



Set Up of an Automatic Water Quality Sampling System in Irrigation Agriculture

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Climate change has already a large impact on the availability of water resources. Many regions in South-East Asia are assumed to receive less water in the future, dramatically impacting the production of the most important staple food: rice (*Oryza sativa* L.).

Rice is the primary food source for nearly half of the World's population, and is the only cereal that can grow under wetland conditions. Especially anaerobic (flooded) rice fields require high amounts of water but also have higher yields than aerobic produced rice. In the past different methods were developed to reduce the water use in rice paddies, like alternative wetting and drying or the use of mixed cropping systems with aerobic (non-flooded) rice and alternative crops such as maize. A more detailed understanding of water and nutrient cycling in rice-based cropping systems is needed to reduce water use, and requires the investigation of hydrological and biochemical processes as well as transport dynamics at the field scale.

New developments in analytical devices permit monitoring parameters at high temporal resolutions and at acceptable costs without much necessary maintenance or analysis over longer periods.

Here we present a new type of automatic sampling set-up that facilitates in situ analysis of hydrometric information, stable water isotopes and nitrate concentrations in spatially differentiated agricultural fields. The system facilitates concurrent monitoring of a large number of water and nutrient fluxes (ground, surface, irrigation and rain water) in irrigated agriculture. For this purpose we couple an automatic sampling system with a Wavelength-Scanned Cavity Ring Down Spectrometry System (WS-CRDS) for stable water isotope analysis ($\delta^2\text{H}$ and $\delta^{18}\text{O}$), a reagentless hyperspectral UV photometer for monitoring nitrate content and various water level sensors for hydrometric information. The whole system is maintained with special developed software for remote control of the system via internet. We will show the system's set up, results of first test runs and the general applicability of the different system's components.