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History and achievements of ‘smart-valleys’: Farmers’ participatory approach for sustainable lowland rice development in sub-Saharan Africa

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Abstract

Africa Rice Center (AfricaRice) aims to achieve rice self-sufficiency in Africa. For this purpose, the enhancement of rice yield and expansion of rice areas are both crucial. Rice is water-consuming and vulnerable to water deficits compared to other field crops. The improvement of water management is a critical factor to enhance yield in rice cultivation and the expansion of lowland for rice should be made with water control. By targeting inland valleys which are prevailing in the lowlands of sub-Saharan Africa (SSA) and account for 190 million ha, Africa Rice Center has developed a Smart valleys approach, a participatory low-cost lowland development technology on a community base. The Smart-valleys approach can be applicable for both the improvement of water management in rainfed lowland rice and reclamation of lowland for rice-based systems with water control. From 2012 to 2020, the Smart-valleys approach was adopted by 14,027 rice farmers on 241 sites covering a total area of 1,615 ha. Adoption of the Smart-valleys approach increased farmers’ yield by 0.9–2.4 t ha⁻¹, farmers’ net income by 267–1,157 US\$ ha⁻¹, food consumption score (frequency of consumption of different food groups by a household) by 4–10 points, and yield stability (assessed using the coefficient of variation (CV) of yields with lower CV value indicating higher yield stability) by 2–11 %. Increases in yield and yield stability thanks to Smart-valleys adoption were higher in areas with more rainfall amounts. We estimated that West Africa (WA) would be rice self-sufficient with 9 % of the total inland valley area developed using the Smart-Valleys approach. Enabling conditions for the large-scale adoption of the Smart-valleys approach included securing land tenure rights, strengthening farmers’ capacity, availability of power tiller for land preparation and fertiliser, and higher paddy market price. Currently, the Smart-valleys approach has been validated and disseminated in eight countries in West Africa (Benin, Burkina Faso, Côte d’Ivoire, Ghana, Liberia, Nigeria, Sierra Leone, and Togo). Seventy-one percent of inland valleys exist in other sub-regions than WA. Including the Smart-valleys approach in national adaptation plans would increase farmers’ resilience to climate change and food security in SSA beyond WA.

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