



# Global Assessment of Biomass and Bioproduct Impacts on Socio-economics and Sustainability



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# Socio-economic impacts of ethanol production from sugarcane in Brazil



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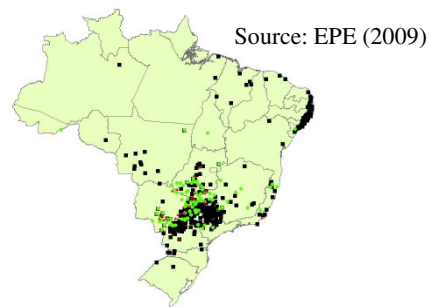
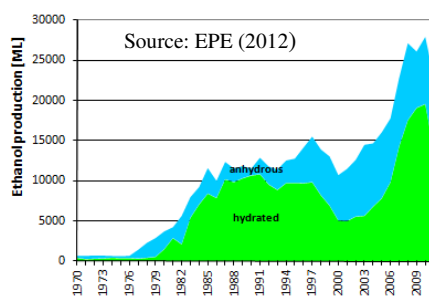


## Outline

- ◆ Sugarcane industry in Brazil.
- ◆ Socio-economic impacts: general figures and controversial issues.
- ◆ Results of previous studies on socio-economic impacts.
- ◆ The two case studies.
- ◆ Conclusions.



## Sugarcane and ethanol in Brazil



- ◆ Production of about 23 BL in 2011 (~60% hydrated ethanol). Estimated as slightly higher (23.6 BL) in 2012.
- ◆ About 440 mills in Brazil, with high concentration of the production in the state of São Paulo and surrounds.
- ◆ 8.5 Mha harvested and about 600 Mt of sugarcane produced.



## Sugarcane sector: differences

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- ◆ The average output of the mills varies: 2.0 Mt/year (Centre-South) to 0.7 Mt/year (Northeast).
- ◆ More than 70 thousand sugarcane producers (about 40% of the total production) (in some regions the share of out-growers is higher).
- ◆ New stakeholders, many from abroad, including several oil companies (mainly in the Centre-South).
- ◆ More diversified production in the Southeast while the production in Northeast is mostly targeted to sugar.



## Socio-economic impacts: general figures

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- ◆ Various studies have shown the socio-economic impacts from a macro point of view (e.g., number of jobs, savings of foreign currency, displacement of oil imports, etc.)
- ◆ Other studies have shown that the wages are reasonable (vis-à-vis other sub-sectors of the agriculture and considering the low skills of the workers).
- ◆ Working conditions have improved along the time: labour rights, working conditions, wages, worker's organization, etc.



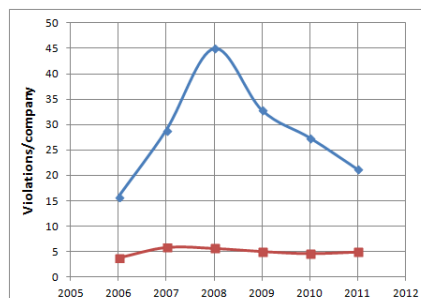
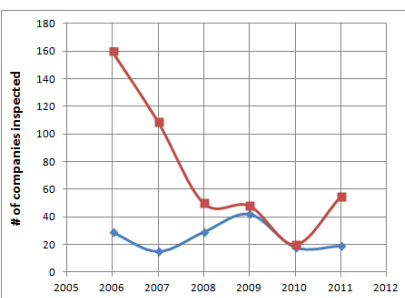
## Socio-economic impacts: controversial issues



- ◆ The fact that a large share of the jobs in agriculture are temporary (harvesters). And many workers are migrants.
- ◆ The working conditions: hard work, payment according productivity, (similar) slavery conditions (in a broad sense), etc.
- ◆ The growing mechanization: reduction of jobs for workers with low skills.
- ◆ Differences between the Southeast and Northeast.
- ◆ Generalization of the worst cases.



## Checking working conditions (1)

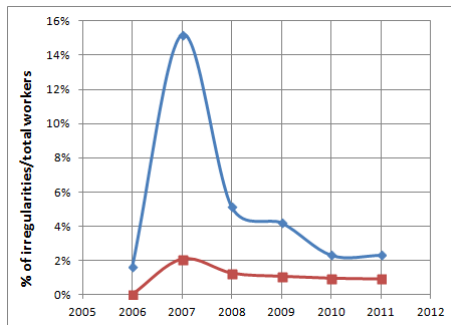


Sources: DETRAE and Fiscalização Estadual

- ◆ Blue = Brazil, inspection by the Ministry of Labour (DETRAE), basically based on denounces. Company is an economic operator (e.g., a mill, or just an out-grower).
- ◆ Red = São Paulo, inspection by a state organization, not just based on denounces and also considering priorities.
- ◆ Violation is any single non-enforcement case of the labour law.



