Contribution of Wild Fruits to Household Income and Food Security among Small Scale Farmers in West Kordofan State - Central-west of Sudan

Sayed Ali Fadul Elmola[1], Abdelateif Hassan Ibrahim[2]
[1] Faculty of Economics, West Kordofan University, Enuhud, - Sudan
[2] College of Agricultural Studies, Department of Agric-Economics, Sudan University of Science and Technology

1. Introduction

The West Kordofan State is predominantly a dry land area classified as arid or semi-arid. The rural economy is dominated by subsistence agriculture or pastoralisms that are dependent on the available natural resources. Drought posses the greatest challenge to the household income and food security of local communities in this area, a problem that is compounded by over-reliance on traditional farming/pastoral activities, which cannot cope with the adversity brought by drought. However, the State is endowed with a rich diversity of natural resources which have the potential to spur economic growth.

Wild fruits play a vital role in the household income and food security of many communities in the state. Moreover, wild fruits contain vital nutrients (Carbohydrates, protein, minerals etc) and essential vitamins, which are important especially for the growing children who are prone to malnutrition and related diseases. Some of the fruits have become articles of commerce in the local, national and international markets thereby contributing to household incomes and food security (FAO, 2002). Recognizing the potential of indigenous wild fruits as a reliable supplemental household food security and source of income, the Association of Forestry Research Institutions in Eastern Africa (AFREA) and node of the Forestry Research Network for Sub-Saharan Africa (FORNESSA), identified indigenous wild fruits as one of the priority research areas.

2. Problem Statement and Objectives

Although, Sudan holds great economic resources in terms of water, arable land and indigenous wild fruits, yet it faces many challenges to mitigate household income and food security. In addition, there are still significant numbers of people in the country food insecure. The situation even more severe in West Kordofan State, which is the subjected of this research paper (SAYED and ABDELATEIF, 2011). In this state agriculture is integral part of traditional farming system which

is associated with various limited factors such as low productivity of farm due to climate change phenomena. This situation forced the farm households to adopt different coping mechanisms in order to secure their food deficit. Wild fruits are a crucial source of household income and food security in many rural households in study area mainly in dry season. However, in the Sudan general and West Kordofan in particular the contribution of the wild fruits to the household income and food security is still relatively limited. Collection and marketing of wild fruits, like *Banalities aegyptiaca*, *Zizphus spina – Christi*, *Adansonia digitata, Tamarindus indica* and *Grewia tenax* contributes significantly to farmer's income and household food security in study area in dry seasons. Thus, this study aimed at investgating quantities collected from wild fruits and its contribution to farmer's income and household food security as well as identifying the factors that influence plantation and consumption of wild fruits among small scale farmers in West Kordofan State.

3. Methodology:

The analysis of this study is initially based on field survey, which was executed in the season 2014/2015, using structured questionnaire. 150 farm households (fruit collectors) were collected interviewed in different localities of the State. A cluster random sampling technique was adopted to select the sampled households. Descriptive statistical analysis and Ordinary Least of Square (OLS) were used to analyze the data. OLS regression is used to identify the relationship between a set of explanatory variables and dependent variable (CHANDAN *et al*, 1998). The obtained results were summarized in tables and coefficients. Mathematically, the regression formulae used was listed as follows:

$Y = a+b1\ln X2+ b2\ln X2+----------+bn\ln Xn + e$

Where:

Y = the average return of wild fruits quantities a = constantan, b = ln (elasticity), X1 = fruits prices, X2 = fruits distance, X3 = fruits costs, X4 = gender, X5 = education level

4. Results and Discussion

Descriptive Statistical Results

The descriptive statistical findings indicate that 50% of households did not have sufficient food to secure their needs. This situation is particularly severed during the rainy season compared with dry season. In fact, the tradition is that the youth migrate immediately after harvest to where they can sell their labor for additional income. When conditions are favorable, such youths accumulate cash during dry season and return to their rural areas to resume production process. Moreover,

