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The public perception of biofuels/bioproducts in Costa Rica

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Abbreviations

ACICAFOC	Indigenous and Peasant Coordination Association for Community Agroforestry in Central America
AESC	Costa Rican Association of Social Ecology
ALIARSE	Public – private alliance for development
CBI	Caribbean Basin Initiative
CARSA	Rey food Corporation S.A. – Burger King
CATIE	Tropical Agricultural Research and Higher Education Centre
CATSA	Tempisque Sugar Mill S.A
CEA	Environmental Education Centre
CENIBIOT	National Centre for Biotechnology Innovation
CESMAG	BusTransportation line
COECOCEIBA	Ecological Communities Association of La Ceiba
Coopeagropal R.L.	Valle del Coto Sur Cooperative
COOPEDOTA R.L.	Dota Coffe Growers' Cooperative
CRECEX	Foreign Trade Chamber of Costa Rica and Foreign House Representatives
DIECA	Directorate of Research and Extension of Sugar Cane
FEDECAC	Federation of South Pacific Agricultural Centers
GEF	Global Environment Facility
GIZ	German Development Cooperation
ICE	Costa Rican Electricity Institute
IDA	Institute for Agrarian Development
IICA	Inter-American Institute for Cooperation on Agriculture
INA	Learning National Institute
ITCR	Technological Institute of Costa Rica
LAICA	Industrial Farm League for Sugar Cane
MAG	Ministry of Agriculture and Livestock
MINAET	Ministry of Environment, Energy and Telecommunications
nd	no date
PITTA	Programme of Research and Transfer of Agricultural Technology
PRIFAE	Institutional Programme on Energy Alternative Sources
RECOPE	Costa Rican Oil Refinery
Sermucoop	Coto 63 Cooperative Services
SGP	Small Grants Programme
STRO-CA	Social Trade Organization – Central America
UBA	United Bio fuels of America
UCR	University of Costa Rica
UNA	National University of Costa Rica
UNED	Distance State University
UNDP	United Nations Program for Development
Coopetalamanca sos	Talamanca sustainable cooperative of multiple service

1. Introduction

This report on public perception of biofuels in Costa Rica was elaborated following the methodology and guidelines proposed by CATIE, cf. Global Bio-Pact deliverable 7.1 by Fallot and Chacon (2011).

Internet and desk methods

Search strategies were developed in Spanish language on the Internet taking as keywords *"biofuels and Costa Rica"* in conjunction with the exact word *"opinion."* We also used the terms "*biofuels in Costa Rica*" and "*conservation*" and searched in English language under the term *"biofuels in Costa Rica"*.

We reviewed and characterized the information from 35 internet links whose inputs run from May 2005 until May 2011, see list in the section "7. References."

We also used the information generated previously: first with a preliminary e-survey on www.e-encuesta.com conducted in August 2010, then during the workshop on public perception of biofuels in Costa Rica that took place in September 2010 at CATIE, cf. Deliverable 7.4 by Polimeni and Fallot, 2010.

Studies specifically dealing with the public perception of biofuels in Costa Rica were not found. A publication by the sugarcane league mentions in general terms the arguments in favour and against biofuels given by different groups in our global society (Chaves, 2007). Opinions and criteria are classified as political, economic, productive or environmental; their relevance is evaluated with respect to the Costa Rican context.

Expert interviews

We selected about 20 experts for interviews and could interview 10 of them:

- Mercedes Agüero, journalist at the La Nacion daily newspaper, covering energy issues, including biofuels (phone interview);
- Alonso Acuña from Ministry of Agriculture, coordinator of the national programme for innovation in agricultural technologies on biofuels (phone interview);
- Giovanni Castillo Pacheco, civil servant at the Energy sectoral direction of MINAET, the Energy and Environment Ministry, involved in the development of the national biofuel strategy (skype interview);
- Jaime García, biology profesor at UNED, part of a network on biomass uses (phone interview);
- Eladio Madriz, general manager of Energías biodegradables S.A., producing and sellig biodiesel (phone interview);
- Julio Mata, chemistry profesor at the UCR, leading the PRIFAE, the Institutional Programme on Energy Alternative Sources (written two page communication in response to our specific questions);

