



Profitability Analysis of Non-timber Forest Products Collected from Block A and Golf Course Forests of International Institute of Tropical Agriculture (IITA), Ibadan, Oyo State, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author OCA designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Author SAO and author MOA managed the analyses of the study. Author MOA managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

The study was designed to analyse the profitability of non-timber forest products collected from Block A and Golf course forests of International Institute of Tropical Agriculture (I.I.T.A). A total of 105 respondents were randomly selected and interviewed using copies of well structured questionnaires. Descriptive statistics, budgetary analysis, Gross ratio, Operating ratio, Expense structure ratio, Return per capital invested and Benefit-cost ratio were used to analyse the data. The study showed that all the respondents involved in the collection of NTFPs were female and native of

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the area with the average age of 51 years. Majority were not educated, were married with 5-7 household size, 11-20 years of experience and are closer to forest by 2-5 km. The study further revealed that eight types of NTFPs which includes firewood, bamboo, palm kernel, water leaf, pseudocolocynth, gum tree, Oil bean seed and drum tree were collected with the total weight of 12,385 kg. Firewood formed the highest quantity of NTFP collected. The collection of NTFPs was profitable with a value of N3, 405.11 per respondent. Thus, it can be concluded that the collection of NTFPs from Block A and Golf course forests of I. I. T. A is a profitable and lucrative business. The study therefore recommends that the quantity, types and frequency of collection of NTFPs from the forests should be moderated to prevent degradation and loss of the forest for future generations. Also, the collectors should be restricted to Golf and Block A forest which serves as buffer zone and not encroaching into west bank forest which is protected.

Keywords: IITA; NTFPs; respondents; villagers; randomly; structured questionnaire; interview; descriptive statistics; budgetary analysis; income; profitable.

1. INTRODUCTION

Tropical forests provide ample goods and services; these mainly include timber and Non-Timber Forest Products (NTFPs). The term non-timber forest product refers to a broad range of resources in the forest. Also known as botanical forest products or non-wood forest products, the terms generally describe any product in the forest, other than the trees used for the production of lumber and other solid wood products or pulp. NTFPs have been studied by researchers from many different academic fields and each field used a slightly different definition of NTFPs. NTFPs are any product or service other than timber that is produced in a forest [1]. According to [2] non-timber forest products include plants and plant materials used for food, fuel, storage, fodder, medicine, rapping leaves, biochemical as well as animals, birds, reptiles, skin and feather that have perceived economic or consumption value, sufficient to encourage their collection and removal from the forest. They include fruits, nuts, vegetables, fish and medicinal plants, resins, essences, and a range of barks and fibers such as bamboo, rattans, and a host of other palms and grasses. A large proportion of rural people use NTFP worldwide. Researchers have identified NTFPs as key resources in a strategy to overcome difficulties in time of uncertainty that can be pursued by workers who find themselves without jobs, and by individuals whose employment opportunities are chronically limited by age, gender and disability. The independent nature of the activity is also suitable for people who do not fit comfortably within the demands of contemporary wage labour. The primary requirements to work with NTFPs are knowledge of products, their uses and locations, and the time, energy and

mobility to access [3]. Moreover, [4] also stated that many international development agenda promote NTFPs as tools for sustainable development. The promotion of gender equity materializes through NTFPs' ability to improve the economic situation of households by incorporating women as key actors, since they are recognised as the main extractors, processors, and marketers. So NTFPs are viewed as a potential means to better the livelihood strategies of rural populations while simultaneously sustaining the biodiversity of forested areas. NTFPs are indispensable part of the livelihood strategy of communities living in and near forests and constitute an important source of livelihood for millions of people across the world. At global level, more than two billion people are dwelling in forest, depending on NTFPs for subsistence, income and livelihoods security [5]. According to [6] 75% of poor people in the world living in rural forest area depend on NTFPs for their sustenance and 80% of forest poor people in the developing countries, like Nigeria, use NTFPs daily to meet some of their health and nutritional needs [7].

