

JIRCAS Newsletter

for
INTERNATIONAL COLLABORATION

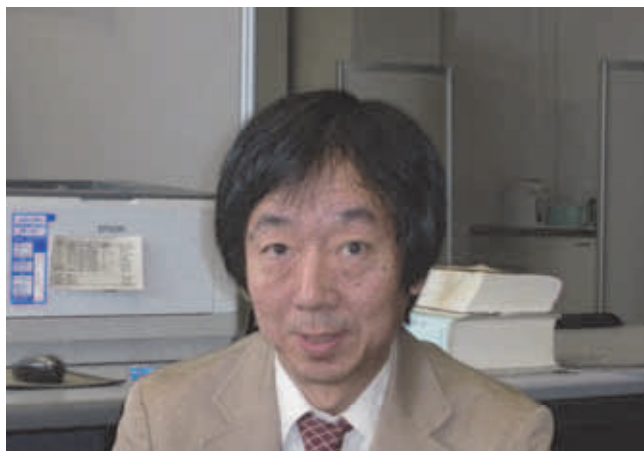


Sagay Marine Reserve, Negros, Philippines (Photo by S. Watanabe)

In This Issue

- 2 JIRCAS Workshop : Development of Aquaculture Technologies for Sustainable and Equitable Production of Aquatic Products in Tropical Coastal Areas
- 4 Research and Development of a Technique for the Co-culture of Giant Tiger Prawn in Thailand
- 5 Development of an Integrated Multi-Trophic Aquaculture (IMTA) Method for Small-scale Farmers in the Philippines
- 6 Development of Blood Cockle Aquaculture Management Techniques in Malaysia
- 7 SEAFDEC/AQD-JIRCAS Partnership
- 8 JIRCAS Workshop on Tropical Coastal Aquaculture Project
- 9 Inauguration of Mini Wet Laboratory at Igang Marine Station of SEAFDEC/AQD
- 10 JIRCAS TODAY

JIRCAS Workshop: Development of Aquaculture Technologies for Sustainable and Equitable Production of Aquatic Products in Tropical Coastal Areas



World per capita fish consumption has doubled in the past 50 years. In recent years, fish has contributed to almost 20% of the global population's intake of animal protein. Under these circumstances, aquaculture production has grown rapidly and currently accounts for nearly half of the world's food fish consumption. According to FAO, the rising demand for fish products is expected to continue in the coming decade, driven by population growth and urbanization. With capture fisheries production stagnating, major increases in food fish production are predicted to come from aquaculture.

Aquaculture is often called the "Blue Revolution" and is recognized worldwide as one of the most efficient and promising contributors to protein production. However, it cannot be denied that aquaculture modifies its receiving environment and often has negative impacts. In fact, rapid development and expansion of intensive aquaculture have resulted in deterioration of the environment, destruction of coastal ecosystems and disease outbreaks. These are also true of Southeast Asia, which has retained its dominant position in world aquaculture. For example, it is well known that mangrove forests in this region have been destroyed by the construction of shrimp ponds, many of which were then abandoned in a few years due to pollution and disease. Also, intensive feeding causes eutrophication and hypoxia in the water and the sea ground, which occasionally result in mass fish kills. The urgency of making aquaculture sustainable and environmentally friendly is clear. The JIRCAS research project entitled "*Development of*

Aquaculture Technologies for Sustainable and Equitable Production of Aquatic Products in Tropical Coastal Areas" was proposed to solve these problems in aquaculture. Thus, the objectives of this project are to develop sustainable and environmentally friendly aquaculture technologies and to improve the livelihoods of small scale farmers in Southeast Asian countries with these technologies.

The project consists of five research subjects, namely, (1) development of co-culture systems of giant tiger prawns in collaboration with King Mongkut's Institute of Technology Ladkrabang (KMITL) in Thailand; (2) development of integrated multi-trophic aquaculture (IMTA) systems in collaboration with the Aquaculture Department of the Southeast Asian Fisheries Development Center (SEAFDEC/AQD) in the Philippines; (3) establishment of a fishery management plan for blood cockles in collaboration with the Fisheries Research Institute (FRI) in Malaysia as well as the Fisheries Research Agency (FRA) and universities in Japan; (4) elucidation of shrimp reproductive mechanisms; and (5) development of shrimp rearing technologies.

