

# An Analysis of Small Scale Irrigation Farming and Poverty Reduction in North-Eastern Ghana

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**Abstract** - Strengthening agriculture is critical for facing the challenges of rural poverty, food insecurity, unemployment, and sustainability of natural resources. Small scale irrigation farming has been recognized as an important avenue for improving the well being of poor people living in arid and marginal areas of the world.

The study examined the contribution of irrigation schemes to poverty reduction in the Garu-Tempene District with reference to Bugri and Gagbiri communities in North-Eastern Ghana. In conducting this research various participatory tools of data collection including interviews, observation and focus group discussions were used.

Despite some bottlenecks identified as affecting the smooth operations of irrigation schemes, the irrigation schemes still serve as a major avenue of poverty reduction in these communities. The contribution of small scale irrigation farming to poverty reduction in these communities were in the form of food security, improved household incomes and ability of farmers to access social services such as education and health services for their families. The schemes had the potential of generating income for the growing number of unemployed people especially in the immediate communities. In the Garu-Tempene District of North-Eastern Ghana, small scale irrigation farming constitutes a major source of livelihood for the people especially in the dry season when the absence of rains makes the cultivation of crops and rearing of animals (which is the major economic activity of the people) very difficult and almost impossible.

**Key words:** *Garu-Tempene, Irrigation Schemes, Poverty Reduction, Income, Food Security and Social Services.*

## INTRODUCTION

Poverty as a social phenomenon is opened to a myriad of explanations and interpretations depending on the school of thought of the person. Although the nature of poverty varies depending on gender, age, culture, and location of people there are obvious similarities across countries. Material deprivation, troubled gender relations, discriminating social relations, lack of security, ineffective institutions, and lack of information, education and health remain the main characteristics of poverty (Klein and Hadjimichael, 2003). Poverty is the inability to command sufficient resources to satisfy basic needs (Todaro and Smith, 2003). This means the inability of people to meet basic needs such as food, education, healthcare, shelter and to participate in decisions that affect them. According to IFAD (2007), Poverty is basically a rural problem and three quarters of the extreme poor live in rural areas and

depend on agriculture and allied activities to earn a living; this is manifest in North-Eastern Ghana and for that matter the Garu-Tempene District where many poor rural people face chronic food insecurity. Livelihoods are more vulnerable in this region, and all the members of the community suffer as a result of food insecurity during some parts of the year. Among the causes of rural poverty, according to the government's poverty reduction strategy paper, (GPRS I, 2003), are low productivity and poorly functioning markets for agricultural outputs. Small-scale farmers rely on rudimentary methods and technology and they lack the skills and inputs, such as fertilizer and improved seeds that would increase yields. Because of erosion and shorter fallow periods, soil loses its fertility, posing a long-term threat to farmers' livelihoods and incomes. Increasing population pressure leads to continuous cultivation in the densely inhabited Upper East region. In the case of the Garu-Tempene it is 99 persons per sq. km (Garu-Tempene District Medium Term development plan 2006-2009). Seminally, the underdevelopment and the pervasive poverty in the north, hence the Garu-Tempene district has been put squarely at the door steps of the colonial administration's policies and that of successive governments after independence.

To escape from poverty, the poor need jobs. Investment is crucial to alleviating poverty because it is the mechanism that provides jobs. The main issue is not just employment, but increasingly productive employment that allows living standard to rise (Klein and Hadjimichael, 2003). In view of this government and various development bodies such as the World Bank and IFAD have seen the need to undertake interventions that is aimed at targeting the poor to earn a decent income. The GPRS II (2006) therefore recognized agricultural modernization as a major tool to alleviating poverty especially in the driest savannah. The document recognizes the fact that rain-fed agriculture cannot amply meet the demands of providing food and sustainable income to people. The government has therefore sought to develop a systematic policy to conserve and utilize rainfall in all parts of the country by taking a cue from Burkina Faso, by using simpler and cheaper technologies for the harvesting and the use of rain water. The construction of these irrigation facilities in Bugri and Gagbiri communities of the Garu-Tempene District is in line with the goals of GPRS II. The farmers and people in the communities therefore depend on these facilities for their livelihoods.

