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Assessment of a Smallscale Irrigation Scheme on Household Food Security and Leisure in Kokoligu; Ghana

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Abstract
The main objective of this study was to assess the impact of a small scale irrigation scheme on household food security and leisure time of the people in Kokoligu - a subsistence-based farming community in the Nandom District of Ghana. A total of fifty household heads adequately represented Kokoligu as homogenous community via simple random sampling technique. In-depth interview (IDI) schedules and observation guides were used to source information on food security situations before and after introducing the irrigation scheme and the effects of the scheme on residents' leisure during the off farming season. The study revealed that the irrigation scheme enhanced household food security and wellbeing during the off farming (dry) season but significantly reduced leisure; communal intimacy in addition to degrading the cultural heritage in the study area. Majority of the farmers (83%) irrigated vegetables, for household consumption and sale to complement the significant proportion of staple food crops (maize, millet and rice) cultivated during farming season to salvage their nutritional needs. With regard to the fading cultural heritage and communal intimacy, the paper recommended that cultural reawakening should be pursued through both formal education in schools and informal education by initiatives of the community elders and the traditional council.

Key words: food security, leisure, small scale irrigation, seasons, Ghana

1. Introduction

Adequate household food needs made people of Kokoligu not worry so much about the next meal decades ago. As indicated by the Food and Agricultural Organization of the United Nations (FAO, 2010) the number of undernourished people is higher now than in 40 years ago. Staple food crops such as maize, millet, rice and sorghum were cultivated during the single rainy season (May to October). Harvest was adequate for household consumption and surpluses sold to supplement household food needs. The off farming season (November to April) was a special period for leisure consequently meant for the reinforcement of cultural heritage through oral literature. This reflected in the commemoration of most social gatherings in the traditional area and the Upper West Region of Ghana in general within certain time frames. Traditional and social functions such as festivals, funerals and contraction of marriages attracted active participation within the period. The youth are gradually ushered into the traditional way of life of the people with high spirit of communalism within this period.

Invariably, multiple natural and artificial factors have distorted the single farming and leisure periods hence increasing the level of vulnerability of the people, exposing the region to food insecurity and eliminating leisure - a key period for informal teaching and learning of the cultural heritage of the area.

In an attempt to restore food security, a small scale irrigation scheme was introduced in 2006. The dam collects water during the rainy season and this is gradually distributed (channeled) into farms and gardens during the dry season. The people of Kokoligu are therefore engaged in some sort of farming throughout the year. It is from this background that the study sought to assess the impact of this small scale irrigation scheme on household food security situation in the study area. The study also did examine the effects of the off season farming activities afforded through the scheme on leisure time of indigenes, formally a period for cultural studies via oral literature presentation.

2. Household Food In/Security Situation – a Review of Literature

Multiple factors from natural events and human induced activities have given enough signals to the research community to ignite conscious efforts to ensure sustainable food security worldwide. The World Food Program (CFSVA Report, 2009) indicates that assessing the level of food security is driven by inter-related agro-environmental, socio-economic and biological factors.

Varied definitions and explanations of food security are focused on food availability, accessibility and utilization. This study derives its understanding of food security from the definition given by the Food and Agricultural Organization of the United Nations (FAO, 1996) as "food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life". This means that people may have the physical and economic access to food but to be totally food secured; the nutritional and dietary requirements for a healthy and strong life are necessary. The preference of the food type is yet another significant requirement; thus the capability to access a variety of food and to meet the expanded or narrow food preference is a basic requisite of a food secured people; thus limited access to preferred food choices depict food insecurity. Consequently, Holben (2004) briefly explained food security as having access to enough and nutritionally adequate food that is safe for consumption and acquired through socially acceptable ways. This implies that when a household or individual has limited opportunities to acquire safe and nutritious food, then they are within the circles/ambit of food insecurity. Consequently, Holben's explanation emphasized the process or ways of acquiring food as socially acceptable eliminating ways not commonly cherished by society.

