

# WATERLEAF (*TALINUM TRIANGULARE* - WILD) PRODUCTION IN SOUTH EASTERN NIGERIA: EXISTING PRACTICES, AND SUGGESTIONS FOR INCREASED PRODUCTIVITY AND PROFIT

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(Received 22 June 2000; Revision accepted 3 November, 2000)

## Abstract

Waterleaf is a major component of food which is cherished in South Eastern Nigeria. Today, the crop has become an important component of urban farms. This study assessed production practices, cost and returns of water-leaf production. It also identified necessary interventions which will enhance productivity and profit of investors in South Eastern Nigeria. The stratified random sampling procedure was used to select 105 respondents studied. The results show that the existing production practices and mode of operation bring low net returns per hectare. The profit margin can however be increased if appropriate interventions such as residue mulching, application of organic manures, irrigation practices, optimum planting distances and removal of flowers to stimulate vegetative growth are utilised.

**Key Words:** Waterleaf, Productivity and Profit.

## A. INTRODUCTION:

Vegetable production has become very popular in many countries of the world due to its increasing importance in the diet of the people. In Nigeria, for instance, the average growth rate of vegetable produced between 1989 and 1993 was 14.0% compared to 8.3% for maize, 6.4% for cassava and 1.8% for palm oil (see table 1.0).

TABLE 1.0 Average Growth Rate of Major Agricultural Commodities (1989 - 1993)

Crops	Average growth Rate (%)
Maize	8.3
Cassava	6.4
Plantain	4.2
Vegetables	14.0
Palm Oil	1.8
Coco-nut	6.2
Palm Kernel	11.8
Soya beans	12.2

Source : CBN; Statistical Bulletin Vol. 5 No. 2, 1994.

Waterleaf (*Talinum triangulare* Willd) is one of the over twenty vegetables grown by farmers and home gardeners in Nigeria. It is a small glabrous herbaceous plant which is well adapted in south eastern Nigeria and a major component of food highly cherished in eastern Nigeria, particularly Akwa Ibom and Cross River States. Nutritionally, waterleaf is rich in water (9%), calories

(25g), protein (2.4g), fats (0.4g) carbohydrates (4.0g), fibre (1.0g), calcium (121mg) phosphorus (67mg), Iron (5mg), thiamine (0.08mg), riboflavin (0.18mg), niacin (0.30mg) and ascorbic acid 31mg, (Tindall, 1983).

Waterleaf is propagated by seed or cutting during the rainy or dry season (if there is irrigation). When using cuttings, they are sown directly on seed-beds but when seeds are used they are sown in containers and later transplanted to seed beds. It has a short maturity period (35 - 45 days after planting (DAP). Although Grubban[ 1977] reported that there is a comparative yield advantage of waterleaf planted by stem cuttings over seeds planting, Epenhuijsen (1974) observed that adverse climatic and environmental factors are responsible for growth reduction and delay in the general physiological process of the crop. According to Greensil (1976) and Dupriez (1989) the crop does not tolerate heavy rain fall. However, there are diverse views on the ideal planting distance for optimum yield. Tindall (1968), recommended 30 x 40cm apart with 25cm to 30cm between row; while

Herklots (1972) prefers 10cm x 20cm spacing for optimum yield.

In South eastern Nigeria, waterleaf was mostly harvested wild in the 1970's. However, the increase in the demand for the crop has made farmers to go into its small-scale production. In fact, in most urban areas, water-leaf production has become an important component of the farming system.

Unfortunately, existing investors appear to lack knowledge of the potential of its production which would bring higher economic returns. This is true because unlike crops such as cassava, yam, fluted pumpkin and maize where large areas of land are cultivated waterleaf does not attract such attention. The direct consequence of the low attention given to its production is the high prices paid for the crop especially during the dry season. This study therefore assesses the production practices for waterleaf, the cost structure of existing farms, and proffers suggestions that will enhance its productivity and profit among the farmers.