Agriculture is Ghana's most important economic sector, employing more than half the population on a formal and informal basis and accounting for almost half of GDP and export earnings (GPRS II 2006). Agricultural crops, including yam, grains, cocoa, oil palm, and timber, form the base of Ghana's economy. The cultivable area of Ghana is estimated to be 10 million hectares (ha), which is 42% of the total area of the country and this (the sum of arable land and permanent crops) was about 6.33 million ha in 2002 (FAO, 2008). Rain-fed agriculture is predominant and average farm size is small (<1.2 ha), thus smallholder farms dominate the sector, accounting for about 80% of total agricultural production. According to the FAO, the main consumptive water uses in Ghana are for domestic, industrial, and irrigation purposes. In 2000, about 652 million cubic meters (m<sup>3</sup>) were withdrawn for irrigation (66%), 235 million m<sup>3</sup> for domestic purposes (24%), and 95 million m<sup>3</sup> for industry (10%), giving a total water withdrawal of 982 million m<sup>3</sup>. Total irrigation potential of Ghana has been estimated at 1.9 million ha. The FAO stipulated that the development of formal irrigation is comparatively recent in Ghana. The first schemes were initiated in the early 1960s and 22 public irrigation schemes existed in the country by 2003. The construction of most of the schemes was supply-driven and emphasis was often on developing exclusively smallholder plots regardless of whether interested smallholder farmers and with irrigation experience were available and willing to cultivate them. In other instances where grants and loans were procured for construction of irrigation schemes, the sources where supplies were purchased were determined by the donor country without the choice of buying from the cheapest source.

The Kpong Scheme in the Greater Accra Region for instance, had a development cost of US\$2,200/ha (year 2000 cost). In contrast, the Tono Scheme in the Upper East region had a development cost of US\$40,000-50,000/ha. Since irrigated agriculture is relatively new in Ghana, the management of the schemes had hitherto been entrusted to the staff of GIDA, and the relatively larger projects to reputable consultancy firms during the first few years after completion. A few irrigation projects in the country are operated by private companies. Because of the precarious financial state of GIDA most of the public irrigation schemes have deteriorated and need some form of rehabilitation, they are operating at low levels of overall efficiency. Water use efficiency at conveyance and field levels is low since no concerted efforts have been made to address the problem of water losses. This calls for more action to be taken to introduce a lot of small holder schemes that can be managed by communities through decentralized Water User Associations who will see to the day-day management of the schemes. The idea is to imbibe into community members the sense of ownership. This guarantees greater sustainability of irrigation schemes as well as enhancing efficiency and equity in the use of water resources (Shah et al, 2002; Obeng and Agyenim, 2013). In view of this the Ghana Poverty Reduction Strategy (GPRS) (2003), mentions irrigation development and rehabilitation

of existing viable facilities to attract private sector management as part of its package of infrastructure enhancement. Financial support within the GPRS (total budget for modernizing agriculture: US\$84.1 million) was earmarked for the vigorous promotion of mainly small-scale irrigation schemes which communities and districts can easily construct and maintain as in the case of the irrigation schemes in the Bugri and Gagbiri communities of the Garu-Tempene District of north-eastern Ghana.

#### METHODS OF IRRIGATION

Irrigation techniques differ in how the water obtained from the source is distributed within the field. In general, the goal is to supply the entire field uniformly with water, so that each plant has the amount of water it needs, neither too much nor too little. Freken (2005) identified three main types of irrigation. These are surface irrigation, drip/trickle irrigation and sprinkler irrigation. These are discussed below:

- *Surface Irrigation* - Surface irrigation is defined as the group of application techniques where water is applied and distributed over the soil surface by gravity. It is by far the most common form of irrigation throughout the world and has been practiced in many areas virtually unchanged for thousands of years. Surface irrigation is often referred to as flood irrigation, implying that the water distribution is uncontrolled and therefore, inherently inefficient. Surface irrigation comes in three major types; level basin, furrow and border strip.
- *Drip Irrigation* - Drip irrigation, also known as trickle irrigation or micro irrigation is an irrigation method which minimizes the use of water and fertilizer by allowing water to drip slowly to the roots of plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing, and emitters. Modern drip irrigation has arguably become the world's most valued innovation in agriculture since the invention of the impact sprinkler in the 1930s, which replaced flood irrigation. Drip irrigation may also use devices called micro-spray heads, which spray water in a small area, instead of dripping emitters.
- *Sprinkler Irrigation* - In sprinkler or overhead irrigation, water is piped to one or more central locations within the field and distributed by overhead high-pressure sprinklers or guns. A system utilizing sprinklers with sprays, or guns mounted overhead on permanently installed risers is often referred to as a solid-set irrigation system. Higher pressure sprinklers that rotate are called rotors and are driven by a ball drive, gear drive, or impact mechanism. Sprinklers may also be mounted on moving platforms connected to the water source by a hose.