Households commonly acquire food through purchases or own production (Ewumbu, 2011). Food crop cultivation to meet the household needs depend on the human and relevant material resources. In many developing countries, household food needs are driven by the use of rudimentary tools to cultivate small farm sizes just enough to feed the household but in the event of a good harvest, surpluses are sold to support other needs. The desire to purchase food at the household level goes through a process: the household begins to purchase food not cultivated by them and then graduate to purchasing any food available at high level of food insecurity. This, according to Graciana (2011), is the economic access to food. On the other hand, a household begins to sell food crops cultivated and harvested in abundance till critical moments when they sell whatever is available to cater for other needs. According to FAO (1997) the level of household food security depends on the income and assets base of the family.

Households in many developing countries attempt to reach their food needs through own production; and reliance on rain fed smallholder farming. The Consultative Group on International Agricultural Research (2011) indicates that climate change and unpredictable weather patterns are changing farming activities and negatively impacting on the food security situation – inadequate food production. Concrete and practicable interventions are required, not just the promises of heads of states and governments of African Union to increase domestic budget allocation to agriculture to reach 10% (Sasson 2012), but to streamline the present food supply chain to stimulate sustainable food supply systems and boost food security. This will gradually eliminate inadequate food production as the key cause of food insecurity (Sasson, 2012) and draw the world particularly Africa closer to achieving the Millennium Development Goal (MDG) number 1: to halve extreme poverty and hunger by 2015. However the Food and Agriculture Organization of the United Nations (FAO) in 2010 indicated that 13.5% of the world's population were hungry before the global food crisis in 2008 and hence concluded that the MDG goal one of 8% of the world's population hungry by 2015 is not achievable. FAO (1999) indicates that, this goal is achievable if and only if there is an annual reduction of 20 million undernourished individuals till 2015. It is a foregone conclusion that many more people are hungry because of the increase in the world's population, the desire for variety; the soaring food prices as a result of low crop yield, political instability; and the growing desire in the use of food crops as fuel.

There are a growing number of people falling below the poverty line and therefore becoming food insecure even though FAO of the United Nations (2003) indicates that available food for direct human consumption grew by 19% between 1960 and 1994-96. Immediately following this success in adequate food availability, 820 million people with about 790 living in developing countries were undernourished between 1995 and 1997 (FAO, 2003). In 2010, the number of undernourished individuals in the world had increased by 11.4% with about 907 million individuals living in the developing world (Van Eeckhout, 2010 cited in Sasson, 2012).

Efforts in reducing the numbers of people falling into extreme poverty are more in principle than practically oriented approach partly because of selfish national interest. For instance, promises made by the G 8 in 2008 to address

hunger and undernourishment by contributing a total of US$22 billion over a period of three years is still to be realized. However, the collaborative efforts from the United States, Cananda, Spain, South Korea including the Bill and Melinda Gates Foundation yielded US$ 900 million towards a global food security programme (Sasson, 2010). Bill Gates contributes in the form of expertise and focus on transforming small farmers to increase their productivity through appropriate technology. This is of great benefit to the developing world because households cultivate food crops on small farm size for consumption and sale to meet other household needs (Bagson and Beyuo, 2012).

2.1 Small Scale Irrigation Schemes and Food Security

Food crops production is affected by the vagaries of the weather but irrigation schemes which have been used since ancient times (Grove, 1989) has positively controlled the effects of floods and droughts on food crop yields. An effective irrigation scheme serves as reservoir during floods and a dependable source of water in drought. This enhances continuous farming all year round and boosts food availability and opportunities for employment and general well being. Consequently governments are severally introducing citizens to irrigation worldwide. For instance, between 1970 and 1990, irrigated land had increased by 17% worldwide (Andrew and Jackson, 1996). However, the limiting factor in many developing countries is the high cost element in the construction of irrigation schemes and the necessary technical expertise to manage the scheme and the judicious use of the water available. In Ghana, there are sites designated as food basket zones and suitable for irrigation schemes but the political will to invest in irrigation schemes is dwindling. However, there are non-governmental organizations in some rural areas in Ghana gradually introducing rural dwellers to food crops cultivation via small irrigation schemes. According to GorCornist (1999) irrigation farming is a source of income for peri-urban dwellers and also source of income for disadvantaged rural people (Chazovachii, 2012). Irrigation farming has become a relief to the poor and disadvantaged especially in the developing countries. More so, irrigation is a “welfare” enhancing agent because it fosters the cultivation of early maturing vegetables for both household consumption and sale. According to Makumbe, (1996) cash earned from the sale of produce from the irrigation project in Mutambara (Zimbabwe) is used to meet some of the basic needs of the people. Consequently, there is some level of improvement in rural infrastructure situation because of functional irrigation projects in some rural areas (Chazovachii, 2012) though the project might not be able to attract high industrialization. The development in the road and telephone networks, schools and health posts put the people in a position to initiate self help and dependable projects via sustained source of income. These unravel the fact that irrigation schemes contribute to food security; people are able to afford food and access varied dietary requirements. It is in this direction that rural-urban migration is gradually reducing (Chitsiko, 1999) and many more youth are now willing to remain in rural areas to engage in irrigation farming.

