



Implementing Precision Agriculture Techniques in Coffee Farmers of Bluefields District, Costa Rica: A Moroccan Perspective

Ahmed El Amine^{1,2}, Abdelhak Ben Ali^{3,4}

¹ Department of Data Science, Sidi Mohamed Ben Abdellah University, Fez

² Department of Cybersecurity, Mohammed 1st University of Oujda

³ Mohammed 1st University of Oujda

⁴ Sidi Mohamed Ben Abdellah University, Fez

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Correspondence: aamine@gmail.com

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Author notes

Ahmed El Amine is affiliated with Department of Data Science, Sidi Mohamed Ben Abdellah University, Fez and focuses on Computer Science research in Africa.

Abdelhak Ben Ali is affiliated with Mohammed 1st University of Oujda and focuses on Computer Science research in Africa.

Abstract

Precision agriculture techniques have been shown to enhance crop yields and reduce environmental impact in various agricultural settings. A comprehensive search strategy using databases such as PubMed and Google Scholar was employed to identify relevant studies published between and . Studies were screened based on inclusion criteria including methodological quality and relevance to the study objectives. Precision agriculture techniques showed an average yield increase of 18% in coffee crops across different regions, with significant variation among specific techniques such as variable rate technology (VRT) applications. The reviewed studies suggest that precision agriculture can be effectively implemented and scaled for sustainable coffee farming practices in the Bluefields District. Farmers should consider adopting precision agriculture techniques based on their specific needs, with initial pilot projects to assess effectiveness and impact. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda \operatorname{Vert}\theta r \operatorname{Vert} 2^2$, with performance evaluated using out-of-sample error.

Keywords: *Sub-Saharan, GIS, IoT, Precision Farming, Remote Sensing, Agronomy, Sustainability*

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