Bioenergy sustainability criteria and oil palm

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Opportunities to apply sustainability criteria to oil palm in Tabasco, Mexico

- Sustainability criteria
- Steps in supply chain
- Examples
- Discussion

U.S. Department of Energy (DOE) Approach to Assessing Bioenergy Sustainability

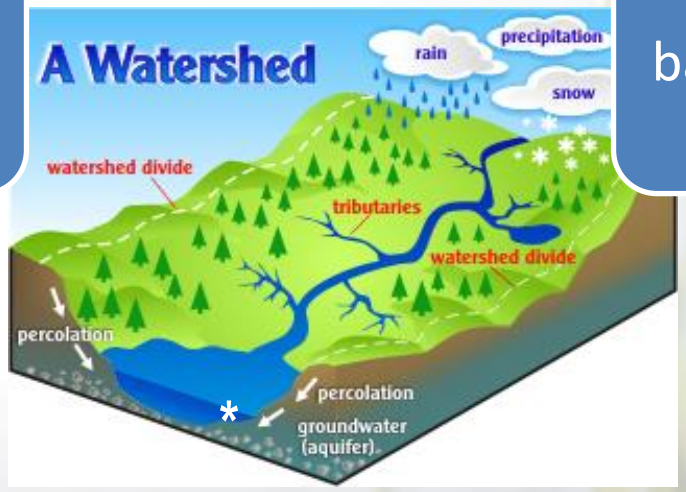
Select Indicators

Establish baselines and targets

Evaluate indicator values

Identify trends and tradeoffs

Develop and test best practices



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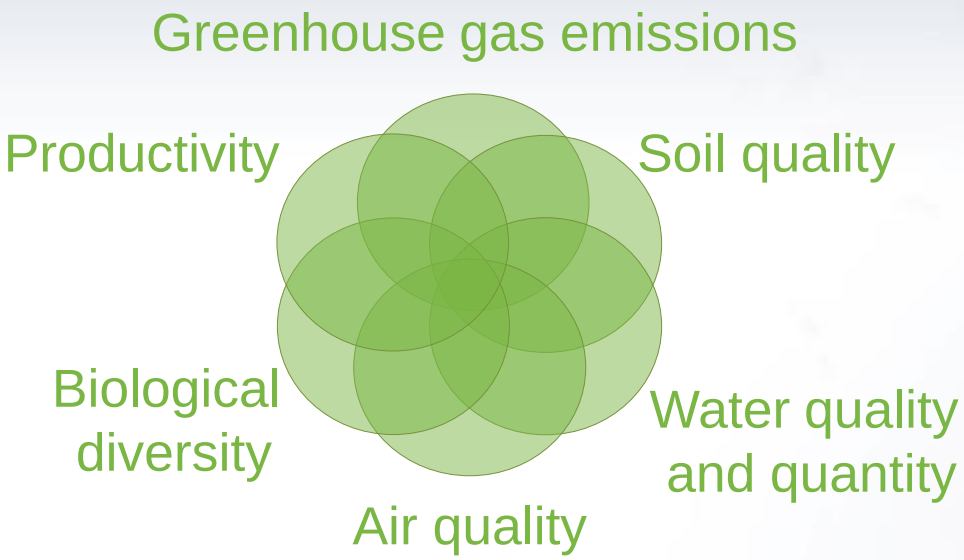
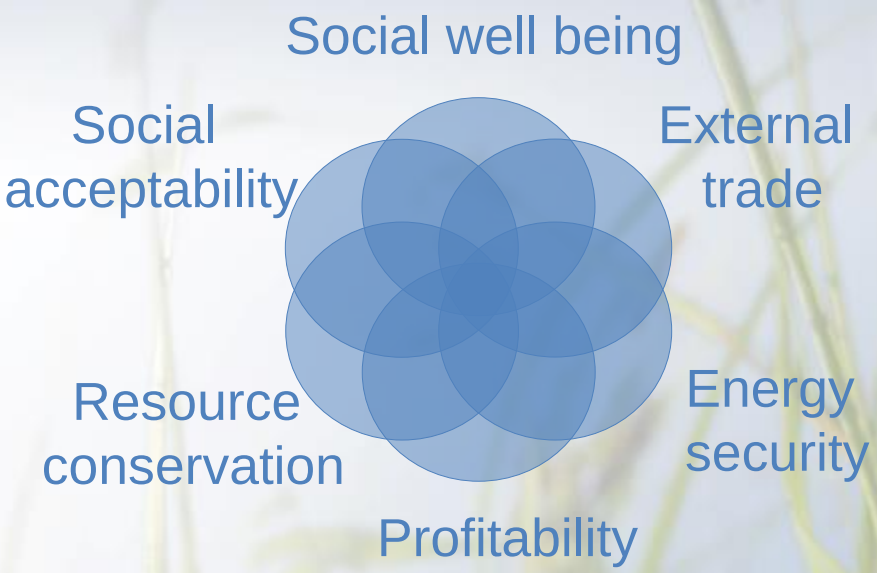
Sustainability criteria developed for bioenergy



McBride et al. (2011)
Ecological Indicators
11:1277-1289



Dale et al. (2013)
Ecological Indicators
26:87-102.