3. Methodology

Fifty household heads adequately represented Kokoligu as a homogenous subsistence base farming community. In the Kokoligu Traditional Area, household heads are key determinants of the food security situation and leisure time for household members. According to the 2000 Population and Housing Census (GSS, 2005), the community has a total of 423 inhabitants comprising 85 households. Based on this information, 50 household heads (which is more than half the total number of households in the entire community) was seen as a highly representative sample. A list of these 85 household heads was sourced from the opinion leaders from which the 50 household heads were randomly sampled (simple random) and interviewed. To fully explore the food security situation in the study area; both closed and opened ended questions made up the interview guide. Nevertheless, a seasonal calendar was included in the guide to gradually unravel the various seasons and food security strategies in the traditional area. Data analyzed was presented in charts to depict a pictorial out look of the findings.

4. Results and Discussions

4.1 Demographic Characteristics

With regard to demographics, majority of the respondents (93%) were male household heads and core leaders in enhancing food security and determining leisure periods in the home. The female household heads (7%) were however led by their male sons (adults or teenagers) in attempts to secure household food needs but no apparent leader in determining leisure periods in the house. There were no forms of gender discrimination with respect to access to water as indicated by Hope, Dixon and Maltitz (2003) but the intense physique required and high cost involved in constructing gardens at the dam site left many women “stressed up” and therefore a disincentive to women direct involvement in the irrigation scheme in the Kokoligu Traditional Area. The household heads are all smallholder farmers with an average household size of five. Majority of the respondents (85%) have had some formal education up to the basic level and this facilitated the adoption of appropriate technology in farming both

before and after the construction of the irrigation scheme. Gardeners within the irrigation scheme now successfully prepare compost to boost the soil fertility in the event of incessant land use; the use of animal traction as an upgrade of the traditional hoe and cutlass and adaption of appropriate vegetables bed types per the water availability.

4.2 Food Security Situation Before and After Introduction of Irrigation

A large proportion of the respondents (73%) identified two distinct seasons about twenty years before the construction of the dam in 2006. These are the rainy season (May to October) and the dry season (November to April). Each of these seasons had varied food security enhancing activities; however, a significant proportion (86%) of the farmers' time is spent on the farm and 14% as leisure time during the rainy season twenty years ago. The leisure time is on Sundays since majority (94%) of the respondents are Christians.

It was revealed that the second quarter of the year (April to June) marked the peak period of food insecurity annually. As indicated in figure 1, about 56% of the respondents experienced acute food shortage within the months of April to June.