**B METHODOLOGY** This study was conducted during the dry season in Calabar metropolis of Cross River State and Uyo in Akwa Ibom State in the 1998 cropping year. The choice of the study area was due to the existence of large number of waterleaf farmers in the area. Primary data were obtained with the use of structured questionnaire as well as oral interviews. The stratified random sampling technique was used to select a total of 105 respondents for the study. At least 15 respondents were involved in each strata.

Simple descriptive statistical tools such as tables, averages, percentages and means were used to analyse the data. Also, the multiple regression analysis was used to assess the effect of changes in some variables on the value of output.

The model estimated was:

$$Y = f(X_1, X_2, X_3)$$

Where  $Y$  = Value of output per batch produced.

$X_1$  = Number of cuttings.

$X_2$  = Area planted in ha

$X_3$  = Capital invested in Naira

The  $t$  - statistics was used to test the significance of variables.

## RESULTS AND DISCUSSION

### 1. SOCIO-ECONOMIC CHARACTERISTICS OF RESPONDENTS

Although most of the respondents (85.71%) were females, only active members of the population were involved in water-leaf production.

Table 2 shows the socioeconomic characteristics of the respondents. According to the table, 12.4 percent of the respondents were aged 21-30 years,

35.2 percent were aged between 31-40 years and 34.3 percent were aged above 41-50 years.

18.10 percent of the respondents were more than 50 years old. The educational level of the respondents was generally below average, with majority (48.60 percent) of the respondents having only primary education while 41.00 percent had secondary and teacher education respectively. About 6.61 percent had higher education and only 3.80 percent had Ordinary National Diploma and National Certificate of Education. Most of the respondents (78.1%) were married and had farming as the most important occupation. It was further revealed that 68.60 percent of the respondents were full time waterleaf producers while 31.40 percent combined waterleaf production with other trades to augment family income. Gifts, lease and inheritance are the three important sources of land available for waterleaf cultivation. Table 3. presents information on the agricultural characteristics of respondents. It reveals that 37.10% of the respondents acquired land by inheritance whereas 33.30% have lease hold arrangement.

About 24.8 percent of the respondents obtained land by gift and only 4.8 percent acquired land by purchase. Planting materials obtained from friends and relatives is a common source accounting for 77.1 percent. About 78.1 percent of the respondents owned one plot each (0.07 ha); 20 percent owned 2 plots (0.14 ha); and about 2 percent owned three plots 0.21ha. The cultural practices adopted for waterleaf production include land preparation (cleaning, tilling and construction of seed-beds of desired sizes), acquisition and preparation of planting materials (preferably first cut after planting), planting, fertilizer or poultry manure application and weeding. In some farms household waste materials were (92.38 percent) preferred to hedge their plots, whereas only 7.62 percent prefer to tie in bundles and sell to buyers.

### 2. COST AND RETURNS OF WATERLEAF PRODUCTION

Cost comprised fixed and variable costs. The variable cost items include labour, waterleaf cuttings, fertilizer and poultry manure, whereas the fixed cost items include land, cutlass, spade, rubber hose, hoe, basin, knife, tray, matched and shovel. Although land is an important resource in waterleaf commonly used. Planting was by cutting. After planting each plot was demarcated by either cassava stems or maize.

Waterleaf is planted as a sole crop under rainfed conditions. However, during dry season the farmers in Akwa Ibom State supply water to plots using rubber hose to connect water-taps installed at strategic points on the field through efforts of the women. Water application was usually done at night when the local water board supply was high. Generally high density planting was practiced and weeding was mostly done once (see Table 3). Waterleaf was replanted twice a year by 55.24 percent of the respondents and once by 44.76 percent of the

respondents. Most of the respondents production, only 38 percent of the respondents paid rent on land. Rent on land was N2577.84 per hectare. Family labour as well as hired labour were used during waterleaf production. Although only 7.62% of the respondents claimed that they used hired labour, land preparation and weeding were the only activities where hired labour was used. It was however not possible to estimate the cost of water applied over the production period since the farmers could not provide sufficient information on the