- Sergio Musmanni, formely belonging to the Industry Chamber where he was part of the Ethanol Comission, now working for GIZ (written two page communication in response to our specific questions);
- José Oduber Rivera, sociologist, professor and coordinator of CATIE's masters on development practices (meeting).
- Marta Valdez y Jorge Valdez, from CENIBIOT research center, respectively director and head of the bioprocess plant (phone conference);
- Orlando Vega, formerly in charge of biofuel development at the Ministry of Agriculture, now working in the regional instituite for agricultural cooperation, IICA, on biofuels still (phone interview);

Questionnaire design and sample selection

The questionnaire design followed the Global Bio-Pact *"Methodology and Guidelines for Assessing Public Perception on Biofuels and Bioproducts"*. Questions were reformulated in Spanish with non technical terms. The sampling of respondents was done during CATIE's International Fair (April 30th and May 1st 2011), gathering many people from different locations of Costa Rica and varied backgrounds: 30 persons were interviewed. All the answers are reported in the table shown on Annex 1.

We put attention on interviewing only Costa Rican residents balancing the representation of genders and age classes. The questionnaire sample has 17 men and 13 women; six persons younger than 30, sixteen persons in the 31 to 45 age interval, seven persons between 46 and 64, and one person over 65. Though we knew we could not aim for a representative sample of the whole Costa Rican population, we asked about occupations and the use of a vehicle, in case such information could bring hypothetic explanations of results. We found ourselves interviewing 5 house-persons, 3 in commerce and marketing, 2 in civil engineering, 2 in agronomy engineering, 2 miscellaneous, 2 students, 2 teachers and 2 office and secretaries. There was also one person in each of the following occupations: psychologist, manager, lawyer, firemen, industrial engineering, refrigeration technician, construction worker, commerce specialist/consultant, pensioner and car sale agent.

The rest of the report builds on our own knowledge of the situation of biofuels in Costa Rica, completed by the experts' interview and answers to the questionnaire.

2. Stakeholder mapping

Eight categories of stakeholders were identified as able to influence public perception of biofuels in Costa Rica. Such influence derives from their involvement, actual or considered, in biofuel projects or in the policies that may determine the future development of biofuel in the country.
Levels of involvements are diverse and in the whole still do not results in large volumes of biofuel production and consumption.

Stakeholders are presented below, more or less along the biofuel production chain: biomass producers; biofuel producers; biofuel distributers and traders; biofuel consumers; policy-making and regulating institutions; research and training institutions, and other stakeholders taking position on biofuels.

2.1. Biomass producers

Function: produce or generate biomass that is meant to be transformed into biofuels, at least partially: agricultural producers of energy crops (Jatropha), of crops with a possible energy end-uses (sugarcane, oil palm), of crops whose residues are transformed to biofuel or planned to be so (coffee, banana and coconut), potential algae producers, oil consumers participating to the collection of used oil for its recycling to biofuel.

Level of involvement: Biomass producers are involved in the provision of feedstock for biofuels. Their involvement either is direct or, more often given that only a fraction of biomass is a feedstock to biofuel, goes through an association or a cooperative of producers as well as an agroindustrial stakeholder whose contribution is direct to biofuel projects.
Biomass producers' involvement is neither continuous nor guaranteed; it fluctuates with prospects on biofuel demand and the relative profitability of non food outlets.
Some of these associations or cooperatives of biomass producers are also involved at the policy level, lobbying for better public support to biofuel development: either first generation biofuels (sugarcane producers), or non yet existing advanced biofuels

Position towards biofuels: Biomass producers stand in favour of biofuel development, as long as biofuel represent market opportunities for their productions. Stakeholders involved in the production of feedstock that could be used for advanced biofuels draw a distinction between first and second-generation biofuels, and criticize first generation biofuels for their contribution to food price rises and to deforestation.

Examples:

- CoopeVictoria produces sugar cane and coffee, partially used for ethanol production; they also have a project with the support of StroCA Foundation about used oils recycling that promotes the collection of used oils in schools, cf. www.coopevictoria.com.
- LAICA gathers sugarcane producers and organizes the supply of sugar and ethanol plants, cf. www.laica.co.cr.
- The consortium formed by Coopeagropal R.L. and Palmatica/Numar, produces and buys palm oil. Sermucoop, a small cooperative of growers, sells palm oil and palm fruit to Coopeagropal RL, and also uses biodiesel in its machinery and vehicles. FEDECAC produces palm oil and *jatropha*, and develops a pilot plant processing vegetable oils into biofuel, cf. www.coopeagropal.com and www.gruponumar.com.
- Coopetalamanca sos promotes the production of biofuels from crops that do not conflict with food production, according to its perception, because

they are crops grown on marginal lands such as *Jatropha curcas,* locally called "tempate", cf. http://coopetalamancasos.org.

