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“Development on the margin”

Nutrient Manager for Rice (NMRice): The Development of an ICT-based Tool for Site-specific Nutrient Management of Lowland Rice in West Africa

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Abstract

Available blanket fertiliser recommendations for major rice growing domains across Africa are often not affordable for rice growers contributing to the low fertiliser use in Africa of only 8 kg per hectare. Hence, the need to develop a site-specific nutrient management (SSNM) tool for small-scale rice farmers that takes into account the wide range of crop management practices, soil heterogeneity, and varying access to fertilisers and the needed capital to purchase them. Based on the scientific principles of 15 years of SSNM research across Asia and Africa, we are in the process of developing a tool that allows rice farmers the precision management of their fields. The aim is to increase farmers' profits by 100 US\$ per hectare and season. The NMRice tool is currently developed for irrigated and favourable rainfed lowland rice systems in the Senegal River Delta and Valley, the Office du Niger and the Sikasso Region in Mali, and rice growing areas in the North of Ghana and Nigeria. The development process comprises the following steps: (1) Collection of omission plot data and the determination of fertiliser responses to calibrate the underlying model for given rice domains; (2) Development of domain-specific questionnaires to acquire the necessary information to compute the field-specific nutrient needs based on 15 to 20 simple questions about the field; (3) Programming of country- or domain-specific software versions of NMRice and the small-scale evaluation of the NMRice recommendation compared to the farmer's practice; (4) Development of ICT applications for the calculation of field-specific recommendations that quickly reach rice growers and extension workers followed by large scale-testing. The ICT applications include a web application for extension services with internet access, an android app for smartphones for use by extension and community knowledge workers directly in the field, as well as a mobile-phone based application using interactive voice response that can be directly used by farmers when internet access is not available. Acknowledging the need of small-scale rice growers for field-specific crop management guidelines in addition to fertiliser recommendations, we plan to advance NMRice into a crop management tool in the near future.

Keywords: Android application, field specific fertiliser recommendation, interactive voice response, mobile phone application, rice, site-specific nutrient management