Outline

- Overview of case studies
- Indicators that are identified
- Main findings / issues that came up

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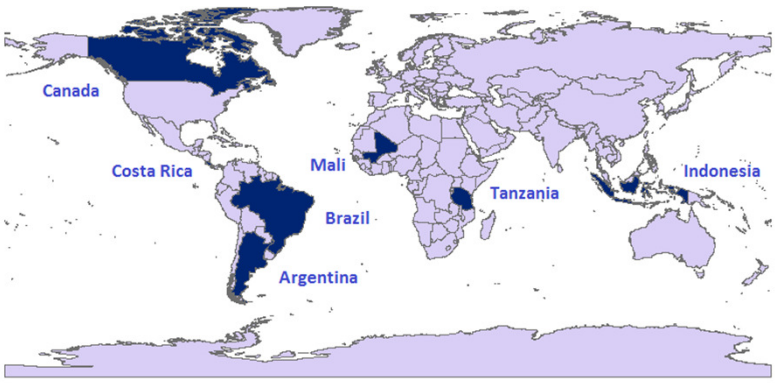
Case study countries



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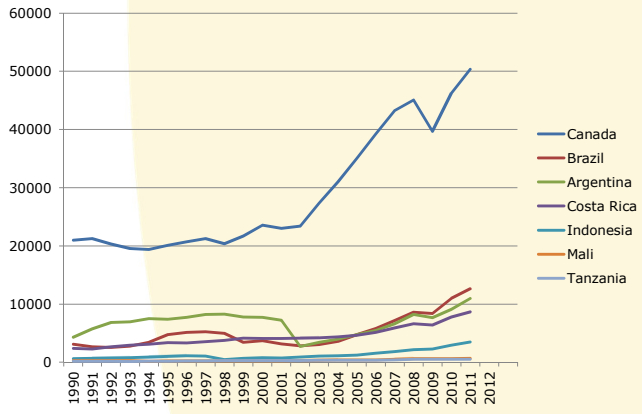
GDP per case study country



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Feedstocks

Lignocellulose

Jatropha

Soy

Palm oil

Sugarcane

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Different processing scales

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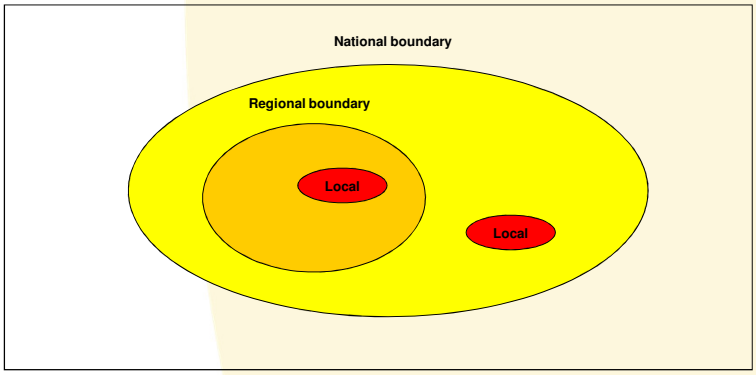
Case study boundaries



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Areas of concern

1. Economics (macro, region and local/micro)
2. Employment generation
3. Working conditions
4. Health issues
5. Food issues
6. Land use competition and conflicts
7. Gender issues

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Indicators identified

Indicator theme	Number of indicators identified	Indicator significance*		
		high	low	no indication
Macro economic	9	5	6	4
Regional economic	11	0	8	5
Micro economic	14	9	3	6
Employment and poverty reduction	13	16	12	n.a.
Working conditions	11	19	5	n.a.
Health issues	11	6	8	n.a.
Food issues	13	4	5	6
Land issues	16	7	2	9
Gender issues	11	10	8	n.a.