NTFPs such as bamboo, seeds, leaves, gums rattan, raffia and other fibres contribute immensely to the subsistence, daily life and welfare of people all over the world especially in rural economies of the developing world [8,9] and [10]. Empirical evidence from India [8] indicated that 54% of forest revenue accrued from NTFPs but were not systematically exploited. NTFPs are considered to be important for sustaining rural livelihoods, reducing rural poverty, biodiversity conservation, and facilitating rural economic growth [11]. [12] maintained that, millions of people especially those living in rural areas in

developing countries including Nigeria collect these products daily and many, according to [13] and [14] in [15] regarded selling NTFPs as a means of a living. International Fund for Agriculture Development [16] indicated that NTFPs have traditionally provided a source of nutrition and income for millions of indigenous women in some of the most remote areas of developing countries. NTFPs support rural livelihoods through the generation of cash income with the sale of NTFP [17,18,19] and through the provision of essential goods –like food and medicine-for household consumption [18,20,21]. Income generated through the sale of NTFPs represents almost the 100% of the cash income earned by some rural households [22]. Household consumption of NTFPs also plays an important economic role in rural families because the consumption of NTFPs decreases rural household's dependency on cash income [21]. In addition, several opportunities for improved rural development are linked to NTFP [23].

The Block A forest and Golf forest of the International Institute of Tropical Agriculture (IITA) is a repository of useful timber and non-timber forest products [24] and is serving as a source of livelihood for villagers living in adjoining villages of the perimeter fence of IITA for over forty years. The villagers are allowed into the forest to collect Non- Timber Forest Products (NTFPs) such as water leaf, vegetables, palm products, fire wood, medicinal plants and other forest products There was no formal record of the types and quantity of Non-Timber Forest Products (NTFPs) collected from the forest as well as the monetary value and profitability of these forest products were not known, therefore, it is pertinent to carry out a study on the profitability of non- timber forest products (NTFPs) collected from the two forests.

1.1 Objectives of the Study

The broad objective of this study was to analyse the profitability of non- timber forest products collected from Block A and Golf forest of International Institute of Tropical Agriculture (IITA), Ibadan, Oyo state, Nigeria.

The specific objectives are to:

- i. Describe the socio-economic characteristics of the respondents.

- ii. Identify the types and quantity of non-timber forest product collected from the forests.
- iii. Evaluate the costs and returns of NTFPs collected by the respondents
- iv. Identify the uses of revenue obtained from NTFPs collection
- v. Analyse the profitability of NTFPs collected by the respondents

2. METHODOLOGY

The study area: The study area was International Institute of Tropical Agriculture (IITA) forests, Ibadan, Oyo State, Nigeria. IITA is located at longitude 7° 30' 8"N, latitude 3° 54' 37"E and 243m above sea level [25]. In 1965, the Federal Government of Nigeria allocated some 1000 hectares of land for the establishment of the main IITA campus. By 1987, the clearing of land for research plots, housing and other facilities was largely completed and it was decided to preserve the remaining land as an informal forest and nature reserve. Today the forest and nature reserve at IITA covers nearly 300 hectares and are in three locations. The first is found at west bank area and the size of the forest is about 150 ha, the second is located at Block A and the size is about 50 ha, the third is at golf course area covering about 100 ha. The forest at west bank area is under active protection by the rangers while forest at Block A and Golf area serves as extractive reserves where rural women who once lived in the villages where IITA is presently located are allowed to collect forest resources (NTFPs) such as firewood, water leaf, bitter leaf, palm (nuts, fruits, fronds) etc.

Land use history: Prior to the acquisition of land by IITA through the Federal Government of Nigeria, the most extensive land use pattern was arable and tree crop farming and about 3000 people lived in about twenty eight villages scattered in this area.

Climate: The site falls within humid tropical lowland region with two distinct seasons: the longer wet season and shorter dry season. The wet season last for eight months and it extends from March to October while the dry season last for four months from November to February. The rainfall pattern is bimodal with an annual total which ranges from 1,300-1,500mm most of which falls between May and September. The average daily temperature ranges between 21°C and 23°C

while the maximum is between 28°C and 34°C. Radiation is about 5285 MJ/m²/year. Mean relative humidity is in the range of 64% to 83% [25].

