

Economics of Jatropha Plant Production in Guma Local Government Area of Benue State.

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Abstract: The study analyzed the economics of Jatropha plant production in Guma Local Government Area of Benue State, Nigeria. This is with the view to analyzing cost and return and constraints that influence Jatropha plant production. A purposive sampling and simple random sampling techniques were used to collect data from 100 Jatropha plant farmers using well structured questionnaire. Descriptive statistics and the gross margin analysis were used as method of data analysis. The socio-economic characteristics of respondents revealed that majority (68%) of the respondents were male, the respondents fall within the age range of 21-40 years and majority (87.6%) were married. The results showed that Jatropha plant farmers were moderately educated and small scale farmers with household of 1-10 family members and annually income of ₦ 1000-50000. The mean gross margin for the Jatropha plant production was ₦ 84166.4168 which implies Jatropha plant farmers in the study area get an annually return of ₦ 84166.4168. The result also revealed that, the prevailing constraints militating against Jatropha plant production in the study area was inadequate capital and it represented 99% of the major constraint affecting the economic sustainability of Jatropha plant in the study area. The study therefore, recommended that large scale production of Jatropha plants should be encouraged both by the government and farmers' cooperative to boost the economics of the State as well the entire nation as Jatropha plant production was profitable in the study area.

Keywords: Jatropha plant, production, profitability, family Euphorbiaceous.

I. Introduction

The indispensability of plant to man and the development of economies of nations can be traced to antiquity. The economic variability of plants to man and the general well being of the ecosystem as well as the growth and the sustenance of nation cannot be overemphasized. Plants serve as pertinent sources of raw material for our industries, as well as the provision of medical values to mankind and the provision of alternative sources of energy amongst others too myriad to mention (Aderibigbe *et al.*, 1997). One of such feedstock plants of contemporary importance is *Jatropha curcas limmaeus*. *Jatropha curcas* is a drought resistant perennial species of flowering plants in the spurge family Euphorbiaceous that is native to the American tropics most likely Mexico and Central American (Achten *et al.*, 2010). It is planted in the tropical and subtropical region around the World, becoming naturalized in some area. Jatropha is a poisonous plant reaching a height of 6m (20ft), with seeds which contain 27-40% oil that can be processed to produce a high quality biodiesel fuel, usable in a standard diesel engine or further processed into jet fuel while the residue pressed cake can also be harnessed as biomass feedstock to power electricity plants, used as organic fertilizer which is composite of nitrogen, phosphorus and potassium or as animal fodder, the cake can also be used as feeds in the digesters and gasifies to produce biogas (Borman, 2011). Medically, it is used for the treatment of diseases such as cancer, pile, snake bite, paralysis and drowsy. Oil extracts of jatropha has been used for illuminations, soap candle and the seeds are used as contraceptive in south Sudan (GANBC, 2012).

The agricultural sector has been proven to be four times successful in poverty reduction and improving livelihood with the production of Jatropha. Again, the rising the demand for oil, speculation for diminishing reserves, fuel price instability, the consequence growing needs for energy security and incited global efforts to develop capacity for alternative source of energy provision which has also accentuated the relevance and economic priceless of Jatropha (Achten *et al.*, 2007). The production of Jatropha plant tends to generate high level of rural employment, improvements of national balance of trade and stimulation of both agricultural and non agricultural sector associated with the Jatropha biodiesel production chain (Heller, 1996). The plant itself is believed to prevent and control soil erosion and reclaim of agricultural wastelands as well as the provision of fence for excluding livestock from food crops as Jatropha is highly unpalatable (Borman, 2011). Despite these colossal contribution of Jatropha plant in the development of economies of nation, the production and understanding of the agronomy of this influential plant is quite worrisome due to the risk involves in its production as it is a poisonous plants.

Objectives of the study

The specific objectives of this study were to:

- Describe the socio-economic characteristics of respondents in the study area.
- Determine the profitability of Jatropha plants production in the study area.
- Ascertain the constraints militating against Jatropha plants production in the study area.

