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

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Test auditing of the Global-Bio-Pact socio-economic sustainability criteria and indicators

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proforest

Imperial College
London

Authors: Anni Vuohelainen, Proforest
Rocio A Diaz-Chavez, Imperial College London

Contact: Anni Vuohelainen, Proforest
e-mail: anni@proforest.net
Tel: +44 (0)1865 243439
South Suite, Frewin Chambers, Frewin Court,
Oxford OX1 3HZ

Rocio Diaz-Chavez
Email: r.diaz-chavez@imperial.ac.uk
Centre for Environmental Policy, ICEPT
Imperial College London
14 Princess Gardens SW7 1NA

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Abbreviations

PPE Personal Protective Equipment

NPK Nitrogen- Phosphorus- Potassium (fertilizer)

Preface

This report was elaborated in the framework of the Global-Bio-Pact project (Global Assessment of Biomass and Bioproduct Impacts on Socio-economics and Sustainability) which is supported by the European Commission's 7th Framework Programme for Research (FP7).

The main aim of Global-Bio-Pact is the improvement and harmonisation of global sustainability certification systems for biomass production, conversion systems and trade in order to prevent negative socio-economic impacts. A number of sustainability certification systems are already in place, but their main focus up to now is on environmental impacts such as greenhouse gas emissions or biodiversity.

One of the key components of Global-Bio-Pact is the description of socio-economic impacts in different countries to collect practical experience about socio-economic impacts of biofuels and bio¬products under different environmental, legal, social, and economic framework conditions.

The report "Global-Bio-Pact set of selected socioeconomic sustainability criteria and indicators" presented a set of indicators developed to measure socioeconomic impacts of biofuel and biomass production. This set was produced using the socio-economic sustainability criteria and indicators of previous tasks of the Global-Bio-Pact project and includes indicators related to local and national economy, economic sustainability, local communities, working conditions, and environmental impacts that could affect local communities.

The current report presents the results of two field tests of the indicators, carried out in Brazil and Argentina. The results show opportunities and limitations in the use of Global-Bio-Pact socioeconomic indicators to measure impacts of bioenergy production in the context of different countries, feedstocks and production models.

Introduction

A number of socioeconomic sustainability criteria and indicators were selected to be included in the "Global-Bio-Pact set of selected socioeconomic sustainability criteria and indicators". These indicators aim to measure socioeconomic impacts of biomass production and they cover a wide range of aspects related to socioeconomic sustainability, including contribution to local economy, working rights and conditions, health and safety, gender, land rights and conflicts, food security and a range of environmental impacts that could affect local communities.

To further develop and improve these indicators, it was considered essential to field test the set of indicators in different feedstocks, production models and geographical contexts. To this end, two case studies were selected for the field test of Global-Bio-Pact set of socioeconomic indicators. The field tests were carried out in two operations and surrounding communities. J. Pilon S/A – Açúcar e Álcool is a Brazilian sugarcane producer company in the town Cerquilho, in the state of São Paulo. J.Pilon S/A uses sugarcane to produce sugar and ethanol in its processing mill. Viluco S.A is an Argentinean agroindustrial company that that produces a number of crops, including soy that it uses for the production of soymeal and biodiesel in its processing plant. Viluco S.A cultivates fields in the provinces of Tucumán, Salta, Santiago del Estero and Catamarca and has a processing plant in Santiago del Estero.

As a part of the field tests, both of the operations were asked to fill in a questionnaire that covered different aspects of the indicators. This was followed up with a visit to the facilities and selected agricultural fields of the two operations, during which key staff and a sample of employees were interviewed. The assessment team also visited surrounding communities and carried out community surveys to capture community perceptions of the impacts of the operations.

The aim of this report is to present the results of the two field tests. For each indicator includes the report a summary of the data collected, followed by an assessment of the clarity, availability, relevance, measurability and temporal availability of each indicator. The report does not aim to compare the results obtained in the two different countries or subject the data into further analysis of the impacts of the specific operations.

Methodology

Study sites

J. Pilon S/A – Açúcar e Álcool

J. Pilon S/A, is a Brazilian sugarcane producer company that owns sugarcane plantations and a sugar/ethanol mill in the town of Cerquilho, in the state of São Paulo. The company was founded in 1953. The company currently has 5 070.79 ha of own land under sugarcane production and they also produce sugarcane on 5 206.07 ha of rented land. They also have a processing mill that is used to produce both sugar and ethanol. As a by-product of the processing, the company also produces electricity and is energy auto sufficient. Between 40% and 50% of sugarcane processed in their mill originates from the lands of independent outgrowers.

Viluco S.A

Viluco S.A is an Argentinean company Argentinean agroindustrial company that that produces soy, corn, wheat, sorghum and chick peas. The company produces crops on 22 fields located in the norhestern Argentina, in the provinces of Tucumán, Salta, Santiago del Estero and Catamarca. The company has 25170 ha of own land and 10 000 ha of rented land. In addition to the agricultural fields, Viluco S.A has a soy crushing and biodiesel plant in the town of Frias, Santiago del Estero. The plant started its operation in 2010 and 2011 was the first full year of operation for the plant. The soybean crushing and biodiesel plants

produce soy flour, husks and biodiesel. Over 70% of the soybeans crushed in the plant are sourced from independent outgrowers. The plant also sources soy oil from other suppliers.

Viluco S.A is a part of a business group called Grupo Lucci. Apart from Viluco S.A the group includes three other companies that focus on production of lemon and lemon derivatives, livestock and sugarcane.

Field test

According to the Global-Bio-Pact set of indicators the indicators may be of qualitative or quantitative nature (see report "**Global-Bio-Pact set of selected socio-economic sustainability criteria and indicators"** on the project's website). The full set of indicators is included in Annex 1 of this document.

The set includes guidance on how to measure or monitor the indicator. Furthermore the guidance indicates possible sources of information for each indicator:

- Processing company or plantation (P)
- Government (G)
- Community (C)
- Non-Governmental Organisation (N)
- Worker (W)

The two operations were visited as a part of the field tests, the first visit was to J. Pilon S/A and the town of Cerquilho, Brazil on the 27-29th of June, 2012. The members of the field assessment team included: Anni Vuohelainen (Proforest), Rocio Diaz-Chavez (Imperial College), Pedro Gerber Machado (UNICAMP) and Mary-Rose Narayane (Imperial College).

The second visit was to Viluco S.A and the fields and communities in the province of Tucumán, as well as the industrial operations and community in the town of Frias, Santiago del Estero. This visit was carried out 12-14th of September, 2012. The members of the field assessment team included: Anni Vuohelainen (Proforest), Rocio Diaz-Chavez (Imperial College), Sofia Galligani (Imperial College) and Jorge Hilbert (INTA).

In the field assessments, the data from each operation was collected in four ways:

- A questionnaire was sent to both of the operations prior to the field visit. The questionnaire included different aspects related to the indicators. Staff in charge of diffferent areas of the operation filled in the questionnaire and sent it to the assessment team.
- A visit to the operations was carried out. During this visit, the assessment team completed the information sent by the operation via interviews with staff in charge of different areas of the operation (e.g. agricultural manager, human resources, quality manager)
- Fields, offices and processing facilities of the company were visited and questionnaires were applied to employees of the operations (see example of a worker questionnaire in Annex 2)
- Questionnaires were applied to outgrowers and contractor companies of the operations where possible, in some cases other stakeholders such as representatives of government or associations were also interviewed.
- Communities located in the vicinity of the operations were visited and community surveys were carried out (see Annex 2).

The number of surveys applied per case study is as follows:

Type of survey	J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
workers	31	30
community	40	32
outgrowers	9	4
Contractor companies		1
Associations and government representatives	3	1

Assessment of the indicators

For each indicator, the following section presents a summary for the information collected via different methods. The summary of the results is followed by an assessment of each indicator. The assessment is based on two sources: some of the interviewees were asked to evaluate the indicators they had been interviewed on and the assessment team evaluated each of the indicators based on their experience of the field test. Following criteria were used to assess the indicators:

- *Clarity* – Is the indicator clear in design and simple in format, is it easy to understand what is being measured?
- *Availability* – Is the data readily available from the source of the information?
- *Relevance* – Is the indicator relevant for the socioeconomic impact that it aims to measure?
- *Measurability* – Can the indicator be easily measured?
- *Temporal availability* – Is the information readily available from the specified time period?

Each indicator was graded on the scale of 1-5, where 1 = poor, 2 = fair, 3 =good, 4= very good and 5 =excellent.

The report presents in the following section the information and the assessment for each one of the impacts of the Global-Bio-Pact set.

1. Basic information

The first five indicators relate to relevant basic information to be collected of the operations. For these indicators, information was collected about the name and location of the operation, the area under production and expansion of the production area, yield, annual production, certification and membership of sectorial associations.

1.1. Name and location

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
J. Pilon S/A – Açúcar e Álcool Fazenda Santa Maria S/N Bairro São Francisco, Cerquilho, state of São Paulo, Brazil	Biodiesel plant – Ruta 157 km 1052 Frías, Santiago del Estero Central office – Ruta 302 km 7, Cevil Pozo, Tucumán Fields in the provinces of Tucumán, Salta, Santiago del Estero and Catamarca

Assessment of the criteria

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	5

This basic information was readily available and easy to obtain by the assessment team.

1.2. Land area under cultivation

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
Own land: 5070.79 ha Rented land: 5206.07 Of this around 8000 ha is harvested annually Independent outgrowers: 6553.35 ha (harvested), total area cultivated by them ~8000 ha Total area harvested in the year 2011/2012 = 16 830.21 ha	Own land: 25170 Rented land: 10 000 ha 72.58% of the soybeans processed in the biodiesel plant are purchased from independent producers, there is no information about the exact land area farmed by them. The plant also purchases crude soy oil from others, but the information on the quantity of this was not available at the time of the visit.

