

Telfairia production: Consideration for alleviating rural poverty among Nigerian women

Odiaka Ngozi Ifeoma¹, Akoroda Malachy² and Odiaka Emmanuel³

¹Department of crop Production, College of Agronomy, University of Agriculture, Makurdi, Benue State, Nigeria, E-mail: niodiaka@yahoo.com; ²Department of Agronomy, University of Ibadan, Ibadan, Oyo State, Nigeria; ³Cooperative Extension Centre, University of Agriculture, Makurdi, Benue State, Nigeria.

Abstract

Gender roles in telfairia leaf production were investigated in Makurdi using a survey based questionnaire administered to 50 farmers to identify gender-disaggregated roles in telfairia production. The survey showed that women have major role as producers and marketers of telfairia leaves. Women and girls provided 80.0% of labour requirements for hole digging, sowing, irrigation, weeding, harvesting and marketing. The men cleared land and dug holes while girls and boys in primary and secondary schools assisted in weeding and hole digging. The results also revealed that a typical telfairia farm using ₦10,650.00 (US\$84.5 at ₦126/dollar) worth of seeds produced 16.5 t/ha of leaves valued at ₦212,400.00 (US\$1,685.7) with 85.0% profit. Seed accounted for 60.7% of total cost of production, while irrigation cost was 20.3%. A minimum take-off fund of ₦210,572 (US\$1671.2) was needed to give revenue of ₦386,000 (US\$2920.6) and a gain of 83% per hectare. Total fruit equivalent of fruits/shoots produced 2,056 fruits and the price of fruit equivalent of fruits/shoots produced ₦514,000 (US\$4079.4) with a gain of 144%. Two major constraints to leaf production were high cost of quality seeds (36.1% of respondents) and water pumps (13.9% of respondents). Women participation in telfairia vegetable production, marketing and utilization in Makurdi can provide a means of livelihood and appreciable income for women in rural and urban areas, which is capable of sustaining the running of the home and enhancing the living standards of women.

Key words: *Telfairia occidentalis* Hook. F., fluted pumpkin, gender, production, constraints, poverty, profit, sustainability, Nigeria.

Introduction

Fluted pumpkin (*Telfairia occidentalis* Hook. F.), a member of the family Cucurbitaceae, contains high vitamin A and iron which can take care of vitamin A deficiency in children and pregnant women. In Nigeria, it is generally referred as a “woman’s” crop (Akoroda, 1990; Lewis, 1997) with folktales that refer to women’s pregnancy. The juice squeezed out of the leaves, serves as blood tonic for anemic patients and pregnant women whose Packed Cell Volume (PCV) is low, which also means low blood level (E. Anujuem, personal communication). In Benue State of Nigeria, however, minimal attention was given to telfairia production and consumption, until recently, when increased awareness of the nutritional value of the leaves (Ifon and Bassir, 1980) and seeds which contain 53% fat and 27% crude protein (Longe *et al.*, 1983) encouraged its consumption. However, it is believed that enhanced production and consumption can play a catalyst role in the income generation and employment, alleviation of rural poverty, improved health status, enhancement of resource use efficiency and overall socio-economic development of the people (Bahar, 1988; Bennett Lartey and Akromah, 1996; Illo, 1988; Ozkan *et al.*, 2000; Roy, 1990; Siddiqui *et al.*, 1999; Wijerante, 1992).

Recognizing that one of the fundamental organizing principles of human society, which affects almost every aspect of what an individual thinks and does, is gender (Illo, 1988), this study was carried out to analyse the respective roles of men and women in telfairia production and to explore how they relate to each other and the profitability of production.

