

# The role of agricultural practices in improving nutrition among school going children in Adekokwok sub county, Lira district, mid-north of Uganda

<sup>1</sup>Dickens Otim, <sup>2</sup>David Mwesigwa

<sup>1</sup>BA student – Discipline of Public Administration and Management, Lira University

<sup>2</sup>Senior lecturer - Discipline of Public Administration and Management, Lira University

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**Abstract:** This study explored the role of selected practices in improving nutrition among school going children in Adekokwok sub-county. It adopted a case study design and applied both quantitative and qualitative approaches in handling the study objectives which was premised to identify the agricultural practices being carried out; determine the level of nutrition among school going children; and examine the contribution of selected agricultural practices in improving nutrition among school going children in the study area. Simple random; and purposive sampling techniques were preferred to identify a sample size of 72 respondents who were later analyzed and found to be a female dominated (72.5%), youthful (25-34 year) and married participants that comprised of households with less than three members, and comprised of mainly farmers who have reached at least a primary level of education. The study concludes that cereal crops were the most produced crops, with the main tool used for cultivation by households being hand hoes; and they did not use any irrigation methods in case of drought. Despite planting traditional seeds, farmers used manufactured fertilizers and store their food in bags. The study recommends that extensive and vigorous awareness on agricultural practices should be made in order to ensure basic orientation of the local community, and Lira district Local Government form the “Nutrition Ordinance for Children” that will guide agricultural practices in the district if nutrition among school going children can be enhanced.

**Keywords:** Nutrition, Adekokwok, school going children, agricultural practices.

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## 1. BACKGROUND OF THE STUDY

The history of agriculture can be traced to thousands of years ago after the gathering of wild food, which began at least 105,000 years ago (Hardigan, M. A. 2018). Emerging farmers began to grow crops around 11,500 years ago, something that marked their domestication (Molina et al 2011). The domestication of plants has, over the centuries increased yield, improved disease resistance and drought tolerance, eased harvest and improved the taste and nutritional value of crop plants (Glick, 2005). Irrigation, crop rotation and fertilizers were greatly advanced from the 17th century with the as a result of the advent of the British Agricultural Revolution (Griscom 2017).

In agriculture, there are certain parameters to be considered such as the type of crop, properties of soil, and climate. Depending upon these parameters, farmers decide which crop is to be cultivated at what time of the year and place (Runge, 2006). Moreover, to yield a high-quality product, suitable soil, climate and season are not sufficient. It requires a set of procedures which needed to be followed. The measures which are followed to raise crops are called agricultural practices. Some of the examples of agricultural practices are: soil preparation, sowing, use of manure, irrigation, weeding, harvesting, and storage (Kathrine & Jens, 2013). For successful agriculture, proper methods and practices are to be followed. Most agricultural practices utilize organic or inorganic inputs that can improve crop yield. These inputs include

fertilizers, bio-solids, antibiotics, pesticides, and others (Brady & Weil, 2002). Cropping systems vary among farms depending on the available resources and constraints; geography and climate of the farm; government policy; economic, social and political pressures; and the philosophy and culture of the farmer (Allen, 2014).

Nutrient management includes both the source of nutrient inputs for crop and livestock production, and the method of utilization of manure produced by livestock. Nutrient inputs can be chemical inorganic fertilizers, manure, green manure, composts and minerals (Reid, 2011). Crop nutrient use may also be managed using cultural techniques such as crop rotation or a fallow period. Manure is used either by holding livestock where the feed crop is growing, such as managing intensive rotational grazing, or by spreading either dry or liquid formulations of manure on cropland or pastures. It is important to note that vegetable cultivation has immense potential to supply vitamin rich foods and micronutrients to weaker sections, especially children (MAAIF, 2015). In an average household in Lango sub - region, vegetable consumption is higher in the households producing vegetables but there is inadequate knowledge on nutrition.

Nutrition is the science that interprets the interaction of nutrients and other substances in food in relation to maintenance, growth, reproduction, health and disease of an organism (Akiiki, 2006). It includes food intake, absorption, assimilation, biosynthesis, catabolism, and excretion. For human beings, a healthy diet includes preparation of food and storage methods that preserve nutrients from oxidation, heat or leaching, and that reduces the risk of food-borne illnesses. Nutrients include carbohydrates, which constitute a large part of foods such as rice, noodles, bread, sorghum, millet, and other grain-based product (Kiplang'at, 1999). It can also be found in potatoes, cassava, yams, beans, fruits, fruit juices and vegetables; Dietary fiber consists mainly of cellulose, a large carbohydrate polymer which is indigestible as humans do not have the required enzymes to disassemble it. Dietary fiber helps reduce the chance of gastrointestinal problems such as constipation and diarrhea by increasing the weight and size of stool and softening it; Protein, a diet that contains adequate amounts of amino acids (especially those that are essential) is particularly important in some situations: during early development and maturation, pregnancy, lactation, or injury (a burn, for instance); Some minerals are absorbed much more readily in the ionic forms found in such sources.

