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Research Article

UTILIZATION OF WOODEN LOCKABLE FISH PONDS FOR ENHANCED HOUSEHOLD FOOD SECURITY IN PERI-URBAN AREAS OF BUSIA COUNTY, KENYA

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ABSTRACT

Wooden lockable fishponds are alternatives to earth fishponds made within home compounds with reliable water sources. They provide an alternative for increased fish production and ensure sustainable household fish production. The objectives of this study were to determine the level of utilization of wooden lockable fish ponds, to assess the food security status of households utilizing wooden lockable fish ponds and to establish the relationship between utilization level and household food security among households utilizing wooden lockable fish ponds in peri-urban areas of Busia County, Kenya. This was a cross-sectional study where purposive sampling of peri-urban households in Busia County was done and 135 households were randomly selected. Data collection was done using questionnaire guides, capturing socio-economic data and household food security status. Data analysis included descriptive and inferential statistics in order to explain the relationship between the various variables in the study. The mean average number of lockable fish ponds per household was 1.7663 with standard deviation of 0.0363. About 46.3% of households reported to own one fish pond, 29.1% owning two and 8.9% indicated to own four and above ponds. 57.3% of the households produced between 425-575 fish over a period of 7 months averaging to 1.59 fish per day. Many (65.8%) households reported of having at least three meals a day with only 7.1% reporting one meal a day. Conclusively, utilization of fish sales as an extra source of income because of increased fish supply contributed to improved household food security status.

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INTRODUCTION

In Kenya, there are various aquatic resources comprising fresh water lakes and rivers and an extensive ocean resource base. The fisheries and aquaculture sector contributes 0.8% to the gross domestic product (Kenya Aquaculture Brief, 2017), therefore providing direct employment opportunities to over 500,000 people and supporting over 2 million people indirectly. Jamu and Brummett (2004), explain that aquaculture is regarded as the practice of farming aquatic plants and animals such as fish, mollusks, crustaceans and aquatic plants in a modified environment. Farming entails the forms of intervention in the rearing process to enhance production including regular stocking, feeding and protection from predators. Wooden lockable fish ponds (WLFP) are fish ponds which are very advantageous over the earthen ponds especially when it comes to protection from predators such as birds of the air and lizards that bring about loss.

The new evidence in the state of food insecurity, confirms a rise in hunger indicating that the number of people who suffer from hunger has been growing over the past three years going

back to levels from almost a decade ago. Mwaijande and Lugendo (2015) describe fish farming as an approach for economic transformation and poverty alleviation. According to a global study by the Conservation International and World Fish Center (2017) which was assessing fish farming, findings revealed that fish farming is key to feeding growing urban populations. The results further reflected that fish farming and its fishery products provide valuable sources of protein and micronutrients for nutrition and good health. This means that it is key to improving both food security and nutrition security at household level.

Cook (2017) observes that fish farming has proven to be an innovative strategy for improving economic growth and well-being of communities. The use of wooden lockable fish ponds is therefore expected to help fill this gap of meeting the national fish supply by catering for supply at the household level. However, this has not been followed up in order to establish its sustainability in meeting the demand for fish increase. This study therefore sought to establish the utilization of wooden lockable fish ponds for increased household food

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security in peri-urban areas of Busia County. FAO (2009) advocates for policy formulation to safeguard small-scale fisheries that are fundamental for improving rural livelihoods. This is a challenge to stakeholders to provide support to fish farmers in vulnerable provinces where fresh water is abundant in order to generate employment and promote food security in such regions. Therefore, the results of this study are therefore key for policy enhancement such as the food and nutrition security policy since the results show that fish farming has an impact on household food.

MATERIALS AND METHODS

Study area and population

This study was carried out in Busia County because wooden lockable fish ponds have been introduced to various households for use in this area by RUDESAT organization. The main economic activity is trade with neighboring Uganda. This study adopted a descriptive cross-sectional design whereby data collection was at a point in time. The study population was the households in Busia County which practice fish farming using wooden lockable fish ponds. Households where wooden lockable fish ponds are used to rear fish were included in the study. Those households where fish farming is not practiced, and where other means other than wooden lockable fish ponds e.g. earthen ponds) are used to rear fish were not included in the study.

Sampling strategy

The study area was selected purposively because it is where wooden lockable fish pond farmers are located and also the farmers using wooden lockable fish ponds were sampled purposively. Households were randomly sampled to reach a representative sample of the whole population. Yamane Method (1967) was used to determine the sample size to be used in the study: a total of 135 households were studied.