Assessment of the indicator

	Score
Clarity	4
Availability	3
Relevance	5
Measurability	3
Temporal availability	3

While information about the operations' own and rented land area was readily available for both operations, in the case of Viluco S/A, the operation purchased 90% of the soybeans it used from independent outgrowers. Since soybeans can be readily stored and transported for long distances before they reach the processing plant, the plants often have limited information and control over their outgrowers, which makes it difficult to obtain information about the agricultural operations of the outgrowers. It would also be important to make a distinction between the total area under production and the area that is harvested annually, as the total area harvested yearly typically varies, due to crop rotation and replanting (in the

case of sugarcane). It was not possible to obtain exact information about the previous 5 years in the case of J. Pilon, the biodiesel plant of Viluco S/A has only been in operation since 2010, so information was only collected from year 2011, as this was the first complete year of operation.

1.3. Expansion of land area

Results

<table>
<tr><th colspan="4">J. Pilon S/A (Brazil)</th><th>Viluco S.A. (Argentina)</th></tr>
<tr><td colspan="4"><table>
<tr><td>Year</td><td>Own land</td><td>Outgrower</td><td>Total</td></tr>
<tr><td>2007</td><td>216.56</td><td>372.10</td><td>588.66</td></tr>
<tr><td>2008</td><td>0</td><td>22.49</td><td>22.49</td></tr>
<tr><td>2009</td><td>60.55</td><td>0</td><td>60.55</td></tr>
<tr><td>2010</td><td>195.22</td><td>112.02</td><td>307.24</td></tr>
<tr><td>2011</td><td>209.66</td><td>214.30</td><td>423.96</td></tr>
</table></td><td>There has been no expansion of own/rented fields. Information is not available of the independent producers that the company buys soybeans from.</td></tr>
</table>

Assessment of the indicator

	Score
Clarity	5
Availability	3
Relevance	5
Measurability	3
Temporal availability	3

While information about the operations' own and rented land area was readily available for both operations, in the case of Viluco S/A, the operation purchased 90% of the soybeans it used from independent outgrowers. Since soybeans can be readily stored and transported for long distances before they reach the processing plant, the plants often have limited information and control over their outgrowers, which makes it difficult to obtain information about the agricultural operations of the outgrowers. For soybean (and other annual crops) it would also be important assess the total area of the farm under crop production, as soybean is generally produced in crop rotation and the land area under soy production typically varies annually. This indicator was deemed particularly relevant, as many negative socioeconomic or environmental impacts can increase with expansion of land area under production.

1.4. Yield

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
2007 = 91.88 ton/ha 2008 = 100.24 ton/ha 2009 = 95.94 ton/ha 2010 = 75.34 ton/ha 2011 = 80.59 ton/ha	3 t/ha (own/rented fields)

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	5

Information about average yields was readily available. While some outgrowers were interviewed as a part of the assessment, it might be interesting to also collect information

separately about average yields for all of the outgrowers, as these may be lower than that for areas managed by a larger company.

1.5. Annual production

Results

J. Pilon S/A (Brazil)

Harvest	Sugarcane (t)	Sugar (t)	Anhydrous ethanol (l)	Hydrous ethanol (l)
2007/08	1,345,791	76,439	24,980,000	35,140,000
2008/09	1,489,255	78,014	22,630,000	43,140,000
2009/10	1,425,783	73,515	16,840,000	38,330,000
2010/11	1,119,001	72,815	10,710,000	32,670,000
2011/12	1,265,836	85,148	18,010,000	31,650,000

As a by-product of the production process the mill produces bagasse (residue remaining after the extraction of juice from the crushed stalks of sugar cane). J. Pilon uses the bagasse for production of electricity, and the mill is energy self-sufficient. In 2011, the operation produced 316 459t bagasse that was used for the production of electricity.

Viluco S.A. (Argentina)

Harvest year 2010-2011:
580,794 t of soy were processed in the biodiesel plant - of this 421,515 t was purchased from outgrowers and approximately 105,500 t came from own production

The soy was used to produce:
413,600 t of flour
36,486 t of soybean husks
and
116.701 t of biodiesel

The first full year of operation of the processing plant was 2010-2011.

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	5

Information about annual production was readily available, the only information that was not available, was the information about bagasse and electricity production previous to 2011. This indicator was considered very relevant as it can be linked to the other indicators to give a measure of impact per production unit.

1.6. Certification

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
No certification	Own and rented fields - RTRS Plant – GMP (flour), ISCC (biodiesel) Two of Viluco's suppliers also reported having RTRS certification

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	5

This information was readily available from both of the operations. It is relevant, as the indicators could be used to assess impacts of certification in the future.

1.7. Membership of sectorial associations

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
UNICA – Brazilian Sugarcane Industry Association São Paulo state's sugarcane producers' cooperative	CREA la Cocha – Producers' organization Aapresid – Argentine No-till farmers' Association

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	5

This information was readily available from both of the operations.

2. Socioeconomic indicators

The socioeconomic indicators relate to economic sustainability and impacts of the production, impacts on local communities, working conditions and rights, health and safety and food security.

2.1. Production cost

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
Not available	255.79 EUR/ton of soy (processing plant, including cost of soy purchased from outgrowers) 24.93 EUR/ton of soy (own agricultural production)

Assessment of the indicator

	Score
Clarity	3
Availability	3
Relevance	3
Measurability	5
Temporal availability	5

This information was not available at J.Pilon S/A. Viluco S/A was able to provide this information for both processing plant and their own agricultural production. It would be important to further refine this indicator to account for feedstock produced on own, rented and outgrowers land. Furthermore, it would be more useful to assess this value for a litre of biofuel, instead of quantity of feedstock. This value would account for the whole chain from agricultural production to processing. This indicator is relevant mainly in relation to the following indicator (value added), as the production cost alone does not give an indication of the economic profitability of the feedstock production.

2.2. Value added

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
Not available	Not available

Assessment of the indicator

	Score
Clarity	1
Availability	1
Relevance	5
Measurability	5
Temporal availability	1

This information was not available at J.Pilon S/A. Viluco S/A was able to provide a significant amount of economic information, but this was not sufficient to estimate value added per ton of feedstock. This indicator was also not clear for people interviewed as a part of the assessment, as they were not familiar with the concept of value added. Further guidance should be given on the use of this indicator or this should be replaced with an economic indicator that is more familiar to agricultural operations. Confidentiality of data can also be an issue when assessing this information. This indicator is relevant as an indicator of economic profitability of the feedstock production, however the indicator could potentially be replace with another economic indicator.

2.3. Taxes/royalties paid to the government

Results

J. Pilon S/A (Brazil)

Year	Payments to government (EUR) [1]
2007	3244349
2008	4254982
2009	6492280
2010	7169373
2011	9663339

Viluco S.A. (Argentina)

Not available

Assessment of the indicator

	Score
Clarity	1
Availability	1
Relevance	5
Measurability	5
Temporal availability	3

This indicator was not clear to the individuals interviewed and should be further clarified. It was not evident what type of contributions should be included in this and this should be further defined. The information was available at J.Pilon S/A. Viluco S/A was able to provide a table of legally mandated percentual employer contributions to social security, pension and other payments, but information of the total payments made for taxes, royalties etc. was not available at the time of the visit. This indicator is considered relevant as it gives an indication of the operation's financial contributions to public entities. However, distinction should be made between taxes and retentions and social security payments, as payments such as pensions are not a direct contribution to the country's public finances.

[1] Calculated as 1BRL=0.370 EUR

2.4. Contributions made by the operation to allied industries in the local economy

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
Percentage of production costs paid to allied industries: 65% sugarcane 35% other costs (inputs, maintenance, labour, etc.)	Biodiesel plant: Production inputs: 7944541 EUR Services from contractors: 822270 EUR

Assessment of the indicator

	Score
Clarity	3
Availability	3
Relevance	5
Measurability	5
Temporal availability	3

Both operations also gave information on costs of feedstock, which was not requested for this indicator. The information from J Pilon S/A also included labour costs, so information could not be obtained of the percentage paid to allied industries. In Viluco S/A the biodiesel plant and the production are managed by two different entities, which is why the production information was often not integrated with the information from the biodiesel plant. Therefore information about related to this indicator was only available from the biodiesel plant. Viluco did not provide information about labour costs, so the percentage of production costs could not be calculated.

Further guidance should be given on the calculation of production costs and allied industries should be defined more clearly, in order to obtain more useful information from this indicator.

2.5. Production farmed by smallholders or suppliers

Results

<table>
<tr><th>J. Pilon S/A (Brazil)</th><th>Viluco S.A. (Argentina)</th></tr>
<tr><td>2007 = 48.9 %
2008 = 50.9 %
2009 = 40.6 %
2010 = 45.9 %
2011 = 47.6 %
In average 150 suppliers/year

The survey applied to external growers of sugar cane in Brazil showed that 2 of the out-growers (out of 9 surveys) sell their harvest to J Pilon:
<table>
<tr><th>Name</th><th>Location</th><th>Land area</th><th>Production</th></tr>
<tr><td>Jose Henrique</td><td>Cerquilho</td><td>145.2 has</td><td>9000 tons</td></tr>
<tr><td>Julio Cesar</td><td>Porto Feliz</td><td>50 has</td><td>900 tons</td></tr>
</table>
</td><td>72.58% of the soy processed came from 242 independent producers in the year 2010/2011</td></tr>
</table>

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	5

This information was readily available from both of the companies. The indicator was clear, measurable and is relevant for estimating the contribution of outgrowers to the biofuel production.

2.6. Amount paid to smallholders and suppliers of feedstock

Results

J. Pilon S/A (Brazil)			Viluco S.A. (Argentina)
Year		Payments to outgrowers (EUR) [2]	71736863 EUR (2010-2011)
2007		8717200	
2008		10530200	
2009		9664400	
2010		10848400	
2011		15821200	

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	5

This information was readily available from both of the companies. The indicator was clear, measurable and is relevant for estimating the financial benefits obtained by outgrowers.

2.7. Employment

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
2007 = 1021 2008 = 1106 2009 = 1073 2010 = 1054 2011 = 1024 In 2011: Administration = 30 Agricultural sector = 731 (381 permanent workers and 350 temporary workers) Industrial sector: = 263 (238 permanent workers e 25 temporary workers) Temporary workers work 6 months a year	Industrial sector: 230 people (permanent) Agricultural sector: 50 people (permanent) A total of 27 contractor companies are used for agricultural operations by Grupo Lucci (approximately 20 of them for crop production, the quantity of companies used for soy production was not available) Two contractor companies were interviewed working for Viluco. The number of permanent jobs is reduced (2-6) and the temporary workers vary from one region to another.

