

# **Remote Sensing Images to Monitor Sugarcane in the South-Central Region of Brazil – an Overview of the Canasat Project**

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The sugarcane crop monitoring project through remote sensing satellite images in the South-Central region of Brazil started in the year of 2003 and has provided several results based on scientific methods and objective observations to contribute to relevant issues related to sustainable ethanol production from sugarcane in Brazil. Annual maps were generated to predict sugarcane area demonstrating that current remote sensing images are adequate to operationally estimate and forecast the available sugarcane area to be harvested each year. A website was designed to put these map available in the Internet where users can access sugarcane area at state or municipal levels. These maps also allowed evaluating the yearly expansion of sugarcane in the South-Central region during a period in which sugarcane experienced a major increase in cultivated area in response to the new market of flexfuel cars that demanded a major increase in ethanol production. With the annual sugarcane expansion maps and the multitemporal feature of remote sensing satellite images it was possible to monitor the land use change during the last decade in response to the sugarcane expansion indicating that major conversion came from pasture land (71%), annual crops (24%), renewed sugarcane (3%) and citrus (1%) with almost no deforestation. In the year of 2007 an Agro-environmental Protocol was established in São Paulo State to reduce the straw burning practice during sugarcane harvest. Remote sensing images proved to be useful to map harvested sugarcane areas with and without the practice of straw burning. It was observed that from 2006 to 2009 the harvested area without straw burning increased from 34.2% to 55.5% while the harvested area with straw burning decreased from 65.8% to 44.5% indicating the effectiveness of the mentioned protocol. Within the context of sustainable sugarcane production it was observed that less than 1.5% of the sugarcane area is cultivated within Permanent Protected Areas in São Paulo State. This evaluation was carried out using remote sensing images with high spatial resolution. Crop yield estimates using remote sensing images of high temporal resolution coupled to agronomic models are also under development within the Canasat Project. Finally, the data base provided by the Canasat project has a huge multi sensor image archive that can also be used for certification purpose and other applications related to land use and land cover change. The several information generated by the Canasat project are useful to help demonstrate the sustainable sugarcane production in Brazil providing precise information to scientist and decision makers.

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