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# Evaluating Agricultural Systems Based on Mulch Technology: A Case Study

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**Abstract**

In this paper we evaluate the effects of introducing mulch technology, a mechanised chopping of the fallow vegetation, in farm family units of the eastern Amazon region of Brazil. The proposed approach includes social research, field experiments and a thematic model to calculate economic performance indicators and technical efficiency scores. These were determined using Data Envelopment Analysis (DEA) models in order to compare agricultural systems applying mulch technology to those using slash-and-burn agriculture. DEA is an optimisation method that generalises single-input/single-output technical efficiency measure to the multiple-input/multiple-output case by constructing a relative efficiency score as the ratio of a single virtual output to a single virtual input. It is a methodology directed to frontiers: instead of trying to fit a regression plane through the centre of the data as in statistical regression, for example, one 'floats' a piecewise linear surface to rest on top of the observations. The results indicate that systems with temporary cultures (e.g. beans, maize and cassava) using slash-and-burn technology were more efficient with a better economic performance. On the other hand, agricultural systems with permanent cultures (e.g. passion-fruit) using mulch technology had higher efficient scores, but lower economic performance when compared to those that used slash-and-burn technology. We conclude that the economic viability of mulch technology demands the reduction of the hour/machine cost, as well as the increase of the family monetary benefit, by intensifying land use with vegetables such as maxixe, sweet pepper and egg plant in the temporary production systems. The aggregated value of the production systems based on this technology can be also reached by the inclusion of organic agricultural techniques and the obtaining of a certification for this ecological process.

**Keywords:** Economic performance indicators, mulch technology, rural family labour, slash-and-burn agriculture, technical efficiency

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