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The complex system of climate change security and the ripple effect of water–food–socioeconomic nexus

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Abstract: The effects of climate change are recognized globally. This study hypothesizes that climate change impacts are a complex system that creates a ripple effect on water security, food security, and economic security. Ultimately, those domains simultaneously exacerbate climate change effects and produce national security concerns. The study's framework uses a transdisciplinary team's quantitative and qualitative approach to evaluate the challenges and possible solutions to climate change security on the Water–Food–Socioeconomic Nexus. Iraq has been taken as a case study highlighting the deficits in management and governance. The dynamic of the ripple effect shows the interventions for each sector's water–food–socioeconomic and security that collectively impact upon each other over time. The radical shift in the political infrastructure after 2003 from a centralized to a decentralized one without proper preparation is one of the root causes of the governance and management anarchy. About 228 state and non-state actors are involved in decision-making, leaving it fragile and unsustainable. Only 1% of the national budget is allocated to both the Ministry of Water Resources and the Ministry of Agriculture, which leaves no capacity to mitigate the risk of climate change impact.

Keywords: climate change; water security; food security; economic security; national security

1. Introduction

Our understanding of climate change has changed dramatically during the first few decades of the 21st century. Theories and hypotheses concerning climate change are diverse, from those that view it as a complicated system (Schneider and Dickinson, 1974; Schneider and Dickinson, 1974) or a complex system (Manabe, 2019; Rind, 1999) to those that hold that it is a fundamentally complex, self-regulating system (Jones and Ricketts, 2021). Applying complex system principles to natural and social phenomena has changed the paradigm for interpreting both. Complex systems are open systems grounded in the dynamic interaction of a large number of elements.