Subjects (1) and (2) focus on co-culture/polyculture systems. Co-culture/polyculture is an approach to aquaculture in which the waste products (e.g. leftover feed and feces) from the fed species (e.g. finfish or shrimp) are recycled as nutritional inputs for inorganic-extracting species (e.g. seaweed) and/or organic-extracting species (e.g. shellfish). Thus, if we can establish these co-culture/polyculture systems, the excess nutrients will be mitigated, and an additional income source for farmers will be created. Subject (3) focuses on the supply of planktonic larvae and the survival after settlement of blood cockles. Both are major factors affecting the production of blood cockles. Thus, if we can clarify the reproduction-recruitment process and carrying capacity of culture grounds, an appropriate fishery management plan for blood cockles will be developed. Subjects (4) and (5) focus on the control of shrimp reproduction. Eyestalk ablation is practically the only technique to induce ovarian maturation in shrimp, although it has low efficiency in broodstock production

and leads to high mortality and poor egg quality. Thus, if we can develop an alternative to eyestalk ablation, stable seed production technology will be established. In addition, since sustainable aquaculture requires that not only environmental factors but also economic and social factors be considered, socio-economic evaluations of developed technologies are going to be made in this project.

The fiscal year 2013 is the midway of this JIRCAS 5-year project. Thus, in cooperation with SEAFDEC/AQD, we held a workshop on October 9-10 at SEAFDEC/AQD in the Philippines to review current research activities and exchange views on how to reach our project goals. A total of 13 speakers from four countries presented the results of the researches being conducted in Thailand, the Philippines and Malaysia. Methods of disseminating developed aquaculture technologies and possible future international collaborations were also discussed.

This issue of the newsletter covers three research topics presented in the workshop. In the article about co-culture of giant tiger prawns in Thailand, Dr. Tsutsui reveals that a green seaweed species co-cultured with prawns not only absorbs inorganic nutrients but also promotes growth and enhances body color on prawns. In the article about integrated multi-trophic aquaculture (IMTA) in the Philippines, Dr. Watanabe shows that a sea cucumber species can efficiently utilize aquaculture feed and fish feces for its growth. In the article about fishery management for blood cockles in Malaysia, Dr. Yurimoto suggests that planktonic larvae of cockles are transported by estuarine circulation and settle on tidal flats. In addition, Dr. Ayson reviews the SEAFDEC/AQD-JIRCAS partnership, with emphasis on the IMTA research.

It will be our pleasure if these articles give you a better understanding of our research activities for development of sustainable aquaculture technologies in Southeast Asia.

Hiroyuki Sudo
Director
Fisheries Division



Photo 1. King Mongkut's Institute of Technology Ladkrabang (KMITL) in Bangkok, Thailand and its logo



Photo 2. Aquaculture Department of the Southeast Asian Fisheries Development Center (SEAFDEC/AQD) in Iloilo, Philippines and its logo



Photo 3. Fisheries Research Institute (FRI) in Penang, Malaysia and its logo

Research and Development of a Technique for the Co-culture of Giant Tiger Prawn in Thailand

Shrimp and prawn aquaculture has become one of the most significant component of the fisheries industries throughout the world, with global Penaeidae production currently ranking second in terms of aquaculture production. There are three kinds of aquaculture systems: extensive, semi-intensive and intensive. The majority of shrimp and prawn aquaculture belong to the last one, and are conducted mainly in tropical and subtropical regions. Phytoplankton plays a key role in water purification in this type of system. However, phytoplankton flora is quite unstable, and species composition in intensive aquaculture ponds is easily altered due to environmental changes such as salinity, light intensity, water temperature, etc. Accordingly, it is extremely difficult for shrimp farmers to appropriately manage species composition and growth in culture ponds. Advanced techniques and experience are required amongst those who deal with shrimp culture. Based on interviews with small-scale shrimp farmers, plankton were said to vanish after periods of heavy rain, confirming the difficulty in retaining control of the plankton.

