

AGRO-ENVIRONMENTAL RESEARCH IN DEVELOPING COUNTRIES

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ABSTRACT

It is widely recognized that the environment issues are one of the most challenging ones for sustainable development of both developing and developed countries in this century. In many scenes of the world, the impacts of expanded human activities on the environment are now nearly or have exceeded the natural capacity of ecosystems at the limit that allows us to a sustainable use of the resources. The issues are strikingly apparent in the scenes of agriculture, where an excessive environmental impact often limits the production of crops and animals.

As well as the other environmental issues, agro-environmental problems take place at the scale of either local or global. There are many serious local problems in agro-ecosystems of developing countries, including eutrophication of water, air pollution by photochemical species, contamination of toxic substances in soils, and others. Various agro-environmental research projects have been directed to solve these problems by international collaboration with Japanese research institutes. For example, I have joined a JIRCAS project on nitrogen cycle in Chinese agricultural systems during 1997 to 2003. The results of the project determined significant impacts of fertilizer nitrogen on water and air quality through large outputs of nutrient and gases from the crop lands. Recent excess use of fertilizer nitrogen in China has been recognized by many researchers (Zheng et al., 2002), and its environmental risks and some approaches to reduce the impacts have also been discussed (Freney et al., 2007). However, despite of these accumulation of research results, it seems that introducing improved nutrient management to the crop lands is not easy at local level. This is probably and partly due to less linkage between researchers and policy makers. In addition, it involves an inevitable criteria, even in the developed countries, that development always takes priority over the environment in a relatively short span of time.

However, under the recent environmental crises that we are facing, it is definitely needed to give higher priority to the environmental issues. For that purpose, I would like to suggest the needs of effective linkages among different persons or parties concerned with the identical problem. First linkage is that among scientists or experts from different specialties. It is generally requested that environmental scientists should cooperate with agronomists in order to make two-way view from environment and production. In addition, participation by socioeconomists is expected for cost and feasibility analysis. Second linkage is that between researchers and policy makers. It is not realistic, in many cases, to make practicable or extend an environmentally mitigation option to local farmers without political control by regulation or subsidies. Therefore, it is recommended that policy makers participate in the project from the planning to the follow-up stages.

The third linkage could be the international one coupled with an international framework to control environmental quality. "Agenda 21" (1992) and Johannesburg Declaration on Sustainable Development (2002) can be the base for the actions. The Stockholm Convention for controlling persistent organic pollutants (POPs) in the environment has entered into force in 2004 with more than 150 signatory countries. National Action Programmes to tackle desertification have submitted from nearly 100 countries under the United Nations Convention to Combat Desertification (UNCCD). The International Nitrogen Initiative (INI) presented the Nanjing Declaration on Nitrogen Management to the United Nations Environment Programme in 2004.

Such international frameworks are more effective for challenging global environmental issues. A good example is those for coping with global environmental changes. Over a decade ago, most countries joined the United Nations Framework Convention on Climate Change (UNFCCC) to begin to consider what can be done to reduce global warming. Recently, a number of nations have approved an addition to

the treaty: the Kyoto Protocol, which has more powerful, and legally binding, measures. Although none of the developing countries have obligations to reduce greenhouse gas emissions under the current Kyoto Protocol, they are requested to submit national emission reports to the UNFCCC. This gives the experts in each country the needs to study greenhouse gas emissions from the sources including agricultural lands and animal industries. In addition, the Clean Development Mechanism (CDM) established by the Kyoto Protocol allows developed countries to earn emissions credits from their investments in emission-reducing projects in developing countries. Therefore, CDM can be used as a new tool for conducting environmental projects in developing countries. Beside such frameworks under the international treaties, international scientific programmes, such as the International Geosphere-Biosphere Programme (IGBP) and the International Human Dimensions Programme (IHDP), have been organized to promote and coordinate research projects on global environmental changes. These programmes have engaged a growing number of developing country scientists in its research, capacity building and scientific committees activities. Actually, in the sector of agriculture, CGAIR has organized joint meetings and research projects in cooperation with IGBP and IHDP.

In order to promoting the linkages above mentioned, it is essential to encourage a researcher or expert to work as a coordinator of the cooperation. Environmental research programmes always stand in need of participation and contribution from different fields. In addition, I would like to point out follow-up support for young researchers. When I participated in international meetings, such as the preparation meetings of IPCC Guidelines and various IGBP meetings, I have always unfortunated to find less participants from developing countries, in particular from Asia. Therefore, in addition to train and promote young researchers in developing countries within a research project, it is necessary to follow those experts up with continuous support for further contributions to international communities.

