Analysis of Households' Expenditure Patterns on Livestock Products in Rural Malawi

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Abstract: Malnutrition is one of the key problems facing human development in Malawi. Deficiency of essential micro-nutrients in diet has resulted in several nutrition-related adverse health outcomes. This study analyzed expenditure patterns of rural households on livestock products with a view of identifying the factors that influence it. The data were collected with structured questionnaire and analysis was done with Tobit regression. Results show that about 21% of the households did not consume any of the livestock products. Fish is the most consumed livestock products. Tobit regression results show that livestock products' consumption expenditures increased significantly (p<0.10) as the number of male household members with formal education and farm revenues increased. It was recommended that efforts to ensure higher farm revenues for farmers through better access to farm inputs and markets and promotion of rural education will boost animal protein intakes of rural dwellers.

Key words: Livestock products, animal protein, consumption, Malawi, South Africa

INTRODUCTION

The need for adequate provision of food as a basic need of man and a necessary quantifiable indicator of economic development had been emphasized in literature (Soliman and Eid, 1995). This has often faulted other parameters of economic development indicators like growth rate of Gross Domestic Product (GDP), literacy rate and immunization coverage that policy makers sometimes emphasize. The general consensus among development economists is that any nation that cannot adequately feed her population should forget about economic development whether in the short, medium or long term period (Wang and Taniguchi, 2003). In Sub-Sahara Africa (SSA), malnutrition is a major socio-economic development challenge. This had been aggravated by several factors such as unfavorable climate, economic mismanagement, civil/communal unrests and economic policy failure. The global financial crises recently worsened the situation as food prices soared and households' purchasing powers drastically declined. For the past two decades, SSA countries have made very little progress in combating hunger and malnutrition. Many of these countries have also represented hotspots for food and nutrition intervention programmes (Von Grebmer *et al.*, 2008). However, African policy makers have realized the need to reprioritize the continent's development agendas in a manner that promotes provision of adequate food and nutrition. This becomes an important issue because based on the 2011 Global Hunger Index, hunger situations in many African countries were absolutely alarming (IFPRI, 2012).

Although, food situation in Malawi had shown some improvements in the past few years, land availability constraints, low farm income and adverse climatic conditions still constitute serious constraints. Available data show that proportion of undernourished people declined from 43% (4.2 millions) in 1990/1992 to 27% (3.9 millions) in 2006/2008 (FAO, 2010). Morbidity rates among different age-groups in the population have been seriously influenced by malnutrition. Specifically, available data indicated that in 2005, malnutrition accounted for 52% of under-five mortality while anemia resulted in 57% of recorded maternal mortality (GOM, 2009). Given current nutrition disorders, it had been estimated that in every passing minute, a Malawian is likely to die of malnutrition-related health problems (Giyose, 2005).

Another dimension of the Malawian food problem is the dominance of starchy food (predominantly maize). To the Malawian government and the people at large, food security implies availability of maize. This has often led to a popular slogan; maize is life (Smale, 1995). National requirements of maize have increased over the years as the population continues to grow. In 2005/2006, precisely 2.1 million metric tons of maize was required to meet the food needs of the people and feed compound formulation for animals (Government of Malawi, 2005). FAO (2010) indicated that out of the Average Dietary Energy Requirement (ADER) in 1990/1992, maize accounted for 64%. However, due to government's efforts to introduce Malawian households to other sources of food, maize only accounted for 52.8% in 2006/2008.

An important source of concern about poor households' diets in Malawi is low intake of protein. Also, intake of protein from animal sources is abysmally low. At national level, FAO (2010) indicated that out of 50.8 g/person/day of protein intake in 1990/92, animal protein accounted for just 9.45%. In 2006/2008, however it was reported that with average protein intake of 55.5 g/person/day, animal protein accounted for 7.96%. The consequences of acute nutrient deficiencies in households' diets evident among under-five children where 48% are stunting, 5% are wasting and 22% are underweight. Poor nutrition has also resulted in prevalence of non-communicable diseases with some fatal consequences (GOM, 2009).

This study seeks to analyze the pattern of households' demand for livestock products in rural Malawi. Conventionally, consumption of livestock products provides a suitable way of minimizing the risks of several nutrition-related diseases, due to the qualitative nature of its protein and other micro-nutrients. Available data suggest that with an average of 4-5 L per capita, Malawi has the lowest milk consumption in Africa. This is abysmally lower than Africa's average of 80 L per capita and 200 L per capita that was recommended by the World Health Organization (WHO) (Banda, 2008).

