ENVIRONMENT and CLIMATE CHANGE

ISEAS Seminar Series

Preparing Rice for the Global Water Crisis



About the seminar

Worldwide, there are about 157 million hectare (ha) of rice land, producing some 600 million tons of rough rice that feeds half the world's population. About 79 million hectare are irrigated, making up 23% of the world's 350 million ha irrigated agricultural land (harvested areas). A rice field takes 2-3 times more water than a field of wheat or maize. It takes on average 2,500 litres of water in a farmer's field to produce 1 kg of rice. To visualize this: it takes an Olympic-sized swimming pool to produce just one ton of rice! Combining this high water use with the large area under rice, irrigated rice receives a staggering 24-30% of the total world's 3800 km3 developed fresh-water resources (for irrigation, drinking, industry, etc).

In Singapore, some 2750,000 t of rice are annually consumed, which requires some 688 billion liters of water. This is about two and a half times the amount of domestic water use in Singapore (of around 291 billion litres of water; 5 million people consuming 160 litres daily) and one and a half times the total (domestic and industry) water use of Singapore in a year (511 billion litres).

Worldwide, water for agriculture is becoming increasingly scarce. The causes include decreasing resources (e.g., falling groundwater tables, silting of reservoirs), decreasing quality (e.g., chemical pollution, salinization), malfunctioning of irrigation systems, and increased competition from other sectors such as urban and industrial users. On top of this, global climate change will greatly reduce water availability in large parts of the world (whereas causing increased flooding in other parts). It is estimated that, by 2025, 15-20 million ha of irrigated rice will suffer some degree of water scarcity. With demand for rice still increasing, the challenge therefore is to "produce more rice with less water". For a city like Singapore, the question is whether the 688 million litres of water will remain available to produce the amount of rice it consumes!

A suite of water-saving technologies exists and is under further development to reduce water losses from rice fields while keeping yields high. A technology called "Alternate Wetting and Drying", for example, can reduce water use in a rice field by 10-30% without affecting yield. Simple tools have been developed for farmers to guide them in the correct use of this technology. The main challenge is to deliver this technology in the hands of farmers. Promising results are obtained with public-public and private-public sector partnerships in Bangladesh, China, Vietnam, and the Philippines, where thousands of farmers are adopting this new technology. Another technology, called "Aerobic rice" entails growing rice without any flooded water altogether and can reduce water use by more than 50%. At the moment, aerobic yields are 20-30% lower than flooded rice yields and more research is needed to breed better varieties and develop improved cultivation practices.

However, in a world where water is becoming increasingly precious, "maximizing water productivity" may be a better strategy than "maximizing yield" per se. Public and private sectors need to be mobilized to implement the existing water-saving technologies through policies, partnerships, and extension and education efforts. At the same time, investments in research to develop new water-saving technologies need to be increased so that the future of rice production is safeguarded.

ISEAS
Institute of Southeast Asian Studies

Wednesday, 10 March 2010
2.30 pm - 4.00 pm
ISEAS Seminar Room II

Speaker:
Dr Bas Bouman
Head, Crop and Environmental Sciences Division (CESD),
Leader Program Intensive Rice Production Systems ,
International Rice Research Institute

Dr Bas Bouman is Head of the Crop and Environmental Sciences Division (CESD), Leader Program Intensive Rice Production Systems at the International Rice Research Institute.

Bas Bouman's research has focused on improving water productivity and saving water in rice production at spatial scale levels from field to irrigation systems. His research activities have also included developing novel water-saving irrigation technologies such as alternate wetting and drying and aerobic rice; designing and executing field experiments and data collection programs; organizing participatory research among research partners in Asia; organizing and convening international workshops and meetings; developing and organizing training courses on water management and crop growth modelling; project leader of various externally-funded projects on water management in rice; project proposal development; and leading a group of national staff; giving scientific guidance to international PhD students.

Bas Bouman graduated with a Bachelors (1984) and Masters (1987) degree in 'Civil Engineering/Irrigation and Drainage' at Wageningen Agricultural University in the Netherlands. His Ph D degree (1991) focused on remote sensing and crop modelling for yield prediction, also from the Wageningen Agricultural University.

From 1987 to 1996, Bas Bouman worked at the Research Institute for Agrobiology and Soil Fertility (AB-DLO, former CABO) in Wageningen in the field of agro-ecology, specializing in remote sensing, crop and water balance modelling and systems analysis. He then worked at the Wageningen Agricultural University and the Centre for Research and Education in Tropical Agriculture (CATIE) in Costa Rica on land use analysis and livestock system optimization from 1996 to 1998. Since 1999, Bas Bouman worked as senior water scientist at the International Rice Research Institute. In 2004-2006, he was employed as the Theme Leader Crop productivity of the CGIAR Challenge Program Water and Food. From 2007, he became head of the International Rice Research Institute's (IRRI) Crop and Environmental Sciences Division (CESD), and since 2008, Leader of IRRI's Intensive Rice Production Systems program.

Bas Bouman has published extensively in leading agricultural journals and is an editorial board member of a number of journals in crop and agricultural sciences.