Assessment of the indicator

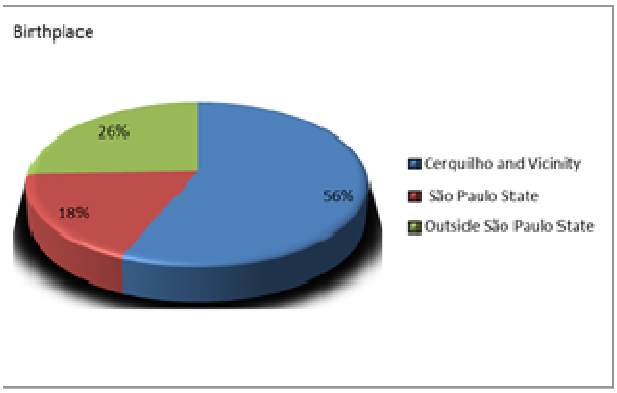
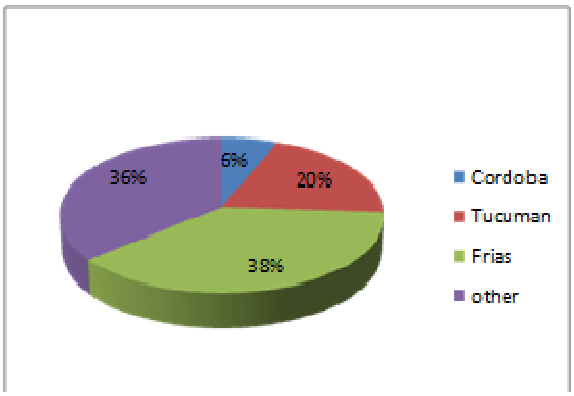
[2] Calculated as 1BRL=0.370 EUR

	Score
Clarity	3
Availability	3
Relevance	5
Measurability	4
Temporal availability	5

This indicator requires both information about the number of employees and of man-days worked per year. While, the information about number of employees was readily available for both of the companies, the concept of man days was not clear to the respondents and neither of the operations had easily accessible records on total man-days worked. Therefore, it would be easier to establish the number of employees and the average number of months worked by temporary workers. It is also important to consider that most of the agricultural work in the Argentinean soy sector is carried out by independent contractors. The contractor companies work in different regions of Argentina and are not under direct control of the producer companies. This makes it difficult to obtain accurate information about the total impact each producer company has on employment creation. This indicator is considered relevant, as job creation can be one of the most significant socioeconomic impacts of biofuel production.

2.8. Ratio between local and migrant workers

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
20% of workers are temporary migrant workers during the harvest period The surveys applied to workers provided additional information regarding their birthplace. Majority of workers were from the region where the companies operate. The employees (n=31) interviewed had the following breakdown:  	85% of employees are from local area (Tucumán/ Santiago del Estero) The surveys applied to workers provided additional information regarding their birthplace. Majority of workers were from the region where the companies operate. The employees (n=30) interviewed had the following breakdown: 

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	3

This information was easily obtainable from both of the operations and it was also easy to obtain this information form the workers interviewed. The information was only not available

for the contractor companies used by Viluco S/A. Accurate information about previous years was not available.

2.9. Percentage of permanent workers

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
63% of the workers have a fixed contract	100% (contractor companies used for agricultural operations)

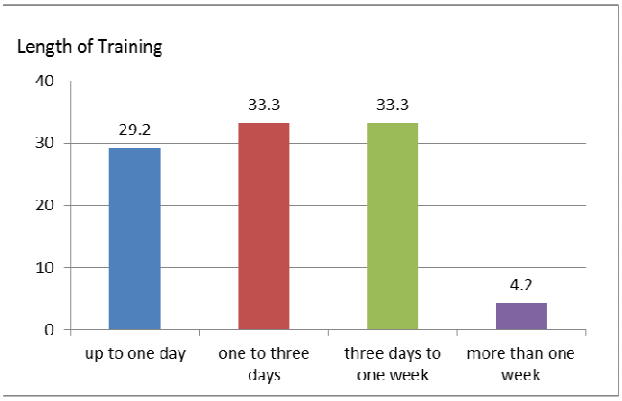
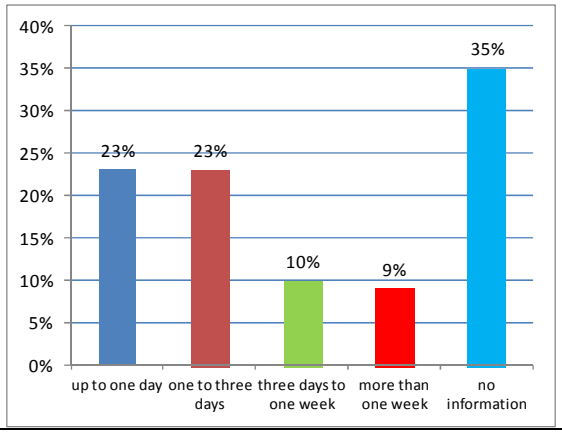
Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	3

This information was easily obtainable from both of the operations. The information was only not available for the contractor companies used by Viluco S/A. Accurate information about previous years was not available.

2.10. Provision of worker training

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
All of the workers receive initial induction training that lasts between 1 and 1.5 days. The rest of the training is carried out depending on the needs and job category. The survey applied to workers provided additional information regarding the length of the training received. This varied according to the position of the worker in the company  	**Industrial sector:** All of the workers receive induction on joining the company, in 2011 there were 1154 participations in training (one person typically participates in more than one training) **Agricultural sector:** training once a year to all employees, in 2011 there were 142 participations in training (one person typically participates in more than one training) Training includes: security and hygiene, quality, first aid and legislation etc. All the contractors receive training in safety and hygiene. The survey applied to workers provided additional information regarding the length of the training received. This varied according to the position of the worker in the company 

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	3

This information was easily obtainable from both of the operations. The information was only not available for the contractor companies used by Viluco S/A. Accurate information about previous years was not available.

2.11. Community investment

Results

<table>
<tr><th>J. Pilon S/A (Brazil)</th><th>Viluco S.A. (Argentina)</th></tr>
<tr><td>
<table>
<tr><th>Year</th><th>Annual values for community investment (EUR) [3]</th></tr>
<tr><td>2010</td><td>1161</td></tr>
<tr><td>2011</td><td>3167</td></tr>
<tr><td>Jan-May 2012</td><td>2487</td></tr>
</table>
These are monetary contributions to different community and educational projects and events. In addition to these, the company has contributed to community projects with in-kind contributions, including, among others, land, labour and other donations.
</td><td>Grupo Lucci carries out community investment via ‘Vicente Lucci foundation’ that had an annual budget of 725,337 EUR in 2011

The budget included operational and personnel costs, volunteer program, communication and community relations program, organized visits to the biodiesel plant, educational projects and donations to community organizations.</td></tr>
</table>

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	3
Temporal availability	3

While the concept of community investment was clear to all of the interviewees, there are some problems with this indicator. In the case of J.Pilon, the indicator only accurately captured monetary value of investment, although a qualitative description of in-kind contributions for community investment was also provided. Thus the monetary value does not necessarily accurately capture all of the community investment activities of the company. For Viluco S/A, the total budget of the Vicente Lucci foundation was given. While this is indicative of the amount that the company spends in community investment, it also included personnel and operational costs of the foundation. Furthermore, the Vicente Lucci foundation is ran by the Grupo Lucci, which owns a number of companies and agricultural operations. Thus it would be impossible to differentiate which amount of this budget originates from soy and biodiesel production.

2.12. Employee income

Results

[3] Calculated as 1BRL=0.370 EUR

J. Pilon S/A (Brazil)

2011:

Sector	Mean salary (EUR) 4
Agricultural	421.87
Administration	882.37
Industrial	501.75

The salaries increase by 5-10% every year.

Viluco S.A. (Argentina)

Industrial sector	
Administrative	1695.47 EUR
Storage	1240.12 EUR
Crushing	1844.45 EUR
Biodiesel	1829.71 EUR
Origination	1902.84 EUR
Commercialisation	2649.77 EUR
Maintenance	1860.02 EUR
Laboratory	1973.12 EUR
Assistants	1130.13 EUR
Agricultural sector	
Foreman	1148.88 EUR
Supervisor	1160.60 EUR
Tractor driver	1614.87 EUR
Engineer	1996.73 EUR
Farmworker	537.44 EUR

The employees also receive annual complementary salaries (50% of the monthly salary) in June and December.

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	3

This information was easily obtainable from both operations, however salary information was not available from previous years. The indicator is very relevant, as it gives information about the economic contribution to the workers of the operation, however this information should be linked to information about number of workers in different categories and minimum salaries of the country to better assess the economic impacts of the operations.

2.13. Employment benefits

Results

J. Pilon S/A (Brazil)	**Viluco S.A. (Argentina)**
The company provides close to 100 houses to the workers depending on need and availability. The company provides transport to all of its workers. Permanent workers receive free medical and dental care with a 50% discount for exams and 40% discount on medicines. Temporary workers receive free medical care, exams and medicines. The company also provides workers/their families with support for funerals and educational supplies.	People in the agricultural sector receive housing, basic services and satellite television without cost. If they do not own a vehicle, they are also provided with transport. The legally mandated benefits include: holidays, family allowances (paid for marriage, pregnancy, maternity, birth, adoption, disabled children and schooling of children).

