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Can Water-Saving Technology Increase Resilience in Smallholder Irrigation Schemes? Experiences from Bangladesh from a Socio-Economic Perspective

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Abstract

Dry-season rice in Bangladesh is mostly produced with small-scale irrigation using groundwater. The uplifting of groundwater requires fuel or electricity which is expensive for smallholder farmers. Additionally, electricity is highly unreliable. Both factors hamper a secure water supply for irrigation. Farmers increasingly develop their own solutions to enhance irrigation efficiency such as repairing canals, irrigating at night or even switching to alternative crops in regions with severe water stress. In this context, the water-saving technology “Alternate Wetting and Drying” (AWD) is discussed as a possible means to enable farmers to cope with scarce water and energy resources. The study is based on a research collaboration of the Centre for Rural Development and the International Rice Research Institute in 2010.

AWD is based on the knowledge that irrigated rice requires 15–30 % less water than generally applied. Our results confirm the economic benefit – farmers practicing AWD report cost savings up to 18 % as the irrigation frequency decreases. This mostly applies to farmers who own a water pump. However, smallholder farmers and share croppers mostly depend on pump owners for buying irrigation water often at a fixed seasonal rate irrespective of their actual water consumption. Furthermore, they have little control over the timing of irrigation which is crucial for maximising economic savings and ensuring that no harvest losses take place when practicing AWD.

In principle, AWD has a great potential to increase resilience of farmers in dealing with the challenges of water scarcity and energy cost. However, the frequently found seasonal payment arrangements and the scheduling of irrigation which is not aligned with the requirements of AWD decrease the incentive or the possibility of farmers within an irrigation scheme to practice AWD. Only when these structural issues within local irrigation schemes are adapted, AWD can unfold its full benefits to the individual farmer.

Therefore, local stakeholders within the same irrigation scheme should be encouraged to find mechanisms that allocate economic benefits to all farmers on a fair and collective base. Furthermore, organisations involved in disseminating AWD should be capacitated to address economic and organisational aspects during their advisory services.

Keywords: Alternate wetting and drying, irrigation organisation, smallholder rice farmers, water and energy scarcity, water-saving technology