For this reason, our research team focuses instead on utilizing seaweed. We are currently researching the use of seaweed on giant tiger prawn (*Penaeus monodon*) culture. We have found one species belonging to genus *Chaetomorpha* (Fig. 1) to be extremely euryhaline (i.e., capable of surviving very wide salinity ranges, from fresh water to brine). We have also gradually clarified that giant tiger prawn growth and redness when heated are enhanced due to co-culture with both *Chaetomorpha* and *Stenothyra* sp. (Fig. 2), a small snail cohabitating with *Chaetomorpha* sp. Our co-culture system incorporates unexploited phyto-benthos and zoo-benthos as supplementary feed sources for giant tiger prawn. This system contrasts greatly with the ordinal concept of an Integrated Multi-trophic Aquaculture (IMTA) system whereby profitability is diversified by jointly cultivating marketable seaweeds, benthos and crustaceans. Detailed studies are necessary for it to find practical use, and we are willing to conduct further research and develop better techniques that will benefit small-scale

shrimp farmers by collaborating with researchers from Thailand and other Asian countries.

We have performed ecological observations and physiological experiments on over 130 species of seaweed in both field and laboratory before selecting a particular seaweed, *Chaetomorpha* sp., which is capable of living in giant tiger prawn culture ponds. We have also collected information on the natural history of these seaweeds, and have taken ecological images and micrographs. We compiled these findings and published it in the form of an ecological pictorial entitled, “*Common Underwater Plants in Coastal Areas of Thailand*” in March 2012 (JIRCAS International Agriculture Series No. 21). This pictorial, described in both English and Thai, is intended to be read by the general public. We truly hope that this picture book proves useful to those who have immense interest in coastal environments. For further information, please go to http://www.jircas.affrc.go.jp/project/aquacult_Thailand/index.html.

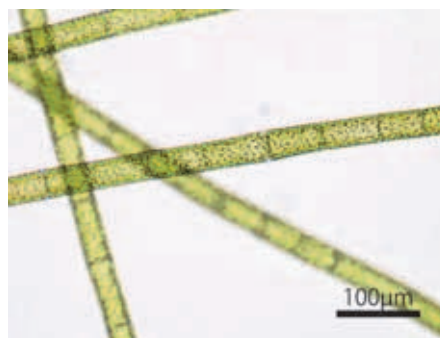


Fig. 1. Microscopic view of *Chaetomorpha* sp.



Fig. 2. *Stenothyra* sp. in natural habitat

Isao Tsutsui
Fisheries Division, JIRCAS

Development of an Integrated Multi-trophic Aquaculture (IMTA) Method for Small-scale Farmers in the Philippines

As aquaculture production continues to rise in Southeast Asian countries, environmental deterioration due to water and sediment eutrophication is getting increasingly problematic, occasionally resulting in mass fish kills. Integrated multi-trophic aquaculture (IMTA), i.e., the polyculture of organisms from different trophic levels, is one of the most promising solutions for sustainable aquaculture and has huge potential as a source of supplementary income to farmers.

The aim of this study is to establish IMTA techniques for small-scale fish farmers in the Philippines, with tropical sea cucumber, sandfish (*Holothuria scabra*) as the key species. This study mainly comprises three parts: 1) laboratory rearing experiments for determination of suitable culture methods of the target species and quantification of nutrient cycle within IMTA system at the Aquaculture Department of the Southeast Asian Fisheries Development Center (SEAFDEC/AQD) in the Philippines, 2) field confirmatory experiments of the laboratory works using floating fish cages at Igang Marine Station (IMS) of SEAFDEC/AQD, and 3) collection and organization of aquaculture and socio-economic information for designing of practically usable IMTA techniques.

Our quantitative laboratory studies have shown that sandfish can efficiently utilize aquaculture feeds and fish feces for growth. Since laboratory experiments showed that sand and oyster shells are comparably good substrates for sandfish culture, their efficacy in field culture is being tested using originally designed sandfish cages set underneath milkfish, (*Chanos chanos*) and snubnose pompano (*Trachinotus blochi*) cages. Tank polyculture trials using sandfish, milkfish, Asian seabass (*Lates calcarifer*), sea grape, (*Caulerpa lentillifera*) and Elkhorn sea moss (*Kappaphycus alvarezii*) have been conducted, but additional runs are necessary for more conclusive results. Although sandfish seems to effectively remove sediment organic matter and sulfide, it may cause temporary acute increase in dissolved inorganic nutrients by excretion of metabolized organic matter; therefore, usage of suitable seaweeds is important to remove inorganic nutrient from the water.

