



Consumption levels of Animal Source Foods in children less than five years of age in Hoima district, Uganda

C. Kajura^{1,2}, A. *Mugisha¹, S. Okello¹,

¹Faculty of Veterinary Medicine, Makerere University, Kampala – Uganda

² Hoima District Veterinary Office

* Correspondence: amugisha@vetemed.mak.ac.ug

Abstract

Child malnutrition is one of the most important human health problems in Uganda being ranked among the ten top killer diseases. Nutritional deficiencies are often juxtaposed to health problems and often malnutrition is a predisposing factor in many childhood illnesses. The contribution of Animal Source Foods (ASF) in alleviating and controlling malnutrition problems in children is enormous. This study aimed at assessing the consumption levels and utilization of ASF in children among four household categories in Hoima, Uganda. The methodological approach was a cross-sectional study using survey questionnaires, unstructured interviews and focus group discussions. The data from the questionnaire survey was analyzed by ANOVA - SPSS packages. The per capita intake of the ASF in children was 3.8 kg (meat), 5.0 kg (eggs) and 1.9 kg (fish). This was exceptionally low compared to the consumption levels of the same ASF in adults which was 14.7 kg. The per capita intake of milk in children under the age of five was 88.6 liters. This was higher than the district average of 75.3 litres. This indicated that more milk was being given to children than adults. The per capita consumption of meat, eggs and milk was higher in predominantly livestock keeping households (7.0 kg, 7.0 kg and 113.7 liters), followed by Others (5.7 kg, 6.0 kg and 97.8 liters), mixed livestock/crop based households (2.5kg, 4.4kg, 91.6 liters) and least was the crop based households (1.8 kg, 4.0kg and 50.9 liters) respectively. The differences in milk intake between the categories were statistically significant ($p=0.000$).

Key words: Malnutrition, Animal Source Foods (ASF), household categories, per capita consumption levels and children under five years.

Introduction

The population of Uganda is increasingly becoming young including that of Hoima district with a high proportion of children (PHC, 2002). Yet, the latter is the most demanding group of people as far as ASF are concerned (UBOS, 2002). Malnutrition in children is one of the most important human health problems in Uganda being ranked among the ten top killer diseases. Nutritional deficiencies are often juxtaposed to health problems and quite more often malnutrition is a predisposing factor in many childhood illnesses (Nnyepi, 2006). Growing children and lactating women are especially vulnerable to the devastating effects of malnutrition (Hickman *et al.*, 1993). Nutrient deficiencies are prevalent globally in low income countries with children and women of reproductive age being most vulnerable (Neumann *et al.*, 2002). The child malnutrition level in Hoima is reported to be 38.5% with stunted growth at 26.8%, body wasting at 8.5% and underweight at 19.8% (Hoima DDSP, 1998; Hoima DDSP, 2000). Child malnutrition in Hoima is widespread with over half the children less than five years under height and a quarter of them underweight for age (Tumushabe and Mukyala-Makiika, 2000). According to FAO, the incident of stunting increases among orphans as food

consumption of all surviving households members often declines, resulting in malnutrition (FAO, 2001).

ASF provide the best quality proteins which contain more of the essential amino acids such as arginine that the human body cannot manufacture compared to vegetable proteins (Owen *et al.*, 2005). ASF especially meat, milk and eggs are a compact and an efficient source of micronutrients (Calloway, 1995). ASF are not readily available to many households especially children and mothers in the developing world making them prone to nutritional deficiency diseases. ASF are infrequently eaten particularly by women and young children because the few animals owned are only rarely eaten (Calloway *et al.*, 1993 and Neumann *et al.*, 1992). Inadequate intake of ASF has contributed to protein and micronutrient deficiency conditions like kwashiorkor, poor eye sight and skin diseases (Neumann, 1999). Other secondary diseases and associated conditions like anemia and helminthosis have escalated. Poor immunity of children is also associated with inadequate protein supplies in the diets. This study aimed at assessing the utilization of ASF by children under the age of five in Hoima. The objective of the study was to establish the levels of consumption and utilization of ASF in children under the age of five in Hoima district.