- The UBA initiative led by American entrepreneurs, promotes *Jatropha* cultivation in Costa Rica and other Latin American countries, cf. http://thecostaricanews.com/united-biofuels-of-america-costa-rican-export .
- The fast-food restaurants Burger King and CARSA collect used vegetable oil for biodiesel production, which is used in the fleet of the same company.

2.2. Biofuel producers and biofuel plant suppliers

Function: These stakeholders run or sell, or are planning to run, the agro industrial infrastructure or at a smaller scale, the equipments, necessary to process biomass feedstock into biofuels: fermentation tanks and distillery for the transformation of sweet or starchy biomass to ethanol, oil extractor, filter and transesterifier for the production of biodiesel out of oily feedstock.

Level of involvement: It is the strongest in the supply-chain.
Their contribution is direct at the project level and indirect at the policy level where they lobby and highlight characteristics of biofuels such as cheaper and eco friendly compared to the use of petroleum products. They seek increased production of biomass feedstock and better incentives to promote the consumption of biofuels.

Position towards biofuels: In favour, biofuel development is their business

Examples:

- A reference organization in the transformation of biomass into biofuels in Costa Rica is the already mentioned LAICA sugarcane league. It has an alcohol rectifying plant for ethanol imported from Brazil and exported to the USA, Japan or Europe. DIECA is the research section of LAICA which has an active role in generating opinion related to biofuel development. They constantly evaluate the conditions for promoting biofuels, particularly ethanol, in Costa Rica.
- CATSA and Taboga are the two sugarcane industrials processing molasses into ethanol, cf. http://www.catsa.net/index.php.
  The coffee cooperative Coopedota transforms coffee waste into ethanol which is used to run their vehicles so as to reduce fossil fuel consumption, cf. http://www.coopedota.com/.
- Energías Biodegradables SA - Costa Rica produces biodiesel, representing the most well-known experience in the country, spontaneously mentioned by most interviewed experts and a few respondents of the questionnaire, cf. http://www.energiasbiodegradables.com/
- The Agregados H & M Company has a demonstration project of biodiesel production and processing, articulating the experience of producing biodiesel with scientific and ecological tourism, their "Biodiesel Tour", cf. http://www.biodieseltourcr.com/

- Biodiesel Central HTP Inc. is a company that sells plants for biodiesel production and promotes biofuel consumption in different countries including Costa Rica, cf http://www.centralbiodieselhtp.com/es/
- Ryan King is a biologist and small entrepreneur producing biodiesel at small scale in Monteverde. Biodiesel is collected from local restaurants and consumed by local bus schools. He shares on Internet his do-it-yourself type experience, cf. http://www.energybulletin.net/stories/2010-08-26/biodiesel-biochar-biodiversity-costa-rica-example-small-scale-locally-appropriate

2.3. Fuel refiner and trader

Function: Importation, refining, wholesale distribution and marketing of fuels. Biofuels are generally mixed with fossil fuels by this category of stakeholder, who also prospect for biomass and biofuels, for technologies, equipments and expertise on biofuels.

Level of involvement: Their involvement is determinant for biofuel development, especially in Costa Rica where there is a monopoly on fuel importation and refining.

Position towards biofuel: In favour as long as they can keep control of biofuel development

At this level there is a single stakeholder, **RECOPE,** the state company with a monopoly on the imports, refinery and distribution of oil products. It is responsible for the production, distribution and sale of ethanol blended in gasoline in Costa Rica. It leads a pilot project of biofuel incorporation in the province of Guanacaste (North West of Costa Rica), cf. www.recope.go.cr.

2.4. Fuel distributers: owners of gas stations

Function: Selling fuel to end consumers. Fuels may have a percentage of biofuels, in which case gas stations may have to follow special procedures on storage and distribution of fuels.

Level of involvement: conditional to fiscal arrangements determining their financial margin. In Costa Rica, gas station owners all belong to a commerce chamber through which they have been pleading for the recognition of an extracost for biofuel incorporation. A financial margin has been pledged to cover this extracost.

Position towards biofuel: opposed, as long as the expected financial margin has not been granted. It seems that the technical problems mentioned in handling biofuels are pretexts to back up financial claims.