Materials and methods

A questionnaire was designed to cover farmers’ activities on their telfairia plots, farm-size, production inputs and techniques and demographic data. Primary data was collected using a structured questionnaire, which was distributed once to each respondent. The study areas in Makurdi were the three major sites for dry season vegetable production, namely the north and south banks of River Benue and the lower Benue. Homestead farms, a common feature in Makurdi area were also observed. Subjective questions were asked to telfairia producers who were target population for this study. A forty four item questionnaire data was administered, and quantitative data were generated for statistical analyses. Hundred (100) telfairia producers were interviewed on their farm sites. Uncompleted questionnaires totaling fifty were disregarded and the remaining ones were used for analysis.

Profitability efficiency of the enterprise was analysed using gross margin analysis with the equation below.

$$\text{Gross Margin (GM)} = \text{Total Revenue (TR)} - \text{Total Cost (TC)}$$

$$\text{Gain(\%)} = \text{GM} / \text{TC} \times 100$$

Gross Margin of fruit equivalent of shoots/fruits produced was also calculated.

Results

Socio-economic characteristics of telfairia growers in Makurdi: Most females (92%) were educated. Among the elderly, 70% were females, while 30% were males, and within the middle-

aged group, 72% were females, while 28% were males. The main sources of funding for the female producers were personal savings, friends and cooperatives, while the males depended on personal savings and moneylenders. The size of plots cultivated and source of farmland differed according to gender (Table 1). Acquisition of this land for production depended on existing interpersonal/family relationships (71% of the respondents). Out of those who leased or hired, 76% were females while 24% were males. The women owned most of the telfairia plots. For instance; out of the 50 respondents who produced on less than 0.2ha, 40 were women while 10 were men.

Table 1. Source of farmland and farm size of responding telfairia leaf producing farmers in Makurdi

Variables	Male	Female	Total Number
Source of farm land			
Family	5 (10.0)	2 (4.0)	7 (14.0)
Leased/hired	6 (12.0)	36 (72.0)	42(84.0)
Friends	1 (2.0)	0 (0.0)	1 (2.0)
Initial plot size			
<0.2ha	5 (10.0)	26 (52.0)	31 (62.0)
0.2-0.4ha	6 (12.0)	7 (14.0)	13 (26.0)
0.4-0.6ha	0 (0.0)	5 (10.0)	5 (10.0)
0.6-0.8ha	0 (0.0)	0 (0.0)	0 (0.0)
>0.8ha	0 (0.0)	1 (2.0)	1 (2.0)
Present plot size			
<0.2ha	8 (16.0)	8 (16.0)	16 (32.0)
0.2-0.4ha	6 (12.0)	10 (20.0)	16 (32.0)
0.4-0.6ha	5 (10.0)	8 (16.0)	13 (26.0)
0.6-0.8ha	0 (0.0)	0 (0.0)	0 (0.0)
>0.8ha	2 (4.0)	3 (6.0)	5 (10.0)

*Figures in parenthesis are percentage

Gender roles in telfairia shoot/fruit production in Makurdi:

The activities practised in the production of telfairia were distributed according to gender and enumerated in Table 2. Most of the respondents (96%) agreed that the major activity done by men (including boys) is land clearing, while, another 72% considered hole digging as the major activity of men. The major activities performed by women (including girls), were harvesting and marketing although they were also engaged in planting, watering and weeding. It was clear from the data collected that men did not practise harvesting at all, but the boys assisted their

Table 2. Gender roles in total value and percentage of labour on in the production of 0.25ha telfairia plot among 50 responding telfairia leaf producing farmers in Makurdi

Activity	Male (%)	Value (₦)	Female (%)	Value (₦)	Both (%)	Value (₦)	Total (%)	(₦)
Land clearing	96	936.0	2	19.5	2	19.5	100	979
Hole digging	72	842.4	4	46.8	24	280.8	100	1170
Planting	8	46.8	48	280.8	44	257.4	100	585
Watering	6	640.1	28	2987.0	66	7040.9	100	10668
Weeding	20	200.0	50	600.0	30	550.0	100	1365
Fertilizer application	0	0.0	23	89.7	77	300.0	100	390
Harvesting	0	0.0	80	3432.0	20	858.0	100	4290
Marketing	4		80		16			
Total	12.7	2465.3	35.3	6855.8	45	8756.6		19444

Actual size of plot without removing pathway 71,684.54ha
 Actual size of plot after removing pathway 70,802.87ha
 Total number of seeds needed for a hectare 70,803 seeds

mothers in weeding. The female contribution to the total labour was 24% higher than the males when valued (Table 3).

