

FOOD PRESERVATION AND SECURITY AT HOUSEHOLD LEVEL IN RURAL NSUKKA, ENUGU STATE, NIGERIA

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ABSTRACT

Household food security exists when members at all times have physical and economic access to adequate, safe, acceptable and nutritious foods to meet their daily requirements and food preferences for an active and healthy life. Preservation of post-harvest surpluses makes local staples available and affordable during off season. In Nigeria, food insecurity at the household level can partly be attributed to poor preservation of post-harvest surpluses. This study sought to demonstrate a relationship (if any) between preservation of post harvest surpluses and food security at rural household level. Eha-Alumona and Opi-Uno, in Nsukka, Enugu State were the two rural communities selected because they have farming as their major occupation. Interviews and questionnaires were used to elicit information on socio-economic characteristics, foods preserved and methods, problems encountered and effect of preservation on food security of two hundred households. Data collected were analyzed using descriptive statistics and results presented as frequencies and percentages. About 42% of households partly produced and partly purchased foods, while 17% depended solely on family food production. Most households (90%) preserved foods mainly by sun-drying cereal, legumes, vegetables and roots/tubers. All the households (100%) stored palm oil in bottles or jars while 87.5% smoked meat/fish. Sun-dried foods were perceived wholesome until used by 61.5% households. About 62% households consumed their preserved foods, 19% sold, while 19.4% consumed part and sold part. Sixty-four percent (64%) were food-secure which they attributed to preservation of post-harvest surpluses. However, 36% did not have enough because of spoilage and rodent/ insect attack. Hunger at rural household level can be reduced if post harvest surpluses are properly preserved. The Nigerian local government should encourage community food preservation through cooperative societies, provision of necessary infrastructure, funding and education.

Key words: Rural, Households, Food preservation and Food security

INTRODUCTION

Food security is defined by FAO/WHO (1992) as assess by all people at all times to the food needed for a healthy life. Household food security exists when members at all times have physical and economic access to adequate, safe, acceptable and nutritious foods to meet their daily requirements and food preferences for active and healthy life (FAO, 2000). Between 1996 and 1998 about 791 million people in the developing world were estimated to be chronically undernourished and recent update has not shown any significant change. The fact that access to nutritionally adequate and safe food is a right of each individual led the leaders of 186 countries in 1996 to pledge to reduce the number of poor and hungry people in the world by half by 2015 (FAO, 2000). Household physical and economic access to food is also vital for overall national development. This

is because the economic cost of hunger and the resultant malnutrition is reflected in lost productivity, illness and death. The depth of hunger is measured by the mean dietary energy deficit of undernourished people expressed in kilocalories (Kcal) per person per day. In Nigeria, the average energy deficit of the hungry is 210 kcal per person per day (FAO, 2000). Hunger and malnutrition are closely linked with poverty in a malnutrition-poverty trap with cause and effect difficult to disentangle. Malnutrition leads to reduction in life time earnings of more than 10% per affected individual and at national level to Gross Domestic Product (GDP) losses of 2-3% (Cleaver, 2007). Poverty leads to hunger and malnutrition because poor people have less to spend on food. Improvement in one therefore, leads to improvement in the other. The hungry are

mostly the poor and majority of them live in rural areas and largely depend on agriculture for their food and livelihood. According to United Nation (2005) rural dwellers are usually pastoralists, fishermen or farmers producing their own foods, often on low potential land or they are landless working on other peoples land. Over 70% of all undernourished people live in rural areas (Muller, 2007). It is therefore, pertinent that the battle against hunger and malnutrition be fought primarily in rural areas. Agriculture which is the main occupation of rural dwellers should be at the centre of this fight because it underpins family income and community wealth. The causes and severity of household food insecurity differ from one geographic area to another and from one household to another therefore, solution to household hunger requires both short and long term measures. Such measures include poverty alleviation policies/programmes, reorientation of agriculture not just towards food production but effective preservation and storage to minimise post harvest losses. Studies have shown that agricultural growth reduces poverty and hunger, more than urbanization and industrialization (FAO, 2006a). Countries that have invested and continue to invest most in agriculture have the lowest levels of undernourishment (FAO, 2006b). World food production particularly cereal has increased over the years (Cleaver, 2007) but there are still many hungry people in the world today. The problem is therefore, not insufficient production but unequal distribution of food and or poor preservation of post harvest surpluses especially in the developing countries like Nigeria. Globally, about 10% of total world food supply is wasted as a result of deterioration (Wong *et al.*, 2002) while in developing countries (Nigeria inclusive) it is estimated that 25% of all foods produced are never consumed by humans, they either spoil or are eaten by insects, rats and other pests (FAO, 1997). Recently, the Kenyan government requested farmers to increase the production of milk, production increased more than immediate consumption and the surplus was discarded because of lack of preservation and storage facilities (ANEC4, 2010). In Nigerian, government effort in improving food security has been through supporting farmers' effort to expand production and not to reduce post harvest losses. Food preservation is the application of measures to delay or prevent microbial, chemical and or physical changes that make food unusable as food or that which downgrade some or all its qualities (van Laack, 1994). The purpose of food preservation is basically to reduce the number of