### *Contribution of Small Scale Irrigation Farming to Poverty Reduction*

Interest in small scale irrigation owes much to the 'small is beautiful' school and the search for alternative form of development. These are in turn related to ideas of sustainable development or economic development (IUCN, 1980, Redclift, 1984; Adams and Carter, 1987). Relevant also are ideas of 'development from below' (Taylor, 1981; Adams and Carter, 1987), and basic needs and poverty-oriented strategies. Therefore the overall government policy in most African countries is to promote social and economic development through irrigated agriculture which is sustainable over time, economically justified, financially viable, socially acceptable and technically sound, without causing unacceptable impacts on the environment. Irrigation development programmes must also benefit as many household as possible and in particular those that belong to the most vulnerable groups of the rural community. Irrigation development, particularly small-scale irrigation, will be an important component of a diversification and expansion strategy to strengthen food security for the future. There is therefore a need to identify crops and irrigation techniques which will give higher returns to irrigation water and overall investment.

According to Hussain and Hanjra, (2004) there are strong direct and indirect linkages between irrigation and poverty. Direct linkages operate through localized and household-level effects, while indirect linkages operate through aggregate or sub-national and national level impacts. Irrigation benefits the poor in the sense that it leads to higher production, lower risk of crop failure, higher yields, and all year-round farm and non-farm employment. Irrigation also enables smallholders to adopt more diversified cropping patterns, and to shift from low-value 'hand-to-mouth' staple production to high-value market-oriented production. Increased production increases food availability and makes it affordable for the poor. Because irrigation investments leads to production and supply shifts, indirect linkages operate through regional and national levels and tend to have a strong positive effect on the national economy (ibid).

Hussain and Hanjra (2004) also identified five key dimensions of how access to good irrigation water contributes to socioeconomic upliftment of rural communities and poverty alleviation. These are production, income and consumption, employment, food security, and other social impacts contributing to overall improvement in welfare and these dimensions are interrelated. The access to good irrigation facilities enables smallholder farmers to intensify production which helps to increase their production and income, creates employment opportunities for the local people, increases the opportunity of smallholder farmers to diversify their income base, and to decrease their vulnerability to external shocks such as drought and floods due to short and erratic rain fall conditions.

Historically, interventions in irrigated agriculture have yielded immense benefits to many societies, for instance, cereal production in Asia has more than doubled between 1970 and 1995, from 300 million tons to 650 million tons and this has been attributed to growth in irrigated agriculture in addition to high yielding crop varieties and fertilizers (Hussain and Hanjra, 2004).

Many sub-Saharan African countries have also recognized the contribution of irrigation to food production despite some constraints (FAO, 2000; Assefa, 2008). The success of irrigation schemes to production for example has been reported to have benefitted smallholder farmers in Zimbabwe in that they could secure food production thanks to irrigation and the use of high-yielding varieties and fertilizers (ibid).

In India poverty head count ranges from 18% to 53% in irrigated areas and 21%-66% in rain fed areas and poverty incidence is 20%-30% lower in most irrigated areas compared to rain fed areas (Hussain and Hanjra, 2004). Studies also show that the incidence of chronic poverty is 10% and 5% lower for irrigated settings in Sri Lanka and Pakistan respectively than adjoining rain fed areas (Hussain and Hanjra, 2004). The poverty gap index used as a measure of the extent of poverty in these areas showed that poverty is much higher in rainfed areas than irrigated areas (ibid).

In West Africa irrigation farming has also benefited a lot of smallholder farmers. In Gambia, irrigation provided smallholder farmers the opportunity for increasing income that was reflected in increased expenditure, investment in productive and household assets, savings and trade, all attributed to increased farm productivity (Webb, 1991; Assefa 2008). Finally, in Ghana, studies around Kumasi confirmed that farmers' income from irrigation can be several times the income of farmers engaged in rain-fed agriculture (Drechsel and Cofie 2007). The above contribution of irrigation farming makes it very important for the Government of Ghana to increase the size of agricultural land currently under irrigation especially small scale irrigation schemes which can directly be managed by communities themselves.

