

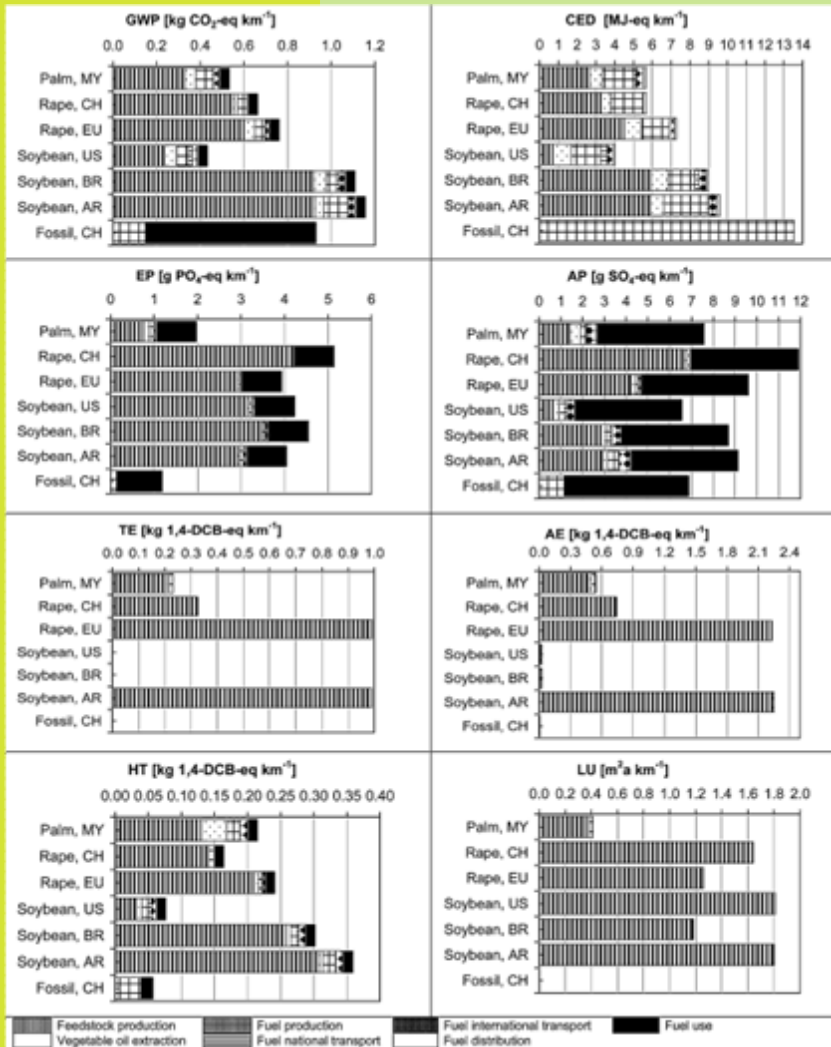


LCA OF BIOFUEL PATHWAYS

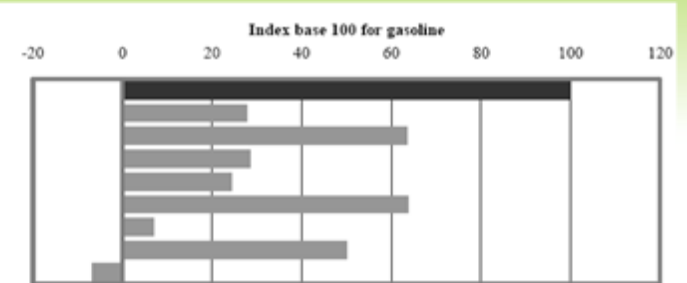


Bioenergy and Energy Planning Research Group

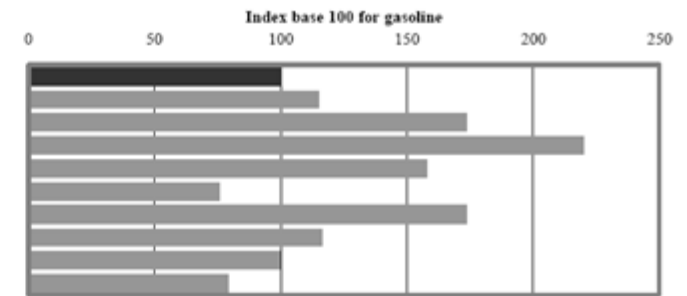
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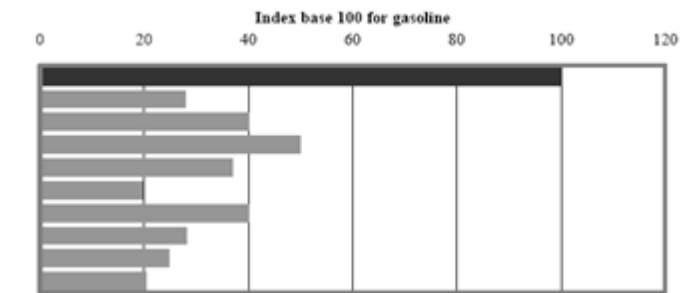
Allocation	LUC	Fuel	IPCC Index	
-	-	Gasoline	100.0	
A-1	LUC-1	Bioethanol, as E5	E5-1	27.9
A-2	LUC-1	Bioethanol, as E5	E5-1	63.4
A-3	LUC-1	Bioethanol, as E5	E5-1	28.5
A-4	LUC-1	Bioethanol, as E5	E5-1	24.2
S-1	LUC-1	Bioethanol, as E5	E5-1	63.8
S-2	LUC-1	Bioethanol, as E5	E5-1	7.0
S-3	LUC-1	Bioethanol, as E5	E5-1	50.1
S-4	LUC-1	Bioethanol, as E5	E5-1	-6.7



Allocation	LUC	Fuel	IPCC Index	