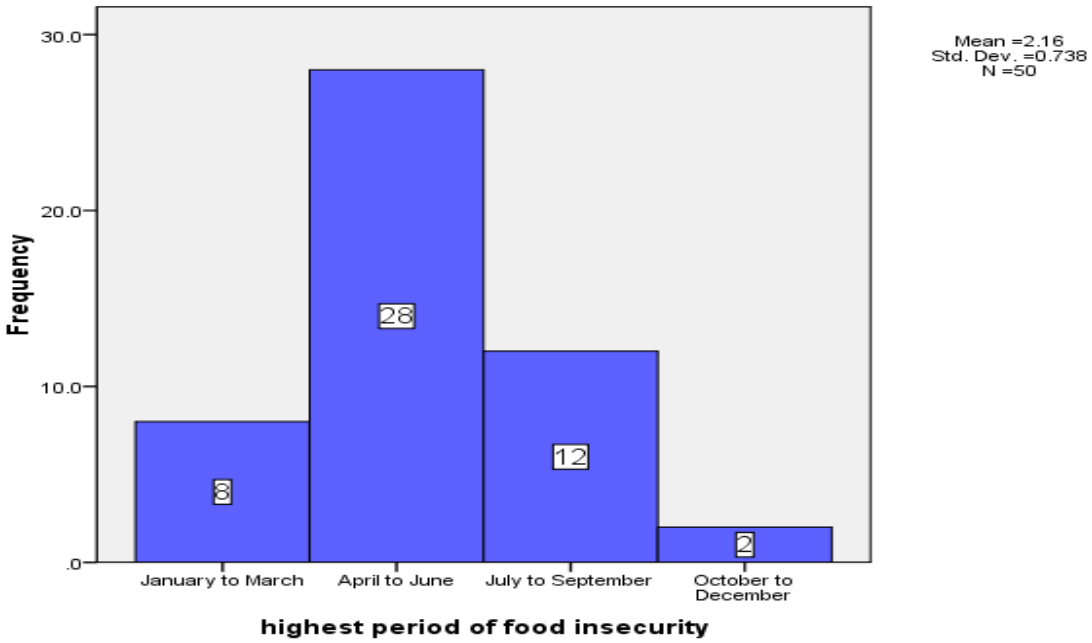

Figure 1: Peak period of food insecurity in Kokoligu

Source: Field work, 2012

This was attributed to the fact that the single rain fed farming season did not yield adequate harvest to cater for the average household size of five individuals throughout the year. The majority of respondents (78%) identified the regular use of poor quality seeds and incessant farming on the same piece of land as the most obvious causes of low food crop yield in the traditional area.

However, as low as 4% of the respondents experienced food shortages in the last quarter of the year as indicated in Figure 1. The majority (96%) indicated that there was abundance of food within the last quarter of the year because the farm produce was ready and harvested and also due to the fact that household sizes dropped. There was reduction in household size because immediately the farm produce are maturing in August through to September, majority of the youth (86%) migrated to southern Ghana to engage in menial work as an adaptive livelihood strategy. The migrants returned in December through to January mostly with maize, cassava flour and money to support household food needs. Nevertheless, the food security situation becomes worst off in May/June because farmers have to use the stored food as seeds in their farms and furthermore household sizes increased this time around as a result of the

returnee migrants. The adaptive strategies include: one meal, mostly at night, for adults but for children under five years, bit and pieces mothers laid hands on during the day may suffice.

The major food crops cultivated in the rainy season before and after the construction of the irrigation project are illustrated in figure 2. In this regard, most of the respondents (34%) indicated that maize was the most popular food crop cultivated on their farms. However close to 26% of farmers cultivated maize for household consumption whilst the remaining 8% cultivated the crop for household consumption and sale to cater for other needs.