II. Material and Methods

The study Area: This study was conducted in Guma Local Government Area of Benue state, Nigeria. The Local governments is situated on the North Eastern parts of Benue State and has a land mass of about 2400square kilometers and shared boundaries with Makurdi Local Governments in the south, Tarkaa and Buruku in the south-east, Logo Local government to the east and two Local governments in Nasarawa State via Awe in the North-East and Doma in the north-west. The State lies between longitude 6^o35'E and 8^o10'E of the Greenwich and latitude 6^o30'N and 8^o10'N of the equator, at an elevation of 97 meters above sea level in the southern guinea savannah agro ecological zone. The State is located in the north central zone of Nigeria and is referred to as the "food basket of the nation" because of the facts that it is major producer of food in Nigeria. Major crops produced in the State include: cassava, yam, rice, benniseed, maize, sweet potatoes, millet, soybean, and a wide of tree crops like mango, citrus, oil palm and banana. Others include livestock production.

Data collection: The population for this study comprised all Jatropha farmers in Guma Local Government Area of Benue State, Nigeria. Purposive sampling technique was used to select the Local Government Area because of the farmers' concentration in the Jatropha plant production. To effectively carry out the research a simple random sampling technique was also adapted to selects ten (10) respondents each from the ten (10) council area of Guma Local Government using well structured questionnaire and this give rise to 100 respondents.

Method of Data Analysis: Descriptive statistics like mean, percentage and frequency distribution were used to describe the socio-economic characteristics of the respondents and gross margin was used to analyze the profitability of Jatropha plant in the study area.

Empirical Specification: The gross margin is the differences in the gross farm income (GI) and the total variable cost (TVC). It is also the differences between total revenue and total variable cost.

$$GM = GI - TVC \text{ or } TR - TVC$$

Where:

GM = Gross margin

GI = Gross farm income

TVC = Total variable cost

TR = Total revenue

III. Result and Discussion

Socio – Economic Factors of The Jatropha Farmers

The result of the analysis presented in table 1 indicates the majority (68%) of the Jatropha farmers were males while 32% were females. This shows that most of the farming activities were headed by men who are believed to be more energetic to practice Jatropha production than their women counterpart. The results also shows that 87% of the respondents of Jatropha famers in the study area were married while 31% were single, 9.3% were widows/widower and no divorced farmers. This result implies that Jatropha plant production in the study area is also done by married people other than category of people. About 27.8% of the farmers had no formal education while 20.6% and 36.1% had primary and secondary education respectively. The remaining 15.5% of the Jatropha farmers had tertiary education. This shows that majority (51.6%) of the respondents are educated implying that there is moderate level of literacy among Jatropha famers in the study area which will enable farmers to better adopt farm practices that will enhance the Jatropha plant production. Meanwhile, 94.8% of the Jatropha farmers' households had 1 – 10 members, 4.1% had 10 – 20 members and 1% had 20 – 30 occupied by 1 – 10 family members. This implies that family size of Jatropha farm households in the study area are relatively small and as such would produce Jatropha on small scale.

The result revealed that 3.1% of the farmer had a farm lands of 0.01 hectares, 30.9% of the respondents had lands of 0.1 hectare, 28.9% of the farmer had farm lands of 0.2 hectares, 21.6% of the farmer had farm lands of 0.25 hectare, 8.2% of the farmers had farm lands of 0.5hectares 6.2% of the farmers had farm land lands of 1 hectares and 1.0% of the farmer had farm land of 2 hectares. The result connotes that Jatropha plant production are small scale farmers. This agrees with the findings of Odoemenem and Adebisi (2011) who reported that the mean farm size for small-scales farming in Nigeria is often less than four hectares. The age distribution of Jatropha farmers in the study area as shown in table 1 reveals that all the farmers were above 20 years with

majority 5 1.5% falling between 41 – 60 years. While 29.9% were between 21 – 40 years, 18.6% were above 60 years. This implies that most (81.4%) of the Jatropha farmers belonged to the age group of 21-60/ ears which connotes that they are within the productive age of 2-060 years as opined by Onu (2003) who reported that age is a very important measure of production which is capable of affecting either positively or negatively the output of per labour input of a famer. Furthermore, result reveals that most of the respondents (94.8%) earning between ₦1000- 5000 annually, 2.1% earned between 5001-10000 per annum and 3.1% earned between ₦10001- 20000. This disagree with the view of Olawepo (2010) found that only 13.80% of small scale farmer such as Jatropha in Guma earn above ₦ 50,000 annually.

