

Major Symposia and Seminars

1. MARCO Symposium 2009

「Challenges for Agro-Environmental Research in Monsoon Asia」

Regions of the world where seasonal winds (monsoons) dictate changes in weather throughout the year, such as in Japan, are called monsoon regions, and the monsoon regions in East, Southeast and South Asia are collectively called Monsoon Asia. People in the Monsoon Asia have traditionally engaged mainly in rice paddy farming, nurtured unique agricultural ecosystems, and carried out agricultural production in a sustainable way. These regions are experiencing dramatically increasing demand for agricultural production due to an increased demand for food as a consequence of increasing population and economic growth in recent years as well as a shift toward the production of new bio-fuels. At the same time, these regions face increasingly serious problems relating to agriculture and environment due to the increased load on the environment by the intensification of farming and degradation of natural resources, as well as advancing global warming.

In order to cope with the increased demand on agriculture while maintaining harmony with the environment under these circumstances, the close cooperation of researchers, engineers and government officials involved in agriculture and environment in these regions is essential. As one such collaborative effort, we held the MARCO Symposium 2009 at the Tsukuba International Congress Center (Epochal Tsukuba) over three days from October 5 to 7, 2009. A total of 445 participants from Japan and 26 other countries, including other countries of Monsoon Asia as well as the United States and Europe, attended the symposium and gave presentations on the status of or trends in agriculture and environment as well as leading edge research projects. The participants also discussed the directions for future research projects and collaborative efforts to take.

The plenary session on the first day generally focused on agricultural and environmental issues in Monsoon Asia, with Dr. Kazutake Kyuma, Professor Emeritus of Kyoto University delivering the keynote lecture entitled “Nature and Agriculture in Monsoon Asia”. Later, researchers representing their respective fields presented reports on the themes of “heavy metal pollution in agricultural lands”, “genetic resources of food plants”, “climate change and rice production” and “introduction of alien plants through grain and plant

trade and their impact on biodiversity”.

At the workshops held on the second and third days of the symposium, lectures and discussions took place at individual sessions on five themes as follows:

- Workshop 1. Development of phyto-technology for decreasing heavy metals in food,
- Workshop 2. Crop production under heat stress: monitoring impact assessment and adaptation,
- Workshop 3. Survey of plant natural resources and isolation of allelochemicals in Monsoon Asia,
- Workshop 4. Biodiversity and agro-ecosystems in rice paddy landscape in Monsoon Asia, and
- Workshop 5. Perspective of metagenomics in agricultural research.

At Workshop 1 on the development of plant function-based technologies to reduce heavy metals in crops, about 100 researchers from Japan and overseas discussed the development of effective technologies based on plant functions for the reduction of cadmium in rice, the current state of water and soil pollution by arsenic in Asian countries, and technologies to deal with arsenic pollution.

At Workshop 2 which was attended by 7 researchers from Japan and 16 from overseas, reports on the occurrence of and predictions for high-temperature injury to crops due to global warming as well as their adaptation were presented. Participants discussed the actual occurrence of heat stress in crops, construction of a monitoring network, promotion of an international network for the development of crop models to assess the impact of global warming and the effectiveness of adaptation technologies.

At Workshop 3, researchers from the plant resource-rich countries of Monsoon Asia gave presentations on plant species with high allelopathic activity which were unique to their respective countries. The Japanese researchers reported on the latest outcomes of their research projects, including the study of strigolactones and lepidimoide which have plant growth promoting activities, isolation and confirmation of allelochemicals based on the concept of total activity, and discovery of an important low-molecular cyanamide.

The participants of Workshop 4 discussed the agricultural ecosystems and biodiversity in Monsoon Asia dominated by paddy farming, and formed a common recognition that the mosaic land use of paddy fields, irrigation ponds, irrigation channels, and forests were functioning as an important habitat for organisms.

Workshop 5 was a large session attended by 180 participants who engaged in lively discussion on the expansion of metagenomic analysis technologies into

Highlights in 2009

the agro-environmental field.

At the plenary session held in the afternoon of the third day of the symposium, reports were presented from the above five workshops as well as from the “International Conference on the Environmental Impacts of Carbon and Nitrogen Cycles in Terrestrial Ecosystems in East Asia”, which was held about the same time as the symposium as one of the MARCO projects, and from the “International Seminar on Residues of Agro-Chemicals and POPs in Soil and the Food Safety”. Based on these reports, the participants discussed the future of collaboration and cooperation for

solving the issues found in agriculture in Monsoon Asia. The MARCO Symposium 2009 concluded with the issuing of the official statement: “In order to cope with the increased demand on agriculture while maintaining harmony with the environment under these circumstances, it is increasingly important for researchers, engineers and government officials involved in agriculture and the environment in these regions to maintain close cooperation. To this end, we will further international cooperation in joint research efforts in the MARCO framework.”



2. Research Presentation: “The Impact and Mitigation of Global Warming on Agriculture, Forestry and Fisheries—Present and Future of the Environment and Food Production”

On Thursday, 5 November 2009 we held the oral and poster research presentation “The Impact of Global Warming on Agriculture, Forestry and Fisheries—Present and Future of the Environment and Food Production” at Tokyo Forum. The purpose of the presentation was to inform farmers, governmental officials, consumers, and students in plain language the results of our research project on “Assessment and Development of Mitigation and Adaptation Techniques for Global Warming in the Sectors of Agriculture, Forestry, and Fisheries.” The presentation was hosted jointly with the Agriculture, Forestry and Fisheries Research Council (AFFRC), the National Agriculture and Food Research Organization (NARO), the Forestry and Forest Products Research Institute (FFPRI), and the Fisheries Research Agency (FRA). The presentation attracted 341 participants.