Table 3. Percent contribution to total labour by gender among 50 responding telfairia leaf producing farmers in Makurdi

Gender	Value of total % labour (₦)	Male to female ratio	Male to female (%)
Male	2,465.3	12.7	35.2
Female	6,855.8	35.3	57.8
Both	8,756.6	45.0/2 = 22.5	
Total	19,444		

Gender roles in marketing of telfairia in Makurdi: Marketing of telfairia leaves was at the site of production by both retailers and middlemen from Makurdi, Jos, Abuja (middle belt of Nigeria), Kano and Kaduna (far north of Nigeria) during the dry seasons. The quantity of leaves demanded determines the transportation pattern. The middlemen, who came to purchase large quantities of telfairia shoot, used J5 motor vans with carrying capacity of 9.435m³ for old model and 7.57m³ for new model. The J5 motor vans were loaded after the harvested leaves had been graded. To minimize the risks associated with long distance marketing, most women preferred to sell their vegetables to middlemen at the production sites as seen in the transportation chain. Seventy percent (70%) of the respondents concluded that women were more prominent in the sale of the leaves. All the respondents (100%) sold telfairia shoots directly to (a) consumers, (b) retailers and (c) middlemen. Only 24% of the respondent produced and sold telfairia fruit, to generate additional income for the family. Telfairia fruits were often graded according to size and arranged in-groups of 100, 50, 20, 10 and 5. Generally, 82% of the respondents used the income generated from the sale of telfairia products for family upkeep and for future telfairia production, while others used their income for personal upkeep.

Shoot yield, cost and returns of telfairia in Makurdi: The yields of telfairia shoot harvested from the respondents' farms differed with the size of farm. Harvested shoots were heaped, graded into bunches called 'heads' (35kg/head) and tied with a jute bag. The quantities produced at the end of the season ranged from 8 to 600 'heads' (280-21,000kg). From an average farm size of 0.25ha, a mean of 118 'heads' (4,130kg) of telfairia shoots was harvested. This showed that 472 'heads' (16,520kg) of telfairia shoots were produced in a hectare. The cost of input in

Mean total number of seeds/fruit 74 seeds
 Total number of fruits needed to plant/ha 957 fruits

Table 4. Average variable cost of inputs in telfairia production for a 0.25 ha plot size among 50 responding telfairia leaf producing farmers in Makurdi

Cost of items	Mean number of man days required	Cost of labour/ man day (₦)	Total amount paid for labour for a 0.25ha (₦)	Percent labour cost	Percent of each input cost to total cost
a. Variable costs					
<i>Labour</i>					
Land clearing	5	195	975	5.0	2.0
Hole digging	6	195	1,170	6.0	2.0
Planting	3	195	585	3.0	1.0
Fertilizer application	2	195	390	2.0	1.0
Watering	28	195	10,668	55.0	20.0
Weeding	7	381	1,365	7.0	3.0
Harvesting	22	195	4,290	22.0	8.0
Total labour	73	195	19,443	100.0	
Seed			31,950		61.0
Total variable cost			51,393		
b. Fixed cost					
Land rent			1,250		2.0
Total			52,643		100.0

Table 5. Gross Margin Analysis of telfairia production per ha estimated from 50 responding telfairia leaf producing farmers in Makurdi