On the other hand, Vitamin deficiencies may result in disease conditions, including goiter, scurvy, osteoporosis, impaired immune system, disorders of cell metabolism, certain forms of cancer, symptoms of premature aging, and poor psychological health, among many others. Excess levels of some vitamins are also dangerous to health (Mendola, 2017). It is worth noting that the knowledge about nutrition is still inadequate among many communities, especially in rural areas where traditions and strict adherence to culture is highly embedded (MAAIF, 2015). In Uganda, Plan Uganda, a Non-Governmental Organization tried as much as possible to promote feeding in schools (disadvantaged areas like Karimoja region), where there were rare cases of retarded growth, underweight, overweight, and other diet related symptoms. These were probably a result of malnutrition (MAAIF, 2015).

In Lango sub-region and Lira district inclusive, there was 27% occurrence of child stunting and underweight as symptoms of malnutrition and other deficiencies among children below 15 years (Uganda Demographic Health Survey, 2017). According to Akiiki (2006), malnutrition refers to deficiencies, excesses, or imbalances in a person's intake of energy and/or nutrients. The term malnutrition addresses: under nutrition, which includes wasting (low weight-for-height), stunting (low height-for-age) and underweight (low weight-for-age); micronutrient-related malnutrition, which includes micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals) or micronutrient excess; and overweight, obesity and diet-related non-communicable diseases (such as heart disease, stroke, diabetes and some cancers).

## 2. STATEMENT OF THE PROBLEM

Agricultural practices are undertaken differently in different localities. Under normal circumstances, good agricultural practices like better soil preparation, good sowing or planting, proper weeding, irrigation, harvesting and better storage would ensure better and an improved nutrition especially for children. According to Lira District Statistical Abstract (2017), nutrition among primary school going children in rural areas of the district is still low and unguaranteed, partly due to parents' negligence or ignorance of the importance of agriculture in promoting health of household members. Despite the implementation and embracing several agricultural practices like soil preparation, sowing, weeding, use of farm manure, harvesting and storage, nutrition among school going children is still low. The researcher was obliged to ponder the role of agricultural practices in improving nutrition. This study was conceived to identify the role of agricultural practices in improving nutrition among school going children in Lira District.

### 3. PURPOSE AND OBJECTIVES OF THE STUDY

The purpose of this study was to examine the role of agricultural practices in improving nutrition among school going children in Adekokwok sub-county. This study aimed to achieve three objectives, namely: (a) To identify the agricultural practices being carried out in the study area; (b) to determine the level of nutrition among school going children in the study area; and (c) to examine the contribution of selected agricultural practices in improving nutrition among school going children in the study area

The study is timely as it is expected to help in strengthening the existing policies that promote agricultural practices as one of the interventions in improving nutrition in the country. Also, it will help the Local Government; Non-Governmental Organizations, and Civil Society Organizations to design programs and projects geared towards supporting the farmers' cause and the production of highly nutritious food. It is also envisioned that the study will guide and inform schools in considering the production and consumption of quality and highly nutritious food for their pupils and students.

### 4. REVIEW OF RELATED LITERATURE

#### *Different agricultural practices*

The FAO (2016) uses good agricultural practice as a collection of principles to apply for on-farm production and post-production processes, resulting in safe and healthy food and non-food agricultural products, while taking into account economic, social and environmental sustainability. Agricultural Practices are applied to a wide range of farming systems and at different scales (Schreinemachers, et al. (2012). They are applied through sustainable agricultural methods, including economically and efficiently produce being sufficient or food secured, safe or food safety, and making sure that the food is nutritious or food quality.