KEYWORDS

Clean Development Mechanism (CDM), cooperation, linkage, international frameworks, sustainable development

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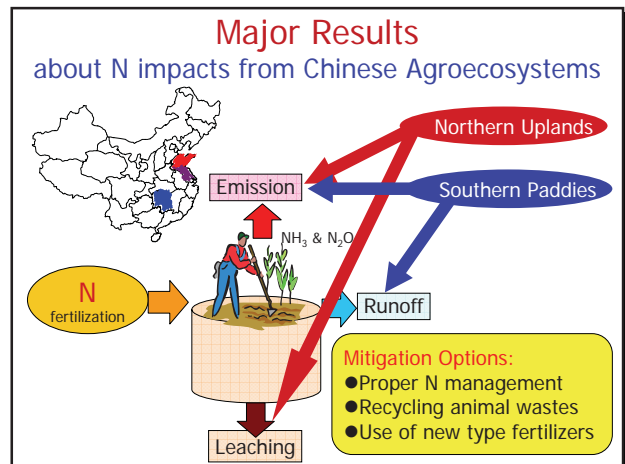
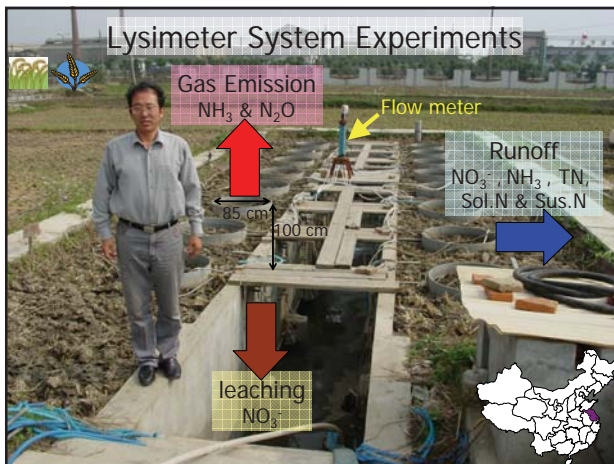
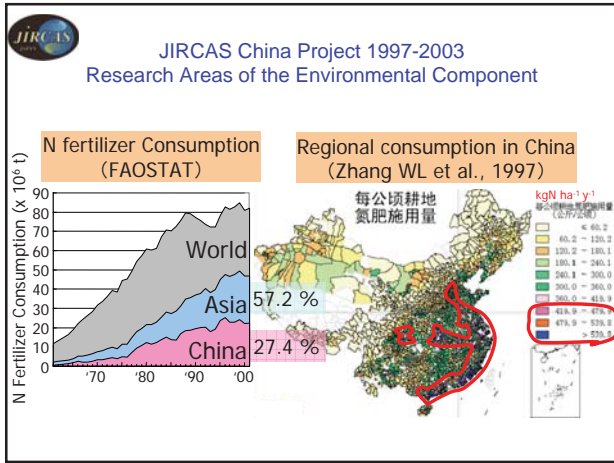
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NIAES

JIRCAS China Project 1997-2003
Research Areas of the Environmental Component

Target: Environmental Impact Assessment of Nitrogen Fertilization in Chinese Agroecosystems



The Study in China

- Research results have accumulated.
- However, it was not easy to introduce or extend the results for improving nutrient management in the crop lands at local level.

Probably due to:

- Less linkage between researchers and policy makers
- Low priority over the environment in a relatively short span of time

Linkages for Promoting Environmental Researches

- Among scientists or experts from different specialties
 - environmental scientists
 - agronomists
 - socioeconomists
- Between researchers and policy makers
 - and also with stakeholders
- To couple with international frameworks

International Framework for Controlling Environmental Quality

Based on:

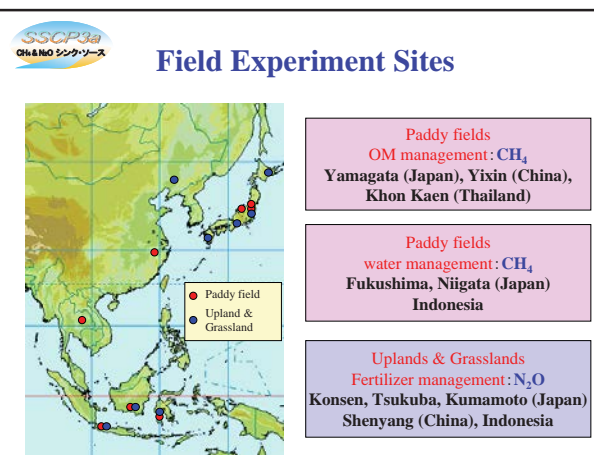
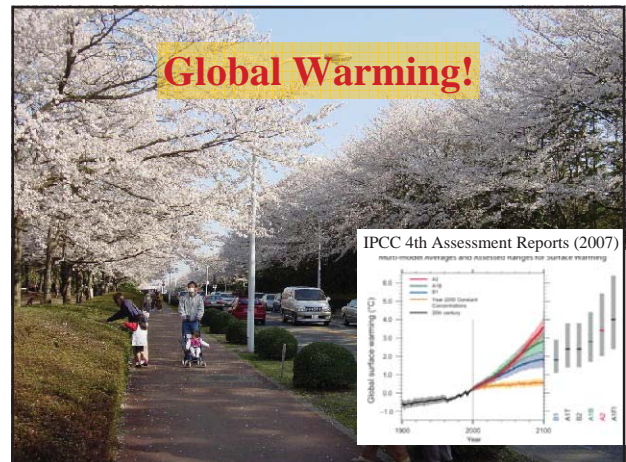
- “Agenda 21” (1992)
- Johannesburg Declaration on Sustainable Development (2002)