NIAES President Yohei Sato and AFFRC Director Akihiro Sasaki opened the presentation with their welcoming remarks. Ichiro Taniyama (NIAES) then gave a keynote speech entitled “The Impact of Global Warming on Agriculture, Forestry and Fisheries.” Kunihisa Morinaga (NARO) reported on “Present Conditions and Prediction of Global Warming Effects on the Agricultural Sector and Adaptation Technologies.” Kazuyuki Yagi (NIAES) presented “Techniques for Reducing Greenhouse Gas Emissions in Agriculture.” Moriyoshi Ishizuka (FFPRI) presented “Prediction of Global Warming Effects and Mitigation Technologies in Forestry.” Finally, Asao Watanabe (FRA) made a speech entitled “Prediction of Global Warming and Adaptation Technologies in Fisheries.”

After the oral presentations, poster presentations of 69 subjects were held in another room. Poster presentations by NIAES members included:

- Effect of Climate Change on Rice Growth and Yield—Paddy Rice Responses in the Free-Air CO₂ Enrichment (FACE) Experiment (Toshihiro Hasegawa)
- The Relationship between Recent Climate Change and Rice Growth, Yield, and Quality (Toshihiro Hasegawa)
- Measurement of CO₂ Flux in Rice Fields (Akira Miyata)
- Farmland as a CO₂ Sink (Toshiaki Ohkura)
- Simulation of Soil Carbon Content Change in Farmland with the Roth-C Model (Yasuhito Shirato).

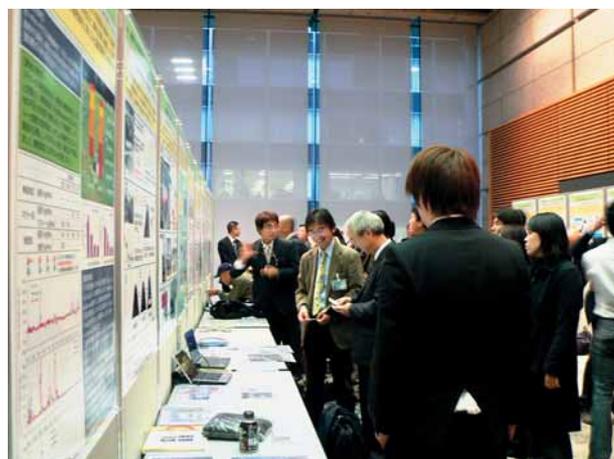
We collected the following responses to a questionnaire on this presentation:

- I hope to hear presentations about food production in the future.
- Thanks to the plain-language presentations, I could easily understand the effects of global warming on the environment and food production. It has been a good opportunity for me to think about how global warming is changing agriculture.
- Thank you very much for the chance to talk with many researchers in the poster session.
- I think collaborative research with many fields is needed to solve the trade-offs between various factors.

With this presentation we achieved our objectives of clearly conveying the results of our research project. If we have the chance, we plan to hold these presentations in other cities.



Oral Presentation



Poster Presentation

3. Open Seminar on Agro-Environmental Technologies in Shiga: Discussion on Global Warming and Aquatic Environments

The Open Seminar on Agro-Environmental Technologies in Shiga, jointly hosted by the National Institute of Agro-Environment Science and the Shiga Prefectural Government, was held on November 17, 2009 at Piazza Omi overlooking Lake Biwa in the city of Otsu, Shiga Prefecture. The purpose of this open seminar was to create and expand mutual understandings and cooperation, exchange, and collaborative relationships between prefectural and local governments and NIAES. This is the second seminar following the first one held in Fukushima last year.

Measures against global warming and reduction of environmental loads on aquatic environments were the themes for discussion at the lecture session held in the large conference hall on the third floor. We presented topics such as “Impact of global warming on crop production”, “Water management to reduce methane emissions from rice paddies”, and “Paddy farming that reduces flow of nitrogen into aquatic environments”. The researchers representing the Shiga Prefectural Government presented the results of their research regarding “Carbon storage in farmland soils in Shiga Prefecture” and “Effective reduction of outflows during the rice planting season by environmentally conscious farming practices”. Although we had only a limited time for discussion, there were lively question-and-answer exchanges on topics such as the effectiveness of midseason drainage, risk trade-offs, and comprehensive assessment of environmental impact.

The lobby adjacent to the third-floor conference hall became the exhibition venue for posters illustrating the latest outcomes of research projects by NIAES as well as the Agricultural Technology Promotion Center, the Lake Biwa Environmental Research Institute, and the Livestock Technology Promotion Center of the Shiga Prefectural government.

We received numerous favorable comments from the

members of the general public who attended the seminar, describing it as refreshing because of presentations were given in a different perspective from the media and other seminars. We are planning to organize another seminar as this type in future.

4. Symposium: Development of Functional Biodiversity Indicators

Under the research project “Selection of Functional Biodiversity Indicators and Development of the Assessment Methods” of the Ministry of Agriculture, Forestry and Fisheries, we are developing a set of biodiversity indicator organisms which can quantitatively evaluate the effectiveness of biodiversity-conscious policies, such as environment-friendly agriculture and IPM (integrated pest management), and which are easy to be identified and will be used by farmers. In order to increase the awareness and understanding of these indicator organisms and evaluation techniques, we held the symposium of the above title on November 18, 2009 at Belle Salle Kudan (Chiyoda-ku, Tokyo). A keynote lecture on agro-environmental policies in the EU (European Union) and a summary introduction of the research project and examples of development efforts was conducted in the first half of the symposium. The poster presentation in the second half exhibited specimens of the candidate indicators and traps being developed, providing the participants with a forum for a lively exchange of opinions and ideas.

The symposium was attended by a total of 206 participants, including project researchers, government officials, academics, journalists, private groups, and members of the general public.