Items	Value of production per hectare		
	₦ 0.25 ha ⁻¹	₦ ha ⁻¹	\$ ha ⁻¹ (@₦110/\$)
Total variable cost	51,393	205,572	1,868.9
Total fixed cost	1,250	5,000	45.5
Total cost	52,643	210,572	1,914.3
a. Revenue			
i. shoot sale	88,500	354,000	3,218.2
ii. fruit/seeds	6,750	27,000	245.5
Total revenue	95,250	381,000	3,463.6
b. Variable cost			
i. labour	19,443	77,772	707.1
ii. seed	31,950	127,800	1,161.8
Total variable cost	51,393	205,572	1,868.8
Gross margin (a-b) =	43,857	175,428	1,594.8
% Gain	85.3%	85.3%	85.3%

the production of telfairia leaves is shown in Table 4, with a mean cost of labour per man-day of ₦195. The total cost of labour in producing telfairia leaves was ₦19,443 for a plot size of 0.25ha (₦ 77,772/ha) and the cost of seed was ₦31,950 for a plot size of 0.25ha (₦ 12,7800/ha). Sixty one percent (61%) of the total cost of production was allocated to seed input while 37% was allocated to labour (Table 4). Fifty five percent (55%) of the total cost of labour goes to watering alone. The price/head of telfairia shoot ranged from ₦450 to ₦1200.00 with an average price of ₦750.00. The total number of vines (92cm average length) in a bunch ('head') was 485 with a mean of 12 leaves/vine. At retail market, a vine sells for ₦10, which indicates that a leaf sells for ₦1: 2kobo. The fruit yield ranges from 14 to 50 fruits per 0.25ha with a mean of 27 fruits/0.25ha (108 fruits/ha). The price range of telfairia fruits is between ₦100 to ₦500 with a mean of ₦250 per fruit. This shows that ₦27,000/ha can be derived from the fruits. The gross margin (₦175,428 /ha) made by the respondents

in Makurdi on telfairia shoot/fruit production had a gain of 83% as shown in Table 5. The price of fruit equivalent of fruits/shoots produced in Makurdi by respondents is ₦514,000 with a gain of ₦303,428 (144%).

Discussion

Among other things, there was need to identify role of gender in telfairia seed/shoot production in Makurdi area. From the survey results, division of labour by sex and age was evident, and family members jointly carried out most of the farming activities. The few males that accompanied the females in such activities as land clearing, which was tedious, were often their spouses. The women were highly involved in harvesting, marketing, planting and watering operations. In each of these practices, the female contribution, which was more than 80% of the total labour requirement, made it a predominantly female enterprise as reported by Siddiqui *et al.* (1999) and Ozkan *et al.* (2000) for some other crops. Thus it is evident that in Makurdi, as in the rest of Nigeria and Africa, women play vital roles not only in the management and maintenance of telfairia production, but also ensure that seeds are always available for planting for the next season. This also confirms the findings of Roy (1990) on the pivotal roles of women in agriculture. It has been shown in the current study that while men and women were involved in wholesale marketing, women were more into retailing. The marketing of telfairia shoot by women significantly contributed to their income for family upkeep and future telfairia production.

Women are therefore the major producers of telfairia in Makurdi. This finding agrees with the report of Ekwe (1996), that the production of vegetables among other crops, was primarily the work of women. These female producers find it easy to go into telfairia commercial production because of the minimal take-off fund, the high returns, accessibility to their spouses land, opportunities to rent land at a very low price and also because of the very small piece of land they start off with the information on telfairia market structure revealed both wholesale and retail markets from within and outside Makurdi. The demand of telfairia leaves and the means of transportation confirmed that the demand of telfairia shoot from the northern state had increased.

It might be necessary to involve the Benue State Agricultural Development Authority (BNARDA) to use its extension service system to educate telfairia producers and encourage them to join co-operative societies. This will guarantee sustained loyalty, provide take-off loans or facilitate bank loans, and ensure easy access to land and also standardization of produce and prices. NGO's promoting the participation of women in vegetable production, conservation and utilization as reported by Karim, 1996) should promote telfairia production and encourage producers to identify with such organizations.

