

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

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***Public Perception Assessment on  
Biofuels***

***Brazilian Case***

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## 1. Introduction

This analysis was conducted according to the proposed methodology “Methodology and guidelines for Assessing Public Perception on Biofuels and Bioproducts”.

### a. Internet and desk methods

Most of the analysis and data gathering was done using the internet. All media analysis was done using journalists websites, or websites linked to newspapers and magazines. The stake holder mapping was also done using internet research and networking with partners from CTBE (Brazilian Bioethanol Science and Technology Laboratory).

The Cultural parameters analysis was based mostly on how the experts see it. It was taken into consideration their opinion, as it was not presented in the common references. This part of the study is not addressed so often, and the experts played an important part in defining what these cultural parameters could be for Brazil.

### b. Selected experts for interview

The experts were selected according to their importance. The idea was to select not only the experts in favor or just the ones against, biofuels and it was important to choose very influent persons and/or groups. The list with the selected experts follows.

#### Profa. Dra. Marcia Azanha

She is a professor at the Economy, Administration and Sociology department in the Superior School of Agriculture “Luiz de Queiroz”. Works with working conditions in the sugarcane sector, mostly.

#### Fátima Cardoso

Works for Solidaridad, a NGO for fair trade and sustainable processes (mainly crops). Fatima is an Project manager exclusive for sugarcane and ethanol related projects. These projects range from social to sustainable development of production.

#### Marcel Gomes

Works for Reporter Brasil, NGO for social and environmental issues related to agriculture production. Marcel is the responsible for biofuels production chain improvement projects.

#### Prof. Dr. Francisco Alves

He is a professor at the Department of economy in the Federal University of São Carlos (State of São Paulo). He has several works in the working conditions and social problems of agriculture in Brazil.

Prof. Dr. Rodolfo Hoffmann

He is a professor at the Department of Economy in the State University of Campinas (State of São Paulo). He has worked with income concentration in agriculture and with food security.

Beatriz Secaf

She Works for UNICA (Brazilian Sugarcane Industry Association), and is an environmental analyst for the group, responsible for certifications and climate change issues.

Pedro Carnaúba

Irrigation Coordinator for Coruripe (State of Alagoas). Works with great technology and science exclusively for irrigation. Works for Coruripe for over two decades.

Dr. Manoel Régis Verde Lima Leal

Sustainability Program Director in CTBE ( Brazilian Bioethanol Science and Technology Laboratory).

*c. Questionnaire design and sample selection*

The sample for the public interviews was selected according to schooling degree, this way; it was possible to divide the sample also by age, making it possible to understand the impacts of different factors on public perception.

The sample has 30 people from the city of Campinas, SP (appr. One million inhabitants) distributed as follows:

- 9 undergraduate students from universities;
- 9 undergraduate degree holders;
- 12 people with no university degree;
- The ages ranged from 20 to 77 years old;
- 15 women and 15 men were interviewed.

The sample was selected from the social network of the interviewers, which is in its whole from an urban population. Maybe this is the largest bias, since the biases on educational level and social class were avoided by using a larger range of people (neighbors, lower level workers, higher level workers, different types of professions).

## 2. Stakeholder Mapping

### 2.1 Agro-Industry and mills

Brazil has several sugar and ethanol mills in its territory. Table 1 shows the number of mills and where they are situated.

**Table 1 Operating mills in 2010 and expected amount of sugarcane (2010-2011)**

Region	State	Number of mills	Sugarcane crushed (1,000 t)
<b>Centre- South</b>	Minas Gerais	40	55,198.1
	Espírito Santo	6	3,484.0
	Rio de Janeiro	7	2,643.5
	São Paulo	197	359,235.5
	Paraná	30	43,905.2
	Rio Grande do Sul	2	85.6
	Mato Grosso	9	13,835.1
	Mato Grosso do Sul	21	34,333.2
	Goiás	33	47,980.8
	Sub-total	346	560,701
<b>North-Northeast</b>	Alagoas	24	26,752.8
	Pernambuco	22	18,783.8
	Paraíba	9	5,349.9
	Bahia	4	3,259.2
	Maranhão	4	2,551.7
	Amazonas	1	345.7
	Piauí	1	836.9
	Tocantins	1	348.0
	Pará	1	540.0
	Rondônia	1	146.5
	Sergipe	6	2,200.9
	Ceará	3	180.4
	Rio Grande do Norte	4	2,994.2
	Sub-total	80	64,290.0
	<b>Brazil</b>	<b>Total</b>	<b>426</b>

Source: MAPA (2011), Conab (2011).

