

**A Microeconometric Assessment of the Integrated Crop-  
Livestock Production Systems in Ghana**

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## **Certification**

I certify that this thesis has not already been submitted for any other degree and is not currently being submitted for any degree.

I confirm that, to the best of my knowledge, any form of support received in preparing this thesis and all cited sources used have been appropriately acknowledged.



Bright Owusu Asante

## **Abstract**

Majority of Ghanaian farmers produce multiple commodities in integrated farming systems. These systems contribute significantly to Ghana's domestic food production and food security. However, most of these farmers receive very low returns from their farming activities making it difficult to sustain or improve household livelihoods. One reason for these low returns is the low productivity and low uptake of technologies in these farming systems. This leaves most farmers in great financial difficulty, particularly during the dry season where most crops are not supported by the climatic conditions. The production of crops, such as yam, cassava, maize, cowpea, groundnut and soybean, as well as livestock, such as small ruminants in a diversified system, are very significant to the livelihoods of the farmers by ensuring a stable income and employment of productive resources throughout the year.

Previous studies have focused on the analysis of the patterns of adoption and performance of farmers in a single crop or livestock production system, but attempts to evaluate the performance in integrated crop-livestock systems are limited. This study fills this gap by using farm-level data collected from farmers in the Atebubu-Amantin and Ejura-Sekyedumase districts to evaluate the nature of adoption of improved technologies in key crops and livestock and integrated crop-livestock farming systems. The nature and determinants of diversification and the extent and drivers of productivity in integrated crop-livestock systems in Ghana are also examined.

Various microeconomic approaches are used to investigate the nature, patterns and impact of technology adoption and integrated crop-livestock systems. The results reveal that improved technologies such as the yam minisett technology and the integrated crop management practices have positive effects on performance. Furthermore, farmers are likely to benefit from growing dual-purpose legumes if they are aware of the varieties and have adequate access to seed. Availability of extension services, level of education, access to credit and research, and use of tillage equipment are found to be key determinants in farmers' decisions to adopt both improved technologies and diversified farming systems.

To evaluate the importance of diversification in integrated crop-livestock farming systems, a diversification indicator is calculated for individual farmers and its determinants examined. Stochastic frontier analysis and data envelopment analysis are used to obtain and examine indicators of farm performance and their determinants. The

results indicate that farmers select their enterprises based on the potential for economies of scope and exposure to risk. In addition, access to credit and research, and use of tillage equipment are found to influence both the probability and extent of diversification. The results also reveal the potential for increasing productivity particularly through changing input mixes but also through changing the mix of enterprises.

The empirical results highlight the importance of technology adoption, diversification and mix efficiency in increasing incomes, reducing risks and ensuring environmental sustainability in crop-livestock production systems in Ghana. To enhance the productivity of these farming systems, the results highlight the importance for governments and other stakeholders to increase investments in extension delivery services to accelerate the uptake of improved technologies. Furthermore, establishment of input credit schemes, and strengthening and extending the existing fertiliser subsidy programme to cover other basic production inputs will enhance the flexibility of farmers to vary input and output mixes and, ultimately, increase productivity in crop-livestock systems. This requires both public and private interests and investments to ensure efficient and effective implementation.

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