



Food and Agriculture Organization of the United Nations

Case Study: Castorbean*

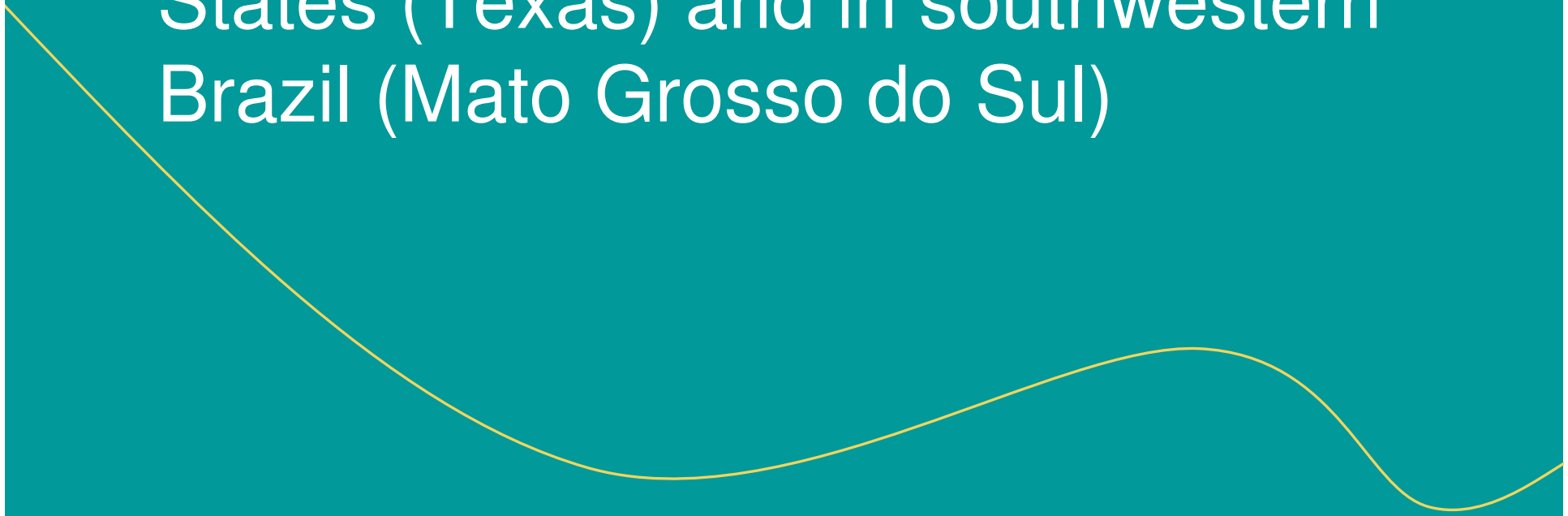
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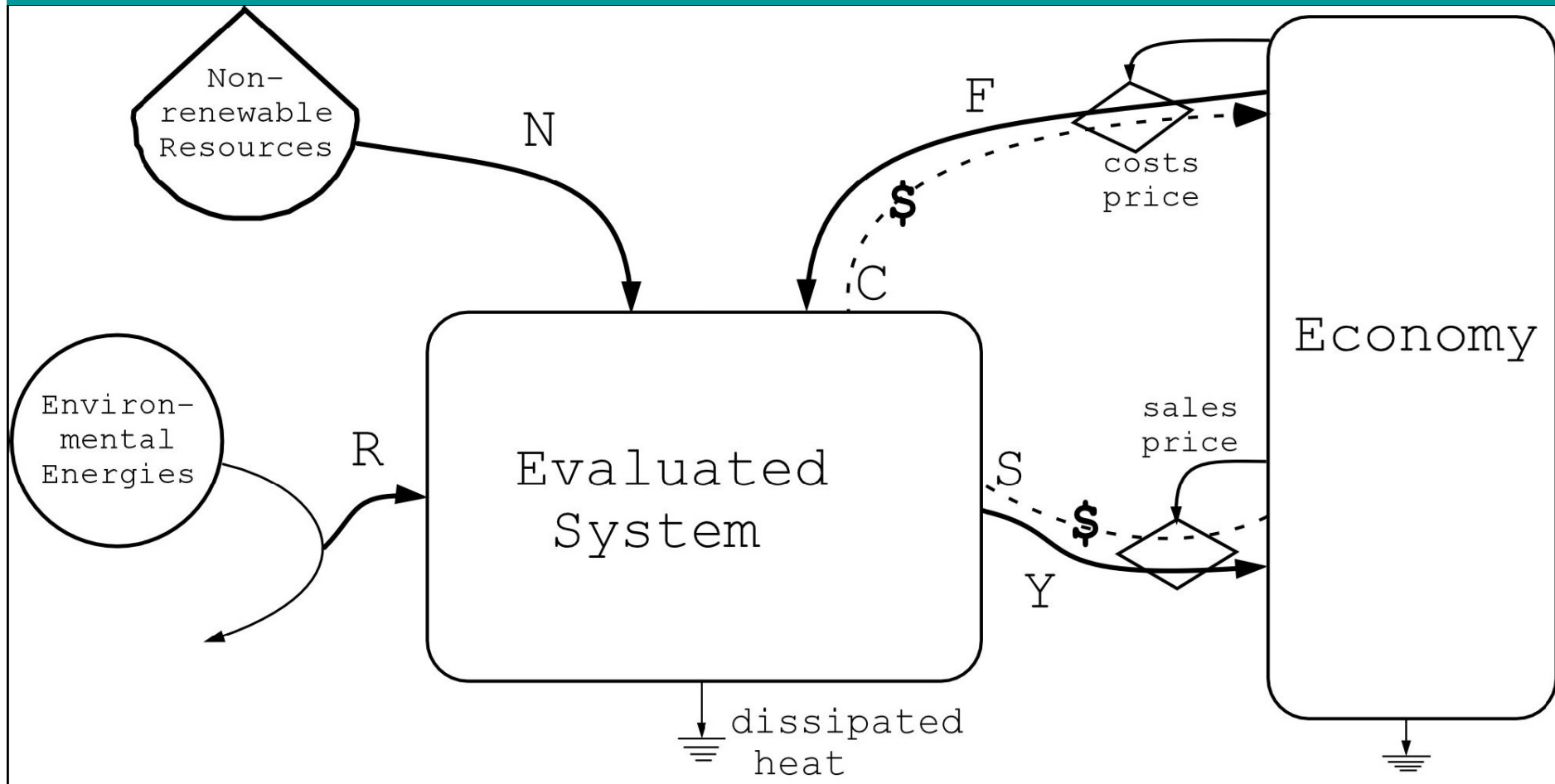
*Comparative Energy Evaluation Of Castorbean (*Ricinus Communis*) Production Systems In Brazil And The U.S.