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5

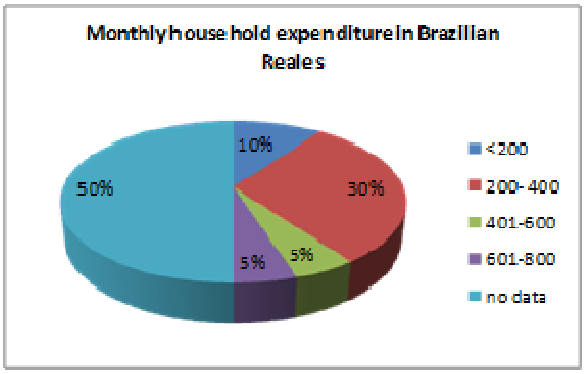
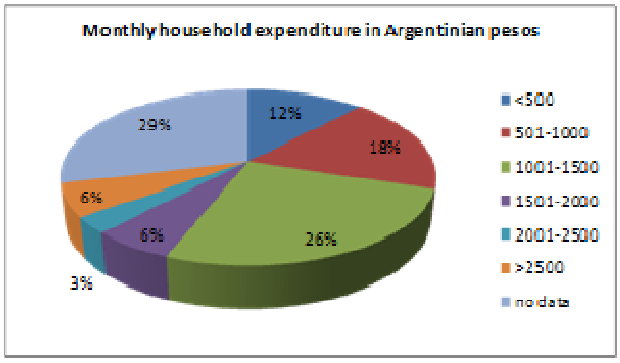
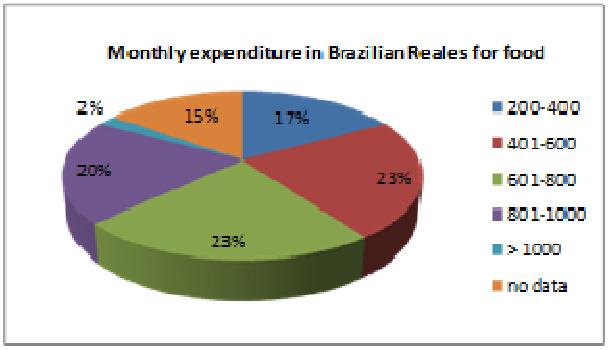
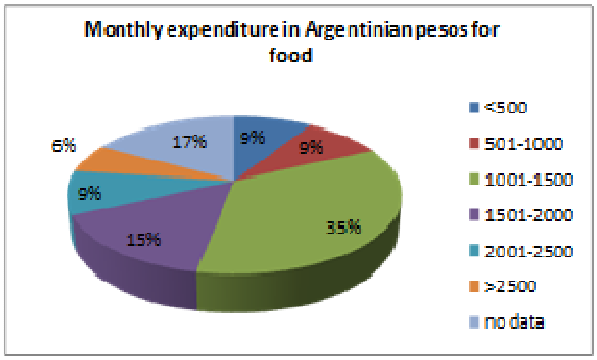
[4] Calculated as 1BRL=0.370 EUR

Temporal availability	3

This information was easily obtainable from both operations. The indicator is very relevant, as it gives information about the additional benefits the company provides to their workers. This indicator should be evaluated in relation to the legally mandatory benefits in the producer country.

2.14. Income spent in basic needs

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
The survey applied to workers provided information on the amount spent on food, but it was not possible to statistically correlate this information with the salaries of the workers. Although, the survey included a question to enquire about the monthly household income. The amount varied according to the salary but it was not possible to correlate the information statistically. It was based more on the estimation the workers did regarding the distribution of the income in food, transport and accommodation or household expenses (depending if they owned the property or lived with relatives).	The survey applied to workers provided information on this indicator. The amount varied according to the salary but it was not possible correlate the information statistically. It was based more on the estimation the workers did regarding the distribution of the income in food, transport and accommodation or household expenses (depending if they owned the property or lived with relatives).
	
	

Assessment of the indicator

	Score
Clarity	5
Availability	4
Relevance	5
Measurability	3
Temporal availability	4

The indicator is important to understand the economic and well-being improvement of the workers. It is possible to gather the data through the survey but it should be better incorporated in the questionnaire with a higher level of clarity and detail. It was difficult for the

workers to estimate the amount spent on the basic needs (food, transport, household expenses) in a monthly basis and some expressed per day or per week. These differences were also more evident according to the salary received by the worker. To be statistically valid a larger survey needs to be applied.

2.15. Hours of work

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
8 hours/day. The employees may work extra hours.	8 hours/day. The employees may work extra hours during harvest and planting (max 12 hours a day), the employees are given days off for the extra hours worked.

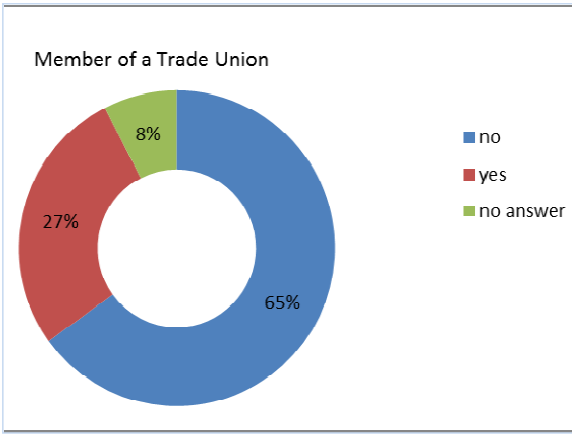
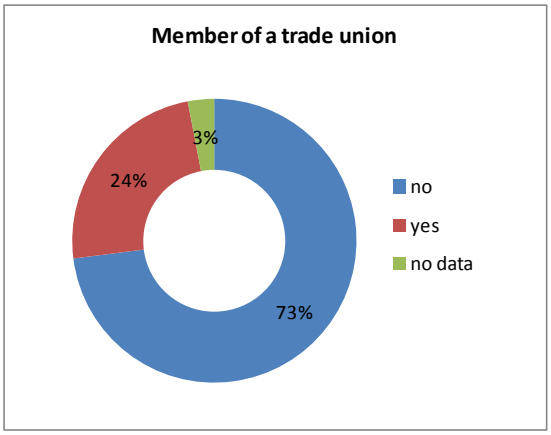
Assessment of the indicator

	Score
Clarity	4
Availability	4
Relevance	5
Measurability	5
Temporal availability	4

While all of those interviewed stated that the average working hours were 8 hours of day, very little information could be obtained about the additional hours worked. Therefore, it would be useful to modify this indicator to include more information about the additional hours worked on peak time – i.e. maximum time worked in a week, or average additional hours worked.

2.16. Freedom of association

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
Agricultural sector: rural workers union, Drivers – Union for drivers Industrial sector: Food workers Union The survey applied to the workers provided information regarding the association of the workers to a trade union. 	Agricultural sector employees have their own union - UATRE, and the industrial sector workers can belong to the Union of Oil, Storage and Petrol workers The survey applied to the workers provided information regarding the association of the workers to a trade union. 

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	3

This information was easily obtainable from both of the operations. The indicator is considered relevant because it is an indication of the workers' rights and ability to negotiate their salary and conditions.

2.17. Work related accidents and diseases

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
2011: Number of accidents = 26 (80% in the agricultural area) 0.072/day (no information about the number of man days) Number of accidents has reduced with training and control of the use of PPEs Most of the accidents take place in the agricultural sector, mainly in manual and mechanized cane cutting.	2011: Industrial sector: 13 accidents 0.000227 accidents/man day/year Agricultural sector: 4 accidents (no information about the number of man days)

Assessment of the indicator

	Score
Clarity	5
Availability	3
Relevance	5
Measurability	5
Temporal availability	3

The information about number of work related accidents was readily available from both operations. J. Pilon could not provide information about the number of work related accidents per man day/ year. There was also no information about work related diseases. It might be useful to further define this information to include information about number of workers involved in accidents (from a total number of workers) or lost work days for accidents (for total number of work days). Limited information from previous years was available.

2.18. Personal protective equipment

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
The company supervises the use of PPEs, at times workers have been found not using the PPEs, but this has been reduced markedly. The interviewees reported that times the workers did not use protective glasses, but with increased supervision, accidents caused by lack of protective eye wear have been reduced. New workers receive a lecture on safety and use of PPEs, there are also annual lectures. During the visit to the operations, no workers were sighted not wearing the adequate PPEs.	According to the company, all of the employees use adequate personal protective equipment. No workers without adequate equipment were seen in the operations. During the visit to the operations, no workers were sighted not wearing the adequate PPEs.

Assessment of the indicator

	Score
Clarity	4
Availability	5
Relevance	5
Measurability	3
Temporal availability	3

It was difficult to obtain standardized quantitative information about this indicator, however qualitative responses were obtained from both operations and no employees were sighted not wearing the adequate personal protective equipment. In addition to this, it might be useful to interview workers about their use and understanding of PPEs.

2.19. OHS training

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
Agricultural sector: There are annual lectures on cane cutting and herbicide application. All of the workers receive induction training that includes training on health and safety. The personnel in specialized functions (as determined by the Brazilian Labour Law NR31, receive annual/ bi-annual training as determined by the legislation.	245 people have received OSH training between 2011 and 2012. All of the staff of the staff of the plant receive OSH training.

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	3

According to the operations, all of the staff receive training on occupational health and safety as a part of their induction training. This information was easily available from both of the operations.

2.20. Benefits created for women

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
As defined in the worker legislation, female workers have a legal right to 120 days of maternity leave. Female workers do not worked with pesticide application.	Legally mandated benefits: Maternity leave, hour/day for breastfeeding (up to a year after birth of the child), maternity bonus (600 ARS ~ 98 EUR)

Assessment of the indicator

	Score
Clarity	3
Availability	5
Relevance	2
Measurability	5
Temporal availability	3

It was not clear to the interviewees whether this indicator referred to legally mandated benefits or additional benefits. As both of the operations only reported legally mandated benefits (i.e. maternity leave), no additional benefits for women obtained from biofuel production could be observed. In the case of the two field tests this indicator was not, therefore, considered very relevant in terms of measuring socioeconomic sustainability. In fact, this indicator more accurately reports on women's reproductive rights and so the indicator could be modified to relate to reproductive rights, as opposed to employment benefits for women.

2.21. Legal title of land right

Results

J. Pilon S/A (Brazil)	Viluco S.A.
According to the operation they hold legal title for all of their own lands and this is not challenged.	According to the operation, they hold a legal title for all their own lands and this is not challenged. Only one farms is rented and there is a rental contract for this.

Assessment of the indicator

	Score
Clarity	5
Availability	3
Relevance	5
Measurability	5
Temporal availability	

This indicator was clear to all of the respondents. Both of the operations were located in an area with very established land use and no evidence of unclear land rights could be encountered in the interviews with the company employees or communities. It was not possible to view the documents of legal titles during the field assessment.