MATERIALS AND METHODS

Data and sampling methods: This study used primary data that were collected from some rural households by direct interview of household heads using structured questionnaires. Multi-stage sampling procedure was used for selecting the respondents. At the first stage, two provinces from Lilongwe were randomly selected. Those that were selected are the Central province (Lilongwe) and Northern province (Dowa). Two Enumeration Province Areas (EPAs) were selected from each of the provinces at the second stage. The EPAs that were selected include Chitekwer and Nyanja from Lilongwe and Madisi and Nachisaka from Dowa. Some villages were selected randomly from each of the EPAs. The number of villages that were selected followed proportionality with the size of the EPAs. From the selected EPAs, six villages were chosen from Chitekwer, four from Nyanja, four from Madisi and seven from Nachisaka. In the last stage, households were randomly interviewed from the selected villages with a total selection of 152 households from Lilongwe and 148 from Dowa.

Estimated model: Researchers used Tobit regression analysis to model the factors that are explaining consumption of livestock products in rural Malawi. Going

by the nature of the data, it was surprising that many households were not incurring any cost on livestock product, either taken from their home production or purchased from markets. This implies that some households had zero expenditure, nullifying any tendency of using conventional ordinary least square regression. Tobit regression analysis is the most appropriate analysis for this type of data by censoring the data at the zero values. The model can be stated as:

$$C_i = \varpi + \alpha_i \sum_{i=1}^{n} X_i + \nu_i \qquad (1)$$

C_i is the amount of money incurred on livestock products per person per week. The independent variables (X_is) are experience of climate-related shock in the past 5 years (yes = 1, 0 otherwise), province (Lilongwe = 1, 0 otherwise), gender (male = 1, 0 otherwise), age, years of education, household size, number of adult male with primary education, number of adult male with secondary education, number of adult female with primary education, number of adult female with secondary education, number of adult female with tertiary education, asset (MKW), farmers' revenue (MKW), nonfarm income (MKW), amount of credit (MKW) and access to health information (yes = 1, 0 otherwise). Also, ϖ and α_i are the parameters to be estimated and ν_i is the error term.

RESULTS AND DISCUSSION

Table 1 shows the distribution of weekly expenditures on livestock products across the different types of livestock products. It shows that average weekly expenditure on fish purchased is highest (MKW 223.26). This is expected because several researchers have indicated that fish is the leading consumers' livestock product in Malawi (Nagoli *et al.*, 2009; Scholz and Chimatiro, 2004). A sizable proportion of the population depends on fish as a primary source of protein. However, recent decline in fish catches has led to reduction in fish intakes from about 14 kg per person per year in the 1970s to about 4 kg person per year (FAO, 2009).

Table 1: Distribution of households' livestock products weekly expenditures

Livestock products	Purchased products		Produced products	
	Total amount	Average amount	Total amount	Average amount
Beef	11253.33	37.51	0	0.00
Sheep	666.67	2.22	0	0.00
Goat	22469.33	74.90	2100	7.00
Chicken	5455.00	18.18	2000	6.67
Fish	66978.81	223.26	0	0.00
Milk	11868.45	39.56	125	0.42
Eggs	1357.91	4.53	315	1.05
Pork	12325.00	41.08	0	0.00

Also, the table reveals that average households' expenditure on purchased goat meat is MKW 74.90 while pork and beef MKW 41.08 and MKW 37.51, respectively. It should be noted that the values of livestock products that rural households keep for home consumption is very low with beef, sheep, fish and pork recording zero value. Kapondamgaga (2012) submitted that though many Malawian households keep livestock, they are rarely integrated into households' nutrition. This is due to the fact that many of the times, livestock are kept to fulfill some other social and traditional purposes.

Table 2 shows the distribution of livestock products per capita weekly expenditures. It reveals that majority belong to the lowest group (<MKW 20). However, majority in that lowest group recorded zero expenditure. Specifically, 99.67 of the respondents did not buy sheep, 95 did not buy chicken, 93 did not but beef, 93 did not buy milk, 79 did not buy egg and 76.67% did not buy goat. Moreover, the data further reveal that 21% of the households never incurred any amount on the livestock products.

Table 3 shows the distribution of the livestock expenditure across its share in total food expenditures of the households. It reveals that the households that were not consuming any livestock products also have the lowest average expenditure on food (MKW 288.79). These households are definitely the poorest among the poor. The Table 3 shows that the average per capita livestock products' expenditure is MKW 73.53 for all the

households. However, average per capita expenditure on livestock products increased from MKW 33.82-173.81 as share of livestock products in the total households' food expenditures increased from <20 to 60<80%, respectively. After this group, average per capita livestock product expenditure declined to MKW 133.29 for the group with livestock product share of 80<100%. This is a reflection of the fact that these household were spending low amount on other food products.

