

Impact of wild fruits local- marketing to household income and livelihood in western sector localities (*Elbiga and Elsalam*) of South Kordofan state, Sudan

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Abstract Marketing of local wild fruits contributes to farmers' income and provides employment to the people in drier seasons. The current study was aimed to investigate wild fruits sold quantities, estimate fruits marketing returns and factors affecting these returns. The study was conducted in western sector localities of South Kordofan state, in *Elbiga* and *Elsalam* local markets. About 60 mediators were selected purposively through field survey in 2013/2014 season. Regression was used to estimate regression coefficients of wild fruits return and factors affecting wild fruits marketing, such as fruits quantities and their prices. Partial budgeting analysis was also used to estimate wild fruits returns. According to regression analysis, the estimated models R^2 was 0.88 which indicates that, 88% of variation in the fruits returns was determined by (fruits quantities and their prices) the estimated models indicated that, the model is highly significant ($p \leq 0.000$) in explaining fruits marketing return at this level. Partial budgeting indicated that, all fruits quantities gave positive returns. Marketing activity filled the labor gap between production seasons. While mediator's net returns were found to be SDG 656.92, 932.44, 1009.89, 668.91 and 41.53 for *Balanites*, *Zizyphus*, *Baobab*, *Tamarind* and *G. tenax*, respectively. Which equal to SDG 2091.45. According to study results, some people buy and sell fruits on certain days in the week, while others buy and sell all the week round. However, wild fruits marketing constraints were fires, over-grazing and trees over-cutting for crops production or fire wood and charcoal as well as local markets scarcity, fruits transporting costs, fruits prices and production seasonality. The study

concluded that fruits local marketing is the most important source of cash income and employment for people in the study area. It recommended that *Balanites*, *Zizyphus*, *Adansonia*, *Tamarindus* and *G. tenax* trees should be adopted and domesticated in remote area, through extension serves and more studies.

1. Introduction

Western sector localities is located between latitudes 12° 76- 9° 85 N and longitudes 29° 6 8- 32° 51 E. Covering an area of 123700km². The total number of population of the sector is estimated at 538486 people in area about 71.045 km² (15). The main job for the people is agriculture (crops production and animal production) and trading in local products. Non- timber forest products (NTFPs) are considered to be important for sustaining rural livelihoods, alleviating poverty and facilitating rural economic growth(20). About 55% of employment was generated by wage sector followed by NTFPs collection 26% and other sectors 19% (4), (13). Reference (8) stated that about 75% of poor people in the world depend on NTFPs for their needs while, 80% of forest based people in the developing countries use NTFPs daily. Economically, NTFPs sustain the rural and urban poor in meeting their needs, about 85% of household in rural South Africa use NTFPs in their daily lives (19).Reference (2) reported that NTFPs attracted early attention among practitioners and researchers, based on three assumption that are widely distributed (contributing more than timber to forest people's livelihoods), their harvesting is ecologically more diverted than alternative and the increase of their commercial value increase forest contribution in both poverty alleviation and forest conservation. reference (3) explained that to introduce wild fruits and their usage contact local people. The fruits significantly contribute to rural household economy; fruits are locally consumed or sold in the market to generate income (5), (10).Reference (18) stated that dried pulp is

processed and marketed by number of different companies internationally as a powder which mixed with liquid to form nutrition. The study area lies within savannah and semi-arid regions, previous studies revealed that these regions were important source for wild fruits collection and marketing (7). Moreover, the study area is limited in livelihoods options and employment opportunities, that suggesting alternatives cash income generating from wild fruit activities (1). While Reference(11) stated that expanding of the local markets needs more efforts. NTFPs are harvested for both subsistence and commercial use which play a role in the livelihood of millions of local communities (9). **Most of rural and urban households in Nigeria depend on forest products to meet their households' nutritional needs and incomes generation (16).** NWFPs play different roles in supporting rural economy by contributing food security, nutrition, medicine, jobs and support environmental objectives (14). Forest and farm trees make substantial contributions to food security of rural populations, supply essential nutrient, especially where food alternative sources are unavailable (17).

2. Materials and method

The area selected for this study was western sectors localities of South Kordofan state where NTFPs are offering trading opportunities for fruits collectors and mediators.

2.1 Data collection and sample size

About 60 of fruits mediators were selected purposively from area localities. Fruits mediators were selected purposively from *Elsalam* and *Elbiga* markets. Secondary sources of data were also used..

2.2 Data analysis

Descriptive statistics method, regression analysis, partial budget and **household economy approach** were used to satisfy studies objectives.

2.2.1.Descriptive statistics analysis

It was used to estimate percentages of mean fruits quantities and returns.

2.2.2 Regression analysis:

Regression method was used to estimate regression coefficients of wild fruits return and factors affecting their marketing, such as fruits quantities and their prices(6).