In order to estimate suitable stocking density of sandfish, milkfish and Elkhorn sea moss in the polyculture of these species, growth pattern and nitrogen budget (ammonium excretion and somatic growth) as well as food digestibility in sandfish were determined by laboratory experiments. Based on these, age-specific nitrogen requirement in sandfish was estimated (Fig. 1). Age-specific feed requirement (milkfish feed) in sandfish was estimated from nitrogen requirement and feed digestibility

in sandfish and nitrogen content of milkfish feed (Fig. 2). For example, one-year-old sandfish is estimated to require a minimum of about 40 mg of milkfish feed daily. It was also estimated how much Elkhorn sea moss could be sustainable by nitrogen provision from sandfish ammonium excretion based on literature value (Fig. 3). A one-year-old sandfish is supposed to excrete enough amount of nitrogen to sustain the growth of a 40 g Elkhorn sea moss. These approximations were established assuming there was 100% transfer of nutrients among these species in an ideal culture condition. Although these values are not exact, these are important baseline data when designing an IMTA system. More studies are being conducted to improve the accuracy of these estimations.

Confirmation of results from laboratory experiments in the field is important to verify the applicability of the information in actual aquaculture. Establishment of methods for field nutrient monitoring, such as tracer techniques (carbon and nitrogen stable isotope ratios and fatty acid composition), is being attempted. Field environmental monitoring has also been conducted at IMS of SEAFDEC/AQD. For water properties and qualities, 3D water current profiling, continuous chlorophyll *a* and dissolved oxygen measurements using automated loggers, periodical nitrogen and phosphorus nutrient level analyses are being conducted. Sediment nutrients and toxic sulfide levels are also periodically monitored. Information collected by these monitoring will be subjected to mathematical model analysis to determine nutrient flow within and around the IMTA system.

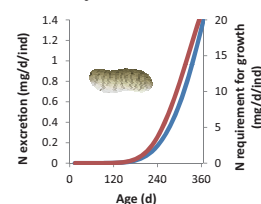


Fig. 1. Age specific nitrogen (N) excretion rate (blue) and N requirement for somatic growth (red) in sandfish from settlement to 1 year old

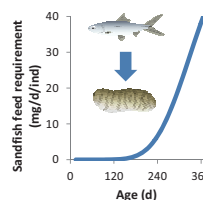


Fig. 2. Age specific feed requirement (milkfish feed) in sandfish from settlement to 1 year old

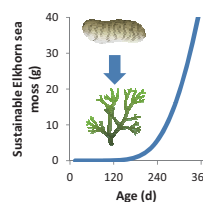


Fig. 3. Amount of Elkhorn sea moss sustainable by N provision from sandfish ammonium excretion.

Satoshi Watanabe
Fisheries Division, JIRCAS

Development of Blood Cockle Aquaculture Management Techniques in Malaysia

The blood cockle, *Anadara granosa*, is an important aquaculture species in Southeast Asia. It is often farmed by sowing culture technique in mud flats around mangrove estuary areas. In particular, spats of the blood cockle are abundant from late rainy to early dry seasons in the Selangor coast of Peninsular Malaysia (Fig. 1), where sowing aquaculture grounds hosting the spats are spread along its 100 km coastal stretch. Although blood cockle production has steadily increased, problems loom amidst environmental changes caused by coastal development, overcrowding of the farms, and occasional mass mortality, hence the need to develop sustainable and stable blood cockle aquaculture production techniques in Selangor coast.

Currently, we are conducting basic research on the research subject, entitled "Development of a sustainable management plan for blood cockle culture by the carrying capacity analysis," by assessing the carrying capacity of aquaculture grounds and by elucidating the ecological early life stage of the blood cockle. Experiments promoting international collaboration are carried out in model areas in Selangor coast, participated in by specialists in aquatic ecology, environmental science and fishery resource management from the Fisheries Research Institute (FRI) of Malaysia, the Fisheries Research Agency (FRA) of Japan, and university laboratories of both countries.

From our previous research, we were able to chronicle the spawning pattern of the blood cockle in Selangor coast. The blood cockle was found to have a long spawning season, same with typical tropical bivalves. The gonad is well developed and spawning is most active during rainy season. In addition, optical microscope observation of zooplankton samples collected from coastal waters revealed that the larvae (i.e., baby bivalves suspended in water), whose planktonic stage last for over two weeks, drift across a wide area and over a long period in Selangor coast, and

that the individuals have increased frequently around rainy season. Furthermore, it was confirmed that the wind blows from the coast to offshore and that freshwater inflow from rivers increase during rainy season. These results suggest that strengthening of estuarine circulation flow (i.e., flow from offshore to coast in bottom water) enhances the return rate of the planktonic larvae to the tidal flats.