### *Analysis of Small Scale Irrigation Farming in Bugri and Gagbiri*

This Part of the study looks at the issues of small scale irrigation farming in Bugri and Gagbiri of north-eastern Ghana and its contribution to poverty reduction. The section examines the farm holdings of farmers, the major crops grown, the output and income from the sale of farm produce.

### Farm Holdings of Small Scale Irrigation Farmers

From the data collected it was observed that the farm holdings of small scale irrigation farmers range below a hectare to six hectares. From Table 1, it is observed that 40.9% of farmers have farm sizes between 1-2 hectares, 25.8% and 23.3% have farm sizes between 3-4 hectares and below 1 hectare respectively while 10% have landholdings between 5-6 hectares. This clearly indicates that farmers at the schemes do not farm on a large scale. The reason given by farmers is that due to the growing population in the communities the landowners have to release part of their land to others so that they can also enjoy the benefits of dry season irrigation farming. This underscores the importance of the small scale irrigation schemes to the people of Bugri and Gagbiri and for that matter the Garu-Tempene district.

Table 1: Farm Holdings of small scale Irrigation Farmers

| Farm Holdings in Hectares | Frequency | Percent |
|---------------------------|-----------|---------|
| < 1                       | 28        | 23.3    |
| 1 - 2                     | 49        | 40.9    |
| 3 - 4                     | 31        | 25.8    |
| 5 - 6                     | 12        | 10.0    |
| Total                     | 120       | 100.0   |

Source: Field Survey, April 2015

### Number of Years Spent Farming in the Irrigation Schemes

It was observed that majority of farmers have spent their entire life working in the irrigation scheme taking into consideration the average ages of farmers. From Table 2, 39.2% of farmers said they have been engaged in small scale irrigation farming for the past 11-15 years, 15% have been farming for the past 16-20 years. The least number of years spent by some farmers using the scheme is 6.7% representing less than five years. This phenomenon further buttresses the point that the irrigation schemes serve as a major source of employment for the communities in Garu-Tempene District. Similarly, 78.3% of farmers confirmed that the irrigation schemes have extended their farming activities by 3-4 months, thereby ensuring that they have some form of occupation during the dry season. They added that with enough water in the reservoirs the period could have been extended beyond 4 months and this would have led to an increase in crop output which would invariably increase their ability to sell more produce and to meet the food requirements of their families.

Table 2: Number of years spent farming in the irrigation schemes

| Number of years spent farming | Frequency | Percent |
|-------------------------------|-----------|---------|
| Below 5                       | 8         | 6.7     |
| 6 - 10                        | 16        | 13.3    |
| 11 - 15                       | 47        | 39.2    |
| 16 - 20                       | 18        | 15.0    |
| 21 - 25                       | 17        | 14.2    |
| Above 26                      | 14        | 11.7    |
| Total                         | 120       | 100.0   |

Source: Field Survey April 2015

### Major Crops Cultivated in the Irrigation Schemes

The major crops grown using irrigation water in Bugri and Gagbiri include onions, pepper, and leafy vegetables. By far onion is the major crop cultivated by the farmers. The interview with farmers revealed that 96.7% of them cultivate onions. Table 3 shows the major crops cultivated. From the table, it is observed that farmers do not engage in the cultivation of only one crop. The cultivation of leafy vegetables from the survey is dominated by women. This is always undertaken after the harvest of onions.

Table 3: Crops Cultivated by Small Scale Irrigation Farmers

| Crops Cultivated                    | Frequency | Percent |
|-------------------------------------|-----------|---------|
| Onions                              | 57        | 47.5    |
| Pepper                              | 3         | 2.5     |
| Leafy vegetables                    | 1         | .8      |
| Onions and pepper                   | 14        | 11.7    |
| Onions and leafy vegetables         | 16        | 13.3    |
| Pepper and leafy vegetables         | 4         | 3.3     |
| Onions, pepper and leafy vegetables | 25        | 20.8    |
| Total                               | 120       | 100.0   |

Source: Field Survey, April 2015

The reason for the cultivation of onions is that it can easily be stored by the indigenous farmers using indigenous strategies in times of inadequate market or clout. The crop does not also require a lot of water and thrives well in arid and semi-arid areas. The study also revealed that all farmers cultivate crops mainly for market purposes but also use part of the produce to feed their households.