Regression general formula;

$$Y = a + b_1 X_1 + b_2 X_2 + b_3 X_3 + \dots + b_n X_n - e$$

Mathematical formula;

$$Y = a + b_1 \ln X_1 + b_2 \ln X_2 + \dots + b_n \ln X_n + e \quad (3.3)$$

Whereas;

Y = wild fruits quantities average return (dependent variable)

B_0 = constant

X_1 = *Balanites* quantity and price

X_2 = *Zizyphus* quantity and price

X_3 = *Adansonia* quantity and price

X_4 = *Tamarind* quantity and price

X_5 = *G. tenax* quantity and price

X_1 qu and X_2 prices = independent variables.

Regression analysis measures the relationship between fruits return and quantities with their corresponding prices as factors affecting fruits returns (dependent variables).

2.2.3.Partial budget method.

As a reference (12) partial budget is used to estimate fruits quantities costs and fruits collection days as well as fruits returns.

3. Results and discussion

3.1 descriptive statistics

According to the results of the current study, 78% and 22% of the respondents were males and females, respectively (Table 1). The same table revealed that, mediators ages between (25- 45) year were 70%, 55% received formal education and 83% were married. Indicates that, respondents practice different activities in drier seasons to generate income and fill the labor gap between production seasons. However, the main job for fruits mediators is agricultural production and local trading beside fruits activities. Similar results were reported by [references \(13\), \(1\)](#) that about 55% of employment was generated by wage sector followed by NTFPs collection 26% and other sectors 19%. However, study detected that wild fruits marketing is a modern activity in study area. So, 48% of fruits mediators were practicing fruits marketing in not more than five years. According to study result, the traded fruits in the study area were *Balanites*, *Zizyphus*, *Adansonia*, *Tamarind* and *G. tenax* fruits. Similar previous results (e. g [reference 20](#)) indicating that NTFPs are considered to be important for sustaining rural livelihoods, alleviating rural poverty and facilitating rural economic growth.

Table 1. Sex, age, education level, marital status and fruits marketing experience profiles of wild fruits collectors (% of interviewees in each class).

Variable	Class	% of collectors(N=60)
Sex	Male	78
	Female	22
Age	< 25 years	5
	25- 35years	35
	36-45 years	35
	46-55 and more years	25
Educational level	Illiteracy	32
	Khalwa	11
	Primary	28
	Secondary	29

Marital status	Married	83
	Unmarried	11
	Divorced	3
	Widowed	3
Marketing experience	5 and more years	48
	Less than five years	52

Source: Study field survey, 2013.

N= number of interviewees.

3.2 Regression analysis

The performance of regression analysis in measurement of the relationship between dependent variables and independent variables was recognized **reference (6)**. According to regression results in this study, the estimated R^2 was 0.88 which indicates that 88% of fruits return variation was determined by estimated model (fruits quantity and their prices). The calculated F- value was 16.279 while tabulated F-value was 2.25 indicating that the model is highly significant ($p \leq 0.000$) in explaining fruits return variation for fruits marketing. It was shown in Table 2 that all variables coefficients were positive except **Balanites and G tenax** price.

The estimated equation is:

$$Y = -447.1 + (0.345x_1 + 1.1x_2 + 4.61x_3 + 1.0x_4 + 0.422x_5) \text{ quantity}$$

$$(165.02x_1 + 82.9x_2 + 18.78x_3 + 153.81x_4 - 6.05x_5) \text{ prices}$$

B_0 = constant

X_1 = **Balanites** quantity and price

X_2 = **Zizyphus** quantity and price

X_3 = **Adansonia** quantity and price

X_4 = **Tamarind** quantity and price

X_5 = **G. tenax** quantity and price

Table 2. Coefficients of fruits quantities and prices in study area

Model	Coefficients	Standard error	Significance
Constant	-446.1	944.248	0.639
<i>Balanites</i> quantity	0.345	0.389	0.379
<i>Zizyphus</i> quantity	1.091	0.311	0.001
<i>Adansonia</i> quantity	4.613	0.676	0.000
<i>Tamarin</i> quantity	0.998	0.327	0.004
<i>G. tenax</i> quantity	0.422	6.583	0.949
<i>Balanites</i> price	-165.02	93.472	0.084
<i>Zizyphus</i> price	82.894	96.73	0.396
<i>Adansonia</i> price	18.782	40.262	0.643
<i>Tamarind</i> price	153.81	139.197	0.275
<i>G. tenax</i> price	-6.053	20.729	0.772
R ² (coefficients of determination)	0.879a		
R adjusted	0.725		
F – calculated	16.279		0.000a

Source: Study field survey, 2013.