Meanwhile, carrying capacity evaluation of blood cockle aquaculture grounds clarified the catch per unit area on each fishing ground. Data on cockle production for each ground in Selangor coast was summarized by the FRI.

We have set four high production sites as research areas, and we are investigating to compare the growth rate of the cockle, the nutrient level of coastal water, and the phytoplankton level in each site. This basic knowledge will be utilized for the development of fishery management plans and for the assessment of carrying capacity of aquaculture grounds.

Another output from our previous research, done in collaboration with the FRA, was the development of a specific primer set (i.e., a tool for species identification at DNA level) as a simple method to identify cockle planktonic larvae. Recently, damage to bivalve aquaculture farms in Southeast Asia has been expanding, and we are working on introducing a new method for paralytic shellfish poisoning monitoring in Malaysia, which has recently been expanding the scope of damages in bivalve aquaculture farms of Southeast Asia. We plan to develop these technologies, from research stage to development stage, and utilize these methods in order to improve blood cockle aquaculture in Malaysia.

Tatsuya Yurimoto
Fisheries Division, JIRCAS



Fig. 1. Blood cockle spats in Selangor coast. (A) collection by local fishermen, (B) spats, in large amounts, look like sand in sandbags and (C) stereomicroscope image.

SEAFDEC/AQD-JIRCAS Partnership

The SEAFDEC/AQD-JIRCAS partnership has had a long history. The Department has collaborated with JIRCAS on various projects in the past and looks forward to many more years of fruitful joint undertakings.

The current JIRCAS 5-year project “*Development of Aquaculture Technologies for Sustainable and Equitable Production of Aquatic Products in Tropical Coastal Areas*” started in 2011 in collaboration with the Aquaculture Department of the Southeast Asian Fisheries Development Center (SEAFDEC/AQD) in the Philippines, King Mongkut’s Institute of Technology Ladkrabang (KMITL) in Thailand, the Fisheries Research Institute (FRI) in Malaysia, Living Aquatic Resources Research Center (LARRec) in Lao PDR, and the Fisheries Research Agency (FRA) and universities in Japan.

The project component implemented in SEAFDEC/AQD is on the development of integrated multitrophic aquaculture (IMTA) method(s) that can easily be adopted by small-scale farmers. IMTA is a sustainable system of fish culture applying techniques for the polyculture of appropriate aquatic organisms from various trophic levels which aims to mitigate the environmental impacts of effluents from aquaculture operations while diversifying yields and increasing incomes.

The sandfish *Holothuria scabra* is the key species in the current IMTA project, hence the initial activities focused on determining suitable methods for its culture together with other target species of fish (e.g. milkfish, pompano and sea bass) and seaweeds (e.g. *Kappaphycus* and *Caulerpa*) which are commercially important aquaculture commodities in the Philippines as well as in other southeast Asian countries. Attempts were also made to quantify the nutrient cycles in laboratory-scale IMTA systems and verify the results in the field through monitoring of water and sediment quality parameters in actual production runs using the IMTA model.

To ensure that the project activities address the needs of the farmers and the technologies that are developed will be readily accepted and adopted by them, a survey of aquaculture practices in Panay Island was conducted to identify species that are widely farmed. Findings

from the survey were considered in deciding which species combinations will be tested. On the other hand, a downstream activity will focus on introducing the IMTA methods to small-scale farmers and facilitating adoption of IMTA through the sustainable livelihood approach (SLA).

As aquaculture production continues to increase, environmental deterioration due to water and sediment eutrophication, which occasionally results in well-publicized mass fish kills is also becoming a major concern. On the other hand, the growth of the aquaculture industry fueled by technological breakthroughs has also brought about unintended problems like the inequitable distribution of opportunities and benefits to the various stakeholders. SEAFDEC/AQD addresses these concerns in its programs on “maintaining environmental integrity through responsible aquaculture” and “meeting the social and economic challenges in aquaculture”. Notwithstanding its mandate to generate science-based aquaculture technologies, SEAFDEC/AQD also strives to develop and strengthen the capacities of the aquaculture sector through the transfer of viable technologies through its training programs and the production and dissemination of information materials. SEAFDEC/AQD can hasten the dissemination and enhance the adoption of technologies resulting from the IMTA project as well as the other components of the JIRCAS project implemented in the other partner institutions, not only in the Philippines but also in other Southeast Asian countries. The framework of the JIRCAS IMTA project is indeed a step in the right direction and brings SEAFDEC/AQD closer to the realization of its program goals.