Fuel distributers are associated within the **Chamber of fuel entrepreneurs,** cf. www.aceccr.com.

2.5. Biofuel consumers

Function: Using biofuel for their vehicle motors Biofuel consumers in the Guanacaste region are passive, they don't choose to consume ethanol but get supplied in gas stations that sell ethanol-gasoline mix (www.nacion.com/2011-04-19/ElPais/Relacionados/ElPais2753442.aspx). Other biofuel consumers are active, either belonging to short supply-chains within a cooperative or other institution where biofuels are both produced and consumed, or dealing directly with a biofuel supplier for specific purposes such as emitting cleaner fumes during the obligatory annual technical vehicle control, or for a captive fleet of local buses or tourism buses for instance.

Level of involvement: given that biofuel volumes available nationally are rather limited, biofuel consumers cannot rely entirely on them to satisfy fuel needs.
Biofuel consumers can influence public perception of biofuels, namely on technical aspects of their performance. We have not found any evaluation yet of experiences of biofuel consumption. CATIE and CIRAD are currently (Medellin and Fallot, 2011) conducting a study on biofuel consumption experiences, namely by captive fleets of agricultural cooperatives.

Position: most active biofuel consumers are promoting their image, getting or hoping to get environmentalist recognition with the use of biofuel, carbon neutrality for instance. In that sense, consumers stand in favour of biofuel development. However, it is not obvious that biofuel consumers would be willing to pay an extra-cost for biofuel in substitution to fossil fuel.

Examples:

- Autotransporte CESMAG S.A., Curridabat-San Pedro Bus Line and Pavas and Deldu Transportation Line, currently use biodiesel in their fleet of passenger transport. Burger King and Papa John's business groups represented by the CARSA Company consume biodiesel in their captive fleets of trucks, cf. www.elfinancierocr.com/ef_archivo/2009/noviembre/22/negocios2164578.html.
- ICE shows interest in consuming biofuels for power generation in its new thermal plant, Garabito currently running on bunker, cf www.nacion.com/2010-10-3/ElPais/NotaPrincipal/ElPais2541040.aspx.

2.6. Policy-making and regulating institutions

Function: declare general orientations on biofuels, provide legal and judicial framework for activities concerning biofuels directly (monopoly on fuel distribution) or indirectly (sugar quotas for instance), provide and regulate incentives at different stages of biofuel supply-chains, from land cultivation until fuel consumption or exports.

Level of involvement: except for RECOPE, public institutions are not involved directly in biofuel production, distribution and consumption. They promote biofuels by declaring them of public interest and including them in national priorities for the energy and the environment, they gather main stakeholders of

biofuel development within several commission or programmes, and they support some research on alternative energy. However they have little leverage on major players for biofuel expansion and do not offer them the right incentives for biofuels to develop according to official plans.

Position: In favour, neutral or passively against biofuel development: because of financial constraints or conflicting objectives, public policies might contribute to complicate biofuel development.

Examples:

- MAG regulates aspects related to agricultural production and intends promoting research and innovation on energy crops within a specific programme (PITTA). IDA provides access to land to small farmers and technical assistance on specific crop (including energy ones).
- MINAET coordinates the National Biofuel Plan (www.dse.go.cr/es/03Publicaciones/01PoliticaEnerg/Programa%20Nacional%20de%20Biocombustibles.pdf) and the National Biofuel Committee, cf www.minae.go.cr/biocombustibles.html, gathering MAG, RECOPE, academic colleges, Canapalma, National Chamber of Agriculture and Agribusiness, LAICA, ICE, and ARESEP.
- ARESEP is responsible for tariff policy for electricity services and fuels, and regulates the commerce of biofuels.

- In her discourse on energy policy, the president of Costa Rica mentioned the need to "replace gradually imported fossil fuels for domestic energy, alcohol, biodiesel, hydroelectric, geothermal, biomass, wind and solar" (Chinchilla, 2010).
  Laura Chinchilla highlights economic and environmental aspects, stating that "This action will allow us to reduce our oil bill, which in 2008 took 22% of our exports, and we will shield against climate change. In this way, our vulnerability diminishes and we become more competitive in international markets and will be again one environmental referring" (Chinchilla, 2010).