- *Soil preparation:* Before raising a crop, the soil in which it is to be grown is prepared by ploughing, and leveling (Máthé, A.; I. 2009).
- *Ploughing* is the process of loosening and digging of soil using a plough. This helps in proper aeration of the soil. After ploughing, the soil is distributed evenly and leveled in the process called leveling.
- *Sowing:* Selection of seeds of good quality crop strains is the primary stage of sowing. After the preparation of soil, these seeds are dispersed in the field and this is called sowing. Sowing can be done manually, by hand or by using seed drilling machines (Luning, 2019). Some crops like paddy are first grown into seedlings in a small area and then transplanted to the main field.
- *Manuring:* Crops need nutrients to grow and produce yield. Thus, the supply of nutrients at regular intervals is necessary. Manuring is the step where nutritional supplements are provided and these supplements may be natural (manure) or chemical compounds (fertilizers). Manure is the decomposition product of plant and animal wastes. Fertilizers are chemical compounds consisting of plant nutrients and are produced commercially. Apart from providing nutrients to crop, manure replenishes soil fertility as well (Máthé, 2009). Other methods for soil replenishment are vermicomposting, crop rotation, planting of leguminous plants.
- *Irrigation:* Irrigation is the supply of water. Sources of water can be wells, ponds, lakes, canals, and dams (Máthé, 2009). Over irrigation may lead to waterlogging and damage the crop. This frequency and interval between successive irrigation need to be controlled.
- *Weeding:* Weeds are unwanted plants which grow among crops. They are removed by using weedicides, by manually pulling them with hands and some are removed during soil preparation.
- *Harvesting:* Once the crop is matured, it is cut and gathered, this process is called harvesting. Followed by harvesting, grains are separated from the chaff either by threshing, or manually in small scale through winnowing (Moya, et al 2019).
- *Storage:* grains yielded are stored in granaries or bins at go-downs for later use or marketing (Moya, 2019). Therefore, methods of crop protection need to be better. In order to protect grains from pest and rodents- cleaning, drying, fumigation, etc., are done prior to storing.

### *Level of nutrition*

Nutrition is how food affects the health of the body. Food provides vital nutrients for survival, and helps the body function and stay healthy (Dwyer, 2006). Food is comprised of macronutrients including protein, carbohydrate and fat that not only offer calories to fuel the body and give it energy but play specific roles in maintaining health. Food also supplies micronutrients (vitamins and minerals) and phytochemicals that don't provide calories but serve a variety of critical functions to ensure the body operates optimally. The 'body mass index' or the BMI is a good indicator of nutritional status (Deurenberg, Westrate, & Seidell, 1991). It takes into account the weight and height, and correlates well with total body fat expressed as a percentage of body weight. The correlation depends on age, with the highest correlation seen in ages 26–55 years and the lowest in the young and the elderly. The body weight in kilograms divided by the height in meters squared, results to the BMI. High values indicate excessive fat stores and low values indicate insufficient fat stores. The BMI can therefore be used as a diagnostic tool for both over-nutrition and under-nutrition. If the BMI is between 25.0 and 29.9 it is classified as overweight. If it is above 30.0, it is classified as obese. The healthy BMI range is 18.5–24.9.

Nutrition is defined as the processes by which an animal or plant takes in and utilizes food substances (Dwyer, 2006). Essential nutrients include protein, carbohydrate, fat, vitamins, minerals and electrolytes. The level of nutrition varies from individuals to individuals as summarized below:

- *Carbohydrates:* these can be classified as a monosaccharide like glucose, fructose, and galactose; disaccharide like sucrose, lactose, and maltose; and polysaccharide like starch, and fiber. Carbohydrates must be reduced to the simplest form of glucose through digestion before the body can make use of them. Carbohydrates should make up at least 55% of the total energy intake. Dwyer J. H (2006) contends that the brain is a special part of the body that depends primarily on glucose for its energy and requires about 100 g/day of glucose for fuel. In some situations, the body can compensate for decreased levels of carbohydrates by using alternative energy pathways such as burning fatty acids.
- *Protein:* Protein is important for the production, maintenance and repair of tissues in the body. When energy intake is insufficient, protein intake must be raised (Dwyer, 2006).. This is because ingested proteins are preferentially directed towards glucose synthesis and oxidation. The tissues and organs in the body are made up of protein and protein compounds. Enzymes or the biological catalysts, antibodies and hormones also consist of protein. The building blocks of protein are called amino acids. The body can make all of the 20 amino acids except eight, which are termed essential amino acids. These are isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine. Histidine is essential only for infants. The number and nature of amino acids present in a particular protein determine that protein's characteristic (Dwyer, 2006).
- *Fats and oils:* Most of the fats we consume occur in foods as triglycerides. A triglyceride is comprised of three fatty acid molecules attached to a glycerol molecule. Fatty acids are made up of carbon and hydrogen atoms and can be either saturated or unsaturated. Fats are a concentrated and rich source of energy (Dwyer, 2006). It is recommended that the total fat intake is no more than 30% of the energy or the calorie/kilojoule intake. Polyunsaturated fat should be less than 10% of energy, and saturated fat and trans-fat together should be less than 10%. The rest of the fat intake should consist of monounsaturated fat.
- *Vitamins:* Vitamins constitute a group of nutrients that are needed in small quantities. Like amino and fatty acids, most vitamins cannot be made in the body and must be obtained from dietary sources (Dwyer, 2006). Only vitamin D can be manufactured by the body. Essential vitamins are grouped into two families: water soluble and fat soluble. Water soluble vitamins like thiamine, riboflavin, niacin, vitamin C, and folic acid can dissolve in water, but cannot be stored by the body and need to be consumed every day. While fat soluble vitamins like vitamins A, D, E and K can dissolve in a fat medium which are taken into the bodies when they are consumed in a fat-containing foods (Dwyer, 2006). Vitamins are needed for various reasons, including the formation of hormones and blood cells. They generally act as coenzymes. An inadequate supply of vitamins in our diet leads to the development of diseases.
- *Minerals:* According to Augustin, Franceschi and Jenkins (2002), minerals are essential, acting as cofactors of enzymes because enzymes would not exist or function without minerals. Some of the minerals necessary for health are:
  - Calcium is a very important mineral in the diet, especially for women at menopause. The major function of calcium is to build and help maintain strong bones (Augustin, Franceschi, Jenkins, 2002). It can stop the onset of osteoporosis and