## Checking working conditions (2)



Sources: DETRAE and Fiscalização Estadual

- ◆ Blue = Brazil, inspection by the Ministry of Labour (DETRAE).
- ◆ Red = São Paulo, inspection by a state organization. Irregularities are related with contracts.
- ◆ Any violation is related with a worker. Share of irregularities is the ratio between the number of violations and the number of workers of all companies inspected.

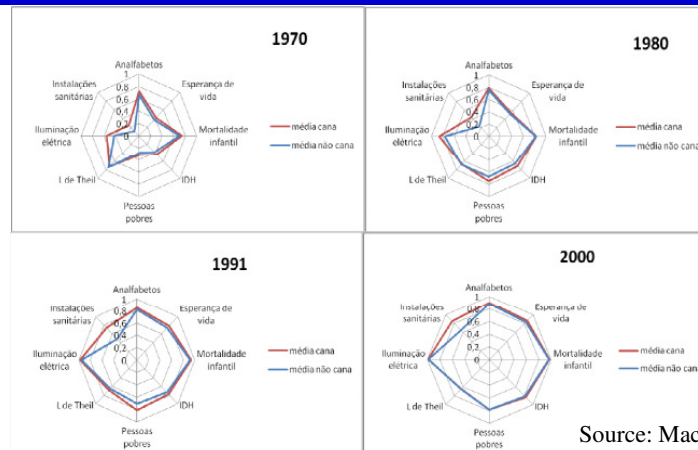


## Local socio-economic impacts (1)

Indicators	With	Without
	2000	
Number of municipalities	181	444
Population (1000)	1.8–504	1.8–504
HDI-M	<b>0.793 ± 0.025</b>	0.773 ± 0.035
Deaths up to 1-year old (per thousand)	<b>13.65 ± 3.59</b>	16.19 ± 5.40
Literate population (%)	<b>90.64 ± 2.64</b>	88.33 ± 3.66
Gini index	<b>0.516 ± 0.045</b>	0.529 ± 0.046
Income ratio (20% richest/40% poorest)	<b>9.65 ± 2.60</b>	10.68 ± 3.92
Income per capita (R\$/month/head)	<b>300.0 ± 69.9</b>	266 ± 92,9

- ◆ Welfare indicators are better in municipalities in which sugarcane production is important in comparison with municipalities of the same size (population). Source: Walter et al. (2011)

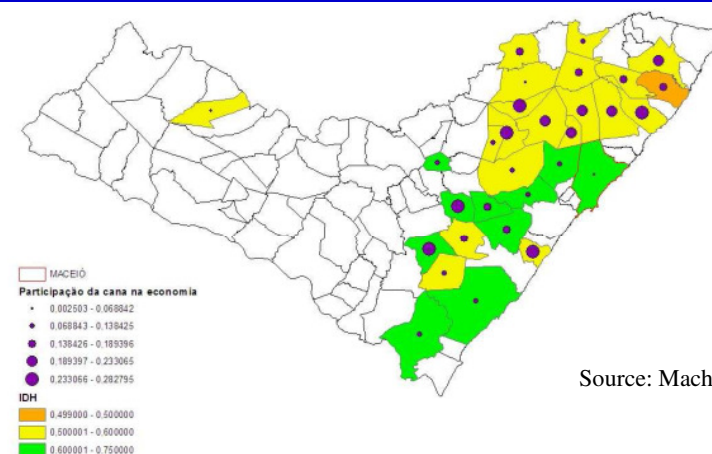
## Local socio-economic impacts (2)



Source: Machado (2012)

- ◆ The (relative) advantage of municipalities in which sugarcane industry is important has been reduced along the years.

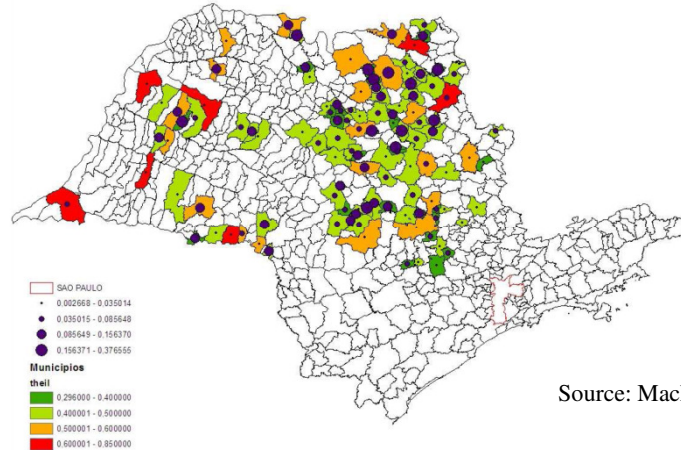
## Local socio-economic impacts (3)



Source: Machado (2012)

- ◆ Differences among the municipalities: IDH (colours) and share of sugarcane in the local economy / Alagoas, in 2000.

