Research Application Summary

An analysis of technical efficiency of mixed intercropping agroforestry technology: A case of Zomba district in Malawi

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Abstract

The study was conducted in Zomba district in Malawi, in 2005/2006 cropping season with the main objective of assessing technical efficiency (TE) of mixed intercropping (MI) agroforestry technology. Study population consisted of 101 farmers practicing MI and 104 non-adopters (NA) of agroforestry. Stochastic Frontier Production Model (SFPM) of parametric approach specified by Battese and Coelli (1995) was applied to evaluate the TE. Mean TE of MI and NA were 0.62 and 0.46, respectively. Results showed that both categories of farmers have technical inefficiencies.

Key words: Cropping systems efficiency, Malawi

Résumé

L'étude a été menée dans le district de Zomba au Malawi, pendant la période de moisson de 2005-2006 avec l'objectif principal d'évaluer l'efficacité technique (ET) de la technologie mixte (TM) de l'agroforesterie. La population d'étude était composée de 101 agriculteurs pratiquant (AP) l'agroforesterie mixte et de 104 non-pratiquants (NP). Le modèle de l'approche paramétrique, appelé "Stochastic Frontier Production Model" (SFPM) et élaboré par Battese et Coelli (1995), a été appliqué pour évaluer l' ET. Les ET moyennes de AP et de NP étaient, respectivement 0.62 et 0.46. Les résultats ont prouvé que les deux catégories des agriculteurs ont des inefficacités techniques.

Mots clés: Efficacité de systèmes d'emblavage, Malawi

Background

Maize production in Malawi faces many challenges especially declining soil fertility (Malawi Government, 2005). Farmers have mainly relied on inorganic fertilizers to increase maize production but this has not fully addressed the problem due to its high prices. Agroforestry is one of the interventions that are employed to improve maize production due to its potential to enhance food production in a sustainable manner through its positive contributions to soil fertility and household income (Neupane and Thapa, 2001).

Despite the potential of agroforestry, most research has been on biological performance of trees and technology adoption with inadequate consideration of the technological context. Economic studies by Mangisoni (1999) and Mkandawire *et al.* (2004) did not handle efficiency of agroforestry. This study aimed at filling this research gap by focusing on Technical Efficiency (TE) of Mixed Intercropping (MI).

Literature Summary

Mkandawire *et al*. (2004) applied a probit regression model to study smallholder farmers' willingness to invest in agroforestry technologies in Zomba district of Malawi. The analysis revealed that farmers who were married and who owned livestock were willing to take up agroforestry by investing in tree seedlings.

Edriss and Simtowe (2003) applied the SFPM in groundnuts to estimate TE in Malawi. About 75% of the farmers were below average TE (0.49) implying the presence of technical inefficiencies.

Study Description

Zomba district was purposefully chosen because it has a large number of farmers involved in MI agroforestry technology in the country. Study population consisted of MI agroforestry farmers and Non-Adaptors (NA) of agroforestry technology in Thondwe, Dzaone and Malosa Extension Planning Areas (EPAs). A total of 101 farmers practicing MI and 104 NA, respectively, were interviewed in the study. A structured questionnaire was used to collect data which included farm size, maize yield, labour, time of prunning, income and costs of seed, fertilizer and transport.

Research Application

Results of the SFPM showed that farmers practicing MI and NA produce mean TE of 62% and 46% of their potential maize output, respectively, implying the presence of technical inefficiencies.

Individual TE of MI farmers ranged from 0.06 to 0.99 with median of 0.62 while TE of NA ranged from 0.01 to 0.88 with median of 0.43. The wide variations in TE imply that the farmers widely differ in maize production relative to their respective frontiers though they use similar resources in their respective categories.

Recommendation

MI and NA had wide variations of TE levels implying wide variations in resource use and maize output. In order to address this, the study recommended the need to intensify extension

Table 1. Technical Efficiency (TE) of farmers practicing Mixed Intercropping (MI) and Non-Adaptors (NA) of agroforestry mixed intercropping.

Element	Mixed intercropping	Non-adopters
Population	101	104
Mean TE	0.62[a](0.030)	0.46[b](0.023)

a and *b* are significantly different at 1 percent.
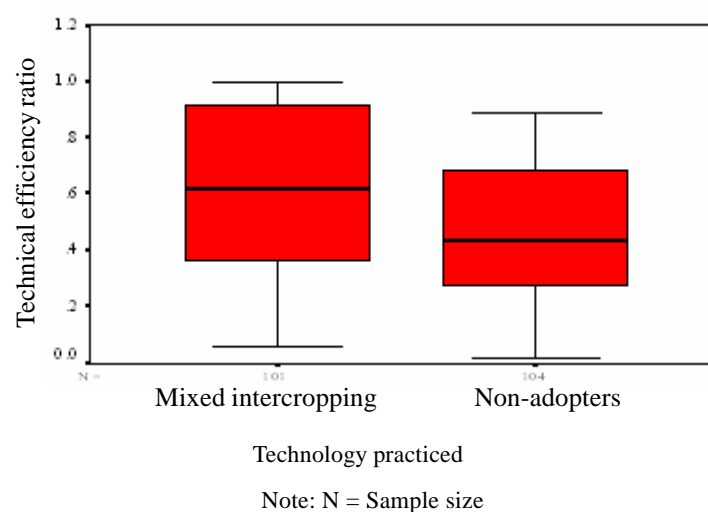

Note: N = Sample size

Figure 1. Technical Efficiency ranges are presented in the above boxplots.

contact with the farmers, offering quality training and informally educating the farmers.

Acknowledgement

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