Vegetation: The natural vegetation in this area could be classified as tropical semi-deciduous forest with various pockets of vegetation types ranging from derived savanna, secondary forest and riparian types. According to [26] the area resembles mature Guinea-Congo lowland rainforest with scattered emergence of trees which include *Ceiba*, *Milicia* and *Terminalia* spp. Large clumps of bamboo (*Bambusa vulgaris*) are common; stands of *Raphia farinifera* are found along watercourses while scattered oil-palms *Elaeis guineensis* grow in both low-lying and the relatively better-drained upland areas. Thickets of climbers grow in openings where the secondary nature of the forest is most apparent.

Method of Data Collection: One hundred and five respondents were selected randomly from the population of collectors of non-timber forest products from IITA forests. Data were collected from the respondents by interview method with the aid of structured questionnaire. The respondents were tagged and monitored for the name, types and part of NTFPs collected for a whole month. The quantity of NTFPs collected were weighed and recorded for each of the respondents.

Analytical tools: Data were analyzed using descriptive statistics to summarize the data collected. Budgetary analysis was used to determine the cost incurred and return accruable to the collectors of NTFPs.

Total cost (TC) = Total variable cost (TVC) + Total fixed cost (TFC)

Gross income (G.I) = Price per kg of NTFPs collected * quantity of NTFPs sold

The cost of fixed assets such as (cutlass, knife, baskets, jute bags etc) was depreciated with straight line method of depreciation.

Depreciation = Original cost of the asset - Salvage value / Number of useful life of the asset
Profit = Gross income – Total cost

Profitability analysis: Profitability of NTFPs collection was derived by analyzing its performances with: Gross Ratio (GR), Operating

Ratio (OR), Expense Structure Ratio (ESR) and Return per Capital Invested (RPCI) as well as Benefit Cost Ratio (BCR) [27,28].

Gross Ratio (GR) given as total cost (TC) divided by Gross Income (GI).

GR = TC ÷ G I. This shows the proportion of the G.I. that goes into the total costs during the collection NTFPs.

Operating Ratio (OR) given as total Variable Cost (TVC) divided by Gross Income (GI).

OR= TVC ÷GI. The ratio indicates the proportion of the G.I that goes to pay for the operating costs. It is directly related to the variable input usage.

Expense Structure Ratio (ESR): given as total fixed cost divided by total variable cost. ESR= (TFC/TVC). ESR indicates the proportion of the cost of collection of NTFPs that form the fixed cost component.

Return per Capital Invested (RPCI) given as net profit divided by total cost (TC).

RPCI = Net profit ÷ Total cost. This indicates the amount of money returns to the collector for every naira invested in the collection of NTFPs (business).

Benefit-Cost Ratio (BCR): given as benefit (Gross income) divided by Cost.

Benefit ÷ Cost.

BCR shows whether a business is worth investing in or not. If the ratio, that is:

BCR >1, it is profitable,
BCR < 1, it is not profitable

3. RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents: Table 1 revealed the socio-economic characteristics of respondents. All the respondents involved in the collection of non-timber forest products from Block A and Golf course forests of IITA are female. This agreed with the findings of [29] which stated that female is mostly engaged in NTFPs collection, while males are involved in other income generating activities.