### 2.2 Agro-industry representative

- Function: Sugar and ethanol sector development, studies and research incentives, legal aid to all associates, encourages technological improvement, gives logistic support and participates on the political conduct of the sector.
- Level of involvement: In the policy area level, the representatives are responsible for talking on behalf of all its associates, and to make sure the

sector continues to prosper. UNICA is lobbying at international level on the sustainability of Brazilian ethanol and for a freer market.

- Contribution: Direct. Has an important part in connecting the producers (small/large sugarcane producers, ethanol/sugar mills) to other stakeholders, including the government.
- Position: In favor of biofuels. Supporting them.
- Examples in Brazil: UNICA – Sugarcane Industry Union; UDOP – Bioenergy producers union, AFCP – Sugarcane Outgrowers association of Pernambuco, ASPLANA – Sugarcane outgrowers of Alagoas, Sindaçucar – Sugar industry syndicate, CRPAAA – Regional Cooperative of ethanol and sugar producers of Alagoas, ORPLANA – Sugarcane outgrowers association of center-south of Brazil.

### **2.3 Project Developers**

- Function: Responsible for new plants and mills construction. They provide new equipments; develop projects for new plants and for old plants to be refurbished.
- Level of involvement: Project initiatives. Construction, maintenance, process coordination.
- Contribution: Direct.
- Position: In favor of biofuels.
- Examples in Brazil: Dedini – Basic industry, Promon – Infrastructure solutions.

### **2.4 Workers representative**

- Function: defense, organization, study, training, job training, technical assistance, coordination and legal representation of the professional category of workers
- Level of involvement: Public Policy level. Influences and support decision makers.
- Contribution: Indirect.
- Position: In favor.
- Examples in Brazil: STAB – Ethanol and sugar technicians society (south, center, east and northern regional), FETAG – Rural workers federation (state level), rural workers union (regional level).

### **2.5 Policy makers**

- Function: are responsible for the management of public policy stimulus to the sector, the promotion of business and the regulation and standardization of services related to the sector.
- Level of involvement: Policy making. seek to integrate the market aspects, technological, scientific, environmental and organizational of the sector.
- Contribution: Direct.
- Position: In favor of biofuels.
- Examples in Brazil: MAPA – Agriculture, livestock, and supply ministry, MTE – Employment and job ministry,

## 2.6 NGO

- Function: Contribute to the different aspects of biofuels that create more diverse opinions, as social and environmental issues.
- Level of involvement: Policy area. Responsible for studies making, information dissemination and influencing public opinion.
- Contribution: Indirect.
- Position: Mostly against biofuels.
- Examples in Brazil: WWF – Environment and agriculture program, ReporterBrasil – Social projects and communication organization, Solidaridad, CPT – Land pastoral committee ( 21 regional's).
- Reporter Brasil: Works with educational projects in regions with human rights issues. Plays an important part in the National Pact Against Slave Labor and the National Commission for the Eradication of Forced Labor. Have a monitoring project of biofuel and its labor force.
- WWF: Has a line of environment and agricultural production. Has projects of education of good practices and how to minimize impacts.
- CPT: basically works in manifests against landlordism and in favor of agrarian reform. Works also against forced labor since 1997.

## 2.7 Regulatory public body

- Function: Supervises hires and regulates services and industrial activities related to the sector.
- Level of involvement: Policy area. Promotes studies, authorizes production and tests quality of the products.
- Contribution: Direct.
- Position: In favor of biofuels.
- Examples in Brazil: ANP – National oil, natural gas and biofuels agency.