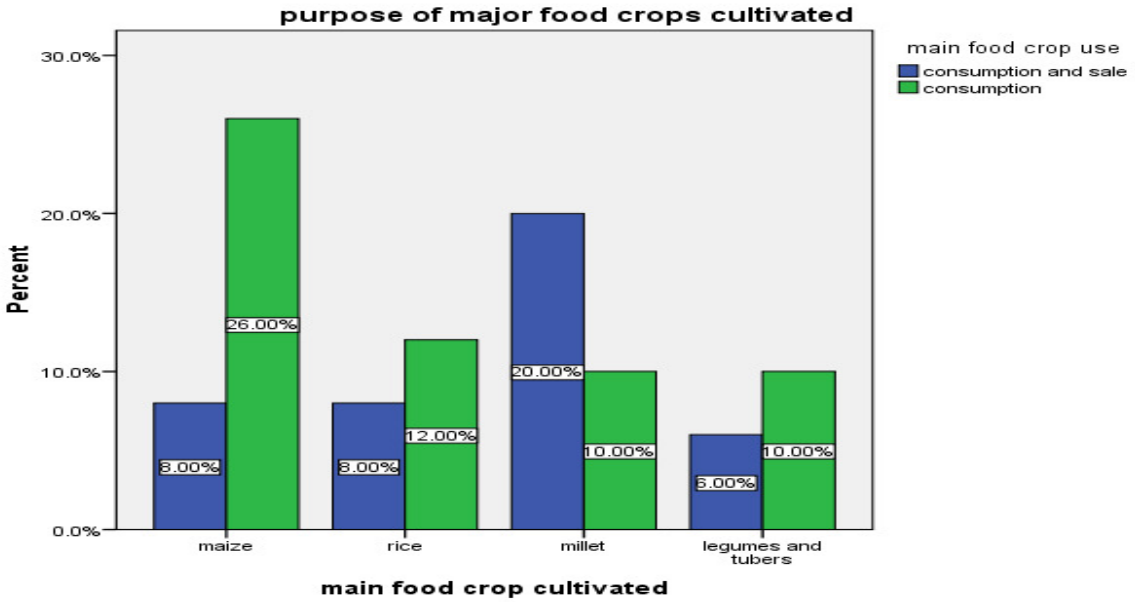

Figure 2: Main food crops cultivated in Kokoligu

Source: Field work, 2012

Majority of the 30 per cent of millet farmers (20%) cultivated the crop for both consumption and sale. A large proportion of millet is sold due to high demand of it for the brewing of "pito" (a local alcoholic beverage). As illustrated in figure 2, it implies that majority of the farmers (58%) cultivated these major food crops only for household consumption even though they became highly food insecure in the second quarter of the year because of the reducing food crop yield over the years. The respondents collectively acknowledged that, major food crops such as maize, rice, millet and bits of legumes and tubers are cultivated in the rainy season before and after the construction of the irrigation scheme.
Respondents, however, also did indicate they were engaged in various food security enhancing activities in the dry season before and after the introduction of the irrigation scheme (figure 4).

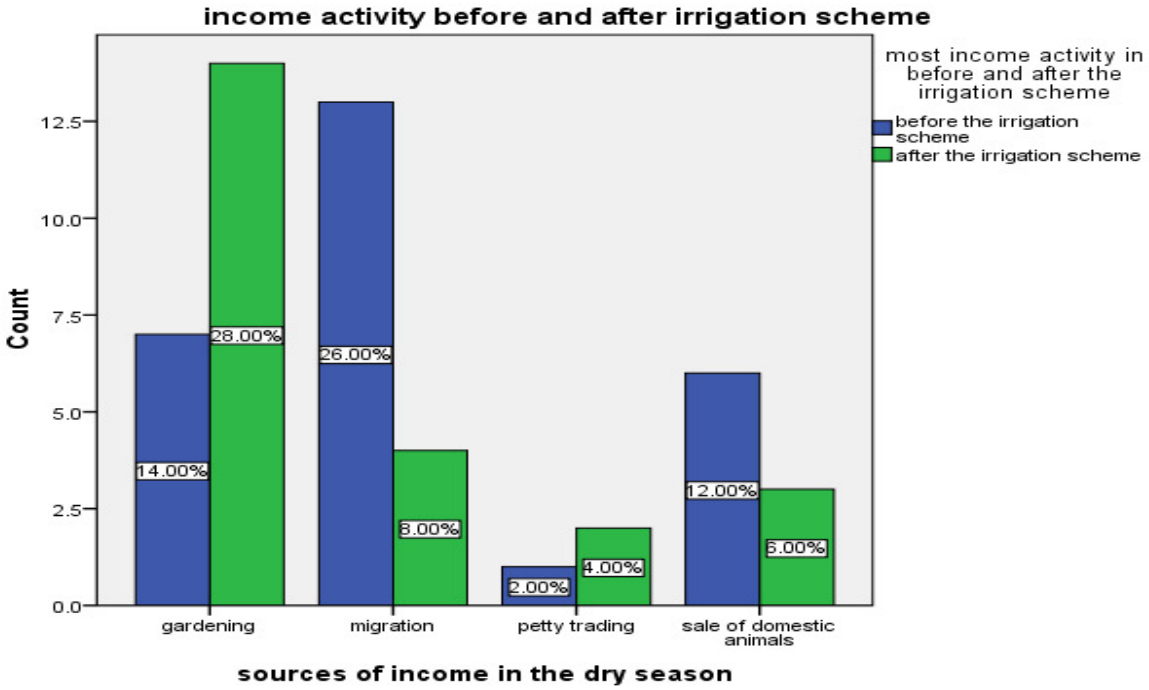

Figure 3: Sources of income in the off farming season in Kokoligu
Source: Field work, 2012

The study revealed that majority of the respondents (42%) is engaged in gardening to boost their household food needs. A further revelation was that 14% and 28% respectively were into dry season gardening before and after the irrigation scheme was introduced. About 34% seasonally migrated to southern Ghana to do menial jobs but with the construction of the dam for irrigation purposes, only 8% still engaged in seasonal migration. The majority of seasonal migrants (26%) are now deriving their livelihoods from the irrigation scheme which is impacting positively on household food needs situation in the community as posited by GorCornist (1999) and Chazovachii, 2012). Furthermore, more people are venturing into petty trading in the community after the construction of the irrigation dam project. Even though 6% of the respondents are into trading [before (2%) and after (4%) the construction of the irrigation scheme] all those into gardening and rearing of livestock (fowls and animals), sell some to support the household food needs. This confirmed Makumbe (1996) that cash made from irrigation proceeds is used to meet some basic needs of people.