Methodology

Three sub-counties were selected for the study using purposive sampling. The household was the unit of focus being represented by selected individuals from the communities. A survey study using questionnaires combined with focus group discussions (FGDs) were conducted. The study was cross sectional in nature. The combined approach was more appropriate in this study since there was a need to study peoples' perceptions and behaviors and the extent to which these socio-economic and cultural factors impacted on the utilization of ASF in the study area. The three sub-counties were selected on the basis of factors like urban influences with households of better socio-economic base and rural based sub-counties with varying socio-economic backgrounds. Four categories of households were

Results

The major enterprises from which communities derived ASF in Hoima were local poultry (85.5%), local goats (57.6%), piggery (48.6%) and local cattle (30%) as shown in Fig. 1. The six most common ASF in Hoima were milk, beef, eggs, goat meat and chicken in that order with average perceptual response on consumption in the communities at 19.6%, 14.1%, 12.0%, 11.1% and 10.8% respectively as shown in Fig. 2. Milk ranked the best in both frequency and amounts consumed. The highest consumption level of milk was observed with the herdsmen or pastoralists communities with 25% compared to the non pastoralist communities which had an average perceptual on consumption response of 17.5%. Among the meats, pork ranked highest in the rural areas with a perceptual response of 18% closely following milk at 20% response on consumption. This was quite a close range for the two types of ASF. Pork and fish were not commonly eaten by the herdsmen communities. In urban areas, beef ranked highest (14%) among the meats, followed by fish (11.3%) and chicken (10%). In the herdsmen communities, goat meat was most popular (22.5%) followed by beef (14.2%) and chicken (10.8%). This meant that the herdsmen depended more on milk for their protein sources than meat. Households which indicated ASF from the four sources as meat, milk, eggs and fish were 45.8% while those which indicated sources from at least any three of meat, milk, eggs and fish were 23.4% and 10.4% were getting ASF from at least any two of meat, milk, eggs and fish. One percent of the households indicated source as only meat or milk while 0.3% indicated only fish. Households which reported all the five sources (meat, milk, eggs, fish and honey) were 18.1%. Most of the households preferred to supplement or diversify sources of ASF.

therefore considered; the livestock dominated households including the pastoralists, mixed crop/livestock oriented households with balanced farming activities, predominantly crop based households with little or no livestock activities, and Others, consisting of business or salary earning households. The sampling of the parishes, villages and households was done using Simple Random Sampling (SRS). The quantitative data from the questionnaires was analyzed by coding and entering data into computer and analyzed by SPSS version 13.0. ANOVA was used to make comparisons on the different statistical findings. The qualitative data analysis was done manually by coding, extracting and relating information gathered on the major themes of the study during the FGDs and key informant interviews.

The overall per capita consumption of meat for children up to five years of age (4.6 kg) was relatively very low compared to the district (14.7 kg) and national (5.6 kg) averages as shown in Fig. 3. This meant that the per capita consumption of adult people was higher than the mean of 14.7 kg. This showed a high level of denial of children in taking ASF. The per capita meat, egg, fish and milk consumption was 3.8 kg, 5.0 kg, 2.0 kg and 86.3 liters respectively.

The per capita consumption of meat, eggs and milk was higher in the livestock based households (7.0 kg, 7.0 kg and 113.7 liters), followed by the Others (5.7 kg, 6.0 kg and 97.8 liters), then the mixed livestock/crop based households (2.5kg, 4.4kg, 91.6 liters) and least was the crop based households (1.8 kg, 4.0kg and 50.9 liters). The average intake for milk in children (86.3 litres) was higher than the total district average (75.3 litres) as depicted in Fig.4. This meant that children consumed more milk than the adults. The milk per capita consumption level for the livestock based households (144.3 liters) was the only one above the overall per capita consumption (75.3 liters). The rest of the categories were below this average indicative of very low intake of milk by these households. The ANOVA confirmed the high level of statistical significance of the differences in milk intake between the four household categories ($p=0.000$). The intake of fish in children was generally very low in all the household categories as shown in Fig. 5 with a comparison of the overall average being very sharp meaning that a lot of fish was being taken by adults than the young ones.