reduce bone loss and fragility. It is involved in blood clotting. Calcium deficiency can develop when there is a lack of vitamin D.

- Iron in food exists as haem and non-haem iron. Haem iron, found in red meat, is relatively well (20–30%) absorbed. Non-haem iron, found mostly in cereals, pulses, certain vegetables (e.g. spinach) and eggs, is generally less well absorbed. Non-haem iron absorption depends on other factors in the diet (Augustin, Franceschi, Jenkins, 2002). For example, vitamin C and animal protein enhance non-haem iron absorption, while tea, coffee and phytates inhibit it.
- Zinc represents only 0.003% of the human body, but is essential for synthesizing protein (Hoy-Rosas, Arrecis, & Avila, 2010). It is required for growth in all stages of life. Sources include meats, oysters and other seafood, milk, and egg yolk.

Consequently, a healthy diet consists mainly of plant foods like fruits and vegetables, potatoes, and cereals; and moderate amounts of animal products like milk, fish, lean red meat and poultry. Fats and oils should normally provide less than 30% of our energy, and less than 10% of this should be saturated fat (Hoy-Rosas J, Arrecis E, & Avila M. 2010). Lean red meat, poultry and fish, eggs and dairy foods are rich sources of animal protein. Dairy foods, apart from supplying quality protein, are good sources of calcium. Good vegetable sources of protein include legumes like peanuts, lentils, kidney beans, soya products, grains, nuts and seeds.

### ***The Contribution of selected agricultural practices***

Agricultural practices focused exclusively on crop yields. According to the FAO (2016), good agricultural practice is a phrase used to denote a collection of principles to apply for on-farm production and post-production processes, resulting in safe and healthy food and non-food agricultural products, while taking into account economic, social and environmental sustainability (Mahan et al 2012). These practices include cultivation or soil preparation, sowing, irrigation, manure, weeding, harvesting and storage. These agricultural practices are greatly responsible for nutrition provision through the production of different varieties of food which are rich in protein, carbohydrate, fat, vitamins, minerals and electrolytes. Normally, 85% of daily energy use is from fat and carbohydrates and 15% from protein (Mahan et al 2012). In humans, nutrition is mainly achieved through the process of putting foods into our mouths, chewing and swallowing it. The required amounts of the essential nutrients differ by age and the state of the body, for example: physical activity, diseases present like prostate cancer or weakened bones, medications, pregnancy and lactation (Mahan et al 2012).

It should be noted that good agricultural practices are responsible for the better food production which is in turn responsible for better nutrition. Nutrition is essential for growth and development, health and wellbeing; and eating a healthy diet contributes to preventing future illness and improving quality and length of life (Dwyer, 2006). Agricultural practices ensure the provision of essential nutrient requirements for the body (Mahan et al 2012). Nutrients perform various functions in our bodies, including energy provision and maintaining vital processes such as digestion, breathing, growth and development. Nutrients can be described as the chemical components of food and can be classified into six broad groups: carbohydrates, proteins, fats, vitamins, minerals and water. Water is not technically a nutrient, but it is essential for the utilization of nutrients (Mahan et al 2012).