29% of households reported inadequate income to buy food. They have mentioned that low productivity of farmers and higher food prices are the most problems of their serious food gaps. Other factors that contribute significantly to household income and food security in the West Kordofan state were, civil conflicts, climate, economic and political changes (USAID, 2012). In other word, productivity of crops is still considered low compared with cropped area. Thus, decline in crop productivity, and diminishing growth of farm income, represent real threats to the farm households' ability to secure their food needs and put them in many scenarios to protect them-selves. Not with standing, these results in line with previous arguments RAHIM *et al.*, (2005), TARIG (2008) who pointed out that, increase of crops productivity is due to, expansion of horizontal crop area, which has been accelerating as a result of pricing policy.

Table 1: Contribution of Wild Fruits to Household Income

Variable attribute	Value in SDG
Farm income	9500
Wild fruits income	22541
Total household income	32041
Contribution of Wild Fruits to household income	71%

Source: Field Survey 2014/2015

The area is endowed with wild fruits trees; hence the fruits are available for collection and marketing. According to the results of econometric model presented in Table 2 show the appropriateness and fairly good model. R- Squared is 0. 755, which indicates that 75.5% of fruits return variation was determined by estimated model, while Adjusted R-Squared is 0.748. The adjusted R-square expressed that about 74.8 % of the variation in the household income and food security in West Kordofan State is explained by the independent variables in the regression equation.

The results of regression illustrated in Table 2 indicate that most of the variables are found to be statistically significant at 10, 5 and 1 percent. As hypothesized, prices of wild fruits, desert date price, christ thorn price, costs of fruit collecting, fruit distance, education level of male and female of household are negatively and significantly influenced household income.

Table 2: Econometric Results of Wild Fruits

Model	Coeff.	St. Errors	Sig.
Constant	-1269.01	286.778	0.000a
Coefficient of desert date price	-7.65	34.58	0.83
Coefficient of Christ thorn price	67.22	30.52	0.03
Education level in years	-0.240	14887.7	-1.451
Educated male	-0.385	4051.2	-0.862
Educated female	-0.370	14887.7	-1.451
Coefficient of Baobao price	37.35	4.29	0.001
Coefficient of Goddeim price	-19.93	33.86	0.000a
Coefficient of Tanarind Price	107.940	10.80	0.001
Fruit Distance	5.44	18.38	0.77
Costs of fruit Collecting	6.98	0.325	0.000a
R squared	0.755		
Adjusted R^2	0.748		
F-value	84.83		0.000a

***, ** and *Significant at 1%, 5% and 10% respectively

In fact, due to continuing civil conflicts and climate changes in Kordofan region in general the food deficit is very high and food demand outstripping food supply put various household categories in hard situation. At the time of survey, more than 86% of households in West Kordofan State purchase most of their foods rather than producing it for themselves. This result agrees with the MALTHUS theory, which rely on the concept that farm household should be supported to increase subsistence production through technology advancement to ensure that food availability equals/exceeds food requirement per household. Many left their home and migrate to the neighboring cities to provide labor when food supplies run out. Therefore, besides studying the impact of environmental and socio-economic factors on crop productivity, future research should focus also on other activities that enable household to diversify their livelihoods beyond agricultural production so that they had enough income to purchase food for the hungry months.

5. Conclusion and Recommendations

Results show that the contribution of wild fruits to household income and food security were 71% and 50% respectively, especially in dry season. This result implied that people engage to wild fruits was done by powerful family members fruits retailers, wholesalers and collectors mainly. Indicating that, there is little flexibility to reallocate natural resources in general and wild fruits in particular to

meet the entitlement shocks. Accordingly, the study suggests a set of recommendations that focus in agricultural investment through efficient and sustainable technology to combat farmer's income and food security. Thus, policies interventions are useful for eliminating the existing inequalities and boost farm output. Moreover, supporting low income groups who are mainly depend on wild fruits as source of income is urgently needed in remote areas.

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