Profitability of Jatropha Plant Production in the Study Area

Table 2 present the results of gross margin analysis for Jatropha plant production. The results indicated that the average total variables cost for Jatropha production was ₦ 7279.4595 and the mean total revenue earned from the production of Jatropha plant as found to be ₦ 791,445.8763. Similarly, mean gross margin of ₦84,166.4168 was estimate for Jatropha plant production which implies that Jatropha plant farmers in the area get an annual return of ₦ 84,166.4168 from the production process. Therefore, Jatropha plant production was discovered as a viable economic venture in the study area. This is capable of addressing the various needs of the rural farmers thereby improving the living standards of the farmers.

Constraints Militating Against Jatropha Production

From the results of the statistical analysis presented in table 3, it is revealed that Jatropha production in the study area not constrained by lack of available markets, low patronage and insufficient land since all (100%) the Jatropha farmers responded not having any problem with the issue of market and land availability for Jatropha production as well as patronage for the product. However, 99% of the farmer mentioned back of capital as the only militating constraints of Jatropha p ant production. The result therefore is an indication that inadequate capital is the major (99%) prevailing problem or constraint militating against the economic sustainability of Jatropha plant production in the area. This agrees with Obwona (2002) who reported that the most of the Nigeria farmers are small holders who are trapped in vicious cycle of poverty that is characterized by low saving and investment which causes reduction’ in the production capacity of the farmers.

IV. Conclusion and Recommendation

The study revealed that Jatropha plant production was discovered to be a lucrative economics enterprise in the study area which is capable of addressing the needs of the rural farmers thereby increases the living standard of the populace in the study area since the result have revealed the profitability of Jatropha plants production. The study recommended large scale production of the plants as it will boost the economy of the state. It also recommended that governments and other financial institution should key into the production by providing loans to farmer and other credits facilities. Constants seminar on the function and uses of the plants should be encourage among the farmers.

Table 1: Socio Economic Characteristics of the Respondent

Variables	Frequency	Percentage
Gender		
Male	66	68.0
Female	31	32.0
Total	97	100
Age		
>60	18	18.6
21-40	29	29.9
41-60	50	51.5
Total	97	100.0
Marital Status		
Married	85	87.6
Single	3	3.1
Widow/Widower	9	9.3
Total	97	100.00
Educational level		
No formal education	27	27.8
Primary education	20	20.6
Secondary education	35	36.1
Tertiary education	15	15.5
Total	97	100.00
Household size		
1-10	92	94.8
10-20	4	4.1

20-30	1	1.0
Total	97	100.00
Farm Land (Ha)		
0.01	3	3.1
0.1	30	30.9
0.2	28	28.9
0.25	21	21.6
0.5	8	8.2
1	6	6.2
2	1	1.0
Total	97	100.00
Income		
1000-5000	92	94.8
5001-10000	2	2.1
10001-20000	3	3.1
Total	97	100.0

Source: Field survey, 2015

Table 2: Result of gross margin analysis for Jatropha production

Variable	Minimum	Percentage	Mean	Standard Deviation
Total variable cost	1920.00	14420.00	7279.4595	2905.31723
Total Revenue	1400.00	2040000.00	911445.8763	2.27042
Gross Margin	-520.00	2025580	84166.4168	-2903.0468

Source: Field Survey, 2015

Table 3: Descriptive Statistics of the Constrain Militating Against Jatropha Production

Constraints	Frequency	Percentage
Lack of capital	5.4	5.48
No problem of land availability	1.0	1.01
No problem of available market	1.4	1.46
No problem of patronage	6.0	6.01
Total	2.2	2.21

Multiple Responses. Source: Field survey, 2015

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