Data collection and analysis

A self-administered questionnaire was used to collect data. It assessed the socio-economic status and demographic status of the households and entailed the parents/guardians level of education, occupation and household size. It also assessed the level of utilization of wooden lockable fish ponds and the household food security status. An observation checklist was used to record the types of fish grown in the ponds and a focus group discussion was held among the fish farmers to collect data on the effect of use of wooden lockable fish ponds on their household food security status. This data was represented by percentages, frequencies and tables in order to give a clear picture of findings. Relationship among utilization and food security was analyzed using descriptive and inferential statistics. Presentation of findings was done using tables and graphs.

Logistical and ethical consideration

Permission to conduct the study was obtained from Busia County, Ministry of Agriculture, Livestock and Fisheries. Participation in the study was voluntary. The participants were requested to sign a written consent after getting a detailed explanation of the study. The questionnaires did not require the identity of the participants and data collection and analysis was done with confidentiality maintained.

RESULTS AND DISCUSSION

Household Head

The results shown in Figure 1 indicate that most of the households were headed by fathers (48.7%) while 10.2% of households were headed by children. Likening these study findings with the Kenya National Bureau of Statistics, KNBS (2010) report, there is dissimilarity with the study findings as KNBS report did not provide information on households in which children are the head. The similarity was in the high cases of male household headship. There were also women headed household at 28.4% and also grandparent headed homes were represented by 12.7%.

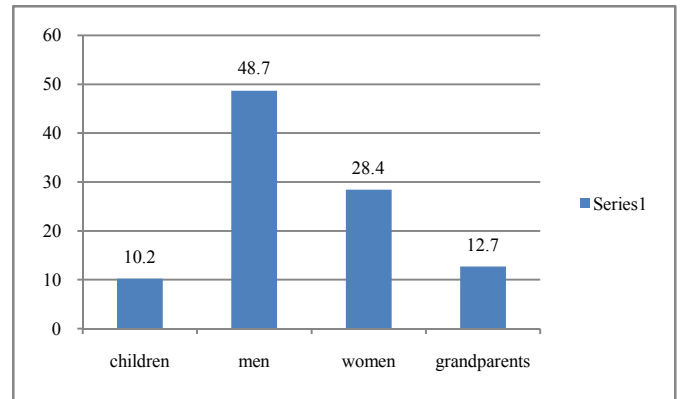


Figure 1 Household head percentage distribution

Occupation of the Household Heads

The results described in Figure 2 drew attention to significant proportion (23%) of own farm laboring as the main occupation of the household heads. This was followed by agricultural labor (14.1%). Fishing came in considerably with 11.8% trailing behind employed category which had 12.6%. This study finding varies greatly with what KNBS, 2010 reports. This could be the effect of the season because this study was conducted during the rainy season and much of the activities in the community were agricultural related. There could be also attributed to regional variation this being unique to Nambale Sub County. A study in the same area by Nungo *et al*, 2012 established that 74.9% of the land was owned by households (where n=319), 24.1% ancestral and 0.3% rented. This could explain why majority of the household heads prefer to farm on their own farms while another 14.1% are able to undertake agricultural labor.

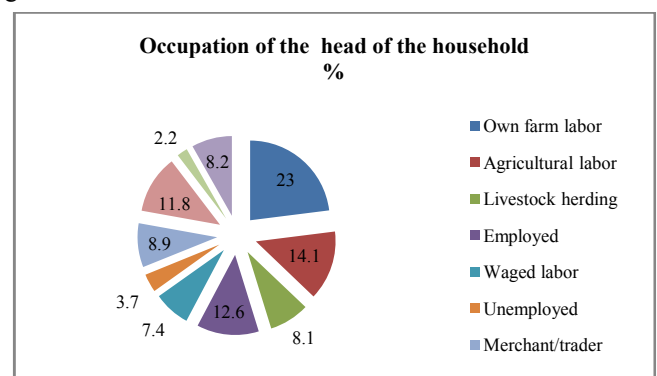


Figure 2 Occupation of the head of the household Weaving and basketry was equally significant occupation representing about 8.2%. This could be unique to this

community. This little variation in employment could be attributed to regional differences and also cultural influence within the community studied.

Livestock Ownership by Households

Significant number (65.2%) of households reported that they owned livestock. The main livestock owned was cow at 58.9%, chicken at 34.2%, sheep at 44.4% and goat at 31.2%. These findings are in line with Ministry of planning and national development, Busia County that indicates that 76% of households in Busia County keep various types of livestock. These households are a good example of integration of livestock rearing and aquaculture, a recommendation by FAO, (2012).