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Macro economic indicators

No.	F…	Qn Ql[a]	Measurement method	Data requirement
	Macro-economic indicators			
	Background indicators			
-	GDP [€ or $]	Qn	…istical data	
-	GDP/capita [€ or $]	Qn	S…stical data	
-	GINI coefficient	Qn	S…stical data	
-	People below poverty line of 2 $/day [%]	Qn	S…stical data	
-	Human Development Index (HDI)	Qn	…tistical data	
	Impact/ specific indicators			
	Sector contribution … GDP [%]	Q…	Statistical data or input/output analysis	Value added, IO tables
a.2	Sector contribution to agricultural GDP [%]	Q…	Statistical data	Value added, agricultural GDP
a.3	Value of the sector (by revenue or turnover generated by the sector [€ or $]	Qn	…tistical data	
a.4	Products exported [tons or litres]	Qn	…tistical data	
a.5	Investments in the sector [€ or $]	Qn	…atistical data	
a.6	Total investment in bioenergy infrastructure over the past decade [€ or $]	Qn	Statistical data	
a..	…e of industrial inputs [€ or $]	Q…	Statistical data	

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Regional economic indicators

B	Re...			
	...ground indicators			
	GRDP [€ or $]	Qn	Statistical ...	
	Regional per capita income as percentage of national per capita income [%]	Qn	Statistical analy...	Regional and national per capita income
-	Regional GINI index compared to national GINI index			
b.1	Bioenergy sector contribution to GRDP [%]	Qn	Statistical analysis o... input/output anal...	Value added, IO tables
	Contribution of bioenergy product ...xports to total ...	Qn	Statistical anal...	Value regional bioenergy export
b.3	...		...analysis	
	Investments in the sector in the region [€ or $]	Qn	Statistica... ...is	
b.5	Regional sector employment as part of total employment	Qn	Statistical analysi...	
b.6	Regional sector turnover as part of total turnover [%]	Qn	Statistical analysis	
b.9	Amount of revenue collected from bioenergy sector [€ or $]	Qn	Statistical analysis	
10	Total number of jobs generated in the region by bioenergy sector [no ...	Qn	Statistical an... ...or Input/o... ...nalysis	

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Regional economic indicators

Two indicators from the previous table seem to describe regional impacts quite well:

- **The % bioenergy contribution to GRDP** (quick first order idea of the importance of a certain sector in the region)
- **The total number of jobs generated in the region** by the biofuel sector (compared to national average or to total unemployment figures of the region)

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Local economic

- Net Present Value (NPV)
- Internal Rate of Return (IRR)
- Contribution of feedstock sales to household income
- Cost of feedstock production compared to other alternatives
- Total project investment
- Turnover of the company
- Revenu per ha from bioenergy crop compared to revenues of other crops

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Local economic – evaluation

- Only limited number of case studies were able to find information on the contribution to household income.
- Data on wage levels, NPV or IRR of projects was hard to obtain
- Costs of feedstock production and conversion seems more easy to obtain.
- The revenue per ha for a certain bioenergy crop (indicator 3.14) can give a good indication of potential profits for farmers or plantation companies, especially if compared to other crops.
- The distribution of profits is important. Wage levels, minimum wages, possibly gender disaggregated wage data but also the ratio of profits that stay in a country is required to assess distribution.
- Contribution of bioenergy project to household income is important, although this does not give information about other (potentially more profitable) opportunities (or the lack thereof).
- Background indicators on local level not available. Only if background indicators identify a possible impact, further monitoring is necessary

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Employment generation

2	Employment indicators	Qn/Ql	Measurement method	Data requirement
	Background indicators			
	Total labour force [nr]	Qn	Statistical data	Total labour force
	Unemployment ratio [%]	Qn	Statistical data	Total unemployment (formal and/or informal)
	Average minimum wage [$/day or month]	Qn	Statistical data	Minimum wage per sector
2.1	Employment generation on national level (sector) [no of jobs]	Qn	Statistical data or input/output analysis	
2.2	Employment generation on regional level	Qn	Statistics, literature (if available)	
2.3	Employment generation on local level	Qn	Company records and interviews	

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Employment generation

2	Employment indicators	Qn/ Ql	Measurement method
2.4	Ratio of fixed contract: casual/daily workers	Qn	Company records and interviews
2.5	Percentage of informal jobs, total jobs generated included informal		
2.6	Wage levels (including casual workers) compared to minimum wages	Qn	Company records and interviews
2.10	Average age of employees	Qn	Sector level labour statistics
2.11	Participation of different races	Qn	Sector level labour statistics
2.12	Wages at farm/company compared to wages in traditional activities (like charcoal making, food production)	Qn	Interviews & analysis
2.13	Wage levels sufficient to buy food and other household needs?	Qn?	Interviews & analysis

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Employment generation - evaluation

- In certification systems there is usually no criterion for the number of jobs to be created
- It can be a challenge to measure minimum wage levels e.g. for contract workers that are paid by unit
- Indicators need to be specified well: there could be a difference between the number of workers and the number of jobs (in fte).