2.7. Research and education institutions

Function: Provide concepts and data on renewable energy in Costa Rica. From a diversity of disciplines and approaches: gather documentation and conduct research on the processes of biomass cultivation, and the production, processing, storage, distribution and consumption of biofuels, particularly ethanol and biodiesel. Participate in the discussions generated through the National Committee on Biofuels, on policies and strategies related to biofuels.

Level of involvement: They are involved in the assessment of potentials, the identification of efficient technologies, the analysis of environmental and economic impacts, and in more focused research on biomass feedstock, processes and bioproducts. They are also directly involved in the diffusion of information and opinions as well as in debates and forums. In spite of their influence, they seem to have limited direct participation in decision-making spaces on policies for the development of biofuels.

Position: In favour of biofuel development when working on the theme and trying to improve their performances; more critical when considering biofuels within wider societal and environmental issues.

Examples

- UNA has been one of the oldest focal points of discussion found in the press articles, seeking information on the benefits of biofuels, from a seminar held in 2005, where an expert from the Argentine Institute of Oil and Gas presented the advantage of biofuels as substitutes for petroleum, cf. www.una.ac.cr/campus/ediciones/2005/mayo/2005mayo_pag05.html
- UCR is federating research on renewable energies from a large variety of disciplines. Its PRIFAE led by the School of Chemistry organizes conferences and is involved in the National Biodiesel Committee. The UCR-Fabio Baudrit Experimental Station, cf http://www.eefb.ucr.ac.cr/ develops research on the cultivation of Jatropha in conjunction with RECOPE.
- The CEA from ITCR promotes non-conventional energy sources. INA has cooperated in the testing of biodiesel in motor skills and is a major national reference for technical training on the process of the agricultural production chain that generates raw material for biofuel production.
- IICA and CATIE lead comparative studies on biofuels in Latin America. State of the Nation Project offered through their national reports some criticism related to the development of biofuels from the perspective of agriculture and its environmental implications, challenges and impact of the use of hydrocarbon energy.
- CENIBIOT has research equipments on biotechnologies that can serve for studies related to biofuel even led by other universities, cf. www.cenibiot.go.cr.

2.8. Other stakeholders taking position on biofuels in Costa Rica

Function: support rural development with community-based organizations. They work through platforms for networking exchange to build joint proposals related, improving access to productive resources such as land, technical assistance, credit and inputs. They also advocate for environmental causes, lead campaigns and exercise political and legal advocacy. Some environmentalist organizations are more radical and focus on conservation.

Level of involvement: we have not identified organizations specialized on biofuel issues, their involvement is often punctual and related to specific cases or contexts where it is perceived that decisions on biofuels may affect local population, either positively (develop rural means of production) or negatively (with regards to the rights of peasant groups).

Position: In favour of the biofuel initiatives that represent opportunities for rural population, for carbon neutrality or other environmental improvement. More critical in general terms when biofuels belong to large scale and international supply-chains.

Examples:

- AESC is an organization that stands controversy related to food security impacts of GMO crops for example. COECOCEIBA shows a critical stance towards biofuels from the food sovereignty point of view, cf. http://coecoceiba.org/2006/10/03/biocombustibles-cultivos-energeticos-y-soberania-alimentaria-en-america-latina/
- Rural Women Network does not show a clear position with regards to biofuels, but defends the rights of rural women and food sovereignty. ACICAFOC through its regional agroecology and food security program has developed a project related to the production of biodiesel from Jatropha crops with peasant organizations in southern Costa Rica.

3. External influences and crises

3.1. External influences

The experience of Brazil is the most well known in Costa Rica. Brazil influences the development of a biofuel industry trough business opportunities, equipment supplies, technical assistance including staff training, and regionally active research and development promotion. Biofuel is also part of the diplomatic agenda between Brazil and Costa Rica, cf. http://documentos.mideplan.go.cr:8080/alfresco/d/d/workspace/SpacesStore/b91fa503-1020-47c5-9804-af5e6642d1ed/prioridades_acciones_CR_Brasil.pdf. There is no doubt that Brazil is recognized as leading the biofuel industry, technically and economically. However, the Brazilian model is not considered fully appropriate for Costa Rica because of the scale differences and also because of criticism on the social aspects (Chavez Saenz, nd). In the same way, Argentina is a reference for its biofuel experience and its experts, but triggers criticism on the environmental and social implications of biofuel development.