The per capita consumption of eggs for the crop based households (7.85 kg) was below the group average of 12.13 kg as shown in Fig. 6. This meant that it was relatively difficult for that category of households to avail eggs in their diets. Unlike the per capita consumption for the mixed livestock/crop based households (15.02 kg), livestock based households (13.02 kg) and Others (12.83 kg), the crop based households had limited own source of eggs at the farm. Most of the eggs for consumption in the households were got from the farm other than purchase from the market. As per the FGDs and in Fig. 2, egg consumption was high with 11.96% response in the third position after beef (14.1%) and milk (19.62%). The per capita intake of eggs in children was higher (5.0 kg.) compared to meat (3.8 kg) and fish (2.0kg). The economic status of the households tended to dictate the type and amount of ASF taken.

Meat, especially beef, which is obtained from the market as indicated by majority of the households in the study is not readily available, accessible or affordable. Eggs were mainly supplied from the households (farm) and this explained the high intake especially in children. It was also noted that household heads (especially men) were

not buying eggs in households. Instead they encouraged the women and children to rear poultry as an easy source of eggs. The feeding of fish to children was minimal compared to the other ASF. The intake of meat by children was very low as adults took a bigger proportion of the ASF as shown in Fig. 3. The average amounts of meat prepared per meal in the households was 1.6 kg. with a mean frequency of intake of once a week. The livestock based households were in a better position to supply ASF to children because it was easy to get them from the farm. However, the Others (business/salaried) households supplied more ASF than the mixed crop/livestock based households and the crop growing households. Such category consisted of people who were partly literate and fairly aware of the need to provide ASF to children. This coupled with the high economic status and better purchasing power to enable them avail reasonable quantities of these foods. It was established that the differences in meat ($p < 0.05$) and milk ($p < 0.05$) intake for children under five years were statistically significant. There were no significant differences observed in consumption levels for the eggs and fish.