2.22. Communal/public land

Results

J. Pilon S/A (Brazil)	Viluco S.A.
No evidence of cultivation of customary, community or public land was found.	No evidence of cultivation of customary, community or public land was found.

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	5

This indicator was clear to all of the respondents. Both of the operations were located in an area with very established land use and no evidence cultivation of customary, community or public land was found in the interviews with the company employees or communities.

2.23. Land conflicts

Results

J. Pilon S/A (Brazil)	Viluco S.A.
There have been no disputes or conflicts over land.	There have been no disputes or conflicts over land.

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	5

This indicator was clear to all of the respondents. Both of the operations were located in an area with very established land use and no land use conflicts was found in the interviews with the company employees or communities.

2.24. Land that is converted from staple crops

Results

J. Pilon S/A (Brazil)

Year	Pasture	Orange	Others (corn etc.)
2007	470.93	88.30	29.43
2008	17.99	3.37	1.12
2009	48.44	9.08	3.03
2010	245.79	46.09	15.36
2011	339.17	63.59	21.20
2012	459.46	86.15	28.72

There is no information about land converted to sugarcane from crops considered staples by the local population (e.g. rice or beans), however most of the land was previously used for as pasture or orange cultivation.

Viluco S.A. (Argentina)

There is no information about this.
Soy is currently farmed in rotation, whereby over the summer 70% of land area is cultivated with soy and 30% with other crops (corn or sorghum) and if hydrological conditions of the field permit, wheat, chick peas, lentils and green peas are cultivated over the winter.

Assessment of the indicator

	Score
Clarity	3
Availability	3
Relevance	4
Measurability	3
Temporal availability	3

For the purposes of the field assessments, it would be important to define what crops are considered staple in each country. Accurate information of exact quantities of land converted from staple crops was not available for J. Pilon. According to the operation, no land had been converted from other crops during the first years of operation of Viluco S.A. However, this indicator may not be entirely applicable for soy production, as soy is often cultivated in rotation with staple crops such as wheat. Information about conversion by outgrowers was not available for the assessment.

2.25. Edible feedstock diverted from food chain to bioenergy

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
Sugarcane was used for production of sugar and ethanol, information was not available of the percentage of sugarcane that was used for ethanol production	Soybeans were used to produce three products: soybean meal, soybean husks and soy biodiesel. Soybean has 18-20% of oil content that can be used for producing soy biodiesel. 116 701 t of soybean material (20% of the soybean material that entered the plant) was used to produce soy biodiesel.

Assessment of the indicator

	Score
Clarity	3
Availability	3
Relevance	4
Measurability	4
Temporal availability	2

Both sugarcane and soy are food crops, and both J.Pilon S/A and Viluco S.A produce feedstock for food chain. Information was not available of the exact percentage of sugarcane that was used for ethanol instead of sugar in J. Pilon S/A. For Viluco S.A, it was possible to calculate the percentage of soybean material used to produce soy biodiesel, instead of being sold as soy oil.

2.26. Availability of food

Not included in field test

2.27. Time spent in subsistence agriculture

Not included in field test

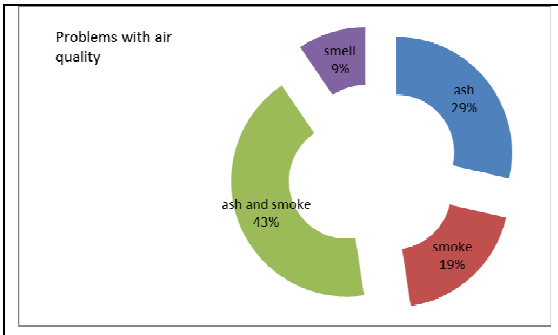
3. Environmental indicators

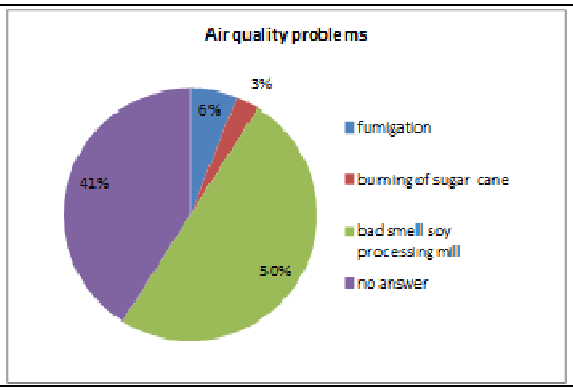
The environmental indicators relate to agricultural practices and environmental impacts of the operation that may have impacts on the local communities.

3.1. Open burning on company level

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
2007 = 207 days 2008 = 222 days 2009 = 228 days 2010 = 173 days 2011 = 182 days In addition to this indicator, information about community perceptions on air quality was collected in community surveys. The results showed that community had concerns related to the air quality related to the open burning practices of Cerquilho sugarcane farmers.	Burning is not used. The community surveys showed that the community members interviewed had some concerns related to air quality in the community, in relation to aerial fumigation of pesticides and bad smell from soy processing mill.





Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	5

Information about days of open burning was readily available from J. Pilon and Viluco. In addition to this indicator, some additional information related to air quality was collected in community surveys. The results showed that the indicator is very relevant in relation to sugarcane production, as concerns on air quality due to burning practices were mentioned by most of the community members interviewed for the survey. It would be useful to include an indicator that specifically relates to environmental impacts observed by community members.

3.2. Open burning area

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
32% of surface is currently under open burning regime	Burning is not used

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	3

This information was readily available from J. Pilon that uses open burning. Information on the surface under burning regime was not available from previous years.

3.3. Use of Best Available Technologies for reducing emissions

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
The São Paulo state agroenvironmental protocol establishes that in areas that have under 12% of gradient, burning should be eliminated by 2014, the company is working to reach this goal. The operation also implements measures to reduce emissions of particulates from the boiler of the mill.	No-till farming (reduces the use of fossil fuels) System implemented to measure carbon footprint of biodiesel production, control of boiler efficiency Although not considered emissions, the survey in Frias and Tucuman. The comments on sugar cane is not related to biofuel production.

Assessment of the indicator

	Score
Clarity	3
Availability	5
Relevance	5
Measurability	3
Temporal availability	3

Qualitative information about technologies used for reducing emissions was available from both of the operations. While this information is useful, it would be useful to compare this with what is generally available for the sector, in order to determine whether the technologies used are 'best available'. This indicator was not very clear to the participants and had to carefully explained. It is important to ask the respondents to define all of the measures they use to reduce emissions, it is then the task of the assessor to evaluate whether these measures are best available.

3.4. Implemented Practices (non or reduced tillage)

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
No-till farming is not used	100% of the soil is under no-till farming

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	3

This information was readily available from both operations. The indicator can be considered relevant, as the use of no-till practices can have a significant impact on soil erosion and use of fossil fuels.

3.5. Implemented Practices (fertiliser applied)

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
Fertilizer use: 20%-05%-20% (NPK) = 500 kg/ha/yr	Approximately 50kg of 'Super Fosfato Triple' $[Ca(H_2PO_4)_2 \cdot H_2O]$ is applied per ha/yr, this fertilizer has 46% phosphate /14% Calcium

Assessment of the indicator

	Score
Clarity	5

Availability	5
Relevance	5
Measurability	5
Temporal availability	3

This information was readily available from both operations. This indicator is considered relevant as the use of fertilizer relates to potential impact of the operation on water and soil quality.

3.6. Implemented Practices (herbicides and pesticides)

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
Pesticide use: Combine 500 SC = 1.8 L/ha Velpar-K WG = 1.5 kg/ha Dinamic = 1.4 kg/ha Regent 800 WG = 0.25 kg/ha	List of pesticides applied is included in Annex 1, pesticides are applied in different concentrations on the different field, the records of pesticide application for each field were not available during the field visit.

Assessment of the indicator

	Score
Clarity	5
Availability	3
Relevance	5
Measurability	5
Temporal availability	3

Information about the pesticides used was available from both operations. The quantities applied often vary from field to field and the average values applied to fields were not available for Viluco S.A.

3.7. Soil Erosion (flood prone area)

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
There is no feedstock cultivation area in flood prone region	There is no feedstock cultivation area in flood prone region

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	5

Neither of the operations had any cultivation area in flood-prone area, so it was not possible to further evaluate this indicator.

3.8. Soil Erosion (wind prone area)

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
There is no data on the area located at wind-prone region.	Much of the region is prone to winds during the winter, however, information on this was not available as 'wind prone region' was not defined for the purposes of the evaluation.

Assessment of the indicator

	Score
Clarity	2
Availability	2
Relevance	3
Measurability	2
Temporal availability	2

Viluco S.A collects data on wind speed, but it was not possible to evaluate this indicator as 'wind prone region' had not been defined. J. Pilon did not have information about wind speed in its fields.

3.9. Soil Erosion (slopes)

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
J. Pilon uses percentage slope instead of degrees. 15% of the area = 2 524.53 ha is located in an area that has over 12% gradient (May 2012)	There is no feedstock cultivation area in slopes above 25° surface gradient

Assessment of the indicator

	Score
Clarity	5
Availability	4
Relevance	4
Measurability	5
Temporal availability	3

J. Pilon could provide information about the percentage of land area located in an area of over 12% slope (6.84°), however there was no specific information about land in gradient over 25°. It might be worth evaluating whether the gradient of 25° is adequate as a limit for the indicator or whether a lower limit might be more appropriate.

3.10. Soil Erosion (measures to control erosion)

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
Measures to control erosion: Contour lines, planting timed depending on the type of soil (clay or sandy soil), crop rotation with soy 40% of the area, particularly on lower quality soils.	Measures to control erosion: Contour lines, dams to avoid hydric erosion, plowing against slopes and strips of natural vegetation between fields are used to control soil erosion.

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	4
Temporal availability	4

This indicator gives a qualitative description of measures to control erosion. The indicator is clear and the information was readily available from information. More information about the feedstock and local conditions would be needed to evaluate the sufficiency of these measures in reducing erosion.

