension (FSRE) approach. In Northeast Thailand, through discussion among farmer groups, research themes were selected and the results were also evaluated. In Mali too, a new planting method was developed by superimposing scientific climate information on villagers' indigenous knowledge which were clarified through participatory discussion.

The participatory approaches, however, often require a substantial effort in making effective and continuous dialogues between researchers and users, as users often have varied and sometimes conflicting interests among them. Cooperation with the local administrators and village leaders is thus essential. In addition, the identified theme sometimes requires extra research expertise and resources which are not available. And the obtained results may not be applicable in a different situation. Thus, there must be a critical evaluation in terms of costs and benefits in each attempt. Nevertheless, this

method of implementing research projects seem to be more welcome by direct users and it reminds researchers about the original role of agricultural researches, which is to serve primarily the needs of end-users like farmers, growers, or fishermen.

## **ACTIVITIES IN AFRICA**

JIRCAS was reluctant to initiate collaboration in Africa, as Japanese researchers were not familiar with the agriculture there. One of the natural reasons was that Africa is located far from Asia, and it has a different cultural and agro-climatic environment. Before the time when the importance of Africa in achieving the global development goals was stressed in various international forums, JIRCAS has only conducted several single-subject collaborations with IARCs located in Africa. These collaborations include veterinary studies on livestock diseases at International Livestock Research Institute (ILRI) (1980-2006), selection of cowpea cultivars at International Institute of Tropical Agriculture (IITA) (1990-95), and a study on desert locusts at International Centre of Insect Physiology and Ecology (ICIPE) (1994-2004). In the middle of 1990s, the Japanese government demonstrated its desire to be involved in the overall African development efforts. A series of the Tokyo International Conference for African Development (TICAD) is one of those initiatives. Meanwhile, JIRCAS has been initiating several projects in Africa since 1996.

### ***The first comprehensive project with WARDA***

The first comprehensive project was made in the field of rice cultivation where the Japanese researchers are believed to have relative advantages. Although East Africa was initially targeted and investigated, for research collaboration purposes, JIRCAS approached the Africa Rice Center (WARDA), which is mainly working in West Africa, after considering the potential impact on the overall African development. Since JIRCAS had very limited established relationship in Africa, it was a justifiable option that an international agricultural research center (IARC) should be chosen as its counterpart in collaboration. JIRCAS made several achievements in a project which covered the physiological evaluation of local rice varieties including the newly developed NERICA (New Rice for Africa) as well as an empirical study on the socio-economic factors limiting the technological innovation.

After finalizing the project due to the political turmoil in Cote d'Ivoire, the initiative was taken over by the following initiatives in several places, including in WARDA itself. Above all it should be noted that new counterparts, including university people, have gained experience in conducting several socio-economic studies. Although

the project did not explicitly play a visible role as a venue for capacity-building for local researchers as the main partners were the researchers in an IARC, there were certain positive and enriching consequences which can be seen more clearly later.

### ***Current activities***

In the second mid-term plan of JIRCAS (2006-2010), two major activities are listed for Africa. One is the continuation of support to the rice research efforts in collaboration with WARDA as well as the ongoing partnership with a NARS in Guinea. Another is also the continuing activity that started several years ago with the International Crop Research Institute for Semi-Arid Tropics (ICRISAT) in Niger. The latter aims at the improvement of the fertility of the sandy soils of semi-arid West Africa, and it consists of a substantial amount of field and laboratory work. In both activities, a certain level of collaboration with local researchers is incorporated in the research plan. In reality however, the collaboration has not yet reached the level that was experienced in Asia due to several reasons. In order to deepen the collaboration to the extent that it is useful for capacity-building, a lot more of joint activities are needed.

Apart from JIRCAS projects, a practical collaboration in Japanese technology cooperation program on NERICA is going on in Benin. A JIRCAS breeder plays a key role in the hand-in-hand collaboration at field level. This is one of the promising consequences of the long-lasting collaboration with WARDA. In addition, MAFF, Japan has recently started two sets of capacity-building fellowship exchange programs through JIRCAS for supporting the JIRCAS and CGIAR research activities. The first one allows Japanese scientists to perform research overseas, and the other is to provide a chance for African scientists to stay in CGIAR centers. Opportunities for mutual exchanges have thus been increased for young scientists of both Japan and Africa, an arrangement that is aimed at grooming potential leaders of research development and helping foster scientific cooperation between the Centers and Japan.

