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Adoption of climate-resilient rice farming practices in Battambang, Cambodia: Challenges, perceptions, and stakeholder roles

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Abstract

Cambodia is among the countries most vulnerable to climate change. Rising temperatures, erratic rainfall, and more frequent floods and droughts are expected to negatively affect agriculture, livelihoods, and economic stability nationwide. These hazards cause substantial yield losses and threaten household incomes, particularly for smallholders farmers with limited or no access to irrigation. Climate-resilient agriculture aims to strengthen smallholders' ability to adapt through cost-effective and diversified systems that help secure production. Farmers' decisions are shaped by financial resources, knowledge, social structures, and trust within the village. This study assesses rainfed and irrigated rice farming systems in southern Battambang Province, focusing on adoption of climate-resilient practices, stakeholder influence on farmers' decision-making, and crop diversification.

The findings based on a participative qualitative-quantitative survey with 50 farmers reveal clear differences between the rainfed (RA) and the irrigated area (IA). RA farmers depend almost entirely on seasonal rainfall and typically cultivate one crop per year, whereas most IA farmers produce two or occasionally three crops when plots are close to irrigation canals. Access to water remains highly unequal within the IA.

Eleven climate-resilient practices were examined. Only three are widely known and used: incorporation of rice straw, rainwater conservation, and weather forecasts. Reduced tillage, coordinated cropping calendars, and early warning systems remain largely unknown. A clear gap between awareness and implementation exists for climate-stress-tolerant varieties, cover crops, machine sowing of rice, rice-fish-duck systems, and alternate wetting and drying. Cash-crop diversification is minimal and rice-centered, whereas home gardens for household consumption are more diversified, especially in the RA. Farming families usually keep a few cows, chickens and sometimes ducks or grasshoppers. Diversification potential for fodder and cash crops is limited, whereas ponds in the RA offer considerable potential for household consumption and local markets.

Social interactions within the community and with local authorities strongly influence access to information. Projects and farmer training are more common in the IA, leaving RA farmers with limited institutional support.

Overall, the adoption potential follows farmers' perceived constraints. Targeted strategies are needed to reduce information gaps, improve enabling conditions, strengthen trust within communities and ensure accessibility and affordability of such practices.

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