Other major foreign actors in a position to influence biofuel development in Costa Rica are Colombia and Mexico. They diffuse their technologies and business models through regional programmes supported by the Interamerican Development Bank (IDB), cf. the Mesoamerican Biofuels Program (BID-OLADE 2006) promoting the installation of biofuel production plants (already in El Salvador and Honduras, planned in Costa Rica, Guatemala, Panama and Dominican Republic). This initiative is supported by all the presidents from Mexico trough Panama region by the XII Summit of Tuxtla Declaration, ratified on June 15, 2010 in Cartagena, Colombia. However, the experiences of Colombia and Mexico do not appear to be well-known in Costa Rica.

USA actors are quite active on biofuels in Costa Rica, promoting biomass for energy production and incentivising exports to the USA:

- the Caribbean Basin tax initiative provides duty-free access to the United States market for biofuel processed in Costa Rica, even if originating from Brazil.
- the University of Florida regularly intervenes in national or regional events on biofuels

- the Energy and Climate Partnership for the Americas (ECPA) supported by IDB and United States Department of Energy (DOE) is a continental initiative that shares experiences on energy development, including biomass and biofuels, cf. http://www.ecpamericas.org/

Other Northern countries importing biofuels or interested to do so may influence biofuel development in Costa Rica: European countries and Japan.
However, their proper first generation biofuel experience is not considered relevant for Costa Rica for various reasons: too costly, edible feedstock, low environmental balance.

India and China have been mentioned in the survey as countries currently developing biofuels.

Without being specifically promoted, biofuels in Costa Rica can benefit from international cooperation policies dedicated on renewable energies. For instance:

- The continental initiative named Energy and Climate Partnership for the Americas (ECPA) supported by the International Development Bank (IDB) and United States Department of Energy (DOE) (ECPA, 2011). At the Summit of the Americas in 2009, held in Trinidad and Tobago, the President Obama "*urged Governments in the region to work in a variety of initiatives by promoting energy efficiency, developing renewable energy, use of cleaner non-fossil fuels, the integration of national grids, the expanding access to electricity for more people in more places, and response to global challenge urgency of climate change".* This initiative recognizes Brazil as the world leader in biofuel technology and supports Costa Rica in the development of an Energy Efficiency Training Center (Clinton and Chu 2010).
- The Finnish and Austrian AEA, Alliance in Energy and Environment, as well as other foreign cooperation agencies provide seed funding for biofuel initiatives amongst other renewable energy developments.

However, there is no international agreement specifically aiming at biofuel development.

3.2. Crises

The main crisis mentioned as triggering recent biofuel development is the oil crisis making the switch to renewable energy more urgent.

While Costa Rica depends largely on renewable sources energy such as hydropower and geothermal energy, petroleum-based fuel is still important, namely for the transport sector. Therefore this sector constitutes the most vulnerable to future crises related to the rising price of oil. Costa Rica has been affected by rising oil prices since 2005 and particularly in the year 2008 (Vedova, 2008). Publicly discussed measures include the restriction of the import of vehicles, biofuel expansion, public transportation development and taxation on cars and gasoline (Vedova, 2008). However, on-going plans for oil exploration in the north of Costa Rica is currently may affect the green image of the country internationally, according to former Costa Rican president Abel Pacheco.

Regarding the food price crises, biofuels are mentioned in general comments on the competition for arable land but do not apply specifically to Costa Rica.

