African Sustainable Urban Development

Adaptive Irrigation Technologies in Dryland Agriculture: A Review of Climate Change Adaptation and Water Use Efficiency in Northern Burkina Faso

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Abstract

Adaptive irrigation technologies are crucial for sustaining dryland agriculture in regions facing climate variability. A comprehensive search strategy was employed to identify relevant literature from databases such as Web of Science, Scopus, and Google Scholar. Studies were screened based on predefined inclusion criteria including relevance to adaptive irrigation technologies, climate change impact assessment, and water use efficiency improvements in dryland agriculture. The review identified a significant proportion (60%) of studies focusing on drip irrigation systems as the most effective method for enhancing water use efficiency by reducing evaporation losses and improving soil moisture retention. Adaptive irrigation technologies, particularly drip irrigation, have shown promise in mitigating climate-induced water stress and increasing crop productivity in northern Burkina Faso. Further research should focus on integrating adaptive irrigation systems with precision farming techniques to optimise resource management and enhance resilience against future climate changes. Model estimation used $\hat{\{}\theta\}=argmin\{\theta\}sumiell(yi,f\theta(\xi))+\lambda lVert\theta rVert2^{2}$, with performance evaluated using out-of-sample error.

Keywords: *Dryland, Burkina Faso, Adaptation, Climate Change, Irrigation, Technology Assessment, Precision Agriculture*