3.11. Soil analysis

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
Every 4 years. If productivity is very low, analysis is carried out more frequently.	Soil organic material analysis carried out once a year Phosphorus analysis carried out every 3 years

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	5

This information was readily available from both of the operations. The information is relevant as it gives an indication of whether an operation is monitoring the soil organic material in its fields.

3.12. Water consumption (irrigation)

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
Fertirrigation with vinasse is carried out – the quantity of vinasse produced is roughly equivalent to 10 times the quantity of alcohol produced. No non-recycled water is used in irrigation	Irrigation is not used in cultivation

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	3

Viluco S.A does not use irrigation, J. Pilon S/A uses only fertirrigation, but no non-recycled water is used. This indicator is considered relevant, as use of irrigation can have a major impact in the local availability of water.

3.13. Water Management Plan

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
There is no water management plan. However, 25m^3 of water is used / ton of sugarcane in the industrial process. At the moment 7 m^3 of this is withdrawn, while 18m^3 is recycled. The mill intends to reduce water use to 2m^3 per ton of sugarcane (previously 15 m^3) Major loss of water currently takes place in the washing of floors and equipment.	There is a waste water management plan in the industrial sector. There is currently primary waste water treatment, but secondary and tertiary treatment is being developed Consumption of water is currently not measured in the industrial sector, but there are plans to measure this in the future

Assessment of the indicator

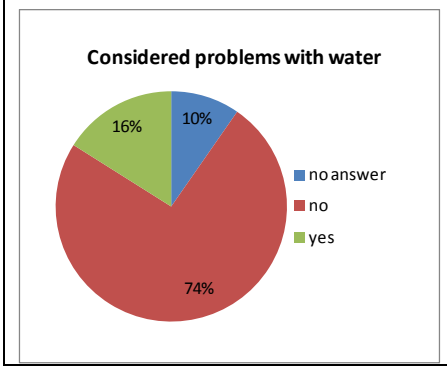
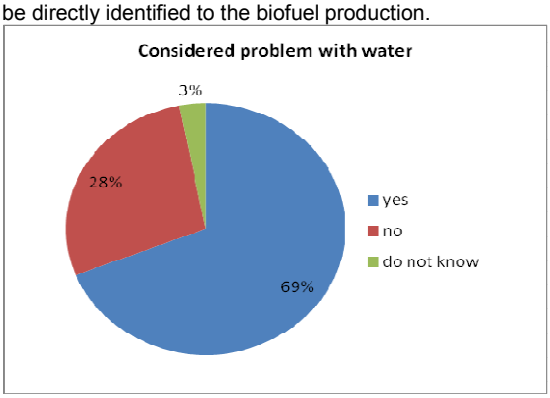
	Score
Clarity	4
Availability	3

Relevance	3
Measurability	3
Temporal availability	4

Neither of the operations have a documented plan called water management plan. However, both of the operations have implemented various measures to manage the water they consume and/or waste water. Therefore, it would be useful to modify this indicator to refer to measures to reduce water use and manage waste water.

3.14. Availability of water

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
The survey applied to the communities provided additional information regarding the perception of the communities on the local environment.  	The survey applied to the communities provided additional information regarding the perception of the communities on the local environment. The problems nevertheless, could not be directly identified to the biofuel production. 

Assessment of the indicator

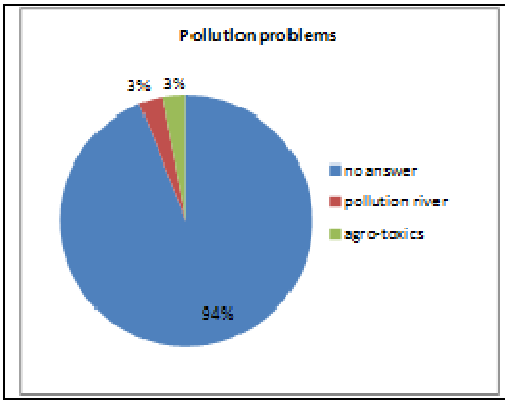
	Score
Clarity	5
Availability	5
Relevance	5
Measurability	3
Temporal availability	4

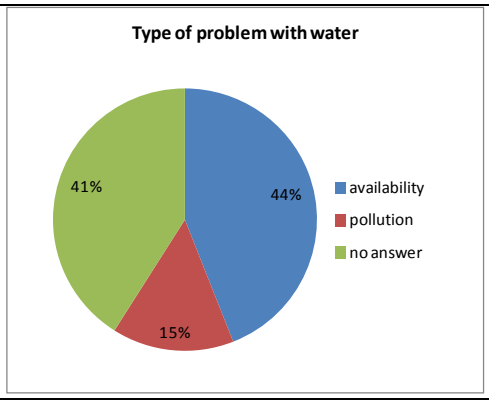
This indicator is important and can be assessed qualitatively or quantitatively. The availability of water data can be obtained through other methods for instance, geographic information systems (GIS) calculations for a whole basin, data from the local authorities, or from the company. Nevertheless, in this case was based on the perception of the community which in some cases can provide information when they notice changes in the local availability of water for basic needs (drinking, cultivation, wash). The data is difficult to assess in a qualitative form and the temporality can be an issue as it needs to be frequently monitored. It can be easily tracked to the consumption of the biofuel company.

3.15. Quality of water

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
The survey applied to the communities provided additional information regarding the perception of the communities on the local environment. The problems nevertheless, could not be directly identified to the biofuel production.	The survey applied to the communities provided additional information regarding the perception of the communities on the local environment. The problems nevertheless, could not be directly identified to the biofuel production.





Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	4
Temporal availability	3

This indicator is important and can be assessed qualitatively or quantitatively. The water quality data can be obtained through other methods for instance data from the local authorities, or from the company. Nevertheless, in this case was based on the perception of the community which in some cases can provide information when they notice changes in the local quality of water. The data is difficult to assess in a qualitative form and the temporality can be an issue as it needs to be frequently monitored. It can be monitored to the biofuel company through a water emissions assessment in the region.

3.16. Reduction of biodiversity

Results

J. Pilon S/A (Brazil)

Year	Pasture converted (ha)
2007	470.93
2008	17.99
2009	48.44
2010	245.79
2011	339.17
2012	459.46

According to the company, no natural ecosystems have been converted within the last 5 years.

Viluco S.A. (Argentina)

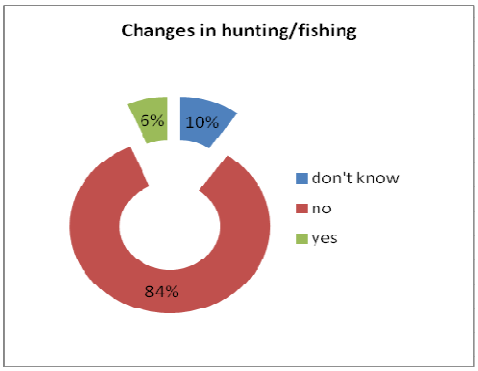
According to the company, there has been no expansion of cropland in the operation's own/rented lands.

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	3

3.17. Impacts on fisheries/other aquatic fauna

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
The survey applied to the communities enquired on perceptions on changes in the environment and activities in the region. Only a small part of the community members had noticed changes in fisheries or aqutic fauna and these changes are no necessarily related in the biofuel production. 	There were no changes reported in these activities in the regions of Tucuman and Santiago del Estero. This might also be related to the non-practice of these activites in the region and not because of the activities related to the feedstock production or the transformation in the mills.

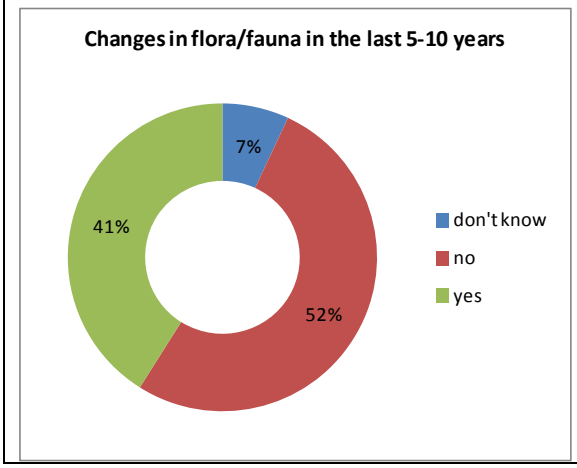
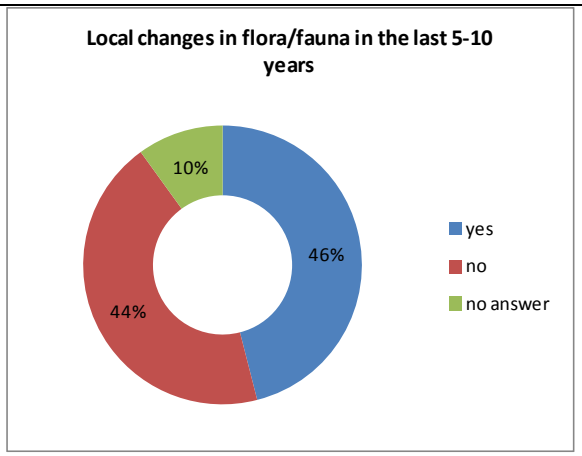
Assessment of the indicator

	Score
Clarity	3
Availability	2
Relevance	5
Measurability	3
Temporal availability	3

The indicator is highly relevant in terms of biodiversity conservation. It overlaps with the ecosystem services indicator regarding the activities that can be sustained in the area.

3.18. Impacts on local fauna/flora perceived by community

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
	

Assessment of the indicator

	Score
Clarity	5

Availability	3
Relevance	5
Measurability	3
Temporal availability	3

This is a qualitative indicator based on the perception of the local population. Data may be difficult to gather because it will depend on the number of years that the interviewee has lived in the region or even the age of the interviewee. Nevertheless, with larger surveys and including several communities it would be possible to assess in a qualitative form the changes perceived by the population. Another issue to consider is how to relate the changes directly to the biofuel production.