It was observed that backyard gardens provided assorted vegetables for the household food needs before and after the construction of the irrigation scheme. Farmers cultivated assorted vegetable on the same piece of land (Bagson and Beyuo, 2012). Nevertheless, commonly cultivated vegetables, in large quantities, before and after the irrigation dam are illustrated in figure 4.

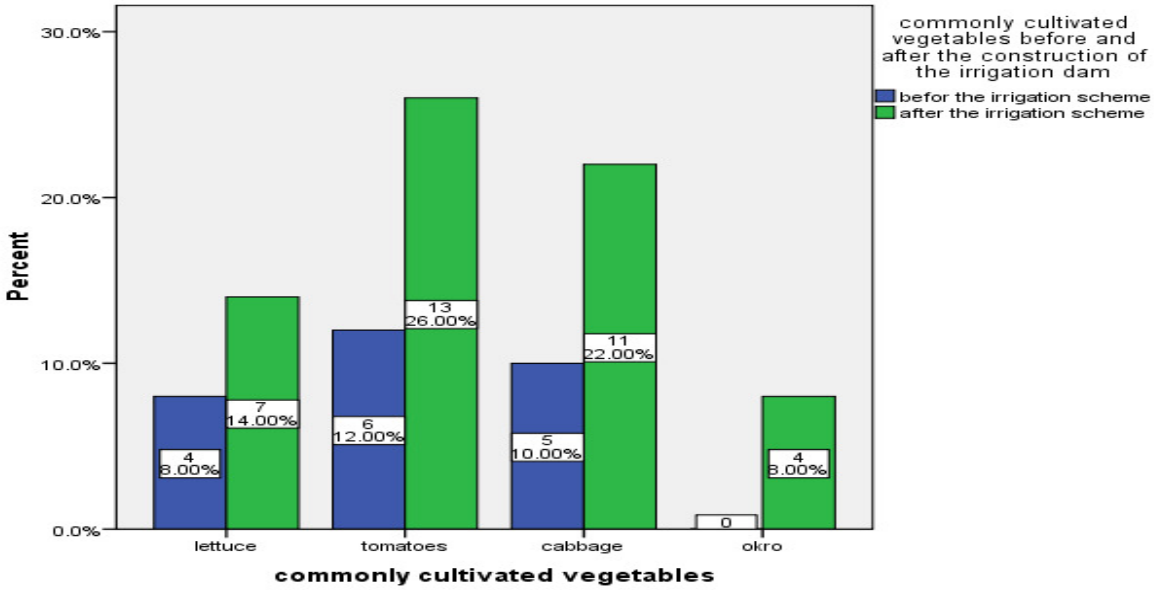

Figure 4: commonly cultivated vegetables
Source: Field work, 2012

As indicated in figure 4, majority of the respondents (38%) cultivated tomatoes as the main vegetable before (12%) and after (26%) the irrigation scheme for both household consumption and sale. Majority are into tomato production in Kokoligu because it is a vital ingredient in sauces/soups which complimented the main staple foods of the area. Aside from this, tomato from their fields is also in high demand in neighbouring Nandom and Hamile markets. It was also revealed that okro cultivation became popular after the irrigation scheme was introduced in the Kokoligu Tradition Area. It is worthy of note that okro produced from irrigable gardens here is also very popular with major consuming centres such as Nandom and Hamile. The study also revealed that 66% of respondents are into vegetables cultivation after the introduction of the irrigation scheme and thus denotes reduction in the number of youth who are willing to engage in seasonal internal migration during the dry season.
The food security situation according to respondents (100%) is fairly stable now in the traditional area due to the introduction of the irrigation scheme. The people are engaged in the cultivation of major staple food crops in the rainy season but now cultivate vegetables in the dry season. Surplus vegetables (which are also perishable) are sold to fetch more income which at times is used to buy more staple foods should stocks in barns diminish drastically in the lean season. This is in consonance with Ewumbu (2011) who opined that households meet their food needs by purchase or by own production and this same scenario has been described by some schools of thought as economic access (Graciano, 2011).