-	-	Gasoline	100.0	
A-2	LUC-1	Bioethanol	E-3	115.0
A-2	LUC-2	Bioethanol	E-3	173.7
A-2	LUC-3	Bioethanol	E-3	220.1
A-2	LUC-4	Bioethanol	E-3	157.8
A-2	LUC-5	Bioethanol	E-3	75.6
A-2	LUC-6	Bioethanol	E-3	173.7
A-2	LUC-7	Bioethanol	E-3	116.4
A-2	LUC-8	Bioethanol	E-3	99.8
A-2	LUC-9	Bioethanol	E-3	79.0



Allocation	LUC	Fuel	IPCC Index	
-	-	Gasoline	100.0	
A-1	LUC-1	Bioethanol, as E5	E5-1	27.9
A-1	LUC-2	Bioethanol, as E5	E5-1	40.2
A-1	LUC-3	Bioethanol, as E5	E5-1	49.9
A-1	LUC-4	Bioethanol, as E5	E5-1	36.9
A-1	LUC-5	Bioethanol, as E5	E5-1	19.7
A-1	LUC-6	Bioethanol, as E5	E5-1	40.2
A-1	LUC-7	Bioethanol, as E5	E5-1	28.2
A-1	LUC-8	Bioethanol, as E5	E5-1	24.7
A-1	LUC-9	Bioethanol, as E5	E5-1	20.4