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Working conditions





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Working conditions

3	Working condition indicators	Measurement method
3.1	Maximal number of hours of work per day	Workers' contracts, company records and interviews
3.3	Extent to which child labour laws / minimum age are complied with.	Company records and interviews NGO monitoring records
3.4	Number of work related accidents	Company records and interviews
3.5	Level of provision of OSH systems, training and protective equipment	Company records and interviews
3.7	Number of unjustified dismissals / end of contracts / resignations	Sector level labour statistics
3.8	Mode of transport to the fields	Company records and interviews

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Evaluation

- Working conditions are an important issue in many existing certification systems.
- Measurement method is very important. Interviews with company owners can easily result in biased outcomes, stressing the important of professional third party auditing including interviews with workers.

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Health and safety

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Health issues

4	Indicators health issues	Qn/Ql	Measurement method
4.1	Number of workers reporting health concerns related to agrochemical use	Qn	Company/health clinic records and interviews
4.3	Number of accidents during work, as proportional to the total number of workers	Qn	National/regional: statistics Local level: company records
4.4	Number of deaths during work, as proportional to the total number of workers	Qn	National/regional: statistics Local level: company records
4.5	Number of retirements due to working accidents, as proportional to the total number of workers	Qn	National/regional: statistics Local level: company records

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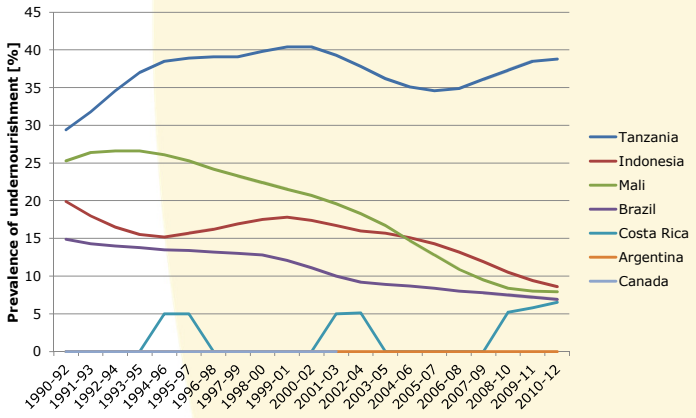
Health issues - evaluation

- Accidents and occupational diseases, deaths and retirement due to labour accidents, potential causes of long term health effects, like noise and dust emission levels etc.
- In Brazil statistics on accidents and deaths were available on sector level, providing useful insights. On company level, it can be difficult to obtain correct information from the involved companies
- Health and safety measures usually described in (national) law, it is possible to check compliance with these regulations.
- No threshold possible for the number of accidents. Compliance, whether a company has a record system for accidents in place, is a (compliance) indicator of the companies awareness and attention for this issue and can be included in a certification system.

Food security

Food security



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Food security

#	Indicator decription	Measurement method
5	Food security	
	Background	
-	Food security index score	Statistics
-	Conversion rates of food producing land	Statistics and literature
-	Poverty rates	Statistics
-	% of household income spent on food	Statistics
	Impact indicators	
5.1	Protection programmes	Interviews
5.2	Providing alternative for current practices	Literature
5.3	Number of people that became food insecure due to bioenergy production	Interviews/surveys and statistics
5.4	Δ in household income spent on food	

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Food security - evaluation

- Most of the indicators depend on (available) statistical data. The qualitative indicators such as type of foodstuff lacking, cannot be quantified.

Possible indicators:

- Household level food expenditures data
- Previous land use (is agricultural land that was used for the cultivation of food crops converted into biofuel feedstock cultivation),
- Food expenditures over time.
- Perception of level of food security by the local communities themselves

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Land use and conflicts

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Land use and conflicts

#	Indicator description	Measurement method
7	Land use competition and conflicts	
7.1	The extent to which land acquisition followed the correct legal process	Company records and community interviews.
7.2	The extent to which community land rights are determined and mapped	Company records and community interviews
7.4	Number of conflicts due to biofuels expansion	-
7.5	Expansion area over other cops	-
7.6	Compensation payments	
7.7	Language of contracts	