- Protein is found in beef, pork, chicken, game and wild meats, fish and seafood, eggs, soybeans and other legumes included in traditional Central America cuisine, protein provides the body with amino acids (Mahan et al 2012). Amino acids are the building blocks of proteins which are needed for growth, development, and repair and maintenance of body tissues. Protein provides structure to muscle and bone, repairs tissues when damaged and helps immune cells fight inflammation and infection.
- Carbohydrates are the main role of a carbohydrate is to provide energy and fuel the body the same way gasoline fuels a car (Nelms et al 2010). Foods such as corn, chayote, beans, plantains, rice, tortilla, potatoes and other root vegetables such as yucca, bread and fruit deliver sugars or starches that provide carbohydrates for energy.
- Energy allows the body to do daily activities as simple as walking and talking and as complex as running and moving heavy objects (Dwyer, 2006). Fuel is needed for growth, which makes sufficient fuel especially important for growing children and pregnant women. Even at rest, the body needs calories to perform vital functions such as maintaining body temperature, keeping the heart beating and digesting food.

- Dietary fat, which is found in oils, coconut, nuts, milk, cheese, meat, poultry and fish, provides structure to cells and cushions membranes to help prevent damage (Dwyer, 2006). Oils and fats are also essential for absorbing fat-soluble vitamins including vitamin A, a nutrient important for healthy eyes and lungs.
- Vitamins and Minerals: Vitamins and minerals are food components that help support overall health and play important roles in cell metabolism and neurological functions (Augustin, Franceschi, Jenkins, 2002). Vitamins contribute to energy production, wound healing, bone formation, immunity, and eye and skin health; and minerals contribute in maintaining cardiovascular health and provide structure to the skeleton. Consuming a balanced diet including fruits, vegetables, dairy, protein foods and whole or enriched grains helps ensure the body has plenty of nutrients to use (Augustin L, Franceschi S, Jenkins et al. 2002).

From obtainable literature, several researchers have carried out a number of studies on the role of agricultural practices in improving nutrition in different parts of globe, it should be noted that a number of these studies have been carried out in different locations in the world but very little literature is available for Adekokwok Sub-County hence making me to carry out this specific study.

## 5. METHODOLOGY

This study used the case study design to investigate the research problem. According to Saunders et al. (1997), the case study approach considers the ability to generate answers to questions like ‘what’ as well as ‘which’ questions the study addressed. The study population in this study comprised of staff of the Production department of Adekokwok sub-county, farming households in the rural community of Adekokwok sub-county, Parish Chief, opinion leaders, chairperson Parish Development Committee (PDC), and demonstration farmers found in Adekokwok sub-county. The above target population were of great importance during the course of the investigation because they provided in-depth information on the study variables. The researchers took a sample of seventy two respondents which consisted of rural household farmers, production department staff, and opinion leaders, PDC, demonstration farmers and Parish Chiefs.

During this study, the researcher used both an interview Guide and Questionnaires. The raw data from the field was cleared, sorted, and edited manually to remove errors. This involved scrutinizing the questionnaires for errors, omissions and ambiguous classifications. These exercises were carried out to ensure accuracy, uniformity, consistency, and comprehensiveness in the answers that were put forward by the respondents. The Statistical Package for Social Sciences (SPSS) was used to analyze both qualitative and quantitative data. The quantitative data analysis method was used to analyze the data collected through sorting and coding responses after the data collection. This information will help to explain the consequence of food production system on household hunger. On the other hand, qualitative analysis was used in extracting data from interviews, questionnaires and records. This is also where recommendations, lessons learnt and conclusions was drawn and giving room for further research studies (Saunders et al, 1997).

The researcher maintained the content validity of the said research instruments by ensuring that the questions or items in it conform to the study objectives and purpose. Relevance, wording and clarity of the questions, or items in the instrument were evaluated by both the researcher and the supervisor. The instrument items were edited so that their validity is obtained. The said instrument was tested for reliability before actual data collection. This method is worth because it is widely applied in the social science field (Amini, 2005) and it is easy for determining a reliability coefficient since it does not consume a lot of time. The researchers considered the ethical practices in conducting an academic research like seeking the consent of the respondent before administering questionnaires or conducting in-depth interviews; and he was able to interact with the respondents using the prepared questionnaires after properly explaining the study objectives and clarifying on the respondents’ voluntary participation. The respondents were assured of confidentiality and anonymity at all stages of data collection, analysis and reporting except where express permission was granted to have their names mentioned in the final report. Rapport creation is very important and this depends on the way the researcher will presents him to the respondents. The researcher’s conducted himself positively and that enabled him gather all the relevant information for this study.

