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Economics of Orange Fleshed Sweet Potato Vine and Root Production During the Dry Season in NRCRI, Umudike

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Abstract **– The study provides empirical results on cost and benefit analysis of dry season production of orange fleshed sweet potato in NRCRI, Umudike Abia State in 2018/2019 crop production year. The study analyse the costs and returns in OFSP production using gross and net profit analysis. The results revealed a total production cost of ₦603157.60 and total revenue of₦2,870,320 from both vine and root. The gross margin analysis shows the gross and net profit of N2,318,162.6 and ₦2267162.4 per ha respectively with gross and net margin of 80.76% and 78.98% respectively. The Benefit Cost Ratio (BCR) result was 4.75:1, indicating that for every ₦1 invested, a profit of ₦4.75 would be made. The result revealed that OFSP production is highly profitable and viable and call for polices if well implemented will not only boost the farmers livelihood but also supply food to the nation with provision of infrastructural facilities like irrigation equipments to these farmers.**

Keywords **– Orange Fleshed Sweet Potato (OFSP), Vine and Root Production.**

I. INTRODUCTION

In Nigeria more than 82 million hectares of arable land is not optimally utilized because the farming practiced in the country is majorly rain-fed. (FGN, 2010). Systemic exploitation of this gap will not only provide means of curbing scarcity occasioned during dry season but also create huge market niche for sweet potato production in the country. Available literatures suggest high profitability for sweet potato production (Asumugha, 1999). High demand of Orange Fleshed Sweet potato (OFSP) root which is rich in beta carotene for combating vitamin A deficiency (VAD) is increasing. Major production constraints in OFSP production were mainly centered on inadequate planting materials. Cost of planting material takes 40.1% of the total production followed by labour and fertilizer that incure 24.9% and 18.5% respectively (Ogbonna, *et al.*, 2004).

Increasing orange flesh sweet potato competitiveness, also command increase in the efficiency and effective cost of OFSP vine (Odebode, S. O., 2004). Cost analysis for OFSP planting materials and root will provide the actual cost of production and determines the price to be paid by the customers and consumers (CIP, 2015). This study therefore analyse the production cost of orange fleshed sweet potato vines and root for dry season production. This will be of benefit to farmers especially the sweet potato vine and root producers/marketers and other agri-entrepreneurs who will likely want to invest in the business.

II. RESEARCH METHODOLOGY

Orange Fleshed Sweet potato OFSP was planted in NRCRI, Umudike, Abia State Nigeria in a hectre during 2018/2019 dry season production. The land was mechanized and manual operational were used for maintenance. All the cost associated in the production process were taken and documented. Gross Profit and Net Profit were used to determine the profitability of the farm. Thus,

$$NP = TR - TC \quad (1)$$

GP = TR –TVC (2)

Where:

GP = Gross Profit.

NP = Net Profit.

TR =Total Revenue.

TC = Total cost of production.

Gross Margin (%) = GP/TR x 100 (3)

Net Margin (%) = NP/TR X 100 (4)

III. Results and Discussion

The results in Table 1 show the cost of land preparation for 1ha of Orange Fleshed Sweet potato vine and root Production during the dry season. The results revealed that the total cost of land preparation for OFSP vine and root was N46, 200, including cost of slashing, ploughing, harrowing and ridging as N5125, N6150, N6150 and N7175 respectively. The cost of tractor operators was showed to be N18,000.

The results in Table 2 show the depreciated cost of the equipment required for the production of OFSP vine and root. The results show the total depreciated cost of ₦20499.8. The results in Table 3 show the cost associated with dry season production of OFSP Vine and Root in NRCRI Umudike. The cost of leasing the land was ₦10000, while the average quantity of planting material (seed) used was 334 bundles/ha with an average market price of ₦ 311.10 per bundle giving a total of ₦103,907.4. This implies that planting materials has the highest cost in the dry season production of OFSP. The quantity of fertilizer was 400 kg/ha with an average market price of ₦130 per kg which amount to ₦52,000 while quantity of agro chemical (pre and post emergence herbicides) was 3 litres/ha with an average market price of ₦2800 per litre. The total labour cost of N366,100 (computed base on cost/man-day) which includes labour cost of preparation, planting, herbicides application, irrigation, fertilizer application, weeding, cutting of the vine, harvesting of the root and transportation.