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Evaluation

- Many indicators identified, considered highly important by the case studies.
- Some of the data for the indicators can be obtained from national statistics, such as the development of land prices and total cultivation area of bioenergy (relative to total area available for example).
- Other indicators are more quantitative such as lost rights to land (difficult to quantify) and the extent to which land acquisition followed the correct legal process. (obtained from interviews with various stakeholders)

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Gender

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Gender

	Gender related indicators	Qn Ql	Measurement method
9.1	Women's wages as a % of men's (doing work judged objectively to be similar)	Qn	Local: Company records and interviews Regional/national: statistics
9.2	The extent to which equal opportunities are extended to women and men in the workplace	Ql	Company records and interviews
9.3	The extent to which women's reproductive rights are respected	Ql	Company records and interviews
9.4	Participation of women (in a type of job, company or sector)	Qn	Local: Company records and interviews Regional/national: statistics
9.5	Women participation policies	Ql	Company records and interviews

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Evaluation

- On national level, gender-specific indicators have been developed like Gender-related Development Index (GDI) (similar to HDI) and Gender Empowerment Measure.
- It is difficult to quantify gender issues, qualitative description is possible or compliance e.g. discrimination policy, specific policies such as maternity leave.

Energy access

Findings

Background data is easy to find

#	Indicator description	Macro economic Indicator result*	Measurement method / source
	GDP per capita	ARG: 10,941 in current $ (2011) BRA: 12,594 CAN: 50,345 CRI: 8,676 IDN: 3,495 MLI: 669 TZA: 529	(World Bank, 2011)
	GINI coefficient [as %]	IDN: 38 in 2007 CRI: 49.8 (based on 2003), and 43.7 in 2009 TZA: 34.6 (2009) MLI: 40.1 BRA: 53.8 (2009) CAN: 32.1 (2005) ARG: 44.2 (2010)	(World Databank) 2007/2008 UNDP, estado de la nation (see case study report)
	People below the international poverty line of 1.25 $ a day (PPP) and below the national poverty line	IDN: 32% in 2006 (above national poverty line) ARG: 0.9 PPP (data from 2000-2009), BRA: 2.8%, 21.4% (26% in 2008 case study rep) CAN: - (10.8% has income below 16,000 € CRI: 0.7%, 21.7% (1.25 $/day and national) IDN: 18.7%, 13.3% MLI: 51.5%, 47.4% TZA: 67.9%, 33.4%	(World Bank 2006) (UNDP, 2011) (UNDP, 2011) CIA (UNDP, 2011) (UNDP, 2011) (UNDP, 2011) (UNDP, 2011)

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But specific data much harder

	Indicators specific for bioenergy sector	
a.1	% of sector contribution to GDP	IDN: (requires further analysis) (export of palm oil accounts for 10% of foreign currency receipt BRA: 2% sugarcane sector contribution to GDP BRA: 2-10 billion $ increase depending on scenario ARG: 4% contribution of the chain CAN: 1.9% in 2008 , 1.7% in 2009 CRI: 1.1 % (sugarcane to GDP)
a.2	% of sector contribution to agricultural GDP	CRI: 14.4%
a.3	Estimated value of the sector	BRA: revenue from sugarcane: 4,562.7 million € for the mills and 3,658.4 million € for independent producers. From Ethanol: 8.85 billion €. Canada: Turnover of the sector: P: $3.571 billion C: $110 billion CAN: forestry sector: 3,571 billion $ (canadaian?)
a.4	Products exported (quantity)	IDN: 8.2 million tons exported during first half of 2011. 42 million litres in 2006 (USDA, FAS, 2010) and 200 million litres in 2009 (USDA, FAS, 2010) ARG: 1.19 million tons soy biodiesel exported thru September 2011 CAN: value of export forestry is 30.2 billion €
a.5	Investments in sector	CAN: $20.0 billion in 2009
a.6	Number of $ invested in bioenergy infrastructure over the past decade	Costa Rica
a.7	Value of industrial inputs	Brazil: growth per sector e.g. 2.5 million euro industrial equipment in 2008

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Main findings

- Look at impacts on different levels; national, regional and local.
- More methodologies have to be developed to gain better insight in socio-economic impacts, based on quantitative data.
- Background indicators provide a quick snapshot image to determine whether the theme, e.g. food security, is an issue at all in the project region.
- More data collection is required on all levels (national, regional and local).
- Government bodies or international organisations could collect and monitor the data which would provide for example the basic data for the background indicators.

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End

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