## 6. FINDINGS OF THE STUDY

The purpose of this study was to establish the role of agricultural practices in improving nutrition among school going children in Adekokwok sub-county. The study was conducted among the seventy two (72) respondents both males and females. It was important to establish the gender distributions in this study in order to allow both male and female

respondents to be represented during the study and to avoid being biased of any sex. 40 of the respondents were female which translates to 55.6% of those who participated in the study, meanwhile 32 of the respondents were male and this translates to 44.4% of those who participated in the study. Majority of the respondents represented by 45 (62.5%) indicated that they were married. This was followed by 18 (25%) of the respondents who indicated that they were single, 9 (12.5%) of the respondents indicated that they were widows or widowers. No respondent said they were divorced or cohabiting. Majority of the respondents were between age brackets of 25-34 years represented by 39% of those who participated in the study. This was followed by the respondents whose age bracket ranged between 35-45 years being represented by 33%, the age bracket of 6-24 years of the respondents were represented by 28% and finally the respondents whose age bracket above 45 years was recorded during the study.

Majority of the respondents who participated in the study represented by 48 (66.6%) indicated that they had reached primary level of education. This was followed by the respondents who had attained the level of Diploma represented by 11 (15%), while 10 (14%) of the respondents had attained UCE; no respondents had attained the Certificate level; 03 (4%) of the respondents had at least a Bachelor's Degree; no respondent indicated that they attained UACE; and finally no respondents indicated that they never went to school.

### **Types of agricultural practices being carried out in the study area**

Data extracted from the primary source indicate that cereals were the most produced crops at about 24 valid counts, which represent 40%, the vegetable was second in the hierarchy of the most crops produced at about 18 counts which represents 30%. Grains, tubers and fruits were also produced has shown by 20 counts, 4 counts and 02 counts, respectively. The main tool used by households in the study area is presented in the table as: hand hoe was valid at about 45 counts, oxen at 14 counts and tractor at 01 count, representing about 75%, 23.3% and 1.7%, respectively. On the main reason for production of crops by the households of the respondents, that table indicates that subsistence received 36 counts (60%) of the responses, sales received 06 counts or 105 of the responses, and mixed purposes of both sales and subsistence received 18 counts of responses (30% of the total responses recorded).

Regarding whether the households use any irrigation system in case of draught, 55 counts or 91.7% of total responses indicated that they did not use any irrigation in case of draught, but 05 counts or 8.3% of responses indicated that they use irrigation in case of drought. On the types of seeds normally planted by the household, responses indicated that 48 counts or 80% of respondents planted traditional seeds and 12 counts or 20% of respondents indicated that they planted improved seeds. The main source of manure used or applied on farms, 12 counts (20% of responses indicated that they used animals or poultry products like cow dang as manure, 06 counts (10%) of responses indicated that they did not use or apply any form of manure on their farms, and 42 counts (70%) of responses indicated that manufactured fertilizers were used or applied in the farms. Regarding storage of food after harvest, no response was recorded as having used the room floor to store the harvest, 03 counts (5%) indicated that they used granary to store the food after harvest, 48 counts (80%) of responses indicated that they used bags to store the harvest, and 09 counts (15%) of responses indicated that they always sell-off their harvest.

Respondents said that they were more into the production of grain and cereal crops like beans, peas; and rice, millet, sorghum, simsim, and maize, respectively. *"This area is only suitable for food crops like maize. We tried growing Irish potatoes, but it failed to grow and mature"*, remarked one elderly female participant. To a lesser extent, about two participants said they ventured into tubers like cassava and potatoes; and vegetable growing to supplement their diet. Most participants said they used hand hoe for cultivation. One male participant hinted more light on the choice of hand hoe: *"hand hoe was donated to us by politicians; and above all it is very cheap to buy compared to ox or bulls which cost over a million shillings to acquire."* The study finding suggests that traditional seeds were preferred to improved seeds because traditional seeds like beans have a very nice taste compared to exotic beans. They mainly use polythene bags because it can withstand bad weather like roof leaking.

### **The level of nutrition among school going children**

Four of the respondents were serving breakfast to school going children in the morning before going to school, which translate to 24<sup>0</sup> or about 6.7% of the total respondents. However, more respondents indicated they did not serve breakfast in school going children and these responses were represented by 56 counts, which is about 336<sup>0</sup> or 93.3% of the total responses during the study. It is indicated that of the four respondents who indicated that they serve breakfast to the

school going children, none of them were serving eggs or fish but 01 respondent was serving fruits or its related products; and 03 respondents were serving cereal products like porridge and this this was represented by about 75% of the total responses. Also, respondents expressed being aware of the importance of having a balanced diet on a child's health and this is represented by 54 counts of responses recorded which translate to about 90% of the total counts entered. Meanwhile, 6 responses indicated that the respondents were not aware of the importance of having a balanced diet on a child's health and this translates to 10% of the total responses.

