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Smart Irrigation Systems in African Agriculture: A Review of Small-Scale Farmers' Implementation in Benin's Côte d'Ivoire Border Region,

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Abstract

Smart irrigation systems have been proposed as a solution to improve agricultural productivity in developing countries, particularly for small-scale farmers. A comprehensive search strategy was employed using academic databases, including Scopus and Web of Science. Studies published between and were considered. The review identified a mixed pattern of adoption rates among farmers, with some projects showing significant increases in crop yields by up to 40% compared to traditional irrigation methods. While the majority of studies reported successful outcomes, there is a need for more tailored implementation strategies and support mechanisms to ensure sustainable adoption. Policy makers should promote demonstration projects to gather evidence on smart irrigation systems' effectiveness before widespread adoption. Farmers also require training programmes to maximise system benefits. Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert\, 2^2$, with performance evaluated using out-of-sample error.

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