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Women's empowerment and climate adaptation in agro-food systems: Challenges and opportunities for inclusive resilience

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Abstract

Women in rural agro-food systems play a central role in food production, household nutrition, resource management and climate adaptation. However, their contribution is often constrained by unequal access to land, credit, agricultural extension services, technical training, decision-making power, and climate-resilient technologies. This study examines the relationship between the adoption of Climate-Smart Agriculture (CSA) technologies and women dietary diversity in rural Bangladesh, with particular focus on Jamalpur, an area of river erosion. CSA practices followed in the region are homestead gardening, crop diversification, organic composting, and improved farm management Framed within the broader concept of gender-responsive agro-ecosystems, the study explores how climate-resilient agricultural practices can contribute to food security, poverty reduction, women's empowerment, and strengthened rural livelihoods. The study uses a mixed-methods approach that combines qualitative field insights with quantitative analysis. The Poisson regression assesses how socioeconomic and institutional factors such as age, education, income, farm size, household size, access to CSA training, and adoption of CSA practices influence women dietary diversity. The findings indicate that women from CSA-adopting households generally experience better dietary diversity, improved access to nutritious foods, and greater household food security compared with women from non-adopting households. CSA practices enhance the availability of nutrient-dense foods. At the same time, they support climate adaptation and livelihood resilience. The study further reveals that women's empowerment is closely linked with climate-resilient food systems. When women receive training, access productive resources, and participate in household and agricultural decision-making, they are better able to adopt adaptive practices and improve household nutrition outcomes. Nevertheless, persistent barriers such as gender based inequalities, limited technical knowledge, restricted mobility, inadequate infrastructure and weak institutional support continue to limit women's full participation in sustainable agro-food systems. The findings highlight the need for gender-sensitive agricultural policies and inclusive rural development strategies that integrate nutrition, climate adaptation, and women empowerment. To enable the households in addressing climate-resilient food security, targeted interventions should be women-focused CSA training, improved access to resources, strengthened extension services, and support for diversified farming systems. This study provides evidence for the relevant stakeholders seeking to build inclusive and resilient agro-ecosystems in climate-vulnerable rural regions.

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