

Food Security Impacts of Rural Households' Employment at a Large-scale Biofuel Project in Madagascar

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BACKGROUND

- After hype in 2007/08 and subsequent downfall, Jatropha is still promoted and new projects are being undertaken (Wahl et al., 2012).
- Jatropha production has comparative advantage in areas with low-input farming systems, abundant land, poor infrastructure and high fossil fuel prices (De Yong and Nielsen, 2011, Achten et al., 2014)
- Besides economic, agronomic and environmental questions, doubts exist on the social dimension of sustainability.
- There is little research quantifying socio-economic impacts of large-scale Jatropha production on smallholders, mainly due to lack of baseline studies and detailed data collection. (Hodbod and Tomei, 2013, Van Eijck et al., 2014, Schut and Florin, 2014)
- Former impact analysis of the project in Madagascar shows that
 - households working for the Jatropha plantation are poorer
 - household income is increased and income inequality reduced (Grass and Zeller, 2011, Bosch and Zeller, 2013)

OBJECTIVES

- Provide insights into relationship between employment for the Jatropha project and household food security.

ACTIVITY

- Five household surveys from 2008 - 2013 in three villages in the surroundings of a large-scale Jatropha project in Madagascar
- Focus group discussions
- Food security indicators:
 - Diet diversity, past 7 days (8 food groups with weights, WFP, 2008)
 - Lack of food, past 30 days and 12 months
- Wage work for Jatropha project
 - Number of household members working
- Agricultural production
 - Seeds, yields (kg), land (m²)
- Fixed effects models
 - Robust standard errors, year dummies included



RESULTS (Focus group discussions)

- Income derived from daily wage work for the project, in particular during off-season and droughts, helps to increase households' resilience against climate variability and poverty.
- Labor demand declined substantially after build-up phase in 2010, very few regular jobs have been created.
- Incomes are mostly used for food and other necessities and only a small percentage is invested in agriculture or business.

RESULTS (Descriptives)

Outcome and explaining variables – Variable means	2008	2009	2010	2012	2013
Diet diversity (8 Food groups, weighted, past 7 days)	9.83	9.50	8.51	13.6	10.1
Lack of food (number of days in past 30 days)	7.7	5.06	3.38	3.46	2.42
HH members working for Jatropha project (Number)	0.91	0.82	1.1	0.54	0.29
Total land per capita (in ha)	0.55	0.42	0.41	0.52	0.43
Crop diversity (Number of crops grown)	4.4	4.7	3.8	8.0	7.4
Agricultural equipment (Dummy)	0.47	0.45	0.53	0.63	0.64
Storeroom for agricultural products (Dummy)	0.26	0.29	0.34	0.37	0.38
Livestock sales (Dummy)	0.48	0.39	0.23	0.61	0.26
Public employment (Dummy)	0.04	0.03	0.04	0.06	0.06
Own Business (Dummy)	0.22	0.34	0.25	0.32	0.23
Employment as agricultural labor (Dummy)	0.37	0.30	0.18	0.56	0.31
Dependents (Number, <10 and >65)	2.0	2.1	2.1	2.0	2.3
Labor force (Number, >=10 and <=65)	3.2	3.3	3.4	4.2	4.2
Total rice yield (kg)	1331	1430	542	1632	944
Total cassava yield (kg)	2267	767	642	1666	1991
Total maize yield (kg)	316	135	45	380	158
Total pulses yield (kg)	143	127	14	260	91
Agricultural workers (Dummy)	0.24	0.42	0.34	0.31	0.38
Mutual help (Dummy)	0.28	0.83	0.85	0.86	0.82
Number of observations	735	613	473	418	390

RESULTS (Fixed effects regression)

	Diet diversity		Lack of food	
	Coefficient	S.E.	Coefficient	S.E.
HH members working for Jatropha project (Nbr)	0.22**	0.10	-0.03	0.29
Total land per capita (ha)	0.32*	0.17	-0.74**	0.36
Crop diversity (Nbr)	0.08**	0.03	-0.18**	0.08
Storeroom for agricultural products (Dummy)	0.50**	0.20	-1.25*	0.67
Livestock sales (Dummy)	1.2***	0.21	-0.28	0.51
Own Business (Dummy)	0.26	0.21	-2.39***	0.52
Labor force (Nbr, >=10 and <=65)	0.19**	0.09	-0.10	0.19
Cassava yield (kg)	-0.0002	0.00	-0.0001**	0.00
Pulses yield (kg)	0.0004	0.00	-0.0003**	0.00
Agricultural workers (Dummy)	0.20	0.20	-1.34**	0.56
Mutual help (Dummy)	0.46*	0.24	-0.82***	0.67
R-sq within	0.39		0.09	
R-sq between	0.20		0.06	
R-sq overall	0.33		0.09	
Number of observations	1633		1979	

LESSONS LEARNED & RECOMMENDATIONS

- Positive impacts on diet diversity, but not on long-term and more subjective food security (Households working for Jatropha plantation use less land, inputs, less yield than others over time, less other activities)
- Recommendations:
 - Rural development: promotion of investments in storage, crop diversification, livestock and savings, off-farm employment
 - For Jatropha plantation: better monitoring of employment, meet local energy needs, provide energy services, sponsor agricultural support programs and activities, set aside land for food growing

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