### Output of Onions Cultivated

To give a comprehensive income derived from the sale of farm produce it is necessary to determine the output of crops cultivated. Farmers during the survey found it difficult to quantify the output of leafy vegetables and pepper. They contended that with these crops they sell them as and when they are matured for harvesting. They were however able to quantify the output of onions for the season. They were able to tell how much they make or made (in monetary terms) from the sale of pepper and leafy vegetables. The output of onions is depicted in Table 4 below

Table 4: Output of Onions to Small Scale Irrigation Farmers

| Output of Onions ( 100kg Bag) | Frequency | Percent |
|-------------------------------|-----------|---------|
| below 1                       | 8         | 6.7     |
| 1- 4                          | 41        | 34.2    |
| 5- 8                          | 44        | 36.7    |
| 9- 12                         | 12        | 10.0    |
| 13- 16                        | 8         | 6.7     |
| above 16                      | 7         | 5.8     |
| Total                         | 120       | 100.0   |

Source: Field Survey, April 2015

Table 4 shows that majority of farmers obtain between 1-12 100kg bags per annum from their onion farming. The farmers confirmed that, output has been reducing annually and this season in particular has not been very good for them. A farmer had this to say. "when I started farming in the early 1980s I use to make about 16 maxi bags per



hectare but currently I struggle to make half of that, this I blame on the pest and diseases I find difficult to control, so report this to the 'big men' so that they can remedy the situation for us or else we would lose our source of livelihood".

#### Income of Small Scale Farmers from Sale of Produce

The sale of farm produce is one of the ways through which farmers in the communities obtain their income. From the interviews with farmers it was revealed that the prices of their produce especially onions is not stable. It continues to fluctuate. The prices peak during the rainy season when they cannot grow the crop any more, but due to improper storage facilities they are forced to sell their produce before they go bad. In the case of leafy vegetables, the women sell it to buyers from the nearby towns of Bawku and Garu at the farm gate. In most instances they carry the produce to the local market where they sell to the local indigenes. The income from the sale of vegetables according to the women is mostly used to buy household consumables such as salt, fish, sugar and in some cases clothing for their children.

Table 5: Income of Farmers from Sale of Farm Produce

| Income of Farmers in Ghana Cedis (GHC) | Frequency | Percent |
|--|-----------|---------|
| < 300.00                               | 12        | 10      |
| 300.00 – 500.00                        | 11        | 9.2     |
| 501.00 – 700.00                        | 28        | 23.3    |
| 701.00 – 900.00                        | 8         | 6.7     |
| 901.00 – 1100.00                       | 35        | 29.2    |
| 1101.00 – 1300.00                      | 9         | 7.5     |
| 1301.00 – 1500.00                      | 6         | 5.0     |
| 1501.00 – 1700.00                      | 7         | 5.8     |
| above 1700.00                          | 4         | 3.3     |
| Total                                  | 120       | 100.0   |

Source: Field Survey, April 2015

The average price for a bag of onions stood at GHC 95.00. The sale of pepper is mostly done at the farm gate when they are matured for harvesting. A pan of pepper is sold at GHC 80.00. The income from the sale of farm produce is shown in Table 5. From Table 5, majority of farmers earn above GHC 300.00 from dry season irrigation farming. In some instances a few farmers earn between GHC 1500.00 and GHC 1,700.00. The Table indicates that all farmers earn above GHC 90.00 which according to the Ghana Living Standard Survey is the upper poverty line per adult per year. This indicates that all small scale irrigation farmers, by income measure are not poor as indicated by the Ghana Living Standard Survey. This is also in contrast with the Ghana Poverty Reduction Strategy which said that by income measure 9 out of 10 people in the Upper East Region are poor.

From data gathered, it was revealed that the income of farmers was not dependent on the size of plots but on the ability of farmers to be able to acquire the necessary farm inputs to carry out farming activities. From table 5, majority of the farmers representing 80.8% of those who earn between GHC501.00 and above are able to buy and use fertilizer and other farm inputs such as pesticides and weedicides on their farms but not necessarily on the size of

their plots. This is because the study also revealed that 19.2% of farmers (who earn less than GHC501) do not use inputs such as fertilizer and pesticides. This therefore means that farmers who are economically endowed are able to use farm inputs which enable them to acquire much yield and invariably more income from the sale of their produce in contrast to farmers who do not use these farm inputs.

