AISE – THE SWEET AND BITTER SIDES OF THE SUGARCANE. AN INTEGRATED SUSTAINABILITY ASSESSMENT FOR THE BRAZILIAN ETHANOL CONTEXT

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The growing international discussion on the role of global warming and renewable energy boosts up once again the interest for bio-fuels. But there is, yet, a significant anxiety of the society about the present patterns of sugarcane cultivation and ethanol production impact balance. The current modus operandi of public policy formulation and implementation, based on punctual and setorized socioenvironmental impact assessment, limits and hides complex productive system functioning essential factors, as observed for the sugarcane ethanol context, enlarging ethanol production sustainability compromising risks. One of the knowlegde gaps is exactly in the methodology design, that will make it possible to integrate the various sustainability elements, following principles of sustainability tailored to the sugarcane ethanol.

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The challenge is exactly in the concept validation process with the stakeholders and the methodology proposal in a way that it will be incorporated by institutions and society in their management and decision making process. It is part of this challenge the study of the existing methodologies and the possibilities of interlinkage and integration among them, what means, turn them more powerful and pragmatic to face the inherent complexity of the sustainability of the sugarcane ethanol context.

Therefore, this research has the general aim of developing and applying an ISA (Integrated Sustainability Assessment) Methodology for sugarcane ethanol to the state of São Paulo, Brazil.

The AISe group includes researchers from several institutions:

- University of São Paulo (USP): São Carlos Engineering School (EESC/USP), School of Arts, Sciences and Humanities (EACH/USP), Luiz de Queiroz Agriculture School (ESALQ/USP) and Ribeirão Preto School of Philosophy, Sciences and Literature (FFCLR P/ USP);
- Institute of Agriculture Economics (IEA);
- Institute for Agricultural and Forest Management and Certification (IMAFLORA);
- Brazilian Agricultural Research Corporation (EMBRAPA);
- Michigan University.

SUMMARY OF RESULTS TO DATE AND PERSPECTIVES

The main expected results of this research are: (i) scientific discussion about the concept of sustainability applied to sugarcane ethanol context, with the engagement of stakeholders; (ii) proposition of a sugarcane ethanol ISA Methodology conception, available for use by the governmental and nongovernmental institutions actuating in the bioenergy area and also for institutions involved with the BIOEN Program; (iii) the basis for the construction of a software on the continuation of this project in the following years; (iv) governmental and nongovernmental institution manager capacity building relatively to ISA methodology of sugarcane ethanol; (v) research team consolidation.

The organized events are:

- I Mesa-redonda sobre etanol de cana-de-açúcar: migração e meio ambiente – April/2008.
- II Mesa-redonda sobre etanol de cana-de-açúcar: um diálogo acerca da sustentabilidade – April/2009
- I Workshop AISE – Avaliação Integrada da Sustentabilidade do Etanol – Dec/2010
- Bioen Workshop on Integrated Sustainability Assessment for Ethanol Context – April/2010

The concluded dissertations and monographs are:

Monographs:

- Discussão sobre as considerações metodológicas relativas à análise de inventário de avaliação de impacto do ciclo de vida para o uso de agrotóxicos
- A atuação do setor governamental na gestão ambiental local no contexto do etanol brasileiro

Dissertations:

- Uso da biomassa da cana-de-açúcar para geração de energia elétrica: análise energética, exergética e ambiental de sistemas de cogeração em sucro-alcooleiras do interior paulista
- Sistema Municipal de Meio Ambiente e produção de etanol de cana-de-açúcar no Estado de São Paulo: estudo de casos em Brotas e Araraquara
- Instrumentos de intervenção governamental e postura ambiental empresarial: uma análise da agroindústria canavieira do Estado de São Paulo

MAIN PUBLICATIONS

Pacca SA. 2009. Historical carbon budget of the brazilian ethanol program. *Energy Policy, Cambridge*. **37(1)**:4863-4873.

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Silva Netto JPS, Cetrulo TB, Molina NS, Malheiros TF. 2008. Gestão ambiental integrada aplicada à produção de etanol da cana-de-açúcar: ensaio sobre a experiência brasileira. In: *Workshop Internacional de Pesquisa em Indicadores de Sustentabilidade-WIPIS* 2008, 2., 2008, São Carlos-SP. Anais... São Carlos-SP.

Molina NS, Netto JPS, CetruloTB, Malheiros TF. 2009. Sustainability assessment approach for the ethanol production system. In: *International Seminar on Environmental Planning and Management*, 3, 2009, São Paulo. Anais… São Paulo, p. 649-663.

Souza SP, Pacca SA. 2009. Life cycle assessment of na integrated biofuels production system in Brazil. In: *International Conference on Industrial Ecology: transitions towards sustainability*, 2009, Lisboa. Anais… Lisboa, p. 218-218.

Galharte CA, Crestana S. 2009. Avaliação dos impactos ambientais na área de expansão da cana-de-açúcar em função da mudança de uso e cobertura do solo. In: *Jornada Científica Embrapa*, 1., 2009, São Carlos. Anais... São Carlos.

Mauad FF, Dantas DN, Ometto AR. 2009. Potential for generation of thermal and electrical energy from biomass of sugarcane: a exergetic analisis. In: *International Conference on Advance Materials*, 2009, Rio de Janeiro. Anais…, Rio de Janeiro, p. 10-25.

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