### **CONCLUSION - FUTURE DIRECTION**

The activity of JIRCAS is so tiny in significance in terms of the overall picture of agricultural development in Africa. However, JIRCAS continues to increase its efforts in Africa. In fact, the share of JIRCAS funds allocated for Africa has been increased from 5% in five years ago to 15% in 2005 (Fig. 2). This trend will continue, as many Asian countries are about to independently commence solving their national food and agriculture problems on their own, with less foreign intervention. JIRCAS has a strong will to play a larger role in the African region in the coming years.

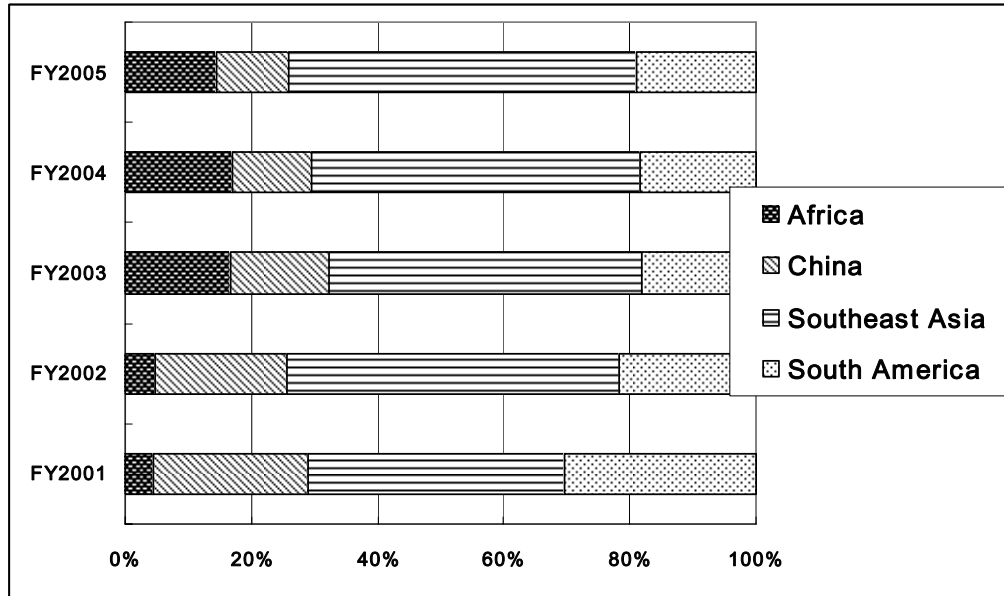


Fig. 2 Budget allocation by regions (direct research spending only)

Despite the experiences obtained in the past decade, it is obvious that JIRCAS' expertise in this region is far from satisfactory. The collaborative research in Africa has just started and it should be redirected towards more effective implementation in terms of achieving the development goals. Basic researches with high quality scientific papers might not be sufficient enough to fit the needs of the final users. A multidisciplinary analysis – a combination with socio-economic focus could be one of the major ways to utilize and realize the research results which have been accumulated so far by research front runners.

Recently, JIRCAS organized a series of symposiums on African research and development, where many prominent speakers exchanged views and discussed extensively on the role of Japan in this field. In a symposium, the words of a famous agronomist, Tokiyoshi Yokoi (1860-1927), were paraphrased, which read “agricultural science flourishes and agriculture gets ruined” and “Listen to the rice about rice. Listen to the farmers about agriculture”. These were warning messages to the Japanese scientists 100 years ago. Overall capacity-building in agricultural system must require various measures with more extensive outlooks including basic education, training of village leaders and so on. However, JIRCAS will continue to make its tiny efforts in the field, hand-in-hand with local researchers and in a long-lasting, or more sustainable, manner. Perhaps it is an ideal way to maximize the potentials of human capacity in agricultural research.

## REFERENCES

- JIRCAS. 2005. *Perspectives of R&D for Improving Agricultural Productivity in Africa - What and how can Japan contribute to Africa? -*, Proceedings of J-FARD & JIRCAS International Symposium, JIRCAS
- JIRCAS. 2004. *Prospects for Food Security and Agricultural Sustainability in Developing Regions – New role of International Collaborative Research*, JIRCAS Symposium Series, No.12, JIRCAS
- JIRCAS. 2006. *Annual Report 2005 (Apr. 2005 – Mar. 2006)*, JIRCAS