Fig. 1: Priority enterprises in the farming communities of Hoima

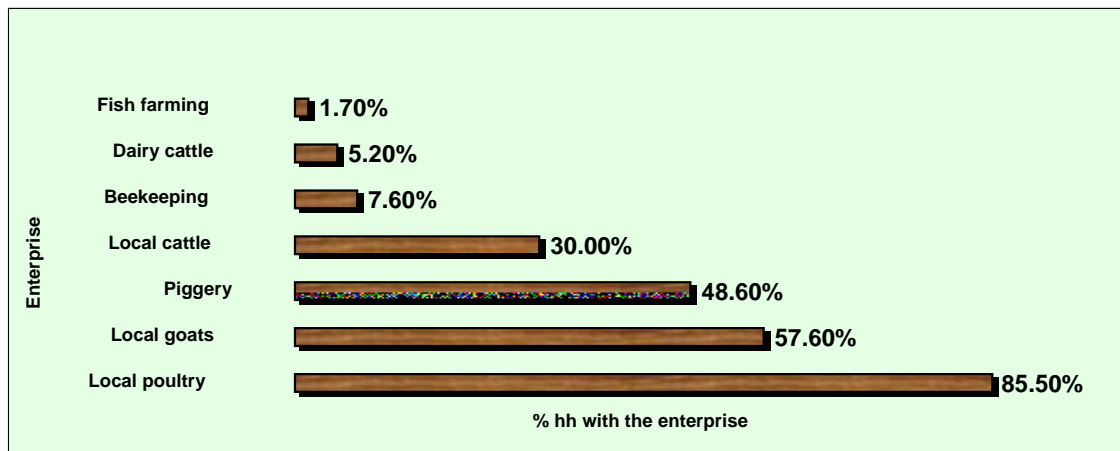


Fig. 2: ASF consumed by the people of Hoima

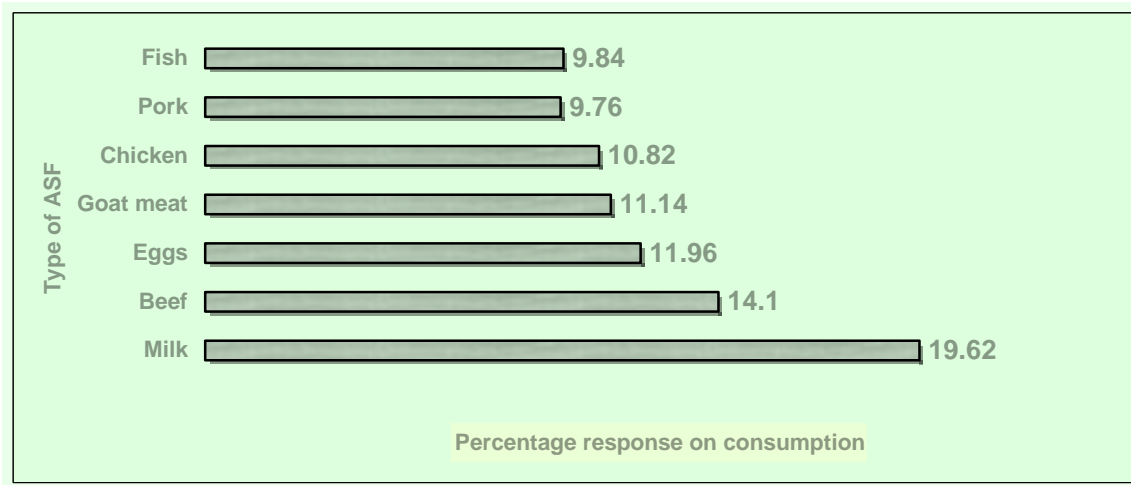


Fig. 3: Per capita consumption of meat by household categories in Hoima

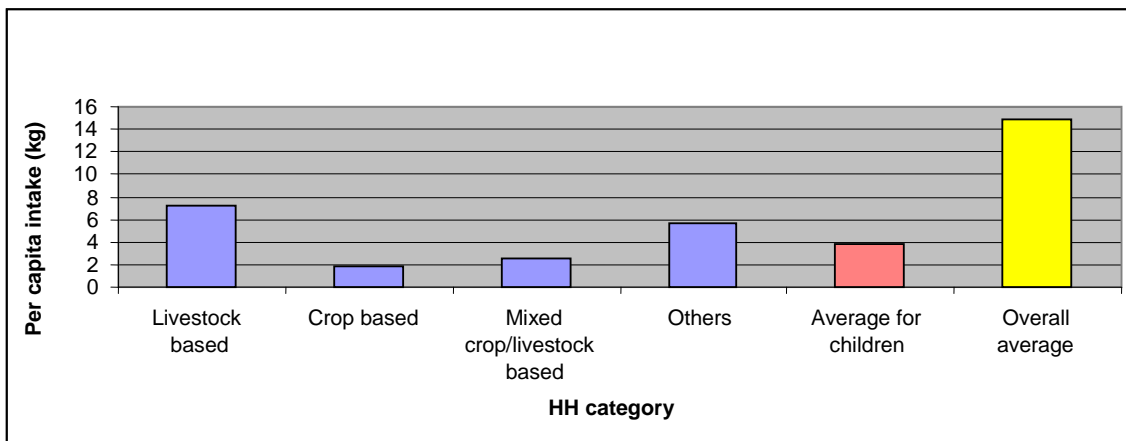


