Analysis of research stocktaking in the Paddy Rice Research Group of the Global Research Alliance on Agricultural Greenhouse Gases

organic carbon content of paddy fields increased by 2.5% from 1980 to 2007, which translates to a carbon sequestration of 74 Tg for the paddy fields nationwide. The sequestrated carbon equals 5.3% of the CH_4 emitted during the same time period in terms of global warming potential (GWP).

In summary, Chinese paddy fields emit CH_4 and N_2O at 190 and 9.8 Tg CO_2-eq $year^{-1}$, respectively, and sequestrate carbon at 10 Tg CO_2-eq $year^{-1}$. Thus the GWP of paddy fields is absolutely dominated by CH_4 emission.

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The Global Research Alliance on Agricultural Greenhouse Gases, which was launched in December 2009, brings countries together to find ways to grow more food without increasing GHG emissions (Global Research Alliance; Shafer et al., 2011). As an initial activity in the Alliance, research stocktaking was conducted within participating countries to identify current research activities, opportunities, gaps and areas of overlap. The results for the Paddy Rice Research Group are presented.

A detailed spreadsheet that captures information on each country's research projects and programmes in agricultural greenhouse gas emissions was prepared and distributed to each contact point of the Alliance member countries. The questions on the spreadsheet include research target, topic, outcome, structure, etc. as well as key equipment, facilities, and databases. As at 1 March 2011, 68 projects from 16 countries (China, Denmark, Ghana, Indonesia, Japan, Korea, Malaysia, Netherlands, Pakistan, Peru, Philippines, Russian Federation, Spain, Thailand, Uruguay and US) had been listed in the stocktake of the Paddy Rice Research Group.

Most of the research is being undertaken into irrigated rice production systems, with little on rain-fed production systems. The lack of data for rain-fed systems may cause difficulties when one tries to develop country specific emission factors. Projects focusing on methane accounted just over 50%, and the percentages for nitrous oxide and soil carbon sinks/sources were 30% and 20%, respectively. This result suggests that possible trade-off between different GHGs and the importance of evaluating the net global warming potential are well understood in many research projects.

There were two areas of research that predominated: GHG accounting/life cycle assessment and agronomy. While much smaller, the third focus for research was farming systems. In terms of research outcomes, the key primary outcomes were included: testing of mitigation, low greenhouse gas emitting varieties, improved national inventory and investigation of mitigation options. Most of the current research can be described as "applied" or "tactical" and is primarily funded from governments. The results indicate the general need for research progress on developing mitigation options and improving national inventories for GHG emissions from paddy fields in many countries.

The Paddy Rice Research Group of the Alliance will continue to compile databases on research projects, experts and literature related to GHG emissions from paddy fields in each member country. Those processes will be conducted through the contact point of each country. The Group also plans to develop and publish a manual of standardised measurement techniques for GHG emissions from paddy fields through identification of "good practice" and gaps in current methodology. As a plan for longer term action, it is discussing to develop a simple project protocol for evaluating promising mitigation options, such as water management practices, that would be undertaken in a number of rice producing countries.