Coordination of the international cooperative research in agriculture, forestry and fisheries fields

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Summary: In 1999, the world population surpassed the level of 6 billion people for the first time. Developing nations are home to 80% of this population, or 4.8 billion people. Based on world population growth estimates, if this trend continues, there will be 8.9 billion people (with an estimated range of between 7.2 billion and 10.7 billion people) living in the world by the year of 2050. However, it remains to be seen whether the necessary food resources will be available to support this sudden increase in the world population. Under the situation the recent activities of Japan International Research Center for Agricultural Sciences (JIRCAS) will be introduced in this article with the ongoing programs in fisheries research fields for sustainable supply of foods in the world.

KEY WORDS: International cooperative research, food issue, environmental problems, fisheries

Japan International Research Center for Agricultural Sciences (JIRCAS) has current staff 161, including research scientists and administrators. Thirty-eight of these staff members are located at the Okinawa Branch on Ishigaki Island. The main office has nine research divisions.

- Research Planning and Coordination Division
- Administration Division
- Development Research Division
- Biological Resources Division
- Crop Production and Environment Division
- Animal Production and Grassland Division
- Food Science and Technology Division
- Forestry Division
- Fisheries Division

Objectives and main activities of JIRCAS are as follows.

Objectives
1. Develop techniques for promoting sustainable production of agriculture, forestry and fisheries compatible with the preservation of the environment.
2. Conduct studies to address problems of food supply and environmental degradation.
worldwide.
3. Coordinate international cooperative research programs in agricultural, forestry, fisheries and socio-economic sciences in a large number of countries worldwide.
4. Develop advanced technologies at JIRCAS laboratories in Tsukuba and Okinawa to promote further research outside Japan.

Main activities
1. Organize cooperative activities between JIRCAS researchers and counterparts in various countries.
2. Promote basic research at JIRCAS to support cooperative studies among foreign countries.
3. Invite and accommodate scientists from foreign countries.
4. Analyze research information for supporting the international cooperative work.
5. Organize international symposia, workshops, and seminars.
6. Act in advisory capacity for food and environmental issues worldwide.
7. Advise organizations involved in overseas development assistance.

The main comprehensive projects are:
2. Comprehensive studies on sustainable agricultural systems in North Thailand.
3. Comprehensive studies on the development of sustainable agro-pastoral systems in the subtropical zone of Brazil.
4. Development of sustainable production and utilization of major food resources in China.
5. Comprehensive studies on soybean improvement, production and utilization in South America.
7. Improvement of food security in West Africa through the increase of productivity of rainfed rice systems.
8. Development of agroforestry technologies for the rehabilitation of tropical forests.
10. Sustainable production systems of aquatic animals in the mangrove brackish water in Philippines, Malaysia and Thailand.

JIRCAS send the scientists to the many countries in Asian, African and South American countries and implement the research projects for agriculture, forestry and fisheries.

Activities in fisheries research area

The marine environment for all organisms consists of nonliving environmental elements (abiotic factors), and organisms (biotic factors). The abiotic factors of the marine environment include low nutrients, high pressure, and high salts concentration that have a bearing on the type of life exist in an area. The biotic factors in the marine environment are the interactions among organisms. Four distinct levels of organization occur in the biotic sector of the
environment: (1) individuals, (2) populations, (3) communities, and (4) ecosystems. Ecosystems interrelate on a global scale, forming the living skin or biosphere, which envelops the Earth.

The Fisheries Division conducts research concerning several characteristic aspects of fish inhabiting sea and freshwater. As an international collaborative activity in the field of fisheries, the Fisheries Division has five major research projects in Asian countries, including efforts to improve the management of fisheries resources and the coastal environment in Malaysia, aquaculture in Thailand, Vietnam, Indonesia and The Philippines, and fisheries product processing in China. In addition to these studies, the Division also endeavors to take part in a research project targeting fish viral diseases in Southeast Asian countries including The Philippines and Malaysia. With the corporation of Fisheries Research Agency which includes Hokkaido National Fisheries Research Institute, Tohoku National Fisheries Research Institute, National Research Institute of Fisheries Sciences, Setonaikai National Fisheries Research Institute, Seikai National Fisheries Research Institute, Japan Sea National Fisheries Research Institute, National Research Institute of Far Seas Fisheries, National Research Institute of Aquaculture and National Research Institute of Fisheries Engineering, these studies are supported by the scientists sent from the above national institute.

During FY2000 - 2001, the Division carried out research on fisheries resource management in Malaysia with the Fisheries Research Institute (FRI). This project involves the integration of studies in fisheries and forestry. JIRCAS has successively dispatched a senior researcher to Penang, Malaysia, to provide long-term oversight for the research, and several short-term scientists specializing in fish larval ecology. In March 2001, to extend this research to the international multidisciplinary project, a project meeting was held with the participation of colleagues from The Philippines, Malaysia and Thailand. In this meeting it was agreed to proceed with studies to establish a method of encouraging low-input synthetic food and drug in aquaculture procedures that takes advantage of the naturally-occurring circulation system which occurs in mangrove forests, combined with the development of more profitable aquaculture procedures based on the rearing of new indigenous aquatic species of a high commercial value. In addition, after these sustainable production systems in brackish mangrove areas are put into practices, studies will be needed to analyze and publicize their economic and environmental advantages to promote and encourage their wider use.

At the same time, the Division remains involved in several other ongoing projects. These include collaborative studies on the environmental management of the coastal waters of Indonesia based on the ecological and chemical analyses being conducted in Maros, South Sulawesi, Indonesia, in conjunction with the Research Institute for Coastal Fisheries (RICF) under the jurisdiction of the Central Research Institute for Fisheries (CRIFI). The
project aims to deepen understanding of plankton ecology and its environmental factors to improve marine resource management methods. One researcher was dispatched to Maros as a long-term resident scientist.

The Division's collaborative work on the development of sustainable aquaculture technology in Southeast Asia also continued at SEAFDEC and Kasetsart University in The Philippines and Thailand, respectively. In addition, the Division has been participating in a comprehensive project entitled "Evaluation and improvement of farming systems combining agriculture, animal husbandry, and fisheries in the Mekong Delta" with the college of Agriculture at Cantho University in Vietnam. This project involves multidisciplinary studies of integrated farming systems to address problems in rice production, animal husbandry, freshwater aquaculture, and socio-economics.

Subjects being solved

The significant increases in food production which have been realized in the past quarter century are due in part to advances in technology that allow for increased yield per unit of cultivated and fisheries areas. Despite many successes, however, numerous new problems have appeared in recent years. For example, global grain yield and fisheries catch have tended to stagnate and the yearly rate of their production have dropped significantly worldwide. Depression of land cultivation due to urbanization, soil loss and water shortages have demonstrated the fragile foundation on which our food production is based. What is more, serious degradation of the global environment has become increasingly apparent. From now on land and water resources should be conserved and we should decrease our dependency on chemicals. At the same time promotion of the development of sustainable agriculture, forestry and fisheries activities shall be searched, that will support mankind's continued existence. As the new millennium dawns, these are the critical issues and challenges we must face. And these problems, the unstable supply of food, the earth's environmental problems and widespread poverty, are especially serious in the developing regions of our planet. The answer to these issues lies in global cooperation of the scientists in the fields of agriculture, forestry and fisheries worldwide.

References