Fig. 4: Per capita consumption of milk by household categories in Hoima

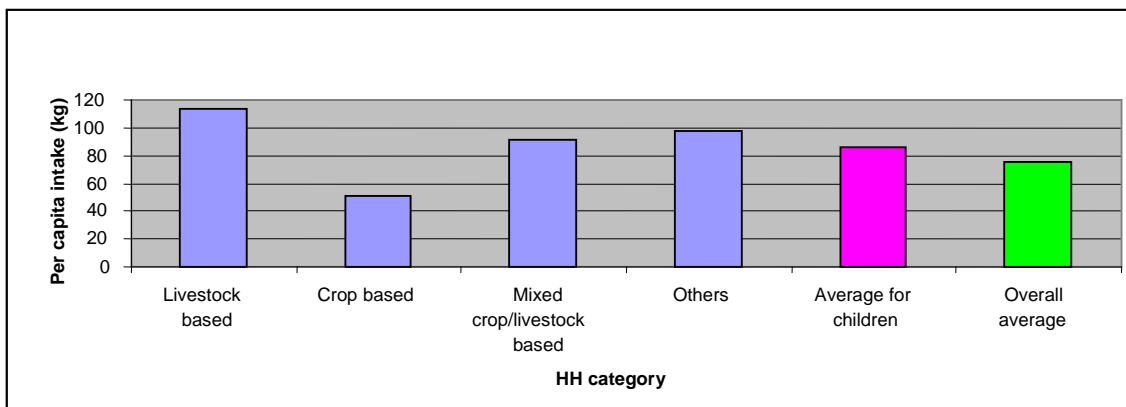


Fig. 5: Per capita consumption of fish by household categories in Hoima

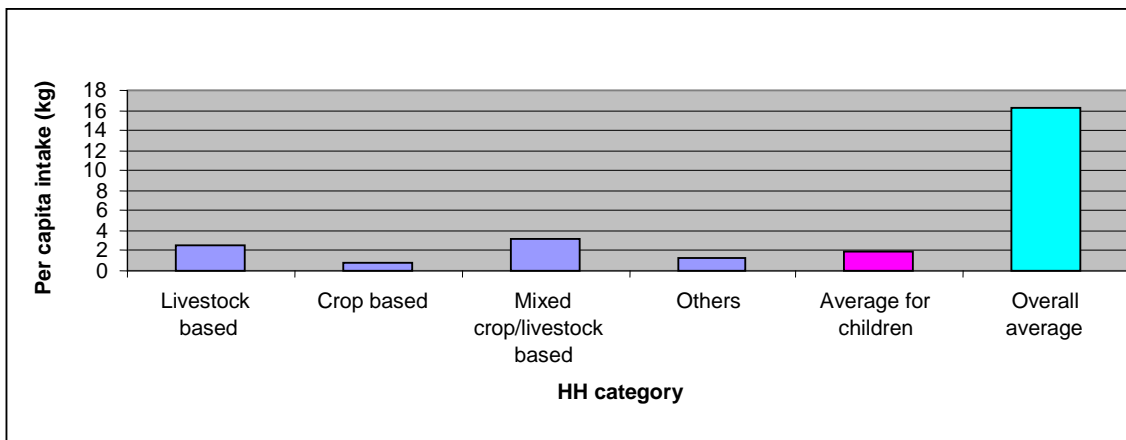
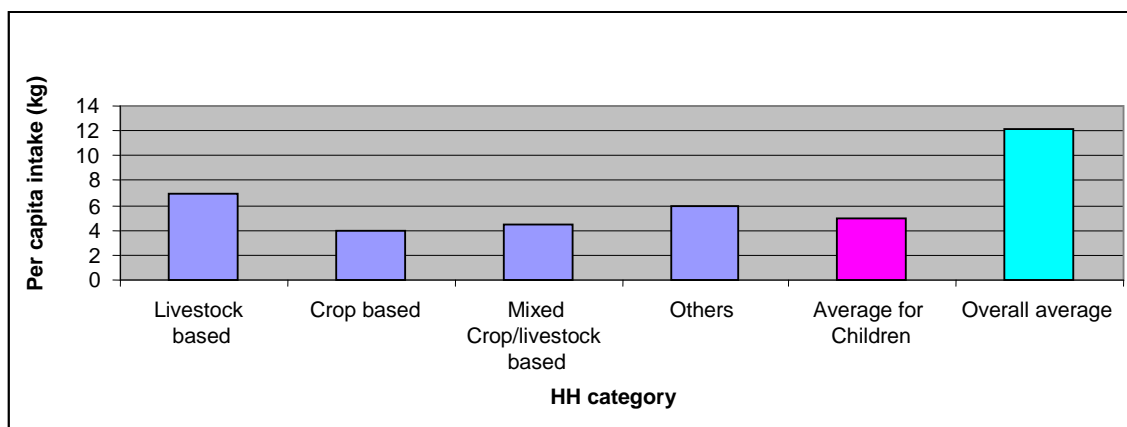


