



ELSEVIER

Available online at www.sciencedirect.com

ScienceDirect

<http://www.elsevier.com/locate/biombioe>

A pro-poor biofuel? Household wealth and farmer participation in *Jatropha curcas* seed production and exchange in eastern Zambia

Elias Kuntashula^{a,*}, Dan van der Horst^b, Saskia Vermeulen^c

^aDepartment of Agricultural Economics and Extension Education, School of Agricultural Sciences, University of Zambia, P.O.BOX 32379, Lusaka, Zambia

^bSchool of Geosciences, University of Edinburgh, UK

^cLancaster Environment Centre, Lancaster University, Lancaster, UK

ARTICLE INFO

Article history:

Received 29 October 2012

Received in revised form

11 November 2013

Accepted 31 January 2014

Available online 1 March 2014

Keywords:

Biofuels policy

Jatropha curcas hedges

Farmer participation

Wealth index

Eastern Zambia

ABSTRACT

When a new crop is being promoted as a pro-poor, like in the case of *Jatropha curcas* (*J. curcas*) in Zambian rural communities, it is pertinent to explore factors that might affect its adoption, on not only homogenous groups but also heterogeneous wealth categories. This is because poorer farmers may be reluctant to invest in any untried innovations mainly due to their limited factors of production. Evidence from a household survey of 249 randomly selected farmers in eastern Zambia indicates that some factors that affect the farmers in embracing *J. curcas* seed production and exchange activities differ according to wealth. While factors related to household labour availability were crucial to involvement in *J. curcas* collection and exchange activities among poorest farmers, it was gender of the household heads and access to off-farm income that significantly influenced these activities among the well endowed farmers. Results further indicate that the farmers who are relatively well endowed are the ones most likely to benefit more from *J. curcas* collection and selling activities. Well endowed households harvested more seed from hedges because they have more labour and currently harvesting of seed is not restricted to private hedges. Further evidence show that even with fewer household members, the poorly endowed could be involved in planting of hedges. This is an avenue that can help the poorest farmers especially when property rights over *J. curcas* hedges are secured.

© 2014 Elsevier Ltd. All rights reserved.

1. Introduction

Studies on adoption of agricultural technologies often do not separate farming communities into wealth groupings in predicting the changes in probabilities of various factors that would enhance uptake of the technology [5,13,17]. Usually wealth indicators are included among explanatory factors as

potential predictors of technology adoption. If wealth indicators are non-significant, it is presumed that socio-economic characteristics, biophysical constraints and the policy environment would affect the households in a given community in the same way regardless of their wealth status. Scaling up efforts would therefore be directed towards removing impediments on factors identified as having significant influence on adoption of the technology. When a

* Corresponding author.

E-mail address: ekuntashula@unza.zm (E. Kuntashula).

0961-9534/\$ – see front matter © 2014 Elsevier Ltd. All rights reserved.

<http://dx.doi.org/10.1016/j.biombioe.2014.01.051>

novel crop like *Jatropha curcas* (*J. curcas*) is being promoted on the basis of its potential to alleviate rural poverty, it is pertinent to explore factors that might affect its adoption, on not only homogenous rural groups but also across heterogeneous wealth strata. It is common knowledge that poorer farmers in rural communities are often reluctant to invest in any untried innovations mainly due to their limited factors of production. Ref. [11] noted that relatively wealthier (or more resource-endowed) households have a better ability to cope with production and price risks and consequently are more willing to adopt new technologies than their poorer (or less resource-endowed) counterparts.