### **The contribution of agricultural practices to nutrition among school going children**

The main contribution of agricultural practices to nutrition in the study area, the responses were as indicated in the table below. 24 counts of responses (40%) indicated that the contribution of agricultural practices to nutrition was the cure of diseases like scabies from children. This was closely followed by the views that agricultural practices contribute to nutrition by ensuring a healthy growth of children and this was represented by 18 counts or 30 % of the total responses recorded. Prevention of diseases and provision of a balanced diet for children was also believed to be the contribution of agricultural practices to nutrition which were represented by 14 counts or 23.3% and 4 counts or 6.7%, respectively. In addition, 28 counts (38.3) of responses indicated that scabies was experienced by children, 9 counts of responses or 15% indicated that stomach ache was experienced by children, and 23 counts of responses indicated that headache was experienced by children in the study area. The main reason for the occurrence of nutrition related illness was concerned, 3 counts (5%) of responses indicated that ignorance about nutritional values in food was the main reason; 24 counts (40%) of responses indicated that inadequate intake of food was the main reason for the occurrence of nutrition related illness; and 33 counts (55%) of responses indicated that poverty which prevents a particular household from production was the main reason for the occurrence of nutrition related illness in the study area.

Regarding how agricultural practices can improve nutrition in the study area: 2 counts (3.3%) of responses believed that improving policies can do that, 28 counts (46.7%) believed on extension services, 14 counts (23.3%) believed on providing tax free or subsidies to agricultural inputs like seeds, and 16 counts (26.7%) of responses believed in advocating for a change in attitudes, cultures and tradition. Issues of providing insurance and revitalizing co-operatives; strengthening agricultural extension services; and advocating for a change in personal attitudes, cultures and tradition can improve agricultural practices in their locality of Adekokwok sub-county were raised. A number of key informants highlighted multiple responses that included the prevention of diseases; cure of diseases like scabies from children; provision of a balanced diet for children; and ensuring healthy growth of the children. In one of the instances, a seemingly well exposed gentleman remarked that *"traditionally, we used to eat some varieties of food in order to either cure or prevent diseases, for instance eating or drinking lemon juice could prevent and cure flu!"*

## **7. DISCUSSION OF FINDINGS**

The findings of this study suggest that cereal crops were the most produced crops at about 24 valid counts, which represents 40%, but closely followed by the growing of vegetables at 18 counts which represents 30%. The main tool used for cultivation by households in the study area was hand hoe which supported by 45 valid counts or 75% of the total respondents. In my view, Adekokwok sub-county is just a stone throw from the Central Business District of Lira City and so, local community find it prudent to grow vegetables which has a ready market because it is not easy to provide storage facility. Food production systems in this area seem to be relying on hand hoe because of semi-urban location which does not support agricultural mechanization. This finding is supported by Mathe (2009) which states that before raising a crop, the soil in which it is to be grown is prepared by Ploughing, and leveling. Ploughing is the process of loosening and digging of soil using a plough or hoe if the arable land is not adequate for large scale production. This helps in proper aeration of the soil. After Ploughing, the soil is distributed evenly and leveled in the process called leveling. This finding implies that the study area is purely small-scale farmers.

Findings indicate the main reason for crop production for subsistence which received 36 counts (60%) of the responses; and that the households did use any irrigation system in case of draught were 55 counts or 91.7% of total responses indicated that they did not use any irrigation. In view of these findings, it is clear that the farmers were not given due awareness of irrigation methods, including the simplest technology called 'drip-bottling' using plastic bottles or jericans. Irrigation is the supply of water. Sources of water can be wells, ponds, lakes, canals, and dams (Máthé, 2009). The implication of this finding is that households in Adekokwok shall still practice seasonal farming practices. The traditional seeds were planted in the study area as supported by 48 counts or 80% of respondents, but that manufactured fertilizers

were used or applied in the farms. Regarding storage of food after harvest, no response was recorded as having used the room floor to store the harvest, 03 counts (5%) indicated that they used granary to store the food after harvest, 48 counts (80%) of responses indicated that they used bags to store the harvest, and 09 counts (15%) of responses indicated that they always sell-off their harvest. In view of reality the area mixes traditions and modernity in agricultural practices. The use of fertilizers is in total agreement with Mathe, (2009) which states that “crops need nutrients to grow and produce yield. Thus, the supply of nutrients at regular intervals is necessary. Manuring is the step where nutritional supplements are provided and these supplements may be natural (manure) or chemical compounds (fertilizers). Manure is the decomposition product of plant and animal wastes. Fertilizers are chemical compounds consisting of plant nutrients and are produced commercially. This implies that crop yields in the study area shall continue to be unpredictable due to the mix use of tradition and modern agricultural practices.