The study results vary with KNBS (2010) reporting a 38% livestock ownership nationally. The variation could be explained by the differences in cultural and economic activities by different regions. The study findings further indicated that 34.6% of the households sold much of the livestock kept to get income that is used for other activities in the household like paying school fees and buying food items

Fish Production by Wooden Lockable Fish Ponds

The main source of water for wooden lockable fish pond was reported as sub surface water at 71.8% obtained from water pumps that is not chlorinated. While the other sources were reported as river water (12.2%), pan (8.3%), tap (4.1%) and the rest obtained water from other sources.

All households studied had at least one wooden lockable fish ponds. These were 135 households studied. The mean average number of lockable fish ponds per household was 1.7663 with standard deviation of 0.0363. About 46.3% of households reported owning one fish pond, 29.1% owning two fish ponds and 15.7 % owned three fish ponds and 8.9% indicated to own at least more than four ponds. The ponds were of standard size with insignificant variations in size. Various factors could be the determinants of the number of fish ponds such as availability of space, construction and maintenance costs. On stocking of fingerlings per pond, there were variations from one farmer to another. Table 1 illustrates the stocking of fingerlings by households.

Table 1 Stocking of fingerlings by households

Fingerlings stocking	N	Percent households
50-100	11	8.1
101-200	31	23
201-300	39	28.9
300-500	47	34.8
>500	7	5.2

A test of correlation to analyze percentage distribution of fingerlings across the households in terms of stocking elucidated that there was significant ($p > 0.05$) association with the occupation of the household heads. Household heads involved in agricultural activities were more attracted to lockable fish ponds than any other occupation. The main factor that influenced the level of stocking was availability of funds which was reported by 61.2% of households while only 7.9% indicated availability of the fingerlings as a determinant factor for level of stocking. These can be highlighted as some of the challenges faced by wooden lockable fish pond farmers. Similarly a study in Siaya County, Kenya indicated that some

of the challenges that have affected this type of farming include the high costs of feeds and shortage of quality fingerlings amongst others (Shitote *et al*, 2013).

Amount of fish produced through wooden lockable ponds by Households

According to results from the structured interviews, they indicated that most (57.3%) of the households produced on average 425-575 fish over a period of 7 months averaging about 1.59 fish per day. Many (73.1%) of the farmers stocked tilapia species as a preferred type of fish as opposed to mudfish. Few households (5.6%) harvested more than 700 fish over a period of seven months. Quantitative data from Ministry of Agriculture Busia County (2017) report, indicate that many (38.8%) of the households produced on average 200-300 fish over a period of seven months. The variation with the current study findings could be attributed to the fact that current findings are specific to the study sites while Ministry of agriculture data was reflecting the whole picture of Busia County status.

One special feature about wooden lockable ponds fish harvesting process was that the process is ongoing which means that households harvested and restocked continuously. This allowed households to have fish throughout the year. From observations and self-reports, households enjoyed fish meal throughout the year.

Utilization of fish from LWFP by households

According to study findings, wooden lockable fish ponds have increased supply of fish within the Bahayo and Teso community which has helped control prices of fish thereby benefiting a large section of the community members. Eighty two percent of the households reported that wooden lockable fish ponds have increased supply of fish in the household and in addition 76.4% indicated that fish harvested from wooden lockable fish ponds is a big source of income to the households. Other than the fish, the water from the pond has been used in the kitchen gardening this was reported by key informants. They indicated that such water is loaded with nutrients that boost kitchen gardening in homesteads. This is a good indicator because utilization of the fish from wooden lockable fish ponds promotes economic development. According to Woods (2012), such trends result in the increased availability and quality of food thereby eliminating food shortages.

Food security situation and Coping Strategies

The food security situation of households was assessed using FAO food security assessment tool recommended by the Ministry of Health, Division of Nutrition, Kenya. Many (65.8%) households reported of having at least three meals a day with only 7.1% reporting one meal a day. From what was reported, the quality of the meals may have been low in terms of diversity but the quantity was above average. It is important to note that this study was done after onset of long rains and therefore households still had some food in store. About 44.2% of households reported of having food in store but insufficient. Only 13.4% reported to be having sufficient amounts to last up to the next season.

Households were asked in the month prior to the survey to state the coping strategies that their households had employed. The findings showed that a number of strategies were used by the

households. All households reported reduction in the number of meals consumed per day as a strategy commonly used. 80% reported reducing the size of meals as another coping strategy. Of great interest was that fish harvested from wooden lockable ponds was sold every day to provide a meal for the whole family from morning up to evening and therefore the strategy has been that, households ensure that the ponds are stocked fully in October- November of the previous years and have them mature by April of the following year which is then used for subsistence and sale.

CONCLUSION

The results from this study point out clearly that the level of utilization of wooden lockable fish ponds among peri-urban residents of Busia County is commendable because of the increased supply of fish among 82% of the households. Utilization of fish sales as an extra source of income was also high among the households.

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