3.19. Conservation Measures

Results

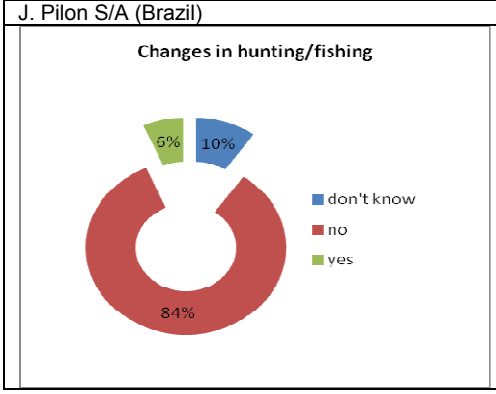
J. Pilon S/A (Brazil)	**Viluco S.A. (Argentina)**
11 % of the company's own land is under conservation measures. There is no data for rented/outgrower land; only productive land is rented.	Around 4% of the operations own lands are under conservation measures, these lands include strips of native vegetation between fields, on hills and riparian buffer zones.

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	3

3.20. Access to ecosystem services (Reduction in hunting/fishing)

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
	There were no changes reported in these activities in the regions of Tucuman and Santiago del Estero. This might also be related to the non-practice of these activities in the region and not because of the activities related to the feedstock production or the transformation in the mills.

Assessment of the indicator

	Score
Clarity	2
Availability	3
Relevance	5
Measurability	2
Temporal availability	2

This is a qualitative indicator based on the perception of the local population. Data may be difficult to gather because it will depend on the number of years that the interviewee has lived in the region or even the age of the interviewee. The concept of ecosystem services is not normally part of the common domain and this may create confusion with general environmental knowledge or perception in the local population.

Another issue to consider is how to relate the changes directly to the biofuel production.

3.21. Access to ecosystem services (Reduction in access to non-timber forest products)

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
There were no reports on this for both case studies	

Assessment of the indicator

	Score
Clarity	3
Availability	3
Relevance	5
Measurability	2
Temporal availability	2

This is a qualitative indicator based on the perception of the local population. Data may be difficult to gather because it will depend on the number of years that the interviewee has lived in the region or even the age of the interviewee. The concept of ecosystem services is not normally part of the common domain and this may create confusion with general environmental knowledge or perception in the local population. This also relates to specific environments which may not be related to the case study

Another issue to consider is how to relate the changes directly to the biofuel production.

3.22. Access to ecosystem services (Reduction in access to cultural ecosystems)

Results

J. Pilon S/A (Brazil)	Viluco S.A. (Argentina)
The survey addressed the question in both case studies but the community does not perceive ecosystem services as being related to any cultural/recreational practice.	

Assessment of the indicator

	Score
Clarity	5
Availability	5
Relevance	5
Measurability	5
Temporal availability	3

This is a qualitative indicator based on the perception of the local population. Data may be difficult to gather because it will depend on the number of years that the interviewee has lived in the region or even the age of the interviewee. The concept of ecosystem services is not normally part of the common domain and this may create confusion with general environmental knowledge or perception in the local population.

Another issue to consider is how to relate the changes directly to the biofuel production.

Conclusions and recommendations

The two field tests provided a significant amount of information on the practical application of the Global-Bio-Pact set of socioeconomic indicators and allowed for an assessment of the indicators using the pre-defined criteria.

The assessment of the indicators showed that most of the indicators were clear and easily understandable for the respondents. Some of the indicators could, however, be further refined to make it clear what information is being requested. This was particularly the case for the indicators where parameters had not been clearly defined (e.g. wind-prone region). Particular attention should be given to specific concepts that may not be used all countries and may thus be unclear for the respondents (e.g. man-day). This should also be taken into account when translating the indicators in different languages. For the two field tests the indicators were translated in Spanish and Portuguese and some terminology and concepts were difficult to translate to these languages.

Most of the information was readily available from both of the operations. For those that were not, it was generally a case of the company not collecting data in the format requested. Most of the respondents did, however, agree that keeping records of the information would be useful for monitoring the socioeconomic impacts of the operation. The field test also showed that operations had different ways of capturing data, which can make it difficult for collecting standardized information across different operations. The issue of availability of data would probably be solved if the indicators were applied in a more formalized way, e.g. as a part of certification scheme, and the operations would have systems in place to routinely collect the information from their operations.

The operational staff interviewed agreed that most of the indicators were very relevant for monitoring socioeconomic performance of the operations. Overall, it would be useful to relate the information collected to some general parameters (e.g. average salary in the agricultural sector in the country) for a meaningful analysis of the performance of the operations. Alternatively, the indicators could be used to measure change over time (e.g. before and after certification). Those indicators that were currently not considered very relevant (e.g. water management plan) could be modified to increase their relevance by, for example, asking about management of waste water or measures to reduce water consumption.

Most of the indicators are quantitative in nature and thus easily measured. Not all of the aspects of socioeconomic impacts can be, however measured quantitatively, which is why some of the indicators are qualitative and thus somewhat more difficult to measure. While incorporation of qualitative indicators is considered important, the assessment team considered that some of the qualitative indicators could be further standardized in terms of the information requested, thus making them easier to measure and compare across timescales.

Overall there was a very low temporal availability of the information requested. For most indicators the respondents were requested to provide information from 5 years prior to assessment, but this information had often not been collected, or it was not easily accessible for the purposes of the assessment. Viluco S.A had only been producing soy biodiesel since 2010, so it was not possible to collect information prior to 2010 from this operation. Considering the low availability of information from previous years, for the practical use of the indicators it would probably be best to collect information from operations only from the year of the assessment. This information could then be collected annually so as to monitor changes in the indicators.

The combination of company interviews with employee, community and outgrower questionnaires was considered to be a good method for collecting the information necessary for the monitoring of the indicators. The application of community questionnaires was particularly useful to be able to gain an indication of community perceptions of impacts. Due to time constraints, it was not possible to apply the questionnaires to a statistically significant sample of respondents, but the information obtained was, nevertheless, considered to be useful supportive evidence for monitoring the indicators. While community questionnaires provided a range of useful information about impacts, the clear limitation of this method was that it was often difficult to link the impacts mentioned to biofuel production. Thus the questionnaire data should be evaluated as supportive data to the information obtained with other methods.

In the practical application of the indicators it may not always be possible to use similar amount of time and resources for field assessments as was employed in these two field tests (3 days with three assessors). One possible use of the indicators would be to ask operations to report annually on a subset of the indicators. Where possible, the reports could then be verified annually, for example, as a part of a certification audit.

An overall recommendation on the application of the indicators is that if the main objective is to measure socio-economic impacts in a region, this should be a joint effort of local authorities and the company. This will help to have a better use of economic, time and human resources. Furthermore, the information provided to the local community regarding the activities of the biofuel sector in the region not only will be complying with sustainability aims for both the company and the government but will also help to strength links between the stakeholders in the region.

Annex 1 Global-Bio-Pact Socioeconomic indicators

Basic information

No	Indicator	Measurement/ Monitoring Process/ Unit	Guidance	Data access
1.1	Name and location	Name and geographical location of the operation	Location map	P
1.2	Land area under cultivation	The total area of land cultivated by the operation (ha)	Breakdown of land under different feedstocks and under different tenure (own land, rented land, smallholders, outgrowers)	P
1.3	Expansion of land area	Additional land area under production (ha/year)	Additional land under feedstock production within the last 5 years. Previous land use of the land area.	P, G
1.4	Average yield	Average yield of the feedstock (t/ha/yr)	Annual average yields of the feedstock within the last 5 years	P
1.5	Annual production	Annual production of feedstock and subsequent products (t)	Annual production of the feedstock and the subsequent products and byproducts within the last 5 years	P
1.6	Certification	Is the operation certified? If so, which certification(s)?	Type of certificate	P, N
1.7	Sectorial associations	Is the operation involved in sectorial associations, if so which association(s)?	Registered membership of associations	P, N

Socio-economic indicators

No	Indicator	Measurement/ Monitoring Process/ Unit	Guidance	Data access
Contribution to local economy				
2.1	Production cost	Breakdown of yearly production costs of the facility (incl. labour, raw material, energy, services, etc.) (EUR/t of feedstock)	Annual production costs within a 5-year period	P
2.2	Value added	Value added by the operation. Annual value of sales less the price of goods, raw materials (including energy) and services purchased. (EUR/t of feedstock)	Annual value added within a 5-year period	P
2.3	Taxes/royalties paid to the government	Breakdown of payments made to the government/year (EUR)	Payments made to the government per year within 5 years	P, G
2.4	Contributios made by the operation to allied industries in the local economy	Percentage of total production cost paid to contractors, suppliers per annum	Percentage of total production cost paid annually to contractors and suppliers of raw materials (excluding suppliers of feedstock) within a 5-year period	P
2.5	Involvement of smallholders or small suppliers	Percentage of feedstock that originates from associated smallholders and outgrowers	Percentage of feedstock that originates from associated smallholders outgrowers within a 5-year period. Number of associated smallholders or outgrowers.	P, C, W
2.6	Amount paid to smallholders and suppliers of feedstock	Annual amount paid to smallholders and suppliers of feedstock (EUR)	Annual value paid to associated smallholders and outgrowers per unit of product within a 5 year period.	P, C, W
2.7	Employment	Total number of employees and person days of employment per year	Total number of people employed each year and total number of person days per year within a 5 year period. Breakdown should be given for categories of employment for operation (management/office/processor/field labour, male/female, contract/no contract)	P, W