Table 1. Socio-economic characteristics of non- timber forest products collectors

Socio economic characteristics	Frequency	Percentage
Sex		
Male	-	-
Female	105	100
Age		
20-40	14	13.33
41-60	85	80.95
61-80	6	5.72
Marital Status		
Married	82	78.10
Widowed	23	21.90
Household size		
2-4	22	20.95
5-7	55	52.38
8-10	28	26.67
Level of Education		
Primary six	18	17.14
Not educated	87	82.86
Years of Experience of NTFPs collection from IITA forests		
1-10	34	32.38
11-20	51	48.57
21-30	13	12.38
31-40	7	6.67
Main occupation		
Crop farming	66	62.86
Trading	39	37.14
Nativity		
Yes	105	100
No	-	-
Nearness to Forest (Km)		
2	63	60
3	13	12.38
4	21	20
5	8	7.62
Extents of sales		
1-3	61	58.10
4-6	43	40.95
7-9	1	0.95
Uses of NTFPs		
Sold and consumed	97	92.38
Sold	5	4.76
Consumed	3	2.86

Source: Computed from Field Survey Data, 2016

The average age of the collectors was 51 years. The implication of this is that most of the respondents are slightly above their active age with little ability of going about the gathering of NTFPs. [30] in her findings described age of 20-50 years as the active age group. However, most of the respondents were within the age (16-64) defined by [31] as economically productive in population. 80.95% had the highest age range of

41- 60 years while 13.33% and 5.72% falls between 20-40 and 61-80 years respectively. Studies have found that young people may be more dependent on forest products than elderly people [32,33] this is because the young may have multiple uses for the forests and forest product collection is labor intensive. On the other hand, elderly people may not risk going into the forest to undertake forest activities particularly

because they may not have the strength to carry out forest-related activities and thereby rely on less arduous activities [34,35,36].

The percentage of the collectors that were married was 78.10% while 21.90% were widowed. In terms of the household size, 52.38% had household size of 5-7. 26.67% had 8-10 while 20.95% had 2-4 household size, the collection of NTFPs will serve as financial support to the husband and children. Larger households collect more forest products and clear more forest compared to smaller households primarily because the large households have more workers and more people to feed [37]. Studies have found that larger families have a greater demand for natural resources and more labor to fulfill this demand, leading to higher forest income [37,38]. However, it appears that household composition, gender and age structure are more important than the mere numbers.

Majority (82.86%) of the respondents were not educated while only 17.14% had primary six educations. According to [39] and [3] the primary requirements to work with NTFPs are knowledge of product, their uses and location, and the time, energy and mobility to access the products. These requirements are fulfilled with increasing years of education among the respondents rather than formal education. Studies find that education makes NTFP collection increasingly unprofitable due to the higher opportunity costs of labor. Moreover, education creates opportunities for off-farm employment, self employment and better job facilities outside the forest area that reduce dependence on forest resources [32,38].

The years of experience of Non-Timber Forest Products collectors from IITA forests show that 48.57% had between 11-20 years experience while 32.38%, 12.38% and 6.67% had 1-10, 21-30 and 31-40 years of experience respectively. The main occupation of the respondents was crop farming which accounted for 62.86% while only 37.14% were engaged in trading. The minor occupation of all the respondents was NTFPs collection. All the respondents were native of the area and once had villages on the land area where the present IITA is located.

The nearness of the forest to the respondents shows that 60% and 20% were near to the forest by 2 km and 4 km while 12.38% and 7.62% were closer to the forest by 3 km and 5 km respectively. The extent of sales of NTFPs by the

respondents reveals that 58.10% and 40.95% had between 1-3 and 4-6 customers while only 0.95% has between 7-9 customers. 92.38% consumed and at the same time sold the NTFPs collected from the forests, 4.76% sold the products while only 2.86% consumed the NTFPs collected.

Types and quantity of non-timber forest products collected:

Table 2 showed the types, parts and quantity of non timber forest products collected from Block A and Golf course forests of IITA as at the time of the survey. The type of NTFPs collected includes firewood, bamboo, palm kernel, water leaf, pseudocolocynth, gum tree, Oil bean seed and drum tree. The parts of NTFPs collected are stems, branches, seeds, leaves and pods. The total quantity of non timber forest products collected was 12,385 kg. Firewood recorded the highest quantity of 9,967 kg. [40] stated that 92% of rural households use firewood as their main cooking fuel, whereas over 50% of the urban population uses charcoal in many sub-Saharan countries. This was followed by bamboo and palm fruits/ kernel with 2,150.50 kg and 138.50 kg. The quantity of water leaf, pseudocolocynth and gum tree was 98.90 kg, 20.50 kg, and 5.50 kg respectively. Other such as oil bean seed and drum tree had 2.6 kg and 1.5 kg collection. Some of these non timber forest products were collected in and at the edges of block A and Golf course forests. The NTFPs collected were used for cooking, production of palm oil and palm kernel oil, food, medicine and wrapping of food items. According to [41,42,43] the historical dependency of human beings on forests is still intact either directly or indirectly for fulfilling their various needs, such as food, fodder, fiber, medicine and cultural epistemic. The age-old traditional interactions of people living in forests and forest fringes with their surrounding natural resources, ecosystems and environment have developed some specific knowledge on the use of forest and forest resources [41,42,43]. Most of these forest dwellers are tribal communities who collect various forest produce for their consumption and income generation. Despite the influence of modernization, cultural diffusion and market forces, most of the traditional practices, are still in existence within tribal communities [43,44]. Being the worshipper of nature and natural resources, many cultural practices of these forest dwellers depend on the forests resources [45]. Besides, the collection and consumption of forest produce are determined by certain cultural norms and institutions. The selection of plant species for

use depends on the knowledge and experiences however, the dependency or exploration of forest resources is determined by the richness or poorness of the produces or the availability of the resources [44]. The creativity, evolution and accumulation of knowledge depend on the locality, availability and opportunity to access the resources.

Budgetary analysis: The budgetary analysis revealed the cost incurred and the revenue generated by the collector of Non- Timber Forest Products as found on Tables 3 and 4. The revenue generated was made up of sales from different non- timber forest products collected. The various costs incurred on different types of inputs used in the collection and the revenue obtained from sales of Non- Timber Forest Products were computed as given by the respondents in Tables 3 and 4. Table 3 showed that transportation cost constitutes the highest total variable cost of 53.39% and average variable cost of 48.11%. Labour cost accounted for 46.61% of the total variable cost and 51.89% of the average variable cost. However, total variable cost of 52.03% and average variable cost of 32.15% forms the highest cost of total cost while only 49.97% of the total fixed cost forms the total cost and 67.85% of the average

fixed cost constitute the average total cost. The total cost and average total cost incurred in the collection of Non- Timber Forest Products was ₦40, 819.14 and ₦ 698.27 respectively. In terms of revenue generated, Table 4 showed that 6.25 kg of firewood sold for two hundred naira (₦200), 8.27 kg of bamboo sold for one hundred and fifty naira (₦150), 190 g of water leaf sold for fifty naira (₦50), 1.5kg of palm kernel sold for one hundred and twenty naira (₦120), one piece of *Adenopus breviflorus* was sold for ten naira (₦10), and one piece of *Tetrapleura tetrapetra* sold for twenty naira (₦20). 2.6 kg of *Pentaclethra macrophylla* was sold for two hundred and fifty naira (₦250) while 1.5 kg of *Cordia millenii* was sold for one hundred and fifty naira (₦150) only. Firewood and bamboo gave the highest revenue of ₦318, 944.00 and ₦39, 005.44. This was followed by water leaf, palm kernel and *Tetrapleura tetrapetra*, which had a value of ₦26, 026.32, ₦11, 080 and ₦2, 000 respectively. *Adenopus breviflorus*, *Penaclethra macrophylla* and *Cordia milenii* gave revenue of ₦900, ₦250 and ₦150 respectively. Firewood and Bamboo which had the highest revenue was collected in high quantity from the forests compared to other non timber forest products. Water leaf was collected in low quantity but had higher revenue compared with palm kernel that

Table 2. Types and quantity of non- timber forest products collected from iita forest at the time of the study