Commercial production of telfairia shoot can be started on 0.002 hectares and on an average of 0.25 hectares with ₦500.00 and ₦10,650, respectively, which was enough to buy seeds. This initial take-off fund can come from savings from other enterprises. These enterprises are necessary to avoid idleness because telfairia production in Makurdi is seasonal. Seed and irrigation are major inputs and they constitute the major constraints in the production of telfairia in Makurdi. This was so because other inputs such

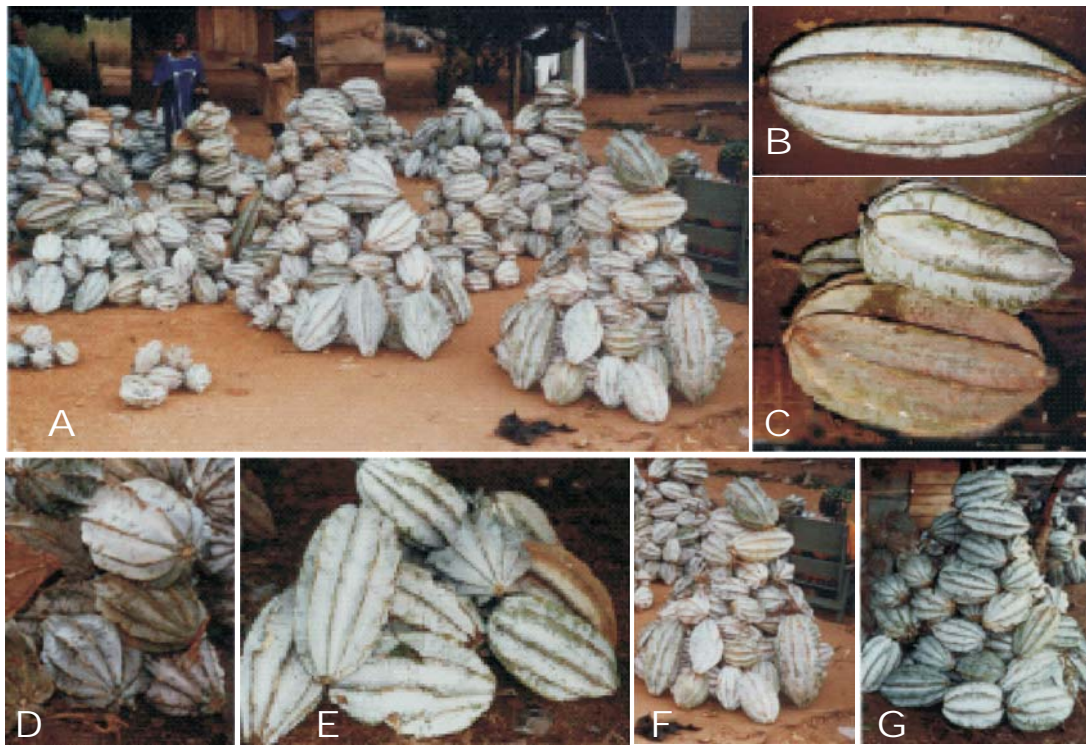


Fig. 1. Graded telfairia fruits for sale (A) A typical telfairia market, (B) A telfairia fruit sells for ₦700, (C) A group of three fruits sells for ₦1,500, (D) A group of four fruits sells for ₦2,000, (E) A group of ten fruits sells for ₦7,500, (F) A group of one hundred mixed fruits sells for ₦13,500, (G) A group of one hundred big fruits sells for ₦17,500.

as land could be leased, labour could be from the family and no chemicals such as fertilizer or insecticide were needed. Acquisition of pumps by farmers could be a cheaper means of managing farms. If only female producers could take decision in the kind of input to buy as suggested by Ozkan *et al.* (2000) they could buy these pumping machines with money saved from previous harvest. If these constraints are redressed, farmers could increase their farm size, to meet the ever-increasing demand for telfairia shoot and fruit, within and outside Makurdi.

