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Mapping suitability of rice production systems for mitigation: Strategic approach for prioritizing improved irrigation management across scales

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After the successful conclusion of the COP21 in Paris, many developing countries are now embracing the task of reducing emissions with much vigor than previously. In many countries of South and South-East Asia, the agriculture sector constitutes a vast share of the national GHG budget which can mainly be attributed to methane emissions from flooded rice production. Thus, rice growing countries are now looking for tangible and easily accessible information as to how to reduce emissions from rice production in an efficient manner. Given present and future food demand, mitigation options will have to comply with aim of increasing productivity. At the same time, limited financial resources demand for strategic planning of potential mitigation projects based on cost-benefit ratios.

At this point, the most promising approach for mitigating methane emissions from rice is an irrigation technique called Alternate Wetting and Drying (AWD). AWD was initially developed for saving water and subsequently, represents an adaptation strategy in its own right by coping with less rainfall. Moreover, AWD also reduces methane emissions in a range from 30-70%. However, AWD is not universally suitable. It is attractive to farmers who have to pump water and may save fuel under AWD, but renders limited incentives in situations where there is no real pressing water scarcity. Thus, planning for AWD adoption at larger scale, e.g. for country-wide programs, should be based on a systematic prioritization of target environments.

This presentation encompasses a new methodology for mapping suitability of water-saving in rice production – as a means for planning adaptation and mitigation programs – alongside with preliminary results. The latter comprises three new GIS maps on climate-driven suitability of AWD in major rice growing countries (Philippines, Vietnam, Bangladesh). These maps have been derived from high-resolution data of the areal and temporal extent of rice production that are now available for most Asian countries. These GIS maps have been expanded by adding relevant data on climate and soil texture to assess the water balance at any given point (in space and time). In the next step, these water balances (available in 10d intervals) have been integrated over the entire season to determine the climate-driven suitability for AWD implementation. These new GIS maps are vital for policy makers and other stakeholders who are now faced with the challenge of developing mitigation programs. The GIS data bases could further be expanded by more GIS layers on irrigation specific information (e.g. use of pumps) as well as on other mitigation approaches such as improved post-harvest technologies for preventing straw burning.