

## CLIMATE CHANGE AND SUGARCANE IN THE STATE OF SÃO PAULO

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Agribusiness accounted for 23% of Brazilian Gross Domestic Product (GDP) in 2007, being around 49.7 billion dollars the surplus of the sector's trade balance. Jobs related to agribusiness were approximately 37% of total national jobs. Brazil is the world's largest producer of sugar, alcohol, coffee, and orange juice; the second in soybeans, beef and chicken; the third in fruit and corn and the fourth in pork. It is the first exporter of sugar, alcohol, coffee and soybeans. Brazil was a global leadership of beef and chicken in 2003. Brazil sells 82% of orange juice, 29% of sugar, 28% of coffee beans, 44% of coffee, 38% of soybeans and 23% of tobacco consumed on the planet. It occupies the first place in the world of tanned leather and leather footwear. It is possible to conclude therefore from the above data that the agribusiness is a fundamental component of the country and various regions of the world.

The climate is one of the major determinants of agricultural production due to: a) natural variability of the various systems prevailing in the country; b) insufficient knowledge about their behavior and c) difficulty in forecasting. The drought that affected Rio Grande do Sul in January and February 2005, for example, had a negative impact throughout the economy of the state and not just in agriculture. The state government estimated a total loss of 300 million dollars in the budget of the year. According to IBGE – Brazilian Institute of Geography and Statistics, Rio Grande do Sul was the only state that accumulated a fall in industrial production in the first two months of 2005, a decrease of 1.6% compared to a 5.2% increase in the

national average (BUENO, 2005). The most severe frost of July 18, 1975 decreased by 20% the budget of the state of Paraná, with estimated losses of 1 billion dollars and 500 million coffee trees.

Until the early 1990's, Brazilian agriculture recorded high loss rates that drastically limited their development, since they were making the sector economically unviable. According GÓPEFERT *et al.* (1993), the 1992/93 harvest losses were about 30% for rice and 21% for beans in São Paulo; 37% for corn and 29% for soybeans in Bahia; and 81% for cotton and 32% for irrigated soybeans in the Northeast. According to ROSSETTI (2001), approximately 90% of the losses recorded in Brazilian agriculture until the early 1990's were caused by two main climate factors: a) dry spells during the critical phase (in 60% of all cases) and b) excessive rain at harvest (in 30% of all cases). These losses were related to a poor knowledge of rainfall distribution that led the farmers to plant after the first rainfalls of spring.

Based on these high loss rates of domestic agriculture, the Ministry of Agriculture – MAPA started in 1995 an official program of agricultural zoning in order to reduce climate risks associated with dry spells during the critical phases of crops and excessive rains at harvest. The practical tools used to achieve these goals have been planting calendars based on meteorological data and parameters for the main crops of the country, considering periods of planting having ten-days length, three different soil types, two or three types of cultivars and each of the municipalities of the regions potentially suitable for plantations.