The results in Table 4 show the revenue obtained from dry season OFSP production. The results revealed a revenue of ₦1,833,300 from root harvest of 18,333 kg sold at the rate of ₦100/ kg. The revenue from 3,333 bundles of vine harvest were sold at N311.10/bundle giving a total of ₦1,037,020. The total revenue obtained from the dry season sweet potato vine and root production was ₦2,870,320. The result shows that root production has the highest revenue.

The results in Table 5 revealed the gross margin analysis for the dry season production of OFSP. The results show the gross profit and net profit as N2, 318,162.6 and ₦2267162.4 per ha respectively. The result also revealed the gross and net margin of the system as 80.76% and 78.98% respectively, and the benefit cost ratio was 4.75:1, indicating that for every ₦1 invested in dry season OFSP production, a profit of ₦4.75 was made. Thus, the OFSP production in the study area is profitable. This finding is in line with Tewe *et al. (*2003) and Adesina *et al.* (2017) who observed that sweet potato production is found to be profitable in Oyo state.

Table I. Cost of Land Preparation for 1ha of Orange Fleshed Sweet potato Production during the dry season.

Operations	No of Liters Required	Price/Litre (N)	Total
Slashing	25	205	5125
Ploughing	30	205	6150
Harrowing	30	205	6150
Ridging	35	205	7175
Operators allowance	**No of operators**	**Rate (N)**	
Operators	4	3000	12,000
Operators mate	4	1500	6000
Total			**42,600**

Source: Field Experiment, 2019.

Table II. Depreciated Cost of the Equipments Required for the Production of OFSP Vine.

Asset	Qty	Unit Cost	Total Cost A	SV Years (B)	Depreciation C = a/b	NBV(D) = a-c
Wheel barrow	1	15000	15000	3	5000	10,000
Machete	2	2500	6000	3	2000	4000
Head pan	4	2000	5000	3	1666.6	3333.4
Rain boot	1	18500	8000	3	2666.6	5333.4
Knap sacks	4	1500	18500	3	6166.7	12333.3
Hoe	4	1000	4000	3	1333.3	2666.7
Overall	1	5000	5000	3	1666.6	3333.4
Total			**61,000**		**20499.8**	**41000.2**

Source: Own calculation. Note SV = Salvage years, NBV= Net Book Value.

Table III. Cost Associated with Production of OFSP Vine and Root in NRCRI Umudike.

Operations	Manday	Rate (N)	Total
Fixed cost			
Leasing 1 ha			10000
Depreciated cost of other equipments			41000.2
Input cost			
Planting materials	334 bndl	311.10	103907.40
Fuel for irrigation	150 ltrs	145	21750
Ferilizer	8 bags	6500	52,000
Herbicides	3ltrs	2800	8400
Labour cost Land preparation			42600
Planting	20	1500	30,000

Operations	Manday	Rate (N)	Total
Irrigation	3	1500	45,000
Fertilizer application	5	1500	7,500
Herbicides application	4	1500	6,000
Manual weeding	60	1500	90,000
Cutting of the vines	20	1500	30,000
Harvesting of the root	20	1500	30,000
Transportation of the root	1	45,000	45,000
Transportation of the vines		40,000	40,000
Variable cost			
Total cost			**603157.60**

Source: Field Experiment, 2019. Note: Volume of vines needed for 1ha = 334 bundles/ of 100 cuttings.

Table IV. Revenue from OFSP Production.

Activities	Cost/ Unit	No of Unit	Total (N)
Sales /Revenue			
Vine(bundles)	311	3,333.4	1,037,020
Root (kg)	100	18,333	1,833,300
Total			2,870,320

Source: Field Experiment, 2019.

Table V. Gross Margin Analysis.

Activities	Total (N)
Revenue A	2,870,320
Variable Cost B	552,157.4
Fixed Cost C	51000.2
Total Cost D	603157.60
Gross Profit = A – B	2318162.6
Gross Margin	80.76%
Net Profit = A- D	**2267162.4**
NetMargin	**78.98%**
Benefit Cost Ratio CBR (Rev/TC)	**4.75:1**

Source: own calculation from the Tables above.

IV. CONCLUSION

The study provides empirical results on cost and benefit analysis of dry season production of orange fleshed sweet potato in NRCRI, Umudike Abia State. The result revealed that dry season production of OFSP vine and

root is profitable and viable. This study call for the investors in OFSP production, the farmers, and processors to invest in the business in other to supply vines on the on set of planting season and provide food for the nation.

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