The study revealed that for one ha commercial production, a minimum take off fund of ₦210,572 is needed to give revenue of ₦386,000 and a gain of 83%. Total fruit equivalent of fruits/shoots produced 2,056 fruits and the price of fruit equivalent of fruits/shoots produced ₦514,000 with a gain of 144%. Women were actively involved in the production of telfairia leaves. It was found that women contributed 80% of total labour requirement regarding planting, watering, weeding, harvesting and marketing of the crop. Although men also market their produce, their main activities were land clearing and hole digging. Mainly women carry out retail activities. Children assist their mothers in weeding and hole digging. The cash generated contributes significantly to food security at the household level and enables women to attain a degree of financial independence within the family budget.

References

- Akoroda, M.O. 1990. Ethnobotany of *Telfairia occidentalis* (*Cucurbitaceae*) among Igbos of Nigeria. *Economic Botany*, 44(1): 29-39.
- Bahar, S. 1988. Women's role in barani crop production and management activities - A research study. *Progressive Farming*, 8(3): 31-35.
- Bennett Lartey, S.O. and R. Akromah, 1996. The role of women in plant genetic resources activities in Ghana. *Plant Genetic resources Newsletter*, 106: 43.
- Ekwe, S.N. 1996. Women's Role in Agricultural Production in Nigeria. In: *Women Development and the Nigerian Environment*, Y. Oruwari (ed.) Vantage Publishers, Ibadan. p. 1-40.
- Ifon, E.T. and O. Bassir, 1980. The nutritive value of some Nigerian leafy vegetables. Part 2. The distribution of protein, carbohydrates (including ethanol-soluble simple sugars, crude fat, fibre and ash). *Food Chemistry*, 5(3): 231-235.
- Illo, J.F. 1988. Women and men in a farming household: the case of the Julian family. *Filipino women in rice farming systems*, 385-403.
- Karim, N.A. and M.M.B. Wee, 1996. Role of women in vegetable Agribusiness. *Vegetable Crops Agribusiness*, Proceedings of a workshop held at BARC, Farmgate, Dhaka, Bangladesh, 2-4 May 1995. 97-457: 177-182.
- Longe, O.G., G.O. Farinu and B.L. Fetuga, 1983. Nutritional value of the fluted pumpkin (*Telfairia occidentalis*). *Journal of Agriculture and Food Chemistry*, 31(5): 989-992.
- Lewis, I. 1997. Network Vegetable Production Africa: its contribution to conservation and use of traditional vegetables. In: *Traditional African Vegetables: Promoting the conservation and use of underutilized and neglected crops 16. Proceedings of the IPGRI International Workshop on Genetic Resources of Traditional Vegetables in Africa: Conservation and use, 29-31 August 1995, ICRAF-HQ, Nairobi, Kenya* (L. Guarino, ed). Institute of Plant Genetics and Crop Plant Research, Gatersleben/IPGRI, Rome, Italy, 1997, p. 159-160.
- Ozkan, B., D. Ediz., V. Ceyhan., P. Goldey and J.P. Ogier, 2000. Women's role in the vegetable farming systems in Antalya, Turkey: a gender analysis of labour participation and decision-making in the agricultural sector. *Proceedings of the XIVth International Symposium on Horticultural Economics, St Peter Port, Guernsey, UK, 12-15 September 2000. Acta Horticulturae* 536, 419-438.
- Roy, S. 1990. Productive role of women in rice farming systems in Punjab. *Social Change New-Delhi*, 20(2): 90-94.
- Siddiqui, M.R., S.M. Shahidullah and M.R Islam, 1999. Adoption of HIV rice cultivation technologies and its impact on resource use, productivity and women's role. *Bangladesh Journal Training Development*, 12(1-2): 141-147.
- Wijeratne, M. 1992. Women farmers: A target group for agricultural extension. *Beitrage-zur-Tropischen - Landwirtschaft-und-Veterinarmedizin*, 30(3): 243-250.