4. Media analysis

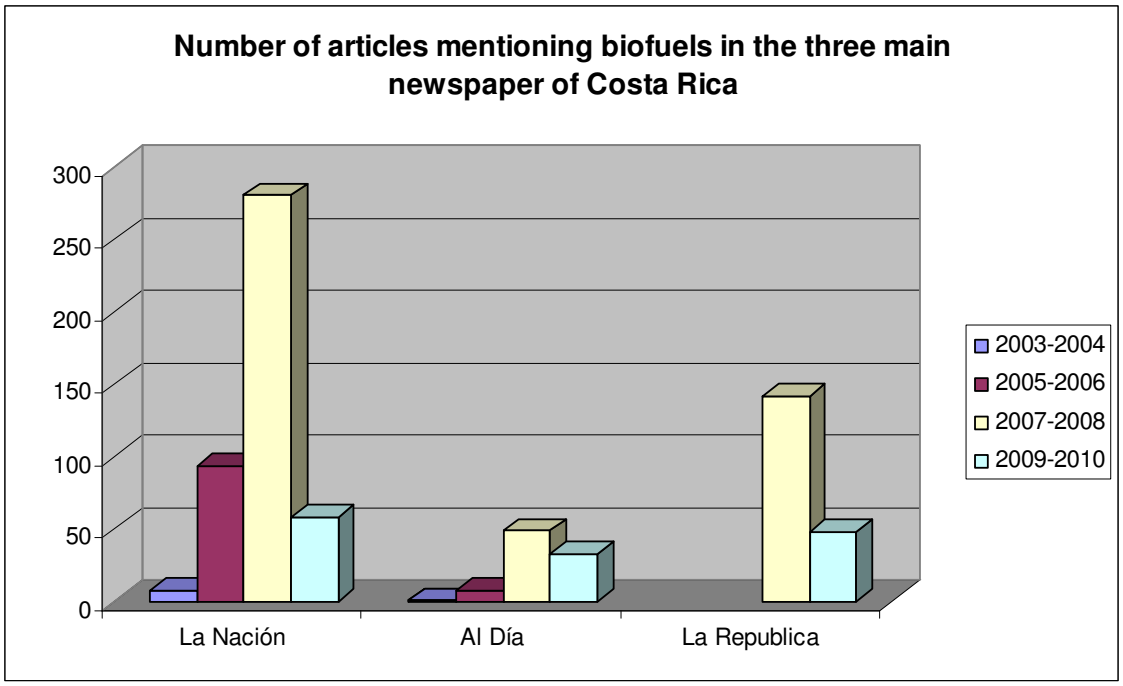
With the help of Mercedes Agüero, journalist at the main national newspaper, La Nación, we investigated how many press articles mentioned biofuels since 2003.
Eight unspecialized newspapers were investigated: La Nación (280 articles mentioning biofuels), La República (200), El País (112), El Financiero (96), Al Día (96), Costa Rica Hoy (60), Prensa Libre (19), La Extra (open page with 274 references).

Information on biofuels were found in different sections, mainly

- Opinion
- Economics and politics
- Technology
- Business.

Looking at the evolution in time, we found that the 2007-08 interval has had much more articles mentioning biofuels, see table 1. This can be explained by rapidly rising oil prices at this time.

Table 1



Own elaboration with data from Mercedes Agüero

Then we analyzed the 35 articles we could find on the Internet, as well as their comments, when existing, see table 2.

Table 2

Electronic media	No. Links	Section	No. public comments
National news and information	14	Opinion and financial	64
International news and information	5	Financial	1
Financial	5	Informative	7
Universities	3	Informative	0
Research centres and cooperation	4	Opinion based on publications	0
NGO and others	1	Opinion	6
Particular Blogs	1	Opinion	0
Enterprises	2	Informative	0
Government agencies	1	Informative	0

We did not investigate Facebook profiles, evaluating that the information it could provide us on public perception was too informal or too difficult to treat in a systematic way.

Readers' comments

Through this media analysis, the level of information and debate on biofuels in Costa Rica appears either quite superficial on general ideas about biofuel for the environment, or quite specific on peculiar experiences and points of view. M. Agüero noted that reactions to press articles mainly originate from students and foreign residents, and that further questions mainly deal with business opportunities.

A representative comment might be: *"the use of ethanol has promoted local development of a renewable fuel source that reduces oil use, allows a sustainable production system to develop, is good for the environment, reduces pollution without requiring costly changes in transport systems and is good for the country's economy because it creates new business opportunities for producers and their communities " "In other countries bio fuels are successful… the (Costa Rican) government has every conditions to produce and thus reduce imports costs and environmental damage they (in reference to oil) generate" (*Ortiz, 2005).

There is a propensity to consider biofuel development from an academic culture of ethics and sustainability *"favoring a sound and sustainable production (understood as integral) and without creating (from) them false expectations"* (Luna, nd).

Negative appraisals focus more on *"what could happen"* from a moral and socio-historical perspective: *"The land (that) should be devoted to raise food will be used to produce raw materials to supply machines and so replace petroleum. Something so sinister in my opinion as the mass extermination of Jews during the Second World War, supposedly because it was the way to solve the problems of unemployment and social inequality in Europe in those years"* [bio fuels development represents a] *"Tragic sentence for humanity, not finding a way to avoid the Apocalypse"* (Chávez Saenz n.d.).