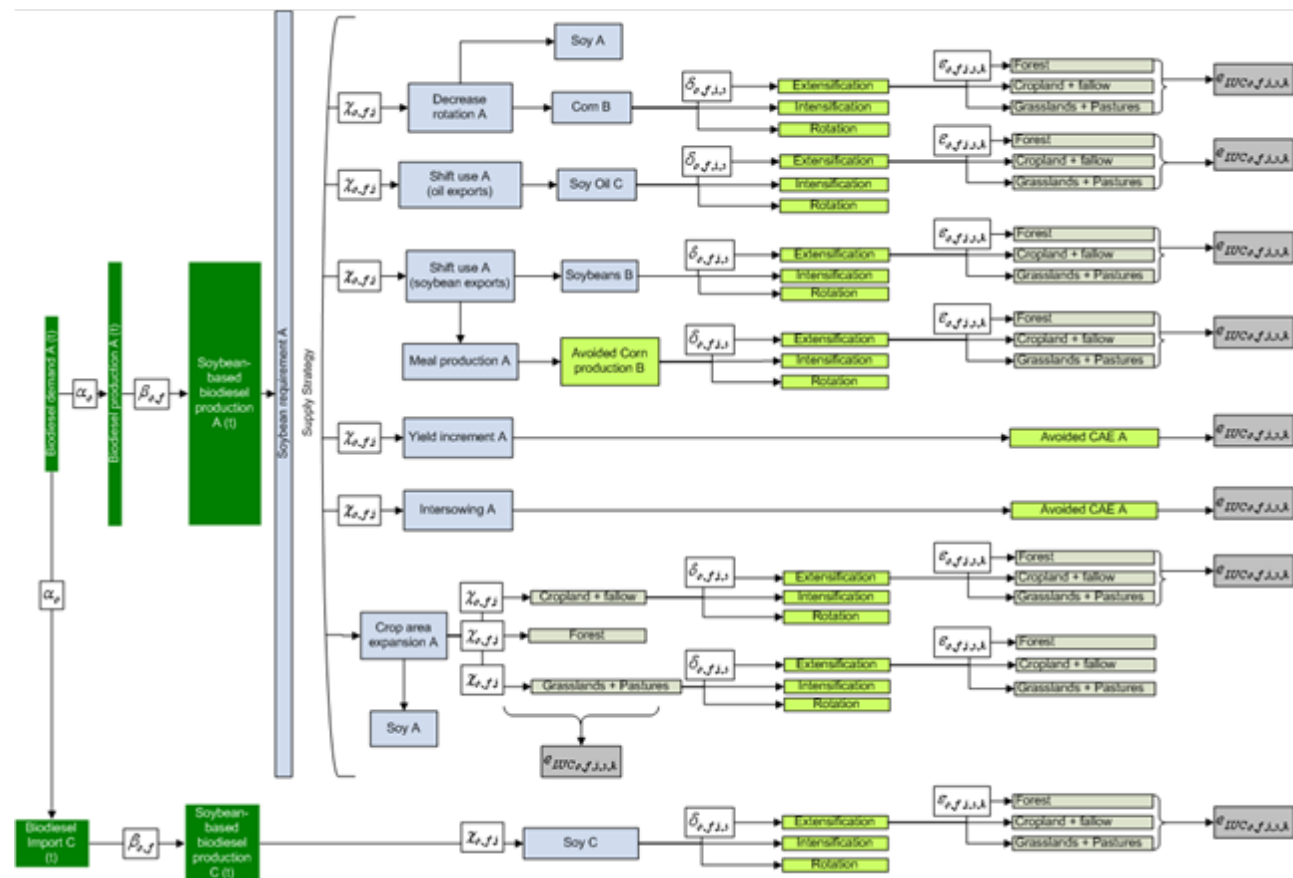
Panichelli et al., 2008

Gnansounou et al., 2008

LAND-USE ENVIRONMENTAL FOOTPRINT OF NATIONAL STRATEGIES FOR BIOFUELS PRODUCTION

CPBT scenarios model

- Panichelli L., Gnansounou E., 2008. Estimating greenhouse gas emissions from indirect land-use change in biofuels production: Concepts and exploratory analysis for soybean-based biodiesel production. *J. of Sc. Ind. Res.* (67) 1017-1030.



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⊙ Reviews

- ⊙ Gnansounou, E.; Panichelli, 2008. Biofuels and Land-Use Change. Background document of the Roundtable on Sustainable Biofuels (RSB) expert workshop “Biofuels and Land-Use Change”, Sao Paulo, Brazil, 20-21 November, 2008.
- ⊙ Gnansounou, E.; Panichelli, L.; Dauriat, A.; Villegas, J.D., 2008. Accounting for indirect land-use changes in GHG balances of biofuels: Review of current approaches. LASEN Working paper. Ref. 437.101, 22 pp.

⊙ LBM model

- ⊙ Gnansounou E., Panichelli L., 2009. Assessing the land-use environmental effects of biofuel pathways: A logic-based model, BPE Working paper.
- ⊙ Rule-based model
- ⊙ Qualitative approach

⊙ Next Step: Expert System

- ⊙ Actors behavior
- ⊙ Scenarios
- ⊙ Thresholds for quantitative model parameters