4.3 Leisure Before and After Introduction of Irrigation Scheme

As illustrated in figure 5, the leisure period available to households and the community at large, before the construction of the dam, was within the first quarter of the year. This is because the only rainy season would have been over and there was little to be done on farms and as such, more time for leisure. It is within this period that participation in social events became very effective. Effectively participated in and common social activities within this period are: weddings, funerals, group hunting, worships (Christians and traditionalist) and storytelling at night. It was within this time that elders enforced the teaching and learning of communal cultural norms and values. It became an annual affair and appropriately this timeframe was used to inculcate the cultural norms, traditions and values to the youth who most often were enticed to attend these social gatherings.
The second quarter of the year recorded less time for leisure pursuits (4% of respondents attested to this) because it is within this period that the community engaged in the cultivation of staple food crops.

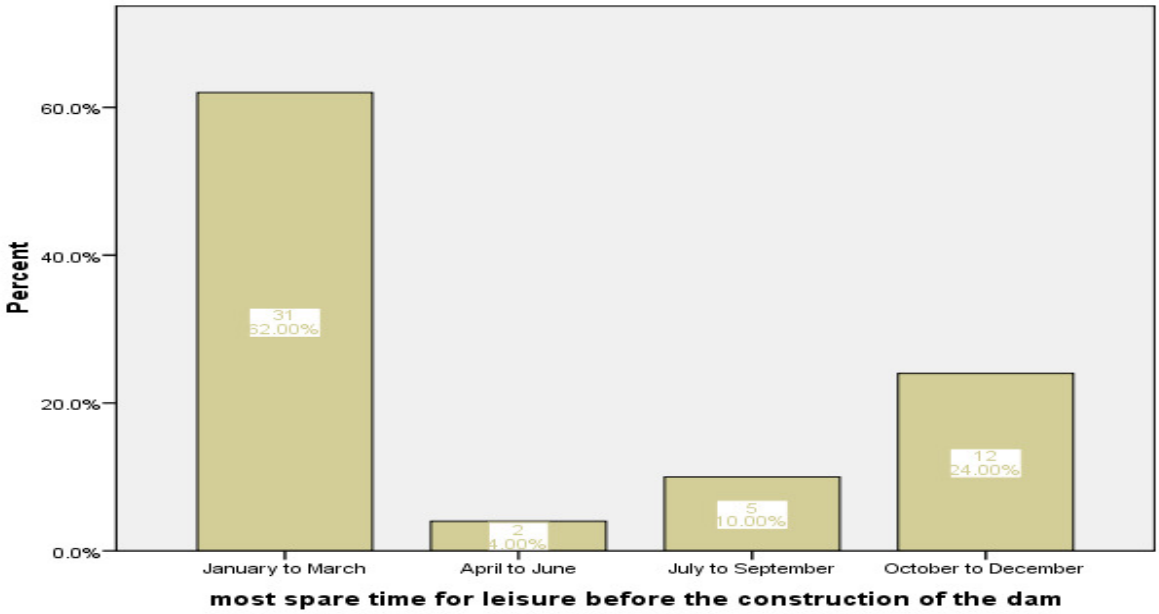

Figure 5: Time for leisure before the construction of the dam in Kokoligu
Source: Field work, 2012

However, after the construction of the dam, close to 54% of the respondents indicated that the last quarter of the year availed the most spared time for leisure pursuits (see figure 6). The respondents indicated that, even though planting of the food crops was strategic that food crops mature and harvested in turns, people are less attracted to social gathering because of the series of farm activities available this time around. It implies that people in the community now have very limited leisure time after the irrigation scheme was introduced because immediately after harvesting the staple food crops they have to prepare for the cultivation of vegetables in the irrigable gardens. It further means that very little time is available now than before for the inculcation of the traditional values and norms by the elders to the youth of the traditional area.