Recognize that measures and interpretations are <u>context</u> specific

Efroymson et al. (2013) *Environmental Management* 51:291-306.

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Looking at the biofuel supply chain in terms of sustainability indicators

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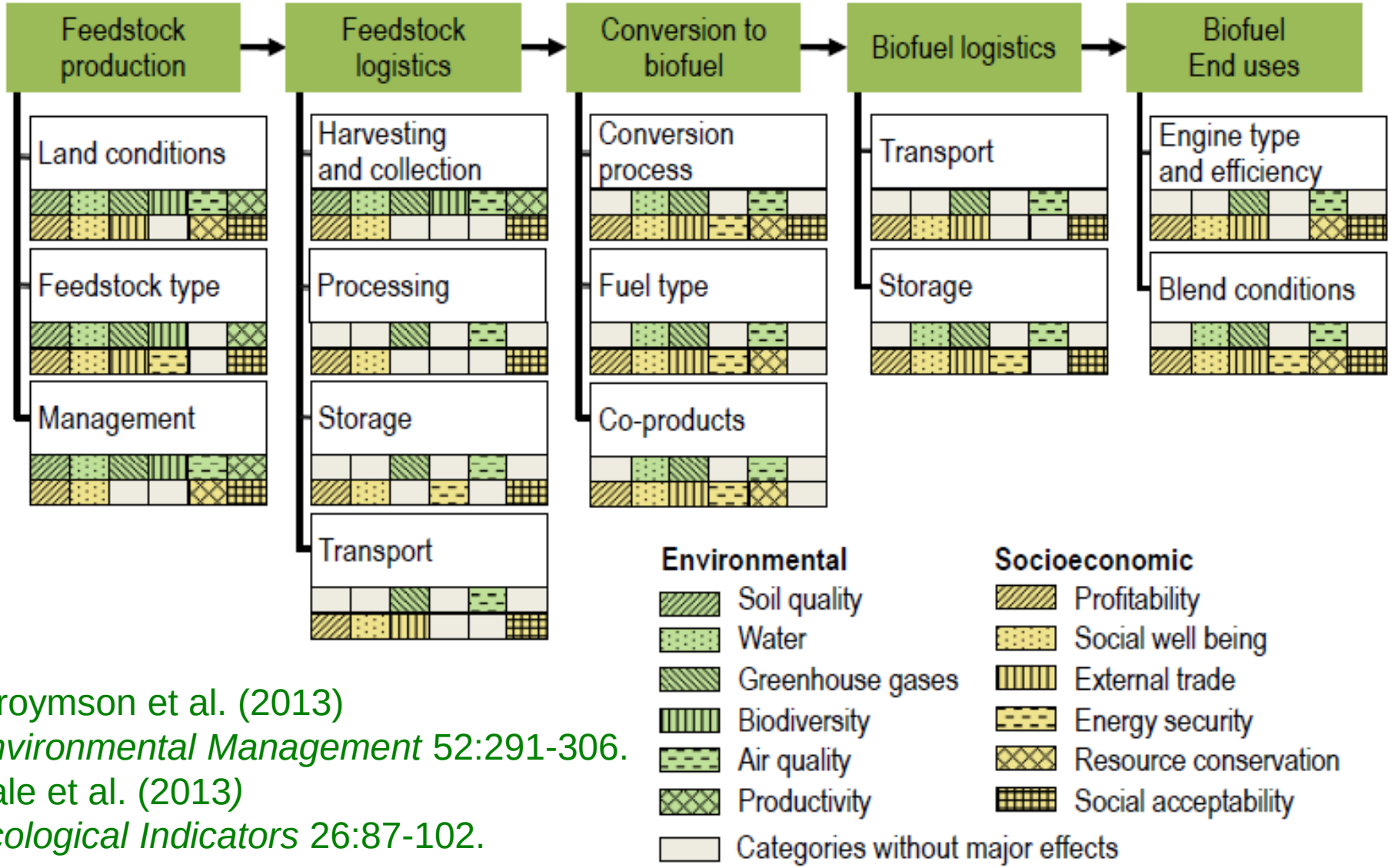


Efroymson et al. (2013)
Environmental Management 52:291-306.
Dale et al. (2013)
Ecological Indicators 26:87-102.