Fig. 6: Per capita consumption of eggs by household categories in Hoima



Discussion

Children were favored more in the intake of milk than in the other ASF like meat. Hence, the per capita consumption of milk in children (88.6 litres) was fairly high; slightly above the district average (75.3 litres) and well above the national level of 40 litres. Many households have also tended to use milk as the main ASF for children because of its availability, affordability and ease of preparation for a meal without additional ingredients. In the pastoralists communities, milk was being used to treat all kinds of nutritional deficiency conditions especially in children. One member of the pastoralist group said: “one time our neighbor had a sick child but we donated milk to the family and this was enough treatment to make the child well after about one month”. This was purely indicative of a protein deficiency syndrome that could respond to improved feeding regimen in children.

Therefore, the predominantly livestock based households who were very much associated with large animals (cattle) enjoyed the advantage of providing milk from the farm. Children were favored to consume more milk than adults because there was a general feeling that this helped them to grow well and stayed healthier. Nevertheless, the crop based households were disadvantaged in the provision of milk as they depended mainly on buying the ASF from the market, thus requiring having money available at anytime ASF had to be availed to the households. This was a major challenge and as a result, the households could never have adequate quantities of the ASF. In the FGDs, many women admitted that it would be very difficult to serve children (more) meat at a meal before the man (husband). “The meat is bought by the husband, he must therefore, eat enough”, a certain woman re-affirmed her

position when asked about the reasons for giving more meat to the men.

Eating enough implied that the husband takes a bigger proportion than any other members in the households. This shows the implications of gender issues in the intake of ASF. Women empowerment in households is still low such that they depend on their spouses for most or all the domestic needs including the ASF. The low intake of ASF in the diets of children obviously indicated their dependence on plant derived protein sources. Unfortunately, plant proteins are not readily bioavailable once taken. This would require eating considerable amounts of plant protein to derive reasonable quantities of the proteins. Besides, some of the nutrients (particularly certain amino acids) may not be found in the plant proteins.

One of the other factors which affected intake of ASF included livestock diseases. However, some people have reduced the intake of ASF because of suspected diseases associated with excessive intake of ASF. In so doing, children are indirectly denied opportunities to take adequate ASF. For instance some households in the rural areas may have associated high blood pressure, obesity and arteriosclerosis to the intake of ASF thus limiting intake even when it may not be necessary. Cases of human brucellosis which have been on the rise in Hoima are closely associated with ASF intake especially milk and meat. Bird flu was mentioned as discouraging the intake of chicken meat and eggs when the threat of the disease reached some African countries in 2006 and 2007. The fear was due to its pandemic nature and lack of specific treatment against it. Bovine Spongiform Encephalopathy (BSE) was also considered with similar fears causing reduction in the intake of beef. Other zoonotic diseases that threaten intake of ASF are helminths, salmonellosis and chemical poisoning. Drug residues were also a cause for some households to

reduce ASF especially the elite class. As consumers become more aware of the risks associated with ASF in the context of residues, there may be a reduction in the intake of selected ASF unless issues of quality and hygiene are addressed. Allergies were also reported as causing reduced intake of ASF. In households where the household head (especially if a man) is allergic to selected ASF, there is always minimal intake of such products.

Improved physical growth, mental development and overall health are critical and cost effective investment in the future economic development of a country and improvement in the quality of life. Neumann (2002) described wide spread micronutrient deficiencies in East African children and the consequent impairment of their physical and cognitive development. There is need for better nutrition measures for children in rural areas. Improving human nutrition and micronutrition are critical elements of achieving food security and are compelling priority concerns of development efforts in sub-Saharan Africa (SSA). The essential role of livestock, and more particularly the potential for market-oriented dairy production (milk) to combat malnutrition and micronutrient problems, may have been overlooked or understated. Food-based approaches (dietary change) to combat nutrient- and micronutrient- deficiencies are likely to be more sustainable than chemical supplementation, such as vitamin A tablets (Neumann *et al.*, 1993) which are being heavily supported by many African governments in an effort to address the challenge. Hence communities should be helped, encouraged and supported to develop small scale livestock enterprises for purposes of both food and income security. This should be translated into positive nutrition and health impacts that can occur when the incomes of household members are raised through market integration which makes food more accessible through markets.