The diversification of a farmer's sources of income is very critical to cushion him against shocks. In other to ensure that they make the most of their income the farmers in the community diversify their investments. The commonest form of investment took the form of buying livestock such as cattle, goat, sheep and donkeys. Farmers also invested in the buying of ploughs which they use for animal traction during the dry season as well as the buying of donkey carts to transport farm produce and goods. The livestock are sold in times of need to solve problems and even to buy farm inputs such as fertilizer, seeds and chemicals (Insecticides and Pesticides) to support their farming activities, about 60% of farmers attested to this form of diversifying their income. The income of farmers has been of immense benefits to their households. The contributions include the ability of farmers to provide the daily food requirements of their households, cater for the educational needs of their wards, repair their houses which include roofing their homes with aluminium roofing sheets, buying of clothing for their families and providing the health needs of their children. The benefits accruing to the household of farmers is depicted in Table 6.

Table 6: Contribution of Farmers Income to Household of Farmers

| Contribution of Income of Farmers                            | Frequency | Percent |
|--|-----------|---------|
| Food security, health care and education for children        | 52        | 43.3    |
| Food, health care, education and clothing for family members | 24        | 20.0    |
| Food, health care, education and house repairs               | 13        | 10.8    |
| Food security and health care                                | 9         | 7.5     |
| Food security and education for children                     | 10        | 8.3     |
| All the five benefits  | 12        | 10.0    |
| Total  | 120       | 100.0   |

Source: Field Survey, April 2015

To show the benefits derived from small scale irrigation farming as depicted in table 6, one farmer remarked "it is through the proceeds of dry season onion farming that I have been able to send my children to school and also to subscribe to the national health insurance scheme, in fact I do not know the type of work I would have done without this scheme since I have never been to school". The table above shows that food security is the major benefit to families of farmers from the sale of their farm produce. Apart from the above contribution 6.7% and 2.5% of respondents intimated that they use the income to cater for funeral expenses and to pay off pride prices respectively. This indicates that the income of farmers also help them to attend to other social issues. This is important because the ability of one to participate in the social processes of his community is an important dimension of poverty reduction.

### *Contribution of Small Scale Irrigation Farming to poverty reduction in Bugri and Gagbiri*

In order to analyze the contribution of small scale irrigation farming in poverty reduction in Garu- Tempane, the perception of farmers about poverty and wealth is very paramount. This was obtained through interviews and focus group discussions with farmers.

#### *Definition and Indicators of Poverty*

This deals with the definition and indicators of poverty as provided by the farmers. This is indicated in table 7 below. From the table it is observed that all respondents saw poverty as inadequate food. This means that the definition of poverty in the district is food poverty, where farmers indicated that the inability to feed oneself and his/her family means the person is poor. This definition largely has to do with the fact that the communities in the district are agrarian and the respondents are also small scale irrigation farmers, therefore their interest might be in food.

Table 7: Farmers Definition of Poverty

| Definition and Indicators of Poverty                                     | Freq | Percent |
|--|------|---------|
| Inadequate food to feed family   | 44   | 36.7    |
| Inadequate food and low income   | 29   | 24.2    |
| Ill-health and inadequate food   | 26   | 21.7    |
| Inadequate food and inability to access medical and educational services | 14   | 11.7    |
| Inadequate food, ill-health, low income and lack of clothing             | 7    | 5.8     |
| Total  | 120  | 100     |

Source: Field Survey, April 2015

*Indicators of Poverty:* Indicators used by the small scale irrigation farmers to identify poverty include inability to feed oneself and family, malnourishment, eating once a day, possessing no livestock and unhappiness. Others include lack of decent clothing, indecent accommodation, ill-health, inability to access medical services and to educate ones children. From the table on the indicators, poverty in the communities and for that matter the district is food poverty even though other forms of poverty such as inability to enjoy social services was also given prominence. Indicators of wealth by the farmers are also shown below;

Table 8 Perception of wealth by Small Scale Irrigation Farmers

| Indicators of Wealth                    | Frequency | Percent |
|---|-----------|---------|
| Enough money                            | 11        | 9.2     |
| Lot of food                             | 30        | 25.0    |
| If you are healthy                      | 11        | 9.2     |
| Plenty Livestock                        | 21        | 17.5    |
| Have many children                      | 4         | 3.3     |
| Enough food and plenty livestock        | 18        | 15.0    |
| Enough of money and food                | 12        | 10.0    |
| Enough money, food and plenty livestock | 13        | 10.8    |
| Total                                   | 120       | 100.0   |

Source: Field Survey, April 2015

The table above shows that food and livestock play a major role in determining who is wealthy in the district. This is also a major factor in determining the social status of a person, whereby a person with more cattle is deemed rich or wealthy and is given a higher social status in the community.