**Table 2: Socio-Economic Characteristics Of Respondents**

S/N	CHARACTERISTICS	FREQUENCY	PERCENTAGE
1	<u>SEX DISTRIBUTION</u>		
	Male	15	14.29
	Female	90	85.71
2	<u>AGE DISTRIBUTION(YRS)</u>		
	21 - 30	13	12.40
	31 - 40	37	35.20
	41 - 50	36	34.30
	51 and Above	19	18.10
3	<u>HIGHEST EDUCATIONAL ATTAINMENT</u>		
	F.S.L.C.	51	48.60
	WASC/TC II	43	41.00
	OND/NCE	4	3.80
	Higher education	7	6.60
4	<u>MARITAL STATUS</u>		
	Married	82	78.10
	Single	8	7.60
	Divorced	2	1.90
	Widow	13	12.40
5	<u>MAJOR OCCUPATION</u>		
	Civil servant	17	16.20
	Farming	72	68.60
	Trading	11	10.50
	Teaching	5	4.70

Source: Field Survey 1998.

**Table 3. Agricultural Characteristics Of Respondents**

S/N	Characteristics	Frequency (n = 105)	Percentage
1.	Land Acquisition		
	Inheritance	39	37.10
	Purchase	5	4.80
	Lease	35	33.30
	Gift	26	24.80
2.	Sources Of Planting Material		
	Market	24	22.90
	Friends/relatives	81	77.10
3.	Number Of Plots		
	1.0	82	78.10
	2.0	21	20.00
	3.0	2	1.90
4.	Frequency Of Weeding		
	Once	76	72.40
	Twice	19	18.10
	Three times	5	5.70
	No - response	5	3.80
5.	Method of Distribution		
	Whole field	97	92.38
	In bundles	8	7.26

Source: Field Survey 1998.

TABLE 4. Production Cost Per Hectare Of Water Leaf During Dry Season.

SN	Description Of Items	Cost/ha (Naira)	( Naira)	Percentage of Total Cost
1.	Labour Input	2104.65		25.07
	Land preparation		1741.81	21.24
	Weeding		362.84	4.42
2.	Material Input	3516.80		42.89
	Fertilizer		739.16	9.01
	Poultry manure		1712.43	20.89
	Waterleaf cutting	31.44	1065.21	12.99
3.	Other costs		2577.8	
	Land purchase/rent	2577.84	31.44	
4	Total	8199.29		

Source: Field survey 1998.

existing water supply arrangement. However, results in table 4 indicates that the total cost of producing waterleaf per hectare during the dry season was about N8199.29. Of this amount, 25.07% was spent on labour, about 42% was spent on material input (excluding water) and 31.44% was spent on rent. Also, 9.01 percent was spent on fertilizer compared to 20.89 percent which was spent on poultry manure.

#### Returns.

Harvesting was done two to three weeks after planting (WAP) and two weeks after each harvest (WAH) subsequently. At least harvesting was done five times before replanting. The average returns per harvest was N 2679.52 per hectare. The total return per hectare was N.13397.6.

#### 3. Impact Of Selected Factors On Waterleaf Production.

An analysis of the data to estimate the impact of selected factors on waterleaf production resulted in the following production function estimate.

$$Y = 282.8752 - 0.0126 X_1 + 5.1985 X_2 + 0.1294 X_3$$

(t = 1.1752)      (t = 3.5138)      (t = 4.5529)      (t = 4.1271)  
 R<sup>2</sup> = 0.3767      (P ≤ 0.01)

This estimate shows that when the number of stands (X<sub>1</sub>) is increased by one unit, the value of output decreases by 0.0126 units. This is probably because the respondents use arbitrary planting distances and stand density. Farm size and capital have positive influence on level of output with the former being a more critical factor. When farm size is increased by one unit, the output per batch of waterleaf is increased by 5.1985 units. Similarly, when capital invested increase by one unit, output will increase by 0.1294 units. Hence, farm size, capital

invested and number of cuttings, have significant influence on the value of output. Although, the t - values of the coefficients were significant at 99% percent, the coefficient of determination (R<sup>2</sup>) was only 38 percent. (P ≤ 0.01), an indication that other factors not included in the regression model also influence the value of output much more than those included.