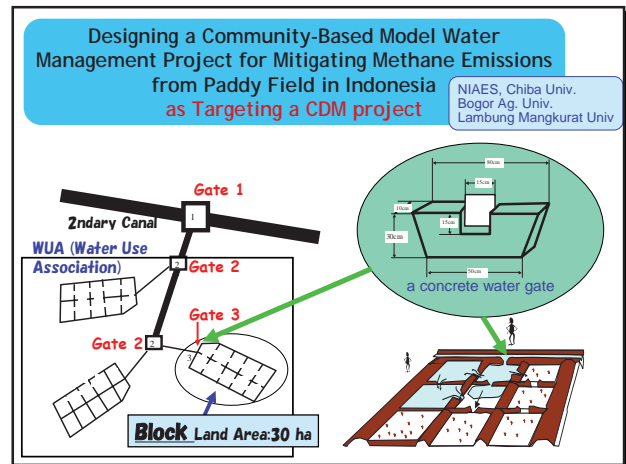
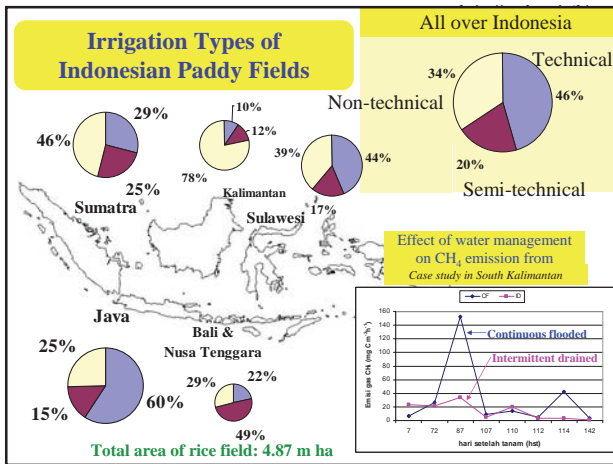
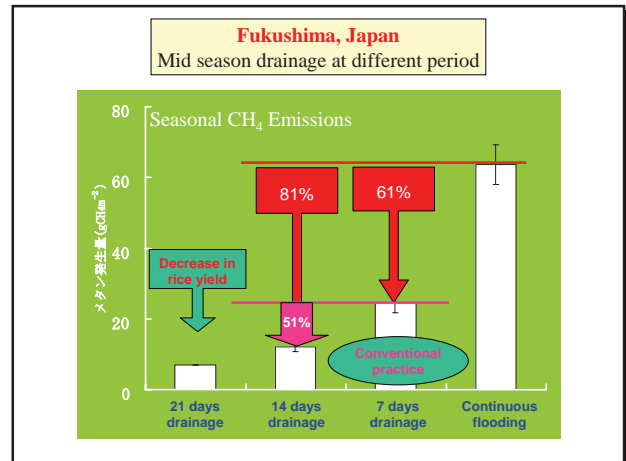
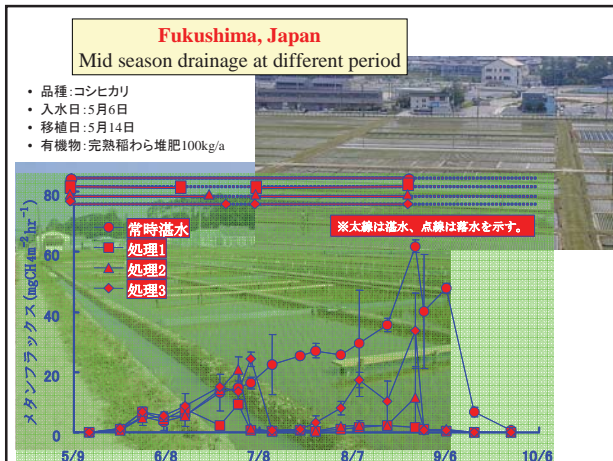
For example:

- Stockholm Convention for POPs
- UN Convention to Combat Desertification (UNCCD)
- International Nitrogen Initiative (INI)
- UN Framework Convention on Climate Change (UNFCCC) & the Kyoto Protocol

And international scientific programmes:

- International Geosphere-Biosphere Programme (IGBP)
- International Human Dimensions Programme (IHDP),
- CGAIR





The Clean Development Mechanism (CDM)

- Has adopted in the Kyoto Protocol as one of the Kyoto mechanisms for mitigating GHG emissions
- Which lets Annex 1 countries earn emissions-reduction credits toward Kyoto targets through investment in green projects in non- Annex 1 countries
- Can be used as a new TOOL for development aids

Follow-up Support for Young Researchers for further contributions to international communities

“Monsoon Asia Agro-Environmental Research Consortium” (MARCO)



This international symposium and its workshops aim to create the “Monsoon Asian Agro-Environmental Research Consortium (MARCO)” by consolidating and integrating the research fields.