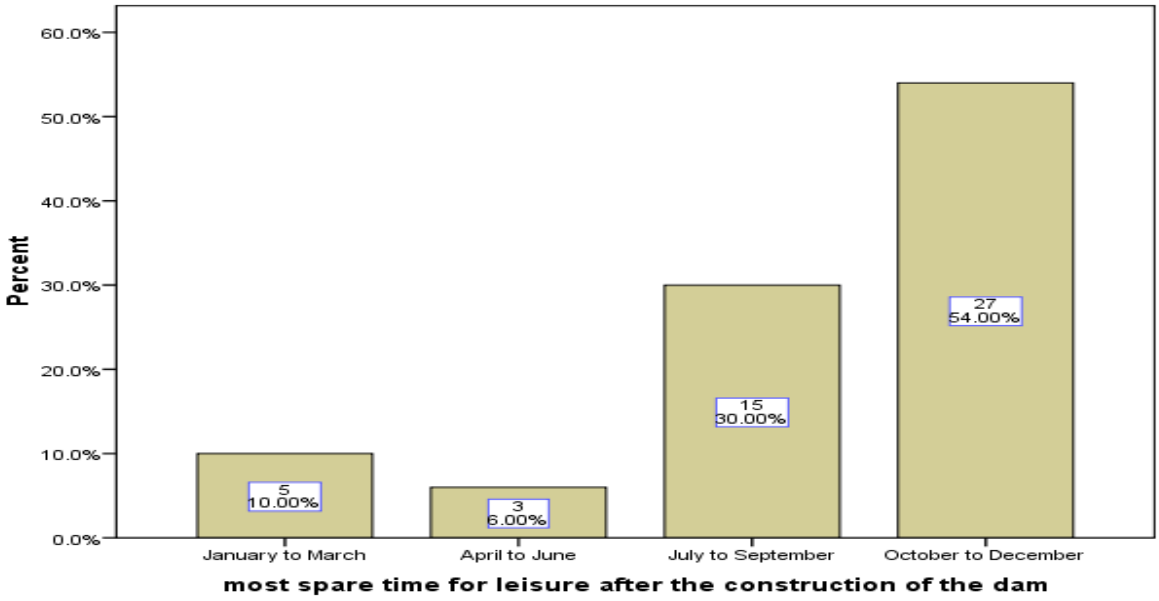

Figure 6: Time for leisure after the construction of the dam in Kokoligu
Source: Field work, 2012

5. Conclusion

Small scale irrigation schemes in the poverty reduction and livelihood enhancement discourse especially in recent times when the rainfall pattern is increasingly becoming erratic are very important in enhancing food security. This study brought to the fore that the food security situation has improved after the completion of the scheme because agricultural related activities became all year round with dry season gardening providing the necessary ingredients (vegetables) to complement staple foods produced during the rainy season. The study also revealed that the advent of the scheme has significantly reduced migration of the youth from Kokoligu who sought menial jobs in southern Ghana; this time around, they stayed back and earn extra cash from sale of fresh vegetables which are now popular in consuming centres such as Nandom and Hamile markets. So goes the old adage that "one cannot eat his cake and have it" hence the pursuance of small scale irrigation farming is negatively impeding the cultural cohesion of the locality because the only leisure time frame meant for social activities which enhanced their cultural heritage is waning off (less leisure time now) because indigenes now stay on farms and gardens throughout the year.

6. Recommendations

The study hereby recommends that:

1. The district assembly and the traditional leaders need to exploit the feasibility of sinking hand dug wells located within vantage points around the dam area. This would serve as extra reserviours to keep the irrigable gardens surviving in the event of the dam drying up.
2. Cultural reawakening programmes should be vigorously pursued through formal education at basic schools to foster learning of the culture by the youth. Furthermore the chief and elders of Kokoligu owe it a duty to appeal and implore on indigenes to make time out of their busy schedules and partake in communal events/activities which will go a long way to ensuring that the youth also develop interest in such.
3. The traditional authorities need to enforce the use of aluminum fencing and gradually reduce the use of mud to construct fence which silts the dam.
4. The Ministry of Food and Agriculture and the district agricultural extension officers ought to guide gardeners construct proper canals to adequately distribute water to gardens both within and afar the dam area.

5. The Ministry of Food and Agriculture needs to make available viable/improved variety of seeds to discourage the recurring use of stored grains as seeds for sowing in gardens and farms.

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