## 2.8 Research Centers

- Function: Perform researches to improve the sector or to prove its positive or negative aspects.
- Level of involvement: Policy area and project initiatives. The research center have a diverse and a wide range of types of research.
- Contribution: Indirect.
- Position: Mostly in favor of biofuels.
- Examples in Brazil: EMBRAPA – Brazilian agricultural research company, CTBE – Bioethanol science and technology national laboratory, RIDESA – Interuniversity network for the sugar and ethanol sector development, USP – ESALQ - Superior school of agriculture “Luiz de Queiroz”, UNICAMP – NIPE – Interdisciplinary Center of Energy Planning, UNICAMP – NEA – Agrarian Economy Cente, UFScar – GEPAI – Agro industrial research and studies Group, ARES – Institute for Sustainable Agrobusiness, ICONE – International commerce and negotiation study institute.



### 3. External influences and crisis

Public perception on biofuels is mainly influenced by its price, according to all of the experts interviewed.

#### a. Price and availability influences

Being produced from the same source, ethanol and sugar have an interesting characteristic of crossed elasticity. Several studies were made in Brazil to explain the impacts of sugar prices on ethanol production and vice-versa. In Campos (2010) was observed that sugar production varies inversely with ethanol prices, and that ethanol production varies inversely with sugar prices, but in smaller proportions.

Other studies in Campos (2010) relate ethanol prices to sugar prices, oil prices, and sugarcane prices.

The year 2011 started with high sugar prices, reaching US\$ 289/ton in February 2<sup>nd</sup> (ADVFN, 2011). Even with little flexibility, the sugar/ethanol mills still can shift their production to sugar (or ethanol) from 45% to 55% of sugarcane use (FILHO, 2009). In an overall scenario, that represents a great amount of ethanol not being produced. Dr. Manoel Régis from CTBE also pointed out that, with the 2009 crisis, the prices went up. In that year, new players entered the market, and instead of building new plants, they decided to buy those that had gone bankrupt. With the 2009 crisis, the production from the new players started slow, making the prices rise from low offer in the market.

The main explanation given by the mills of high prices was the lower Indian production in this harvest year, as reported USDA “decline in sugar production has shifted India from net exporter to net importer during 2009/10, contributing to a runup in global sugar prices”.

The explanations to ethanol high prices fall on other intrinsic problem, which is the seasonal property of sugarcane. The sugarcane production in Brazil has two big regions, Center-South and North-Northeast. The Center-South region is responsible for 90% of all sugarcane harvesting, going from May to November.

In order to attend the internal demand of ethanol during the periods with lower production (outside Center-South harvesting period), the producers must make a substantial reserve of ethanol. These reserves not only represent loss of profit in that period of time, but also represent bigger expenses, with high maintenance costs.

In this matter, ethanol public perception depends highly on how expensive it is to use that fuel. The latest news saying Brazil would have to import ethanol from the United States has caused an even bigger impact on public perception (FOLHA, 2011).

#### b. Food crisis influence

Another crisis, a much more international and deeper crisis, especially on the image of biofuels, was the 2008 food crisis.

In late 2008, the guardian (UK) has reported that biofuels were responsible for a rise of 75% in food prices, accordingly to a confidential report from the World Bank. The website stated that “The figure emphatically contradicts the US government's

claims that plant-derived fuels contribute less than 3% to food-price rises. It will add to pressure on governments in Washington and across Europe, which have turned to plant-derived fuels to reduce emissions of greenhouse gases and reduce their dependence on imported oil.”

On the other hand, two experts pointed out that this interference in food prices and food availability is tied to ethanol production from corn, especially in the United States of America. Dr. Rodolfo Hoffmann has said yet that there is no proof of connection of high food prices to ethanol production from sugarcane in Brazil.

c. External influences

When it comes to external influence, Fatima Cardoso said Brazil has two major publics. One is the consumers inside Brazil, and the other is the international community and potential buyers. These two publics have different views of the ethanol. The first one is worried about prices and availability, while the second worries about food security and sustainability. That influences the producer’s actions in great proportions, including certification and corporate social responsibility programs.

According to all experts, in Brazil people are mostly familiar with United States as a biofuel producer. They say it is because of their production and how media has discussed and compared their system of production and the one in Brazil.

