

Jatropha Production in Tanzania

Smallholders struggle to profit

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I. Introduction

- **Jatropha curcas L.** produces oil containing seeds suitable as a biofuel feedstock
- Encouraged by local NGOs, international development organisations, private enterprises and the Tanzanian government **thousands of smallholder farmers** have invested in Jatropha cultivation
- Yet, its **economic viability** and **competitiveness** remain unclear



II. Research questions

- What is the **current knowledge** on Jatropha cultivation in Tanzania?
- Is Jatropha cultivation **economically viable** for smallholder farmers?
- Is it **economically competitive** with alternative crops?

III. Methodology

- **Qualitative and quantitative survey** of Jatropha growing households in Western and Northern Tanzania (Mpanda and Arusha region)
- Calculations based on own **empirical data** and on different **yield development scenarios**
- **Financial cost-benefit analysis** to calculate **net present value (NPV)** and **internal rate of return (IRR)**
- **Comparison** of Jatropha's NPV with alternative crops

VI. Findings

Knowledge on Jatropha cultivation

- Knowledge on best cultivation practice is **very low among all stakeholders**, this includes inter alia fertilisation, pruning, spacing, water requirements, pests and diseases

Economic viability

- NPV and IRR are only positive for the medium and high yield scenarios (Table 1)



Table 1: NPV and IRR for different yield scenarios

Yield scenario (YMT ³ t ha ⁻¹)	Western Tanzania ¹			Northern Tanzania ²		
	1.5	2.5	3.5	1.5	2.5	3.5
NPV (USD ha ⁻¹)	-249	129	507	-42	136	314
IRR (%)	-5	18	31	4	29	43

¹) n = 131, not intercropped ²) n = 14, year 1-3 intercropped with sunflower ³) Yield of Mature Trees

Parameters applied:

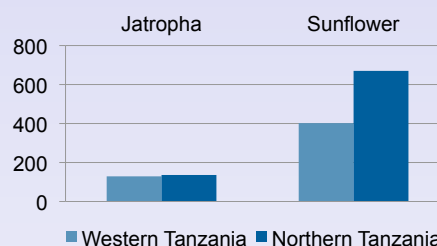
- Time period of 10 years (common timeframe of outgrower contracts)
- Discount rate r = 0.12
- Currency exchange rate of USD 1 = TZS 1250
- Assumed yield development: in Western Tanzania YMT³ attained from 7th year onwards, in Northern Tanzania from 5th year onwards

Relevant literature

GTZ (2009 forthcoming): *Jatropha Reality Check – Kenya Oilseed Baseline Survey*, prepared by Endelvu Energy, ICRAF and KEFRI. Nairobi.
Loos, T. K. (2009): *Socio-economic Impact of a Jatropha project on Smallholder Farmers in Mpanda, Tanzania – Case-study of a public-private-partnership project in Tanzania*. MSc-Thesis. Universität Hohenheim. Stuttgart.
Wahl, J. N., Baur, H., Jamnadass, R., Munster, C. and Iiyama, M. (2009 forthcoming): *Economic viability study on Jatropha curcas L. plantations in Northern Tanzania*. Working Paper No 91. World Agroforestry Centre. Nairobi.

Economic competitiveness

- Compared to sunflower Jatropha yields a much lower NPV when applying the medium yield scenario (Figure 1)



Parameters applied: YMT of Jatropha 2.5 t ha⁻¹, other parameters as in table 1

Figure 1: NPV of Jatropha, sunflower and groundnut in Western and Northern Tanzania

V. Conclusions

- Significant **knowledge gaps** on best management practice **hamper efficient Jatropha seed production**
- Investment in Jatropha is only profitable if **seed yields of at least 2-3 t ha⁻¹** can be reached
- Such **high yields** seem rather **unlikely** considering the poor development of seed yields observed so far
- Similar results are reported for Kenya (GTZ 2009)
- Economic **competitiveness is limited** → most alternative crops yield higher profits

VI. Recommendations

- Under current conditions **we cannot recommend** smallholder farmers **to invest in Jatropha** as a field crop
- To improve conditions substantial **research on agronomy** is needed
- In a **low-input system** Jatropha may prove profitable, e.g. when seeds are collected from hedges