Recommendations

There is a clear need to promote the development of livestock production at household level and the consumption of ASF in Hoima district. This requires improved livestock production techniques and practices to increase the number of stock. The smallholder farmers should be supported to increase production and productivity putting in mind the issues of market integration for profitability. This will improve physical and mental health and fitness especially of the children less than five years. Secondly, local governments should carry out consumption surveys that provide more reliable information and data on actual food consumption patterns and deficiency levels than national statistics.

Intervention studies utilizing pharmaceutical supplements such as vitamin A, iron and zinc, either singly or in combination can be carried out to establish the varying results they can have compared to the ASF. In addition, the district should develop a District Nutritional Strategy (DNS) that incorporates utilization of livestock products.

The nutritional strategy should be viewed as a framework to address gaps in ASF nutritional deficiencies in households and communities. Thirdly, Hoima district should develop capacity in the communities to handle issues of home economics and hygiene for utilization of animal source foods. This can be done synergistically

with existing NGOs involved in food production, human nutrition and disease control. Lastly, considering the impact of agricultural policies on the structure of the agricultural sector and food availability especially the

Acknowledgements

We are highly indebted to Hoima District authorities for providing a conducive environment for the study. We are

ASF, local governments should remarkably contribute to changes in policies which address current needs of an ever increasing demand of ASF in the communities.

also very grateful to all those households in Hoima that readily provided information with out reservation.

References

1. Calloway D.H., Murphy S.P., Beaton G.H. and Lein D., 1993. Estimated vitamin intakes for toddlers: Predicted prevalence of inadequacy in village populations in Egypt, Kenya, and Mexico. *American Journal of Clinical nutrition* 58: 376 – 384.
2. Calloway, D.H., 1995. Human Nutrition: Food and Micronutrient relationships. Working Papers on Agricultural Strategies for Micronutrients, No.1. International Food Policy Research Institute, Washington, D.C., USA.
3. FAO, 2001. Food and Agricultural Organization (FAO) report for 2001. Website: www.fao.org.2001 (Accessed December 2006).
4. Hickman C.P., Roberts L. S. and Larson A., 1993: Integrated Principles of Zoology.
5. Hoima DDSP, 2000. Baseline Survey study for the districts of Hoima and Kibaale funded by the IFAD/BSF.
6. Hoima DDSP, 2003. Mid-Term Review Report, Africa Division II, East and Southern Africa Region, Program Management Department. IFAD, Rome.
7. Hoima District Health Department, 2005. The annual report for Hoima district for the financial year 2004/2005, Hoima – Uganda.
8. Neumann C. G., Bwibo N. O. and Sigman M., 1992. Diet quality and quantity: Functional effects on rural Kenyan families. *Unpublished Final Report, Phase II, Human Collaborative Research Support Program, UAAID, Office of Nutrition, 1989 – 1992.*
9. Neumann C. G., Bwibo N. O., Murphy S P., Sigman M., Whaley S., Lindsay A. H., Guthrie D., Weiss Robert E. and Demment W. M., 2002. Animal Source Foods to improve micronutrient nutrition in developing countries. *Supplement to The Journal of Nutrition.*
10. Neumann C., 1999. The contribution of animal source foods (ASF) in improving diet quality for children in the developing world. A presentation prepared for the World Bank, Washington D.C.
11. Nnyepi M. S., 2006. Dietary and nutrition screening for children seeking curative care in health facilities in Botswana: *African Journal of Food, Agriculture, Nutrition and Development, Vol. 6, No. 2, 2006.*
12. Owen E., Kitalyi A., Jayasuriya N. and Smith T., 2005. Livestock and wealth creation. Improving the husbandry of animals kept by the resource poor people in developing countries.
13. Population and Housing Census (PHC), 2002. Hoima District 2002 Population and Housing Census analytical report. Uganda population and housing census.
14. Tumushabe J. and Mukyala-Makiika R., 2000. Ministry of Local Government and IFAD, District Development Support Programme baseline study follow-up report for Hoima, Kabarole and Kibaale districts.
15. Uganda Bureau of Statistics, 2002. Statistical Abstract for 2002