This research also shows that there are several problems facing waterleaf farmers. From information presented in Table 5, it is clear that the most problematic areas in waterleaf production include scarcity of water during the dry season, scarcity of fertilizer and poultry manure and inadequate finance. Actually all the farmers have the problem of water supply during the dry season whereas 91.43% and 87.62% experience scarcity of fertilizer and poultry manure respectively.

4. Suggested interventions for improvement This study shows that all farmers used arbitrary planting distances. Actually, maintaining closer spacing appears laborious but ensures optimal plant population and results in higher output. Based on research by Ekpe [1998], 2cm x 2cm and 5cm x 5cm spacings should be encouraged even though these have to be accompanied with regular soil replenishing interventions. However this study reveals that more than 50% of the respondents have soil management problems as evidenced by the frequency with which they replanted per annum. Such problems are attributed to high cost of fertilizers and poultry manure. Today, emphasis is on low external input and sustainable agriculture. Consequently, to reduce their overdependence on poultry manure and chemical fertilizers, waterleaf farmers should be encouraged to utilise house-hold wastes in waterleaf farming. Actually Eyo and

Table.5 Problems of waterleaf production

S/N	Problems	Frequency	Percentage
1	Scarcity of fertilizer	96	91.43
2	Scarcity of poultry manure	92	87.62
3.	Scarcity of water dry season	105	100.00
4	Land acquisition	43	40.95
5	Theft of waterleaf	27	25.71
6	Inadequate finance	54	51.43

Source: Field survey 1998.

Ogban (1999) have indicated that there duction is an important component of urban agriculture in South eastern Nigeria, recourse should be made to the utilisation of household waste as a sustainable soil replenishing intervention.

This study identifies the need for irrigation. The small farmers cannot provide irrigation facilities for use, especially during the dry season. What they can do is elect to acquire land or plots near public water sources or streams where they can fetch water and apply on their plots. In one of the study areas, dry season production has been greatly enhanced by group effort of the farmers - actually they team up and secure water taps at strategic points on was a growing level of ignorance on the potential of house hold waste in enhancing productivity of farms and the resilience of the ecosystem. Since waterleaf pro the farm-land through the assistance of the water board and then take turns to water their crops, most at times, late each night or at early hours of the morning when there was public water supply. Farmers in other areas that operate in close proximity could try such group efforts to enhance the dry season production.

As a way out of the problem of land acquisition which is aggravated by the fact that demand for the waterleaf crop is highest in urban centres where land is scarce, farmers could try to utilise any available space on road sides, uncompleted residential areas and undeveloped plots.

Available information reveals that farmers appear to be ignorant of the advantage of removing the flowers on output of waterleaf. Removal of flowers results in the termination of apical dominance of flower buds and induction of growth of the lateral buds leading to profuse branching and the enlargement of leaf size, and thereby enhancing quality product.

The problem of inadequate finance can adequately be tackled by obtaining loans under the group-lending-scheme of the central bank of Nigeria

(Self Help Group Linkage with banks). The waterleaf farmers can form groups of 25 and enlist in the Self Help Group Linkage Programme (of the agricultural credit guarantee scheme) with a partner bank, open a group savings account, save and obtain loans in multiples of amounts saved.

#### D. CONCLUSION

Waterleaf production is a profitable business particularly in the dry season. However, the existing production practices and mode of operation bring a low net return per hectare. This profit margin can greatly be increased if harvesting is followed by appropriate agronomic interventions such as residue mulching, application of organic manures, irrigation practice, optimum planting distance and removal of flowers to stimulate vegetative growth. With adequate efforts to utilise the recommended interventions, waterleaf farmers will optimise profit from waterleaf production in South eastern Nigeria.

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