3.3 Returns of wild fruits marketing in study area localities:

As a general consensus, collection and marketing of wild fruits generates income and livelihoods for the community living in rural areas. Some people collect and market the wild fruits for daily needs. Reference (8) has pointed out that about 75% of poor people in the world depend on NTFPs for their needs while, 80% of forest based people in the developing countries utilize NTFPs for their daily needs. According to the current study, fruits mediators receive fruits quantities from fruits collectors and sellers. They purchase and sell the fruits to wholesalers at a certain contract and commission. Table (3) showed that average sold quantity for *Balanites* fruits was 1877.7 kg, while *Zizyphus*, *Baobab*, *Tamarind* and *Gaddeim* quantities were 2027.04, 435.3, 1486.49 and 41.95 kg, respectively. This result showed that *Zizyphus* fruits are available among fruits quantities in the study area. According to

the fruits prices and sold quantities, the costs of the aforementioned quantities were SDG1934.31, 3648.67, 3678.29, 2408.12 and 132.14, respectively. It apparently revealed that Baobab and Gaddeim fruits were of high costs among sold quantities. The result reconciled with [reference \(18\)](#) that dried pulp is processed and marketed by number of different companies internationally as a powder which can mix with liquid to form nutrition. Whereas the fruits average return were found to be SDG 2591.23, 4581.11, 4688.18, 3077.13 and 173.67 for [Balanites](#), [Zizyphus](#), Baobab, Tamarind and Gaddeim fruits, respectively. While net return for the above were SDG 656.92, 932.44, 1009.89, 668.91 and 41.53, respectively. It indicated that, Baobab was of high price and net returns. In this respect, [reference \(19\)](#) has documented that NTFPs trading economically sustain the rural and urban poor people in meeting their needs. It was found out that about 85% of households in rural South Africa utilize NTFPs in their daily expenditures.

Table 3. Average returns of wild fruits marketing in western sector localities of South kordofan state

The fruits	Desert date	Christ thorn	Baobab	Tamarind	Gaddeim	
Fruits quantity	1877.7	2027.04	435.3	1486.49	41.95	
Buying price/SDG/kg	1.03	1.8	8.45	1.62	3.15	
Quantities costs/SDG	1934.03	3648.67	3678.29	2408.11	132.14	11801.24
Selling price	1.38	2.26	10.77	2.07	4.14	
Output /SDG	2591.23	4581.11	4688.18	3077.03	173.68	15111.13
Net return/SDG	657.2	932.44	1009.89	668.82	41.54	3309.89

Source: study field survey, 2013.

3.4 Benefits of wild fruits marketing

Collection and marketing of wild fruits is envisaged as a substantial income source for people in some rural areas. People in such areas buy and sell wild fruits on a specific day in the week coinciding with the rural market working days whereas; others buy and sell all the week round especially those who have the capability to access sub urban and urban markets. Such role is most likely done by mediators rather than collectors. Accordingly, it seems plausible that fruits collection and marketing explicitly support the rural community income and employment.

Consequently, the activities of collection and marketing of wild fruits prompt those people to adopt and domesticate wild fruits trees in their fields and adjacent their dwellings.

3.5 Constraints of wild fruits marketing

Some people in the study area Localities face many problems when they market their collected wild fruits, such as fires, over-grazing and trees cutting for crops production and/or fire wood and charcoal production. According to study results, about 37% of the respondents explained that, the main problems for wild fruits marketing were local markets scarcity, transportation costs and price fluctuations and seasonality of fruits production. Similar results were reported by [reference \(11\)](#) who showed that expanding of the local markets needs greater efforts, while [reference \(1\)](#) stated that the prime problem of wild fruits collection was fruits seasonality, transportation, collection costs, pricing and land ownership. Nonetheless, wild fruits collection and marketing is regarded as an important source of income generation in the study area. [However, the lack of the wild fruits studies and researches were constrain their collection and exchange value.](#) About 36% of fruits mediators were complaining from problems of fruits storage and transportation costs. This indicates that fruits marketing support fruits mediators income, nutrition and employment, which reconcile with [reference \(2\)](#) who has pointed out that NTFPs have attracted early attention among practitioners and researchers, that NTFPs are contributing more than timber to forest people's livelihoods. Moreover, their harvesting is ecologically more diverted than other alternatives and the increase of their commercial value increases forest contribution in both poverty alleviation and forest conservation. Wild fruits local marketing added economic value for the fruits and unequivocally support environmental objectives through fruits trees adoption and domestication. Similar viewpoints were reported by [reference \(3\)](#) that [To introduce wild fruit and their usage](#)

contact local people. It implies that NTFPs activities positively impact household income, livelihoods and support environmental objectives.

4. Conclusion

The estimated models R^2 was 0.88 indicating that, 88% of variation in the fruits return was determined by the estimated models (fruits quantities and their selling prices) indicating that the models is highly significant ($p \leq 0.000$) in explaining the fruits return variation at this level. All fruits quantities gave positive returns. Wild fruits marketing days bridged the labor gap in drier seasons. According to study results, collection and marketing problems are exemplified in occidental fires, overgrazing, fruits seasonality and costs.

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