## 4. Media Analysis

In order to analyze Brazilian media concerning biofuels several media sources were browsed: The websites of 3 of the 10 most popular print media in the country - Folha de São Paulo, O Globo and O Estado de São Paulo (Journals National Association, 2009) -, the websites of a magazine - Época -, a television newscast - Jornal Nacional -, and an online news website - G1. The period taken into account was from 2006 until 2011.

It was noticed that the biofuel issues are quite recurrent in the Brazilian media, especially because of the pioneering and investments by the country in the production of sugarcane's ethanol, as well as the use of flex-fuel vehicles.

The most frequent themes are related to the controversy on food security, fluctuations on prices, biofuel production innovations (especially in the transportation sector), and government investments, more specifically the creation of a new branch of the State oil company aimed to produce biofuels: Petrobrás Biocombustível. Other topics covered were exportation, international agreements, national and international environmental concerns (mainly the protection of Pantanal and Amazon), fuel blending, and commodities issues - whether ethanol could become a commodity and if it's production interferes with sugar production and it's prices.

There were many news citing FAO's and UN's opinions about food security, which were controversial during the analyzed period. On the contrary, the news about the Brazilian government show a consolidated opinion that defends biofuels image and deny that food crisis may be caused by their production. This is an issue that has been discussed for a long time. In the analyzed Medias, the topic appears since 2007, but the theme became more frequent since 2008 due to the food crises.

It was also broadcast several times the innovations on alternate fuel production, many of which are created by very unusual materials, such as whiskey, ox fat, coffee, grass, cooking oil, among others. There are also many articles regarding the use of non-fossil fuels in transportation sector, for example tests performed by TAM airline company in 2010 using biofuels- which were broadcast by all the consulted medias, except Jornal Nacional. Some news from Folha de São Paulo show that there were investments for the use of biofuels in TAM's airplanes since 2008. Another example is the introduction of biodiesel-powered buses in cities such as Curitiba in the state of Paraná (since 2009). Although this analysis take into account data from 2006, it is important to stand out that news from Folha de São Paulo show that the first tests for the use of biodiesel in public transportation begun in 1997.

There also news about investment in research, for example, the Federal University of São Carlos, which recently began researching algae biofuel. However, little is said about the production of second generation biofuels, although there are efforts in the country accordingly- for example, the opening in 2010 of CTBE (Brazilian Bioethanol Science and Technology Laboratory).

It's perceivable that there is a great attempt from the Brazilian government not only for investing in the production of biofuels but also for defending it inside and outside the country. This trend has been consolidated after the creation in of Petrobras

Biocombustível, which recently began to buy and produce ethanol, besides investing in other biofuels. The Petrobras Biocombustível has been frequently in all the analyzed medias since its creation in 2008.

There were several news regarding Brazil's image in the world, especially in the US and EU. The media also shows that there are a favorable policies for fuel blending, exportation, and cooperation agreements with several countries, such as Japan, Indonesia and The Netherlands.

Despite the targets established by the government for mechanization of sugarcane's crop, the topics is still not widely debated by the mainstream media. There is also little discussion about work conditions in the sugarcane fields.

Regarding environmental issues, there is a national and international concern with protection of native vegetation against deforestation for biofuel production, especially in Pantanal and Amazon.

This is a subject that appears since 2006 (only in Folha de São Paulo), but it is intensified from 2008-2009 in all the medias probably due to the increasing global concern about the theme. The concern with the protection of Amazon is much frequent in the analyzed Medias than the concern about Pantanal. The theme is much more recurrent in the printed Medias (O Globo, Folha de São Paulo e O Estado de São Paulo) than the audio and video Medias.

Less frequently, crop extension issues also show up. From 2008 there are few reports in Folha de São Paulo, G1, O Globo e Folha de São Paulo about LUC which are mainly related to livestock. Issues related to sustainability, certification and greenhouse gas emissions are recent and also appear sporadically.

The themes are discussed in many categories of the analyzed medias, from opinion posts and Blogs to sections like Politics, Market, Environment, Lifestyle, Economics, General, National and International.