Within the wider bio-fuels debate, the potential contribution of *J. curcas* as a source of biodiesel and an avenue out of poverty has sounded promising; *J. curcas* has been hailed by some as a more sustainable bio-fuel since it is an inedible perennial which could in theory be grown by poor, small scale farmers on degraded land and could thus help to sustain rural livelihoods [19,4,16,21,17]. However the extent to which *J. curcas* is indeed a 'pro-poor bio-fuel', is open for debate and local context-dependent interpretations [3,1,2,12]. With the poorest of the poor lacking in terms of most of the production resources, it is important to explore which factors would most likely constrain this sector from participating in *J. curcas* production and seed exchange activities. There has been heated debate among various stakeholders in Zambia with regard to the growing of *J. curcas*, as well as the development of the bio-fuels industry in general [20]. Chief among these concerns were the effect of *J. curcas* production on resource use and food security. On the broader issue of food security, two contrasting views have evolved from several fora discussing the involvement of small scale farmers in *J. curcas* production. On one hand, views have been held that *J. curcas* production by small scale farmers could exacerbate their poverty in the sense that more resources will be diverted away from food crops [20]. On the other hand, it has been strongly argued by, for instance the Biofuel Association of Zambia (BAZ) that the involvement of small scale farmers in *J. curcas* production is a potential route out of poverty, since there is an already existing and ever expanding market for liquid bio-fuels. Thus the promotion of *J. curcas* farming as a pro-poor economic empowerment strategy for the local communities in Zambia has been gaining momentum.

This study's objective was to explore the factors affecting farmers' decisions to be involved in *J. curcas* production and exchange activities in eastern Zambia, and to what extent these factors may differ between the poorly endowed and well endowed households. Since productive assets are distributed differently among households within a community, adoption behaviours are expected to differ across socioeconomic groups. Refs. [14,6] showed that within a farming community, households at the upper part of the wealth continuum are most likely to adopt new technologies because of their secure economic positions. Further, it is noted that the desire for upward mobility in the economic group would motivate those at the lower end of the wealth continuum to adopt, but they may be unable to invest in new opportunities and would therefore lag behind in terms of adoption of new techniques. Ref. [6] recognises the existence of a small group between the two that is unwilling to invest in new techniques that may fail

leading them to lose their relatively favourable economic positions. The study thus shows non-linearity between wealth and technology adoption. Given the smaller sample size available to us, we attempted to model adoption decisions based on only two categories; the poorer and well-endowed.

Literature on *J. curcas* adoption in developing countries is still somewhat limited. Existing adoption studies on *J. curcas* such as Ref. [17] treat small scale farmers as a homogenous wealth group in the analysis of factors affecting adoption. Our study addresses the knowledge gap by explicitly treating farmers differently in terms of their wealth status within their communities. We hypothesise that the factors constraining the poorest in the local communities from participating in *J. curcas* production and exchange activities are different from the factors affecting the relatively well to do farmers or indeed the factors affecting the small scale farmers when considered as a homogenous group. Assessing the factors this way is vital as it provides important insights into the likelihood of *J. curcas* cultivation in alleviating poverty among the poorest farmers in local communities. The increased access to markets for *J. curcas* seeds in the country as a whole and in eastern Zambia in particular, provides a useful platform for assessing the factors affecting *J. curcas* production and exchange activities.

The paper is structured as follows: the first part of the methodology section comprises the study area, sampling design, survey instrument development and implementation. The second part is devoted to data analysis, covering the theoretical frameworks on wealth ranking and regression modelling. Results and discussions are combined in one section, which is followed by the conclusions.

2. Methodology

2.1. Study area

The study was conducted in Katete, Petauke and Nyimba districts of the eastern province of Zambia (Fig. 1). These three districts were purposely selected out of a total of eight in the province on the basis of information from *J. curcas* out-growers schemes that farmers in these districts were actively involved in field production and collection of *J. curcas* seed.

The eastern province is characterised by a flat to gently rolling landscape with altitudes ranging from 900 to 1200 m above sea level. Rainfall is unimodal with about 85% falling in four months, December through March. During the period 1962–2000 annual rainfall in the study area averaged 1030 mm (AGROMET office, Msekera, Zambia, 2001). Average air temperatures range from 15° to 18 °C during June–July and 21° to 26 °C during September–October [18]. Population density varies between 25 and 40 persons Km⁻². About half of the farmers practice ox cultivation, the others cultivate by hand-hoe. Land tenure is mostly traditional with most farmers acquiring land through inheritance. Average cropped land ranges between 1.1 and 1.6 ha for hoe cultivators, and 2.3–4.3 ha for ox cultivators. Maize is the most important crop in the area accounting for about 60%–80% of total cultivated area. Other crops include sunflower, groundnuts, cotton and exotic vegetables [8].

Download English Version:

<https://daneshyari.com/en/article/676925>

Download Persian Version:

<https://daneshyari.com/article/676925>

[Daneshyari.com](https://daneshyari.com)