S/n	Scientific name	Common name	Yoruba name	Part collected	Uses	Quantity collected (kg)
1	<i>Adenopus breviflorus</i> Benth.	Pseudocolocynth, Lagenaria	Tagiri	Pod	Medicine	20.50
2	<i>Bambusa vulgaris</i>	Bamboo	Oparun	Stem	Cooking	2,150.50
3	<i>Cordia millenii</i>	African cordial, Drum tree	Omo	Leaves	Wrapping	1.5
4	<i>Elaeis guineensis</i> Jacq.	Palm fruit & Palm kernel	Eyin, Ekuro/Ira	Palm seed	Palm Kernel	138.50
5	<i>Pentaclethra macrophylla</i> Benth.	Oil bean seed	Pala, Igbogho	Leaves	Wrapping	2.6
6	<i>Talinum triangulare</i>	Waterleaf	Gbure	Leaves	Food	98.90
7	<i>Tetrapleura tetrapetra</i> (Schum. & Thonn.) Taub.	Gum tree	Aidan	Pod	Medicine	5.50
8		Firewood	Igi Idana	Stem, branches	Cooking	9,967
Total						12, 385

Source: Computed from Field Survey Data, 2016

was collected in high quantity with lower revenue to water leaf. The total revenue obtained by the respondents from the sales of non- timber forest products collected from the forest was ₦398, 355.76 and net return or profit of ₦357, 536.62 were realized by all the respondents with each respondent having ₦3, 405.11. Additional income of ₦6, 348.48 and ₦9, 102.56 were obtained per month per respondent from crop farming and trading which serves as the main occupation of the respondents. This makes total income of ₦18, 856.15 per month per respondent.

Uses of revenue obtained from the collection of non- timber forest products: Table 5 shows the uses of revenue obtained from the collection of Non- Timber Forest Products from Block A and Golf course forests of IITA. Multiple responses were obtained for each of the variable considered. The revenues were used in several areas. The majority (29.41%) of the NTFPs collectors used the revenue for the provision of food for the family's needs. 25.21% and 22.41% used the revenue for the purchase of clothing and various household products such as soaps, matches, oil and drugs etc. Only 15.40% and 4.20% used the revenue for the enrolment of their ward in school and other miscellaneous expenses while 3.36% used it in purchasing accessories like mobile phone, radio and television. This agreed with the finding of [46] which stated that revenue collected from Non Timber Forest products gathering are used for alimentation, clothing, accessories, various household products, enrolment fees, investment in other activities and miscellaneous expenses.

Profitability analysis of non- timber forest products collected: Five measures of profitability analysis were used to determine the profitability of Non- Timber Forest Products collection from Block A and Golf course forests of IITA (Table 6). This includes Gross Ratio (GR), Operating Ratio (OR), Expense Structure Ratio (ESR), Return per Capital Invested (RPCI), and Benefit cost ratio. The value of Gross ratio was 0.10, this shows that the total collection cost was 10% of the gross income or total revenue; also it implied that from every ₦100 return to the collection of Non- Timber Forest Products from the forest, ₦10 was been spent; this is desirable for any business enterprise. According to [27] the lower the ratio the higher the return per naira invested. Also, operating ratio of 0.05 indicates that 5% of the gross income (total revenue) goes into the variable inputs used in the collection of Non- Timber Forest Products from the forest. Expense structure ratio of 0.92 was obtained, indicating that about 92% of the cost of collection of non timber forest products was made of fixed cost component. This made the business (NTFPs collection) worthwhile since increase in the collection of NTFPs will increase variable cost and total revenue leaving fixed cost unchanged. The financial viability of NTFPs collection and sales was determined using the return per capital invested and Benefit- cost ratio. The value of 8.76 was obtained for RPCI. This implies that for every additional naira invested in the collection of NTFPs business, 876 kobo was realised. The analysis of benefit-cost ratio gave a value of 9.76 (BCR>1). This shows that the collection of NTFPs from the forest was a viable business.