No	Indicator	Measurement/ Monitoring Process/ Unit	Guidance	Data access
2.8	Ratio between local and migrant workers	Ratio of employment from local area / outside local area per category of employment (management/office/processor/ field labour)	Local area is defined as state or province (however, assessor can further adapt this to local context). Absolute annual number of workers per employment category (including temporary/ permanent) within a 5-year period	P, G
2.9	Percentage of permanent workers	Percentage of workers that have a fixed contract employment per category of employment	Annual percentage permanent vs. temporary workers within a 5-year period	P, G
2.10	Provision of worker training	Number of workers that have received training (for skills development, education etc.) each year, number of working days spent in training provided by the operation each year, type of training	Annual numbers should be given for a 5-year period	P, W
2.11	Community investment	Amount invested in community investment projects (e.g. CSR) (% of annual revenue) and qualitative description of investments including any projects specific for women	Annual values should be given for a 5-year period. This should be calculated as percentage of annual revenue.	P, C
Working conditions and rights				
2.12	Employee income	Average income of employees by category of employment (EUR)	Annual average income per employment category for a five-year period	P, W
2.13	Employment benefits	Employment benefits (e.g. housing, health care, holidays) provided by operation (desctiption of benefits per employee per year)	Breakdown of average benefits given per employment category. Distinction should be made between the benefits that are mandated by law and those that are not.	P, W
2.14	Income spent in basic needs	Percentage of worker disposable income (by category of employment) spent on fulfilling basic needs (food, accomodation and transport)	To be estimated based on average salary per employment category, amount spent in food per day, accomodation per month and transport per day	W, C
2.15	Hours of work	Average daily hours of work per employee per employment category (h)	Average daily working hours per category of employment. This should be verified from employment records and worker interviews with questions addressing number of working hours/day.	P, W
2.16	Freedom of association	Existence of labour unions	Existence of labour unions and whether workers have the right to join them. This should be verified by interviewing the management and the workers: Do workers belong to a union or other type of working association?	P, W, C
Health and safety				
2.17	Work related accidents and diseases	Number of work related accidents per person days of employment per year, number of work related diseases/ person days of employment per year	Records of any work-related accidents or diseases.	P, W
2.18	Personal protective equipment	Percentage of workers that use appropriate personal protective equipment	To be calculated as a percentage of sample in a site visit	P
2.19	OSH training	Percentage of employees that have received OSH (Occupational Safety & Health) training	Training records and worker interviews	P, W
Gender				
2.20	Benefits created for women	Employment benefits that are specific for women	List any employment benefits that are specific for women (i.e. maternity leave, others)	P, W
Land rights and conflicts				
2.21	Legal title of land right	Operation has a legal title/ concession for the land that is not challenged.	Document of legal title	P, G

No	Indicator	Measurement/ Monitoring Process/ Unit	Guidance	Data access
2.22	Communal/ public land	Area of land cultivated by the operation that is customary, public or commmunity land (ha)	Report on public or commmunity land within the project which would affect people living from subsistence agricultures, nomades, etc. Cross-check this information with the land categories listed under 'basic information'	P, C (N)
2.23	Land conflicts	Area of land currently under dispute, land conflict. (ha) Has the operation had any land use conflicts, if so, what caused them, how were they resolved?	Land area currently under dispute. Qualitative description of any current or previous land use conflicts. If they were resolved, how this happened.	P, C, G (N)
Food security				
2.24	Land that is converted from staple crops	Land that has been converted from staple crops (ha)	Hectares of land land that has been converted from staple crops to the feedstock production (assessor should define staple crops for the country) within the last five years	P, (G, N)
2.25	Edible feedstock diverted from food chain to bioenergy	Amount of edible raw material diverted into bioenergy production (t)	Annual amount of edible feedstock that was used in bioenergy production (5-year period)	P
2.26	Availability of food	Perceived change in availability of food after the beginning of bioenergy operations	Check (survey) at community level about perceived change	C, W
2.27	Time spent in subsistence agriculture	Change in time spent in subsistence agriculture in the household	Check (survey) at community level about perceived change	C, W

Environmental indicators

No	Indicator	Measurement/ Monitoring Process/ Unit	Guidance	Data access
Air				
3.1	Open burning on company level	Days open burning used in operations/year	Annual days open burning used in operations, 5-year period	P
3.2	Open burning area	Percentage of surface under open burning regime	% surface under open burning regime	P
3.3	Use of Best Available Technologies for reducing emissions	List of best available technologies in place	Review technologies used at company	P
Soil				
3.4	Implemented Practices	Percentage of surface under no or reduced tillage	Check practices on the fields	P
3.5		Fertiliser applied (type)(kg/ha/yr)	List types of fertilizer and the annual amounts applied per hectare (5-year period)	P
3.6		Herbicides and pesticides applied (type)(kg/ha/yr)	List types of fertilizer and the annual amounts applied per hectare (5-year period)	P
3.7	Soil Erosion	Feedstock cultivation area in flood prone region (ha)	Maps and data from company	P
3.8		Feedstock cultivation area in wind prone region (ha)	Maps and data from company	P
3.9		Feedstock cultivation area in slopes above 25° surface gradient	Maps and data from company	P
3.10		Implemented measures to control soil erosion	List measures implemented	P
3.11	Soil analysis	Frequency of carrying out soil analysis in the operation	How often is soil analysis carried out in the operation?	P

Water				
3.12	Water consumption (irrigation)	Net non-recycled water consumed through irrigation per unit mass of product (l/ton of feedstock)	Check water balances at the company level	P
3.13	Water Management Plan	Implementing a water management plan	Is there a water management plan, is it implemented?	P
3.14	Availability of water	Perceived change in availability of water by local communities (amount consumed)	Questions addressed to local community representatives, NGO or local authority	C, N, G
3.15	Quality of water	Perceived change in quality of water by local communities	Questions addressed to local community representatives, NGO or local authority	C, N, G
Biodiversity				
3.16	Reduction of biodiversity	Non-agricultural land or pasture that has been converted towards feedstock operation within a 5- year period (ha), type of previous vegetation of converted land	This can be check with the operation and cross checked with local or national authorities or environmental NGOs	P (G, N)
3.17	Impacts on fisheries/other aquatic fauna	Local perceptions on impacts on fisheries/other aquatic fauna	Questions addressed to local community representatives, NGO or local authority	C, N, G
3.18	Impacts on local fauna/flora perceived by community	Local perceptions on impacts on local fauna and flora	Questions addressed to local community, NGO or local authority	C, N, G
3.19	Conservation Measures	% of surface set-aside for conservation purposes	e.g. protected habitat, buffer zones, ecological corridors, riparian vegetation, etc.	P
Ecosystem services				
3.20	Access to ecosystem services	Reduction in local communities' access to hunting, fishing	Qualitative questions to local community representatives, and NGO(s)	C, N
3.21		Reduction in local communities' access to non-timber forest products	Qualitative questions to local community representatives, and NGO(s)	C, N
3.22		Reduction in local communities' access to cultural ecosystem services such as sacred and recreational sites	Qualitative questions to local community representatives, and NGO(s)	C, N

Annex 2

Date _____ Number _____

Place _____ Interviewer _____

GLOBAL-BIO-PACT

Socio-economic questionnaire for workers and staff

General data

1. Name (optional) _____

2. Age [ ] 3. Gender [F] [M]

4. Place of origin _____

5. Address _____

6. Family [Wife] [Husband] children [ ] _____

Working issues

7. Number of years working at [company] [mill] [plantation] [years] _____

8. Position at company/mill/plantation _____

9. Do you belong to a union or workers association? [yes] [no] number of years [ ]

10. Do you have a contract? [yes] [no] [type] [permane] [temporal] [other] _____

11. How many hours do you work per day? _____ [shifts] _____

12. Do you receive any other benefit apart from the legal ones from the company?

13. Have you received any type of training? When _____ Topic _____ How long _____

14. Do you work with hazardous substances? (e.g. Fertilizer, pesticides, chemicals [yes] [no] type _____

15. Do you work in a risk area? (e.g boilers) [yes] [no]

16. Do you wear special/safety equipment? [yes] [no]

17. Have you had an accident at work in the last year? [yes] [no]

a) did you receive indeminisation/compensation/leave [yes] [no] [type] _____

Economic information

17. Own house/property [yes] [no] where? _____

18. Who is the main provider of the household [husband] [wife] [father] [mother] [other]

19. How many people live in your household?

19. Average income /month

[ ] [ ] [ ] [ ]

20. How much in average do you spend for:

food/day	
transport/day	
accomodation/month	

Comments

Date _____ Number _____

Place _____ Interviewer _____

GLOBAL-BIO-PACT

Socio-economic questionnaire for communities

General data

1. Name (optional) _____

2. Age [ ] 3. Gender [F] [M]

4. Place of origin _____

4.a. If different from current addres reson for moving _____

5. Address _____

6. Family [Wife] [Husband] children [ ] _____

7. Own house/property [yes] [no] where? _____

Working issues

8. Economic activitiy [industry] [services] [informal] [rural] [other] _____ [years] _____

9. Position at work _____

Economic information

10. Who is the main provider of the household? [husband] [wife] [father] [mother] [other]

11. How many people live in your household? _____

12. Average income /month

[ ] [ ] [ ] [ ]

13. How much in average do you spend for:

food/day	
transport/day	
accomodation/month	

Perception bioenergy production

14. Are you familiar with the activities on sugar cane in the region? [yes] [no]

15. Do you consider the activities are favourable for the community? [yes] [no] [don't know]
why? _____

16. Are there problems related to land use in the area? [yes] [no] [don't know]

16a. If yes which ones? _____

17. Are there problems related to water in the area (e.g. availability, quality)? [yes] [no] [don't know]

17a. If yes which ones? _____

18. Are there problems related to soil in the area? [yes] [no] [don't know]

18a. If yes which ones? _____

19. Are there problems related to air quality in the area (e.g. smoke from burning)? [yes] [no] [don't know]

19a. If yes which ones? _____

20. Did you use to carry out an activity realted to fishing, collecting, hunting or something related that you cannot do due to the sugar cane operations?
[yes] [no]
19a. If yes which ones? _____

21. Have you noticed in the last 5-10 years any changes related to the natural environment in your area?

21a. On flora, natural vegetation [yes] [no] [don't know] If yes which ones? _____

21b. On animals (large vertebrates) [yes] [no] [don't know] If yes which ones? _____

21c. If yes to 21a and b, do you think is the result of the sugar cane activities?

[yes] [no] [don't know] If yes which ones? _____

22. Do you know if there are any natural protected areas in the region?
[yes] [no] [don't know] If yes which ones? _____

22a. If there are not, do you think there should be? If yes which ones? _____

23. Do you know if there is an area important culturally fr the people in the community?

[yes] [no] [don't know] If yes which ones? _____

22a. If there are not, do you think there should be? If yes which ones? _____

24. What is your overall perception of the sugar cane activities in the area?

a. Provide jobs in the region	yes	no	don't know
b. Have positive impacts in terms of water, air, natural environment	yes	no	don't know
c. Have negative impacts in terms of water, air, natural environment	yes	no	don't know
d. Have changed the region	yes	no	don't know

how? _____

Comments