In the expert opinion, the media is quite frequent in covering this subject. For most of the experts, the media has taken care of pretty much every aspect of biofuels/ethanol. For Profa. Dra. Marcia Azanha, the media has improved its quality of sources, relying on more scientific results other than just manipulated data. All of them agree that media is mostly worried about prices and availability, and that ethanol is found normally in the economy section of newspapers and magazines. For Prof. Dr. Rodolfo Hoffmann and Dr. Manoel Regis, the most read media vehicles are Folha and Estado de São Paulo. They say these newspapers have done a few coverage over time.

## 5. Cultural Parameters

Only two experts (Marcel Gomes and Fatima Cardoso) have named any groups with position against biofuels from an ethical or moral perspective. These groups are against bioethanol because of the way it is produced, causing a supposed income aggregation, instead of income distribution. These groups are:

1. MST (Movimento Sem Terra, or “the landless movement”), which is against agribusiness more than bioethanol itself, but, since bioethanol is mainly produced by large companies and can hardly survive as a small producers, it is targeted by the movement for manifests;
2. Amigos da terra (or Friends of the Earth, in English), a NGO that works to Implement projects and activities that promote the sustainable development of the country, with particular focus in the Amazon region and recognize the value of environmental heritage. According to Fatima Cardoso, they have signed documents against biofuels, and have also published papers against them, as the “O milho, o etanol, os ricos e a fome” (Corn, ethanol, the rich and the hunger”), talking mainly about ethanol production from corn, and “Etanol, Matando os Pobres de Fome” ( Ethanol, killing the poor from hunger”).
3. The CPT (Comissão Pastoral da terra), a group linked to Catholic Church completely against the expansion and the model of production, especially when it comes to income concentration.

The aspects mostly used for public perception construction named by the experts were:

- In favor: Renewable energy; local development; emissions reductions; energy security; employment for low education; country economic development.
- Against: Price and availability, Food security, Income concentration, working conditions, Biomes invasion.

Two experts have clarified some points that might be used to build a negative public perception on ethanol. Prof. Dr. Marcia Azanha has pointed out that working conditions are in great improvement and some groups or researchers are still attached to a historical precedent. In the past, sugarcane production was based on the slavery, and the workers only started to have a better working condition and the sector to be supervised a few years ago. Another Professor, Dr. Rodolfo Hoffmann, has different publications on how the salary for the sugarcane sector is slightly higher than other crops.

The biomes invasion is also a controversy. On one side, Prof. Dr. Francisco Alves, from Federal university of São Carlos says the so called agro-ecological zoning will not be respected once the available land is scarce, on the other hand, Beatriz Secaf, Environmental analyst for UNICA (Sugarcane Industry Association) has a strong position saying the sugarcane land use is 1% of all agricultural land, and it will not surpass the limits in the agro-ecological zoning.

No expert is familiar with a group or public person that is against or in favor of biofuels from a religious point of view.

Dr. Manoel Regis has yet said that socio-cultural parameters change over time. The history of ethanol production started back in the 30s, and then the argument was excess of sugar cane. In the 70s and 80s it was energy security. After a decade of instability, in the year 2000, the environment became the argument.

## 6. Synthesis

Brazil has a long history of ethanol production and consumption. As pointed out by Dr. Manoel Regis, it has been produced since 1931 and has gone through a variety of crisis and levels of importance. Public perception on biofuels, especially ethanol in Brazil, has also changed over time. The media has included sugarcane and ethanol production in all sort of news. As the villain of deforestation and the savior of global warming, like the expert Beatriz Secaf said.

All the experts have the same opinion when it comes to what drives public perception of biofuels: their price and availability. Price has appeared 13 times in different sections of the questionnaire, 7 in the critical aspects of biofuel development alone.