Table 3. Budgetary analysis of non- timber forest products collection

	Total (N)	Percentage	Average	Percentage
Variable cost				
Labour	9,900	46.61	116.47	51.89
Transportation	11,340	53.39	108.00	48.11
(A) Total Variable Cost (TVC)	21,240	52.03	224.47	32.15
Fixed cost (Tools)				
Cutlasses	15,835.82	80.88	150.81	31.83
Aporon and Hammer	793.10	4.05	79.31	16.74
Axe	2,195.25	11.21	199.57	42.12
Sack	326.62	1.67	15.55	3.28
Basket	428.35	2.19	28.56	6.03
(B) Total Fixed Cost (TFC)	19,579.14	49.97	473.8	67.85
(C) Total Cost (TC)= TVC + TFC = (A+B)	40,819.14		698.27	

Total and average cost of collection of non- timber forest products by the respondents

Source: Computed from Field Survey Data, 2016

Table 4. Revenue obtained from the collection of non- timber forest products by the respondents

S/n	Non timber forest products	Qty (Kg)	Price/ kg (N)	Revenue (N)
1	Firewood	9.967	6.25kg/ N200	318,944.00
2	Bamboo	2,150.50	8.27kg/ N150	39,005.44
3	Water leaf	98.90	190g/ 50	26,026.32
4	Palm kernel	138.50	1.5kg/ 120	11,080.00
5	<i>Adenopus breviflorus</i>	20.5 (90 pieces)	90* N10	900
6	<i>Tetrapleura tetrapetra</i>	5.50 (100 pieces)	100* N20	2,000
7	<i>Pentaclethra macrophylla</i>	2.6	-	250
8	<i>Cordia millenii</i> Baker	1.5	-	150
	(D) Gross income or Total revenue			398,355.76
	Net return or Profit (D-C)			357, 536.62
	Net return or profit per respondents			3,405.11
	Income from crop farming	419,000		6,348.48
	Income from trading	355,000		9,102.56
	Total average income per month			18,856.15

Source: Computed from Field Survey Data, 2016

Table 5. Uses of revenue obtained from the collection of non- timber forest products

Purpose of the expenditure	Frequency*	Percentage
Food	105	29.41
Clothing	90	25.21
Accessories (mobile, radio, television etc)	12	3.36
Various household products (soaps, matches, oil, drugs etc)	80	22.41
Enrolment fees	55	15.40
Investment in other activities	-	-
Miscellaneous expenses	15	4.20

Source: Computed from field survey data, 2016

* = Multiple responses

Table 6. Profitability analysis of non- timber forest products collected

S/n	Profitability measure	Ratio
1	Gross Ratio (GR)	0.10
2	Operating Ratio (OR)	0.05
3	Expense Structure Ratio (ESR)	0.92
4	Return per Capital Invested (RPCI)	8.76
5	Benefit Cost Ratio (BCR)	9.76

Source: Computed from Field Survey Data, 2016

4. CONCLUSION

Based on the findings of the study, it can be concluded that all the respondents involved in the collection of NTFPs from Block A and Golf course forests of IITA are female; all were native of the area and once had villages on the land area where the present IITA is located. From Table 2, it can be concluded that eight types of NTFPs are collected from the forest with total weight of 12, 385 kg per month. The cost and

return analysis of NTFPs collection was profitable with a value of ₦3, 405.11 per respondents. Thus, it can be concluded that the collection of NTFPs from Block A and Golf course forests of IITA is a profitable and lucrative business. Also, the forest serves as a source of livelihood to the women living in the adjoining villages of IITA perimeter fence and as a reservoir of NTFPs which are useful for food, medicine, cooking and wrapping or preservation of food items.

5. RECOMMENDATION

1. The collections of NTFPs from Block A and Golf course forests of IITA was profitable, however, the collectors should be restricted to Golf and Block A forests which serves as buffer zone and not encroaching into west bank forest which is protected.
2. Proper agreement of which NTFPs to collect and what not to collect should be produced in black and white and made known to the collectors. Enforcement of

- such document is necessary to ensure compliance.
3. Adequate monitoring of the NTFPs collectors is necessary to ensure that they collect those NTFPs they are given permission to collect.
 4. The quantity, types and frequency of collection of NTFPs from the forests should be moderated to prevent degradation and loss of the forest for future generations.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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