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Climatic Zoning for Upland Rice in Brazil: Economic, Social and Environmental Impacts

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Abstract

The intensive expansion of agriculture in Brazil occurred in the seventies when extensive areas of the “Cerrado” and part of the Amazon region were occupied. In this process upland rice was one of the most important crops due to its easy adaptation to soil conditions and the use of little mechanisation. Yield losses often occurred due to the climatic variations, limiting the sustainability of the crop. In 1997, the climatic zoning for upland rice cultivation, to identify areas with lower climatic risk and the best sowing time, was offered by Embrapa. Additionally, the climatic zoning serves as tool to assist the government for the allocation of resources in regions with better ability to produce upland rice. Since 2001, this agricultural innovation is being submitted to economic, social and environmental impact assessment. The methodologies used are the Economic Surplus Method for economic impacts, and the AMBITEC system for social and environmental impacts. The AMBITEC is composed of a set of electronic spreadsheets built to consider different aspects that contribute to a given technology. The resulting impact index can vary from -15 (very undesirable impact) to +15 (very desirable impact). In 2004 the adoption of the climatic zoning for upland rice cultivation generated, in 2004, a surplus of US\$ 5.6 million; corresponding to an additional harvest of 29.3 thousand tonnes of paddy rice, in the States where the technology was adopted. In the social scope, the main benefits were the generation of jobs and an increase in food supply in the domestic market. The social impact index was 0.61. In the environmental scope, the technology contributed to reduce the use of pesticides, energy, and incorporation of new land (deforestation) for rice cultivation. Climatic zoning allows to choose areas with low risk of drought, using less energy with re-sowing and spraying operations. The environmental impact index obtained by the technology was 3.4.

Keywords: AMBITEC system, climatic zoning, economic surplus method, impact assessment, upland rice