The interviews were conducted as a “biofuel” interview. Although ethanol has appeared in 19 interviews as an example of biofuel, and as it can be considered a result of a bias, since some of the interviewed people had only mentioned ethanol after the interviewers have pointed out that ethanol was in fact a biofuel (in order to ease the answer of other questions, like “do you know about biofuel projects?”). On the other hand, it was not mentioned or it wasn’t the first biofuel in the mind of 16 interviewees. This could be explained by the history of ethanol. Like said before, ethanol is present in Brazil for decades. You can fill your tank with it also for decades, and, with the flex fuel cars, you can even choose the fuel you want to use. Biofuels are considered something new, something high tech, and people just don’t make that connection. That also explains why castor beans biodiesel has showed in 6 of the interviews. When the biodiesel program in Brazil started, it was supposed to be an incentive for rural development in small family plantations, and the main product would be castor beans. The government did huge marketing campaigns and the castor beans biodiesel became a symbol of the new age of biofuels.

Other interesting results can be taken out of the interview. For example, the media has great influence on what people know and what people think about biofuels and the media type changes with the age and social class. Internet is used mostly by the younger interviewee. The amount of knowledge on biofuels doesn’t have any apparent connection with age. But social class and education have more influence on what people say about biofuels in general, although it is not an exclusive characteristic for biofuels knowledge.

The knowledge levels were classified as: Knows nothing, heard about it, knows little and knows a lot. As expected, one of the people knows nothing, 10 heard about it, 18 know little and one knows a lot. The classes are explained as follows:

1. Knows nothing: When the first question “what do you know about biofuel: which biofuel?” was not answered at all, and the other questions needed some kind of input, as example or issues ranking.

2. Heard about it: The interviewee had some idea about biofuels, like what sources they come from and knows at least one example. Most of the questions needed some kind of input.
3. Knows little: The interviewee knows where biofuels come from and know more than one example, and/or the question where answered with no input from the interviewers.
4. Knows a lot: has a clear view of biofuels. Not necessarily answered all questions, but had a better idea than the other interviewees of what is involved with biofuels production.

The knowledge on biofuels (or specifically on ethanol) was lower than expected. When asked about local projects, only 6 answered, and the answers were on where they were, instead of a mill, or a real project. When asked about projects in the country, the answers were even worse. Only 8 interviewees had an answer. 3 answered northeast, 1 answered paran state, and 1 ribeirio preto (SP). The other 3 answered Petrobras, since it has entered the sector in 2008 when Petrobras biofuels was created., and it was shown all over the media. In other countries, only USA, Spain and Latin America were named.

Even though it is a questionnaire on biofuels, when asked about priorities for the region/country, most of the interviewees did not address that subject. The question was “What do you think is a priority for your region/your country? What are the main issues that policies should address first?”. 16 answered education as first or second option, 10 answered health as first, second or third option, 5 answered safety, and only 5 answered exclusively about biofuels spontaneously.

The opinions about biofuels are almost unanimous. 26 said they believe biofuels are sustainable, 6 believe they can be sustainable if well produced or not over exaggerated, and only 1 believes they are not sustainable, and 1 did not know what to say. That could have been distorted by the knowledge of people on sustainability. The majority is also in favor of biofuels. 27 say they are in favor of biofuels, and 3 say they are in favor but with some kind of condition (price, pollution levels and monoculture activities).

The reasons why people are in favor of biofuels did not vary much. 14 people answered because it is good for the environment as a reason why they are in favor of biofuels. And 7 answered because it pollutes less as a reason, meaning, 21 of the answers are related to environmental issues. Other reasons were: Good for the economy, it helps economic development, more job positions and energy security.

After the 100% acceptance and the low knowledge on biofuels, it was not a surprise that almost every interviewee had difficulties with the last question “what aspects of biofuels development do you think are critical?”. Most of them needed an issue ranking. 5 answered there were no critical aspects. Other aspects were the environment, decrease pollution, and 8 answered the prices and costs should be decreased.

Looking at how people see ethanol and biofuels in general, one can say the public perception should not change in the short term. It is highly influenced by prices and availability, and if these parameters follow the same tendencies, they might suffer



some shifts due to seasonality and competition with co-products like sugar, but nothing great enough to change how people look at it.

As pointed out by 4 interviewees, information is the key to improve knowledge on biofuels, and to disseminate the culture of biofuel use. As long as the public is not well informed or has no meanings to reach a good level of understanding biofuels, the public perception on how good (or bad) biofuels are, again, should stay the same.

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