Examples of criteria and indicators applied to palm production

Positive impact	Either - Potentia	Negative imapct

Category	Indicator	Units	Score
Social well-being	Employment	Number of full time equivalent (FTE) jobs	
	Household income	Dollars per day	
	Work days lost due to injury	Average number of work days lost per worker per year	
	Food security	Percent change in food price volatility	
Energy security	Energy security premium	Dollars /gallon biofuel	
	Fuel price volatility	Standard deviation of monthly percentage	

Examples of criteria and indicators applied to palm production

Positive impact	Either - Potentia	Negative imapct

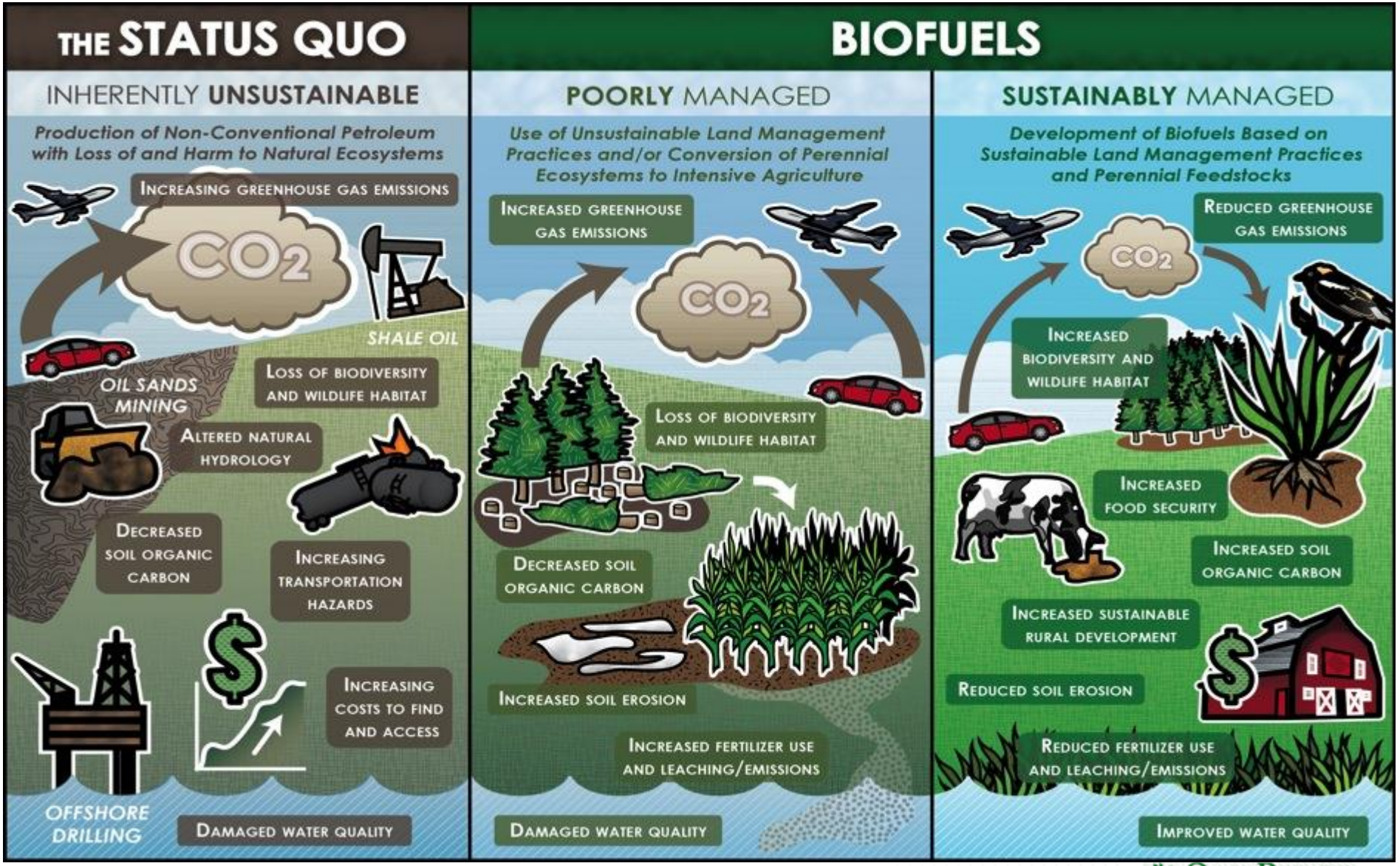
Category	Indicator	Units	Score
Social acceptability	Public opinion	Percent favorable opinion	
	Transparency	Percent of indicators for which timely and relevant performance data are reported	
	Effective stakeholder participation	Number of documented responses to	
	Risk of catastrophe	Annual probability of catastrophic event	?

Jobs are important for social and political sustainability – Fossil fuels = boom/bust cycles, while…

i - Employment information for large-scale hydropower is incomplete and not included.

Source: www.ren21.net

Biofuels need to be sustainably managed



Dale B et al. (2014) Take a Closer Look: Biofuels Can Support Environmental, Economic and Social Goals. Environmental Science & Technology 48(13): 7200-7203.

Thank you!

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