Size does matter

The possibilities of cultivating *Jatropha curcas* for biofuel production in Cambodia

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Introduction

- GERES & DATe

  NGOs planning to start a biodiesel project

- Research Question:

  What are the implications of biodiesel production using Jatropha curcas in Cambodia from the perspective of sustainable development, especially in relation to food security?

Cambodia

- Democracy since 1993
- High corruption
- Rural economy
- Low education level
- All fuels imported

Methods

- Comparison between different biofuel projects all over the world
- 3 scales evaluated

  National, plantation, community

Biofuels

- Firewood
- Fossil oil replacements:
  - Ethanol (made from sugar, starch)
  - Vegetable oils, waste oil, fat → Biodiesel
  - Biogas
- Oil to biodiesel requires trans-esterification

Jatropha curcas L.

- Can grow on marginal soil
- Yield depends on soil quality & water
- Seeds contain ~ 30% oil
- Can be used in diesel engine (in principle)
- Other applications
  (soap production)

Food security

UN definition:

All people at all times have access to sufficient, safe nutritious food (…)

Main risks:

- Poverty
- Cash crops replace food production
- Land degradation

Ecology & Sustainability

- Biofuels close carbon cycle, but...
- Biofuels = Intensive agriculture?
  - Erosion
  - Nutrient export
  - Water use
  - Deforestation
  - Decreasing biodiversity

National scale

Brazil (ethanol) and India (Jatropha curcas)

National scale

Effects:

- Job creation
- Reduced CO_2 emissions
- Decreased dependency on fuel imports

- Increased income gap
- Deforestation, soil erosion and water pollution
- Complex effects on food security

National scale

India: Still in planning stage

Plantation scale

Jatropha as 'cash crop' in Nicaragua and India

Plantation scale

Not much success yet:

- High expectations - Low yields, low profit
- Market not yet developed
- Has to compete with “cheap” diesel

Problems with plantations

- Small-scale vs. large-scale
- Monoculture, nutrients, water-use, pollution

Community scale

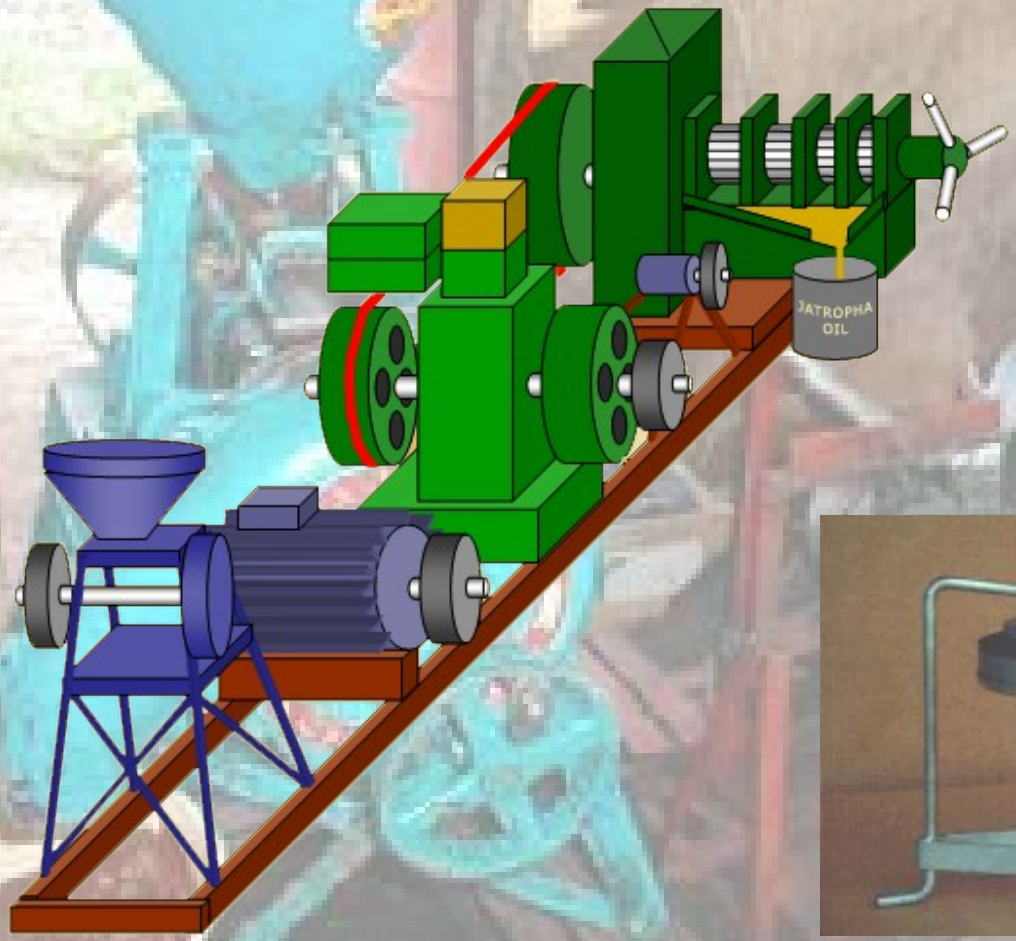
Tanzania and Mali

Community scale

- Positive ecological effects: erosion reduction
- Poverty reduction:
  - Added value (soap production)
  - Reduced fuel expenses
- Success through participative approach
- Income generation remains a problem

Community scale

Opportunities for rural energy production



Conclusions

	Feasibility	Ecological impact	Poverty reduction	Food security
National Biofuel	+ (MT)	-	--	0/-
Plantation Jatropha	?	0/-	+/-	0/-
Community Jatropha	0	++	+/0	+

Questions?