Objective

To assess environmental and economic sustainability of Castorbean production in the south-central United States (Texas) and in southwestern Brazil (Mato Grosso do Sul)

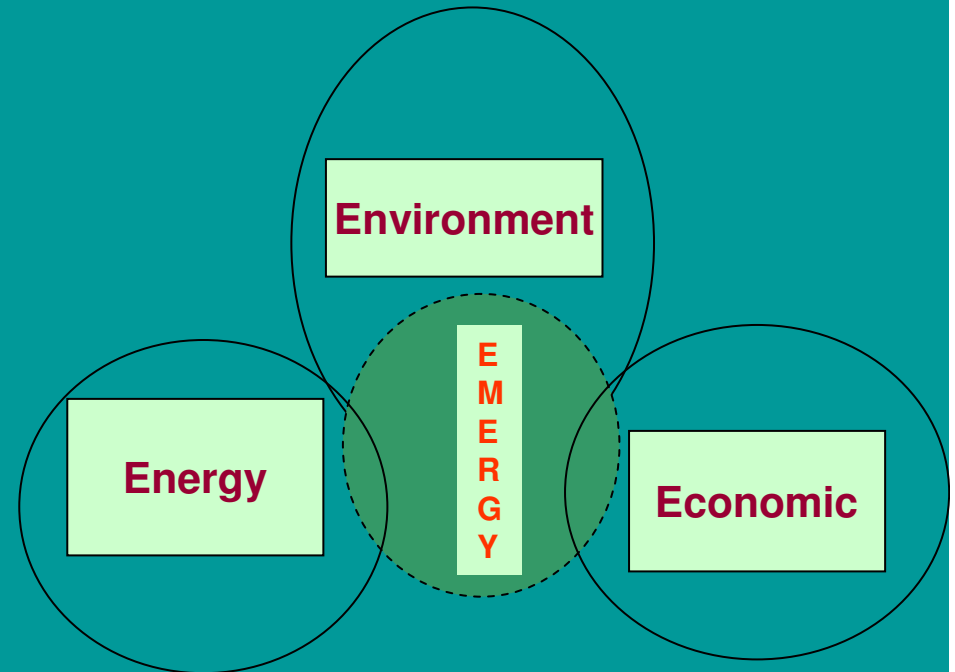


Energy System Diagram

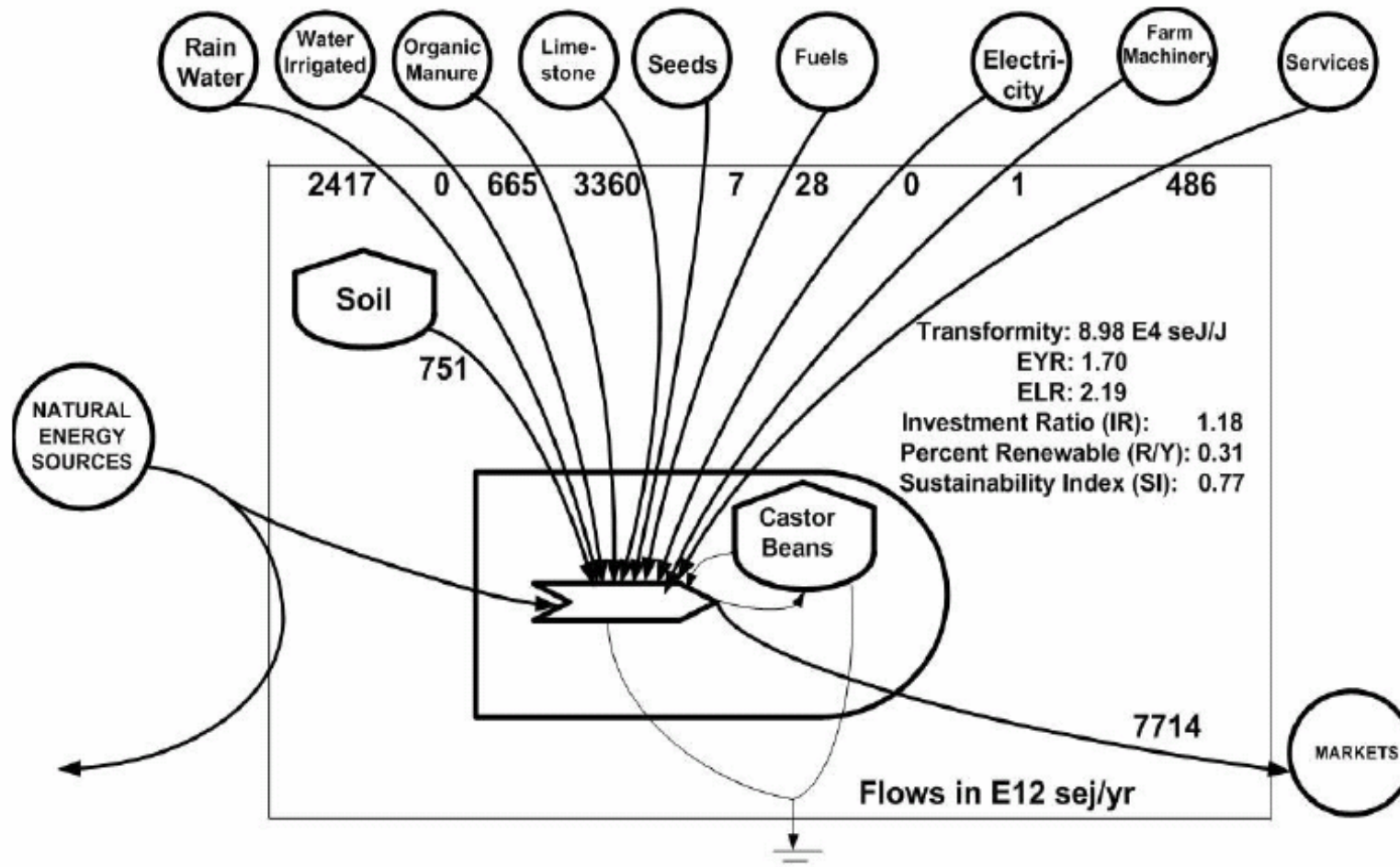


Environmental Accounting

- Energy assessment tool
- Energy Accounting is an ecological economic methodology that quantifies relationships between economy, environment and services using a “common metric” emjoule



Castorbean Brazil Production Requirements



Castorbean Production System - Sidrolandia-MS Brazil

Comparison Castorbean Production between US and Brazil

	US (Texas) Solar Energy (1×10^{12} seJ ha ⁻¹ y ⁻¹) unless noted otherwise)	Brazil (Mato Grosso do Sul) Solar Energy (1×10^{12} seJ ha ⁻¹ y ⁻¹) unless noted otherwise)
Input		
"Free" Renewable Inputs		
Sun	38	39
Wind	729	128
Water, rain	881	2417
"Free" Non-renewable		
Soil loss	1054	751
Water, irrigation	2122	0
Purchased		
Nitrogen	575	0
Phosphorus	429	0
Organic manure	0	665
Limestone	0	3360
Fuels	69	28
Seeds (energy, J)	30	7
Electricity	650	0
Farm Machinery	28	1
Human services	1426	486

Observations

- Highlights importance of the local climatic conditions in production of biomass
 - Contribution of local natural resources, i.e. rain-fed vs irrigation
- Intensity level in agricultural production
 - Mechanization for unskilled labor
 - Inputs i.e. manure for chemical fertilizers
- Overall, these are key considerations in the BEFS AF analysis

REFERENCE

- Comparative Energy Evaluation Of Castorbean (*Ricinus Communis*) Production Systems In Brazil And The U.S. by Vito Comar, David Tilley, Erika Felix, Mirko Turdera, Matias Chagas Neto, *In* Ortega, E. & Ulgiati, S. (editors): Proceedings of IV Biennial International Workshop “Advances in Energy Studies”. Unicamp, Campinas, SP, Brazil. June 16-19, 2004. Pages 227-237
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