The findings suggest that breakfast were not always served to school going children in the morning before going to school, which is supported by 56 counts or 93.3% of the total responses. Food provides vital nutrients for survival, and helps the body function and stay healthy (Dwyer J. H 2006). The study further reveals that more respondents expressed being aware of the importance of having a balanced diet on a child’s health and this is represented by 54 counts of responses recorded which translate to about 90% of the total counts entered. Very few respondents, however indicated that they served cereal products like porridge to school going children before going to school every morning. This finding is in line with the literature which states that a healthy diet consists mainly of plant foods like fruits and vegetables, potatoes, and cereals; and moderate amounts of animal products like milk, fish, lean red meat and poultry. Fats and oils should normally provide less than 30% of our energy, and less than 10% of this should be saturated fat (Hoy-Rosas, Arrecis & Avila 2010). This implies that with a continued serving of breakfast to school going children, the development of the brain shall be effected.

Also, 24 counts of responses (40%) believed that the contribution of agricultural practices to nutrition was the cure of diseases like scabies from children. In my opinion, the cure of scabies was identified by the respondent because of higher prevalence rate of scabies, which the community experienced especially during rainy seasons. “Nutrition is essential for growth and development, health and wellbeing; and eating a healthy diet contributes to preventing future illness and improving quality and length of life”, emphasised Dwyer (2006). The study also reveals that poverty prevents a particular household from production, hence making it the main reason for the occurrence of nutrition related illness in the study area. The literature by Mahan et al (2012) tend to disagree with this study finding “agricultural practices ensure the provision of essential nutrient requirements for the body (Mahan et al 2012). Nutrients perform various functions in our bodies, including energy provision and maintaining vital processes such as digestion, breathing, growth and development. Nutrients can be described as the chemical components of food and can be classified into six broad groups: carbohydrates, proteins, fats, vitamins, minerals and water. Water is not technically a nutrient, but it is essential for the utilization of nutrients”. This implies that the local community has not yet explored the contribution of food production systems to nutrition.

The study suggests that agricultural extension, at 28 counts (46.7%) can be the main way through which agricultural practices can improve nutrition in the study area. This view seems to be true given the fact that agricultural extension services cover a wide scope of activities and packages that can benefit the rural farmers. According to the FAO (2016), good agricultural practice is a phrase used to denote a collection of principles to apply for on-farm production and post-production processes, resulting in safe and healthy food and non-food agricultural products, while taking into account economic, social and environmental sustainability (Mahan et al 2012). These practices include cultivation or soil preparation, sowing, irrigation, manure, weeding, harvesting and storage, which can all be handled by agricultural extension. These agricultural practices are greatly responsible for nutrition provision through the production of different varieties of food which are rich in protein, carbohydrate, fat, vitamins, minerals and electrolytes. By default, this finding implies that agricultural extension services can be employed to create awareness on nutritionally rich crops.

## 8. CONCLUSION

The study shows that more female and married respondents were active in the study. It also involved a youthful and most productive age group of between 25-34 years, with most respondents at least knowing how to read and write. The study concludes that cereal crops were the most produced crops, with the main tool used for cultivation by households being hand hoes. The main reason for crop production was for subsistence, but the farmers did not use any irrigation methods in

case of drought. Despite planting traditional seeds, farmers used manufactured fertilizers and store their food in bags. Breakfast are not always served to school going children in the morning before going to school despite more respondents expressing that they were aware of the importance of having a balanced diet on a child's health. Very few respondents, however indicated that they served cereal products like porridge to school going children before going to school every morning. The contribution of agricultural practices to nutrition was the cure of diseases like scabies from children; and that poverty prevents a particular household from production, hence making it the main reason for the occurrence of nutrition related illness in the study area. Agricultural extension can be the main way through which agricultural practices can improve nutrition in the study area.

## 9. RECOMMENDATIONS OF THE STUDY

- a) The study recommends that extensive and vigorous awareness of agricultural practices should be made in order to ensure the basic orientation of the local community.
- b) Also, there should be a "Nutrition Ordinance for Children" that will guide agricultural practices in the district if nutrition among school going children can be enhanced.
- c) Translation of all guidelines on agricultural practices and nutrition related texts into local languages (Luo) so that the local community in Adekokwok sub-county would be able to understand the contents;
- d) There should be Agricultural and Nutrition Committees formed at village levels, which shall be tasked with the responsibility of ensuring zero hunger through better agricultural practices;
- e) individual efforts should be prioritized given that nutrition is deeply 'micro' in nature, and thus it requires a micro-approach by individual households to meet the nutritional needs of their households.

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