Evelyn Grace D. J. Ayson

Head

Training and Information Division, SEAFDEC/AQD

JIRCAS Workshop on Tropical Coastal Aquaculture Project

JIRCAS, in cooperation with the Aquaculture Department of the Southeast Asian Fisheries Development Center (SEAFDEC/AQD) in the Philippines, held a workshop on October 9-10, 2013 at the Tigbauan Main Station and Igang Marine Station of SEAFDEC/AQD as part of the ongoing research project entitled “*Development of Aquaculture Technologies for Sustainable and Equitable Production of Aquatic Products in Tropical Coastal Areas.*” This JIRCAS 5-year project, which started in 2011, is an international collaboration between King Mongkut’s Institute of Technology Ladkrabang (KMITL) in Thailand, SEAFDEC/AQD in the Philippines, the Fisheries Research Institute (FRI) in Malaysia, and the Fisheries Research Agency (FRA) in Japan, to develop sustainable and environmentally friendly aquaculture technologies and to improve the livelihoods of small-scale farmers in Southeast Asian countries through application of these technologies. Since this year (2013) is the midway of the project, a workshop was conducted to review current research activities and exchange views on how to reach the project goal. A total of 33 participants from 7 organizations in 4 countries (KMITL; SEAFDEC/AQD and University of the Philippines; FRI and Department of Fisheries; JIRCAS and FRA) attended the workshop.

Thirteen speakers presented their research findings on three subjects, namely, (1) development of co-culture systems of giant tiger prawns in Thailand; (2) development of integrated multi-trophic aquaculture (IMTA) systems in the Philippines; and (3) establishment of a fishery management plan for blood cockles in Malaysia. In the co-culture research, it became clear that a green seaweed species not only absorbed the excess nutrients but also promoted growth and enhanced body color on giant tiger prawns. Similarly, in the IMTA research, it was evident that a sea cucumber species was able to efficiently utilize aquaculture feed and fish feces for its growth. In the blood cockle research, new methods for identifying their planktonic larvae and detecting fatal paralytic shellfish poisoning toxins were developed. Furthermore, various ideas for the dissemination of developed aquaculture

technologies and possible future international collaborations were proposed in General Discussion. Thus, the development of sustainable and environmentally friendly aquaculture technologies can be highly expected.



Photo 1. Opening address by Dr. Saito, Program Director of JIRCAS



Photo 2. JIRCAS workshop participants



Photo 3. Workshop bags distributed to participants

Inauguration of Mini Wet Laboratory at Igang Marine Station of SEAFDEC/AQD

JIRCAS workshop participants and SEAFDEC/AQD staff attended the inauguration of the mini wet laboratory at Igang Marine Station (IMS) of SEAFDEC/AQD on the second day of the workshop.

The laboratory, located next to the mariculture park, was built to help facilitate better experimental conditions for researchers who use IMS, including JIRCAS scientists who have also been conducting field confirmatory experiments on integrated multi-trophic aquaculture techniques. The small (5 m x 5 m) one-room structure is equipped with basic interior furnishings, including a sink, a freshwater faucet, electrical outlets, cabinets, an air conditioner and a lab bench for biological sampling as well as simple chemical analyses for environmental monitoring.

Although IMS is blessed with a natural environment for aquaculture research, the lack of a wet laboratory was a huge inconvenience, particularly for SEAFDEC/AQD researchers who had to process/prepare the samples at the IMS dining hall and corridor to avoid wind and rain. The laboratory is a result of successful collaboration between SEAFDEC/AQD and JIRCAS. SEAFDEC/AQD Research Division Head Dr. Ma. Junemie Lebata-Ramos and IMS Officer-in-charge Mr. Mateo Yap conveyed their gratitude for having collaborated with JIRCAS. In his inauguration message, JIRCAS Program Director Dr. Masayoshi Saito expressed hope that the mini wet laboratory would help accelerate the research performance of SEAFDEC/AQD and JIRCAS. The inauguration messages were followed by a ribbon cutting ceremony led by Dr. Saito, Dr. Lebata-Ramos, Mr. Yap and JIRCAS Fisheries Division Director Dr. Hiroyuki Sudo.