The questionnaire identified TV and newspapers as the main media for information, highlighting channel 6 (Repretel) and channel 7 (Teletica), the daily "La Nación", "Al Dia" and "La Teja". Reported radio stations include "Radio Monumental" and "Radio Columbia".

Media appears quite favourable to biofuel development in Costa Rica. Most media related reviews tend to emphasize the implementation of biofuel governmental program for environmental reasons, reducing greenhouse gases, rural development and energy reduction in the price of petroleum fuels. This coincides with the perception of respondents in the survey, as the majority opinion in favor of biofuels being good for the environment. Emitted criticisms are generally dedicated to the lack of consistency and perseverance of the national biofuel policies.

5. Cultural parameters

Costa Rica is quite small in terms of territory and population, quite open to international trade and politics and very much involved in environmental protection at various levels from local to international levels. It appears that the aspects of biofuel development of major interest to the population are:

- the environmental benefits biofuels can provide,
- the business opportunities they represent at quite local levels,
- the involvement required from the government to support biofuel.

The Costa Rican population is quite aware of the climate change problem and currently considers biofuels as part of mitigation strategies through fuel switch. However, doubts are raised whether the biofuel industry can really contribute to mitigation, given logistical issues. Because of its national aim to reach carbon neutrality, Costa Rica is relatively well informed on issues of greenhouse gas accounting, especially in activities where green labels can be obtained.

In fact, environmental challenges in Costa Rica coincide with business opportunities in various sectors: eco-tourism, agricultural and agro-forestry productions…

Comparatively in the region, Costa Rica counts with a well educated and flexible population, therefore appearing quite open to the new business opportunities that biofuels represent. There are numerous and scattered cases of individual initiatives for biofuel production, more of biodiesel than ethanol, but also of feedstock only (*Jatropha* especially). However success chances are limited by high levels of prices in Costa Rica compared with neighbouring countries.

Regarding fuel consumption, the population tends to consider that biofuels should be cheaper than fossil fuels, for being produced locally. Long term outlook and solidarity preoccupations are overlooked, in times of growing worries about purchasing power.

Since biofuels are more expensive than fossil fuels with the current system of incentives (prices, tax, and subsidies in the agricultural and energy sectors), it is commonly perceived that the government is faulty, for not intervening consistently. Governmental policies are often criticized with regards to the difficulty to achieve official goals and protect the purchasing power.

6. Synthesis

The current public perception of biofuels is generally positive in Costa Rica, since their development is associated with environmental strategies. At the national and regional levels, the potential for biofuel production and consumption is included in climate change mitigation policies. At local levels, biofuels are considered for self-consumption and the obtaining of green labels such as on carbon neutrality or more informally, a green image.

The business perspective was more enthusiastic a few years ago than now, due to the lack of biomass resources available in the country, the low profitability of energy crops and the persisting discontinuities of investments that are still not secured. Biofuel projects are known as punctual initiatives rather than elements of national dynamics. Various obstacles are commonly identified namely on incentives and the securing of investment and cast doubt whether true biofuel supply-chains will eventually emerge.

However, such problems are not perceived as specific to biofuels and rather lead to criticisms towards national policies.

There is no doubt that biofuel development is in line with public policy objectives. Major sustainability threats at the global scale, such as competition with food and deforestation or other natural resource degradation, are not so relevant in Costa Rica where biofuel feasibility faces high prices of land and high exposure to the changing international context. When the international context is favourable to biofuels, national producers have better market opportunities abroad, when the context is not favourable internationally, neither is it domestically.

Expectations on biofuels might have been too high a few years ago, based on the need to address different national and international issues: energy dependence to oil, high and increasing energy prices, and climate change.

RECOPE's pilot project experience on development of ethanol blends with gasoline in one of the seven provinces, is the most referred to, by a few respondents to the questionnaire and by most of the interviewed experts. They mentioned an initial reluctance to consume biofuel and to distribute it, under the argument that biofuel might damage car engines and gas pumps in the stations. This argument might have been a strategic one in order to plead for a better margin of distributors, see section 2.4.

Biofuel initiatives are mainly on biodiesel production. Most of these initiatives seem to be known more by stakeholders, experts and people working towards energy development rather than by the general public. There is a consensus amongst most experts, that reliable information on biofuels is needed, based on research and communication to the general public.

Although most respondents to the questionnaire said to have been informed about biofuels in the last two to six years, more information is expected, especially from the government about the means they can really dedicate to biofuel development.

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