## Local socio-economic impacts (4)



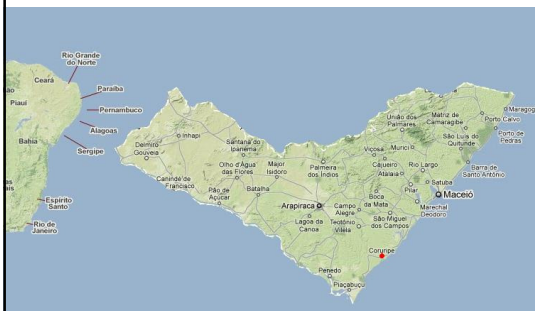
Source: Machado (2012)

- ◆ Differences among the municipalities: wealth distribution (colours) and share of sugarcane in the local economy / São Paulo, in 2000.

## Local socio-economic impacts (5)

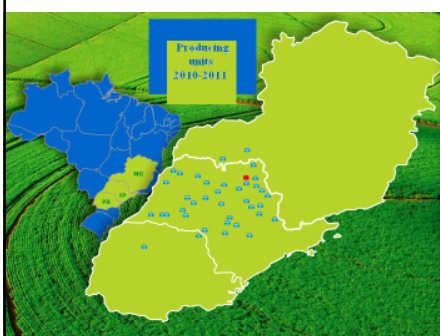
- ◆ General conclusions of the studies developed at CTBE/Unicamp on this issue:
- ◆ (On average) Sugarcane does not cause negative local impacts from a socio-economic point of view but, obviously, it is not (per se) the reason of the best results.
- ◆ Municipalities with the best results are those with more diversified economy, with lower dependence regarding sugarcane, larger population, larger transfers from the central government (in case of small municipalities).

## The two case studies - Pindorama



- ◆ Pindorama mill belongs to a cooperative of agricultural farmers (1,160).
- ◆ It's a small mill in Brazilian terms (about 900 kt/year), producing both sugar and ethanol.
- ◆ The reason for choosing: there are few cooperatives in the sugarcane sector. The aim was in identifying differences, from a socio-economic point of view, regarding the traditional mills in the Northeast region (owned by the traditional entrepreneurs).

## The two case studies – Sao Francisco



- ◆ The mill belongs to a traditional sugarcane group based in the state of São Paulo
- ◆ It is also a small mill (about 1,3 Mt/year) considering Brazilian averages.
- ◆ Is the largest exporter of organic sugar.
- ◆ The reason for choosing: checking if the target on organic sugar production makes any difference from the socio-economic point of view.





## Case studies: synthesis of results (1)

- ◆ In field surveys were done. As much as possible, both cases were compared to other mills in the same region.
- ◆ It was not possible to identify specific advantages regarding the other mills in the same region. As there are other mills, it is not possible to evaluate the impacts of single projects.
- ◆ General sense, the advantage in case of Pindorama mill is that the out-growers are owners of the mill. In this sense, the results are clearly better. But, taking into account the opinions of the employees (and data gathered), into seems that working conditions, wages, etc. are similar regarding other companies in the same region.



## Case studies: synthesis of results (2)

- ◆ In case of São Francisco, the results from an environmental point of view are better, due to the required practices for producing organic sugar.
- ◆ From a socio-economic point of view the practices are similar to the best mills in the region: e.g., social programs, law enforcement, no proved irregularities, etc.
- ◆ The required certification for exporting organic sugar imposes the adoption of best practices.



## Conclusions

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- ◆ Socio-economic impacts of large-scale ethanol production is still a controversial issue. Two important points should be highlighted: (1) the size and the heterogeneity of the sector; (2) the focus put on the worst cases.
- ◆ Working conditions are improving, but certainly there is room for moving forward, and faster.
- ◆ The difficulties of evaluating the impacts of single projects.
- ◆ The Pindorama case is emblematic: the experience should be replicated.
- ◆ The São Francisco case indicates that environmental results can be better. Social conditions are good, in relative terms.
- ◆ From a social perspective, none of these cases are clearly better than the best cases in both regions.