Table 4 shows the results of Tobit regression. The model produced a good fit for the data as revealed by statistical significance of the sigma value ($p<0.01$) and that of the Likelihood Ratio Chi-square ($p<0.05$). The results show that the number of adult males with primary and secondary education have positive significant impacts on per capita livestock products expenditure ($p<0.05$). Specifically, if the number of adult males with primary education increases by 1 person, per capita expenditure on livestock products will increase by MKW 35.33. Also, if the number of adult males with secondary education increases by 1 person, per capita expenditure on livestock products will increase by MKW 60.86. These results are expected because education is expected to enhance the ability of male household members to obtain non-farm jobs. Also, with formal education, adult males will be able to properly utilize emerging opportunities for farm production increase. It should also be noted that returns from secondary education is higher than that of primary.

Table 2: Frequency distribution of livestock products per capita weekly expenditures

Livestock products	<20 (MKW)	20<40 (MKW)	40<60 (MKW)	60<80 (MKW)	80<100 (MKW)	100<120 (MKW)	120<140 (MKW)	≥140 (MKW)
Beef	279	3	3	6	2	5	0	2
Sheep	299	0	0	0	1	0	0	0
Goat	232 (2)*	14	13	17	7	7	3	7
Chicken	286 (1)*	4	2	1	4	1	1	1
Fish	137 (33)*	61	23	14	12	7	11	35
Milk	282 (3)*	7	3	0	0	0	1	7
Eggs	299 (62)*	0	1	0	0	0	0	0
Pork	260	5	10	10	6	6	1	2

()*indicate the frequency of non-zero values

Table 3: Descriptive statistics of livestock products expenditure across its share in food budgets

Prop groups (%)	Frequency	Food consumed (Brought and produced)		Total animal products consumed		Per capita animal products expenditure	
		Mean	SD	Mean	SD	Mean	SD
None	63	288.79	292.40	0.00	0.00	0.00	0.00
<20	46	2213.72	3690.27	157.50	150.53	33.82	35.95
20<40	80	964.54	756.17	288.13	237.70	64.62	50.61
40<60	81	1199.33	972.92	609.07	513.54	126.13	114.20
60<80	24	1068.75	1108.34	745.83	771.26	173.81	160.60
80<100	6	595.00	376.12	500.00	308.22	133.29	121.63
Total	300	1083.81	1710.28	337.35	447.61	73.53	98.25

Table 4: Determinants of households' per capita livestock product expenditure

Variables	Coefficients	SE	t-value
Shock experience	11.4537500	13.7190800	0.83
Province	7.2046400	14.4072800	0.50
Gender	19.5209400	16.7198400	1.17
Age	0.3678338	0.5086154	0.72
Years of education	-1.7387470	2.2706560	-0.77
Household size	-2.5674200	3.5199070	-0.73
Adult male with primary education	35.3285700	13.5162700	2.61
Adult male with secondary education	60.8651800	27.1911200	2.24
Adult female with primary education	-10.7042100	16.0928100	-0.67
Adult female with secondary education	32.6362100	51.6493100	0.63
Adult male with tertiary education	-82.4431900	57.5578100	-1.43
Asset	-0.0001745	0.0000939	-1.86
Farm revenue	0.0001929	0.0000724	2.67
Non-farm income	0.0000706	0.0000927	0.76
Credit	-0.0006146	0.0004781	-1.29
Family health information	-29.6777400	14.4548300	-2.05
Constant	41.4913900	36.3729900	1.14
Sigma	110.7001000	5.2610190	-

LR χ^2(16 = 27.92)*

The results also show that if farm revenues increases by one unit, per capita expenditure on livestock products will increase significantly by MKW 0.0002 (p<0.01). The returns per one MKW is small because there are other competing needs that farmers will have to attend to as their farm income increases. However, as the total values of household asset increases, per capita expenditure on livestock products decreases significantly (p<0.10). This is a reflection of the fact that there is a maximum intake of livestock products that is required for good health. Expenditure on livestock products cannot increase indefinitely. Also, households that sought family health information from extension agents have significantly lower per capita livestock products' expenditure (p<0.05).

CONCLUSION

Intakes of livestock products guarantee adequate supply of animal protein for rejuvenation of body tissues and proper development of organs. When this is lacking, growth deficiency is the outcome with some avoidable nutrition-related health problems. This study analyzed consumption of livestock products among rural households in rural Malawi. It was found that intake of animal protein was abysmally low in some households with some not even demanding these products at all. Formal education of male household members was found to be important factor in promoting expenditure on livestock products due to its tendency for enhancing productivity. It is therefore important that efforts to promote education in rural Malawi should be intensified in order to build the intellectual capability of household member for enhanced productivity. Also, researchers

found that increase in farm revenue will lead to better consumption of livestock products. Efforts by the government to enhance productivity of farmers by making available farm inputs and ensuring better access to markets will enhance nutritional status of rural households through increased consumption of livestock products.

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