Photo 1. A ferry boat transporting the workshop participants to Igang Marine Station of SEAFDEC/AQD



Photo 2. Mini wet laboratory at Igang Marine Station



Photo 3. Ribbon cutting ceremony



JIRCAS TODAY

○ JIRCAS staff receives "Friendship Award" from the Chinese Government

Dr. Masayoshi Saito, Director of JIRCAS's Rural Livelihood Improvement Program, was among the 50 foreigners who received this year's prestigious "Friendship Award" from China's State Council. This award is the highest honor given to foreign experts working in China, including researchers and educators who have made valuable contributions in various fields.

JIRCAS has been promoting collaborative activities with China for many years. Research activities with China Agricultural University have resulted in the improvement of food processing technology and physiological functionality of traditional Chinese food, as well as in providing guidance to young researchers. Accordingly, Dr. Saito's award was made possible because of the recommendation he received from China Agricultural University.

On September 29-30, a series of ceremonies related to the awards was held at the Great Hall of the People in Beijing, with Premier Li Keqiang and Vice Premier Ma Kai of the State Council of the People's Republic of China (PRC) in attendance.

* Founded in 1991, the Chinese Government Friendship Award is bestowed on 50 foreign experts each year (doubled to 100 on special years like in 2004 and 2009, the 55th and 60th founding anniversaries, respectively). To date, 1,299 people from 67 countries and regions have been awarded, in recognition of their outstanding contributions in the field of education, research and publications, or for being instrumental for assisting China in achieving breakthroughs in development. The awardees are determined by the State Administration of Foreign Experts Affairs of the PRC from a pool of nominees recommended by various ministries and provincial governments.



Photo: Dr. Masayoshi Saito (left) accepts his medal and plaque from Vice Premier Ma Kai of the State Council of the People's Republic of China.



○ **Research Highlight (Press Release)**

Japan-sponsored afforestation and reforestation CDM project for the benefit of small-scale farmers in Paraguay generates carbon credits for the first time

The ongoing Japan-sponsored Clean Development Mechanism (CDM) project in Paraguay, titled “Reforestation of croplands and grasslands in low income communities of Paraguari Department, Paraguay” was issued carbon credits by the United Nations CDM Executive Board (EB) on August 24 this year. This marked the first time that a Japan-sponsored afforestation and reforestation CDM project was issued carbon credits, which correspond to the reduced or mitigated greenhouse gas (CO₂) emissions in the atmosphere due to the project.

This project began in 2007 and was formulated as a rural development measure. It is being conducted with the participation of the community. The project covers a total of 215 ha of degraded lands farmed by 167 farm households. Carbon credits amounting to 6,819t-CO₂ equivalent were issued by the UN CDM EB for carbon dioxide stored in 82 ha of good growth plantation maintained by 56 farm families. In South America, ongoing deforestation activities outweigh reforestation, but the direct benefits received by small scale farmers are comparatively less, thus this CDM project is expected to be used as a leading case when dealing with carbon credit projects participated in by small-scale farmers.

Japanese companies willing to purchase carbon credits are currently being sought. Companies may consider their participation as part of corporate social responsibility (CSR) strategy, and as their contribution toward achieving Japan’s greenhouse gas emissions reduction target.

Funds generated from the purchase of carbon credits by companies will be used by the University of Asuncion in Paraguay, a collaborative research institute, to cover the

costs of buying educational equipment for elementary and junior high schools in 16 villages.

* The Clean Development Mechanism (CDM) is one mechanism defined under the Kyoto Protocol which allowed industrialized countries to provide technology and funding to developing countries in order to meet their emission reduction or limitation targets, through projects which generate Certified Emission Reduction units, which may be traded and sold under the Kyoto Protocol’s emissions trading scheme.

* Carbon Credit (CER; Certified Emission Reduction) refers to any certificate or permit traded among developed countries or companies, with each credit unit equivalent to one tonne of CO₂. To prevent global warming, developed countries (on the basis of the Kyoto Protocol) have set greenhouse gas emissions allowances for each country and company, and allowed those which have not spent their full allowances to trade the remainder with other countries and companies which have exceeded theirs.

JIRCAS Newsletter

Japan International Research Center for Agricultural Sciences (JIRCAS)



December 2013-No.69

Information and Public Relations Office

1-1 Ohwashi, Tsukuba, Ibaraki 305-8686, JAPAN

Phone: +81-29-838-6708 Fax: +81-29-838-6337 <http://www.jircas.affrc.go.jp/>