microorganisms in order to reduce or eliminate public health hazards. Preservation processes such as chilling, thermal treatment, dehydration and irradiation restrict, prevent or limit enzymatic, chemical and physical reactions that cause deteriorative changes and spoilage (Ridgwell, 1996). Proper preservation and storage of post harvest surpluses would make local staples available and affordable all year round to the common man. According to FAO (1997), better home and community food processing, preservation and storage and access to marketing facilities can contribute to household food security by alleviating seasonal shortages in food supply and stabilizing market prices. It is therefore, necessary to evaluate the effect of rural household preservation of postharvest surpluses on their food security.

MATERIALS AND METHODS

Area of study

Eha Alumona and Opi Uno were the two autonomous rural communities in Nsukka local government of, Enugu state, Nigeria selected for the study. The communities have high rainfall, moderate temperature and humidity which fluctuate between wet and dry seasons. Farming is the main occupation of people in the two communities.

Sample size

The households in the two communities were first listed and numbered. Every third household was picked from the 721 listed households to give a total of 200 households (100 from each community) used for the study.

Data collection

Interview and structured questionnaire were used for data collection. To ensure a high degree of validity of the questionnaire, five lecturers in the Department of Home Science, Nutrition and Dietetics University of Nigeria Nsukka validated the questionnaire. The questionnaire was administered to illiterate mothers by the interviewer while for literate mothers the questionnaire was self administered. The questionnaire elicited information on demographic characteristics, socio-economic status, sources of family food supply, methods of food preservation/storage, problems encountered and the effect of food preservation on the food security of the households.

Data analysis

The data obtained were analysed using descriptive statistics. The statistical package for social sciences (SPSS) computer software version 11 was used for the analysis. The results were expressed as frequencies and percentages.

RESULTS

Demographic characteristics of the respondents

The result of the study showed that 36% of the respondents were 41-50 years of age while 30% were 31-40 years. Most (80.5%) of the respondents were married, only 14% and 5.5% were widowed and separated, respectively

Table 1. Socioeconomic characteristics of the household

Household members	Frequency	Percentage (%)
1-3	12	6.0
4-6	55	27.5
7-9	125	62.5
10 and above	8	4.0
Total	200	100
Household monthly income (=N=)		
< 5000	15	.5
5000 - <10000	33	16.5
10000 - <15000	133	66.5
15000 - <20000	14	7.0
20000 - <30000	5	2.5
Total	200	100
Amount spent on food per week (=N=)		
500 - <1000	15	7.5
1000 - <2000	93	46.5
2000 - <3000	77	38.5
3000 and above	15	7.5
Total	200	100

Table 1 shows the socio-economic characteristics of the households. There were 7-9 persons in 62.5% of the households while 27.7% had 4-6 members. Most of the households (66.5%) earned between N10,000 and N15000 (less than 150 US dollar) per month. Only 2.5% earned up to N30000. Majority of the households (46.5%) spent less than N3000 weekly on food.

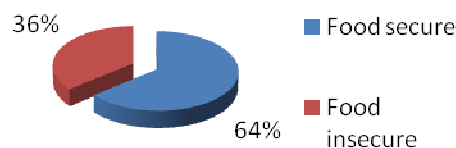


Fig 1. Household food security/insecurity based on availability of preserved foods after preservation of post-harvest surpluses

A good number of household (42.5%) produced part and purchased part of their family foods while 17% and 40.5% of households solely produced and purchased foods, respectively (Table 2). Over 40% of households preserved enough foods for family consumption, 22% for consumption and sales and 20% to supplement purchase. Insect/rodent attack (47.5%) and spoilage due to poor preservation and storage facilities (45%) were the two main factors responsible for post-harvest losses in the communities studied.

Table 3 shows the foods preserved and methods of preservation used. About 90% of the households preserved cereal, legume, roots/tubers and vegetables by sun-drying. Meat/fish was mostly (87.5%) smoked while 100% preserved palm oil by storing in bottles and jars. Fruits were preserved by leaving them in cool place.

Fruits and vegetables in most households (92.2% and 91.8%, respectively) were perceived to be wholesome when preserved for less than 3 months and 3-5months, respectively (Table 4). Cereal (88.1%) and legume (58.5%) were perceived wholesome by the households for 9-12 months while for palm oil it was more than 12 months. Based on availability of preserved food, 64% households were food-secured while 34% did not have enough to eat despite preservation as shown in the pie chart (Fig 1).

Table 2. Source, sufficiency and causes of postharvest food losses of the households

Sources household food	Frequency	Percentage (%)
Home produced	34	17.0
Partly home produced and partly purchased	85	42.5
Purchased	81	40.5
Total	200	100
Sufficiency of food preserved		
Enough for family consumption only	81	40.5
Enough for family consumption and sales	44	22.0
Enough for sales only	35	17.5
Enough to supplement purchase	40	20.0
Total	200	100
Causes of post harvest losses		
Insect and rodent attacks	95	47.5
Spoilage due to poor preservation/storage	90	45.0
Poor transport facilities	15	7.5
Total	200	100

Table 3. Methods of preservation and foods preserved

Method of food reservation	Foods preserved						
	Cereal	Legume	Root/Tuber	Vegetable	Fruit	Meat/Fish	Oil
Sun drying	178(89.8)	178(89.8)	178(89.8)	183(91.5)	-	-	-
Smoking	-	-	-	11(5.5)	-	175(87.5)	-
Salting	-	-	-	-	-	11(5.5)	-
Use of preservative	22(10.2)	22(10.2)	-	-	-	-	-
Un-harvested	-	-	22(10.2)	-	-	-	-
Store in bottles/jars	-	-	-	-	-	-	200(100)
Refrigeration	-	-	-	6(3.0)	16(8.0)	14(7.0)	-
Sore in cool Place	-	-	-	-	184(92.0)	-	-
Total	200(100)	200(100)	200(100)	200(100)	200(100)	200(100)	200(100)

Figures in parenthesis are percentages

Table 4. Duration of preservation and perceived wholesomeness of preserved foods

Foods	Period of preservation (months)				
	<3	3-5	6-8	9-12	>12
Cereal	-	-	24(12.0)	176(88.0)	200(100)
Legume	-	17(8.5)	66(33.0)	117(58.5)	200(100)
Root/Tuber	-	-	63(31.5)	137(68.5)	200(100)
Vegetable	17(8.5)	183(91.5)	-	-	200(100)
Fruit	184(92.0)	16(8.0)	-	-	200(100)
Meat/Fish	11(5.5)	15(7.5)	174(87.0)	-	0.0(0.0)
Palm oil	-	-	-	-	200(100)

DISCUSSION

The result of this study showed that 36% of the households did not have enough food to last till next harvest despite preserving their post harvest surpluses. This is similar to the finding of Maziya *et al.* (2004) that about 40% of households do not have enough food to eat. The households attributed their food storages largely to spoilage and insect/rodent attack of preserved foods. Studies have shown that 25% of all foods produced in developing countries are not consumed by humans, instead they spoil or eaten by insects, rats and other pests (FAO, 1997). Another factor that might have contributed the insufficiency is large household sizes which according to Pelletier *et al.* (2001) deplete family food stores with the danger of food-insecurity. It

could also be that the households did not preserve enough and or sold part of their preserved foods due to market prices. FAO (2000) noted that when poor rural families produce enough food, they often sell their produce rather than consume them because of high market value. A good number of households (64%) however, had enough food to consume till the next harvest season. This was attributed to preservation of post-harvest surpluses. Cereal, legume, root/tuber and vegetable were mainly preserved by open-air sun-drying. This method was extensively used by Ayirebi rural households in Ghana to preserve foods before storage (Dei, 1990). The objective of sun-drying was to remove as such water as possible thus making the food items keep longer. Open air sun-drying of foods has disadvantages such as infestation by insects, contamination from dirt,

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rodents and birds attack and spoilage from occasional rains. Solar drier is a better alternative because its temperature can be maintained at 60 to 70°C with minimal damage to vitamins. Roots and tubers were left un-harvested till required as a preservation technique, this method was also by the Ayirebi households. Fruits were left in cool place or preserved in refrigerator by the households in this study. Refrigeration was not popular because of the problem of electricity particularly in rural areas in Nigeria. The perceived wholesomeness of the food depended on the food preserved and method employed. Foods that were sun-dried or smoked lasted longer than those left in cool place or underground. This is understandable because moisture in the foods favoured organisms responsible for spoilage. Palm oil which was preserved by storing in bottle and jars in most cases was wholesome for more than 12 months.

CONCLUSION AND RECOMMENDATIONS

The result of this study showed that post-harvest losses were high, there is need to control insect and rodent attack and fungi and food rot. Measures such as trapping or use poison for rats, use of insecticides and airtight containers for insect attack should be explored. Fungi and food rot can be controlled by storing food in as dry a state as possible in better containers. The local government should pay attention to proper preservation of post-harvest surpluses as one way of reducing food insecurity at household level. Community level preservation can be explored through cooperative societies, provision of necessary infrastructure, funding and educating people about safe and hygienic food storage. Practical information on preserving techniques and the construction and use of solar driers in communities is necessary. Improvement in income generation activities of rural households is also essential because low income hinders rural people from obtaining the foods needed for adequate diet. Their food security can therefore, be improved when their overall household income rises to the level that permits them to afford foods they need.

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