Haven examined the perception of farmers about poverty and wealth. It is important to analyze the contribution of small scale irrigation farming to poverty reduction in the district. The issues to be looked at include income, food security, ability to access social services and employment. According to Rahmato (1999) Irrigation can play a significant role in improving food security and household income in Africa. He further stated the purpose of agricultural water development should be to increase social benefits, and to promote food security and poverty alleviation. Also looking at the contribution of small scale irrigation farming, Hussain and Hanjira (2004) argue there are strong direct and indirect linkages between irrigation and poverty. The direct linkages they state operate through localized and household effects whereas the indirect linkages operate through aggregate or sub-national and national level impacts. Irrigation they contended benefits the poor through all year-round farm and non-farm employment. This assertion is true for the Garu-Tempane district; this will be demonstrated in the ensuing analysis.

*Income:* The income of a given population is one of the commonest indicator of measuring well being or poverty. The indicator refers to the minimum income needed to be able to satisfy minimum basic needs or the income (or level of spending) required to purchase a bundle of essential goods (typically food, clothing, shelter, water, electricity, schooling, and reliable healthcare). In the two communities the income accruing to farmers from the sale of their crops indicates that all the farmers earn above the minimum income considered by the GLSS 4 classification of who is poor in Ghana. From the survey all small scale irrigation farmers earn above GHC 90.00 for the 3-4 months spent farming in the schemes. The income is used to augment what they obtained during the rainy/wet season. Therefore, by income measure using the GLSS 4 standard of considering the poor to be adults earning between GHC 70.00 and GHC 90.00, it will be right to conclude that all farmers who are engaged in the small scale irrigation schemes are not poor.

*Food Security:* From the study, it was revealed that farmers saw food insecurity as the major indicator of poverty. According to the farmers, dry season irrigation farming has extended their farming or occupation by 3-4 months. This has therefore reduced the hunger gap from 6 months to only 2-3 months. The income earned by farmers is mostly used to secure additional food to feed the family. All the small scale farmers interviewed mentioned that dry season irrigation farming has helped them to secure their household food requirement. A farmer during a focus group discussion expressed the relevance of food security to poverty reduction when he remarked that "if you take away the food problem you have taken away poverty and this is what dry season irrigation farming has taken away

from us". This indicates that food poverty among small scale irrigation farmers is reducing at an appreciable level.

**Employment:** According to Klein and Hadjimichael (2003), for the poor to escape from poverty they need jobs and investment is key to alleviating poverty because it is the mechanism that provide jobs. To them the main issue is not just employment, but increasingly productive employment that allows living standard to rise. Considering this assertion by Klein and Hadjimichael then it can be concluded that the irrigation schemes in the district are contributing significantly to poverty reduction. This is because dry season irrigation farming is the single highest employment avenue for people in the communities. This is even more significant since majority of those who farm in the scheme are in the active labour bracket of 15-60 years. The employment avenue created by the irrigation schemes has immensely reduced the migration of the youth to the southern part of the country. The irrigation schemes have been able to support all-year agriculture thereby ensuring job security. Therefore, in terms of employment creation and retention as an indicator of escaping from poverty then the irrigation schemes in the district are guaranteeing that. The benefit is that they serve as safety nets for the care of the aged and vulnerable such as children and as buffers against shocks such as drought.

**Access to Social Services:** Deprivation such as inability to access social services such as education and health care due to inadequate command over resources is one indicator of poverty. Small scale farming in the Garu-Tempene district is contributing significantly to people having access to such social services by providing farmers with the resources that will enable them to enjoy such services. From the interviews, all farmers who had children of school going age said they use the income they earn to take care of the educational needs of their children, others have also been able to send their children to vocational institution so that they can have entrepreneurial training. About 92% of farmers also revealed that through irrigation farming, they able to comfortably seek health care for themselves and their households when the need arises. About 52% also revealed that they have been able to subscribe to the national health insurance scheme due to dry season irrigation farming. This shows that by measuring well being in terms of access to social services then irrigation farming has contributed immensely to the well being of the communities in the district.

The above contribution of the Bugri and Gagbiri irrigation schemes to poverty reduction gives credence to the conclusions drawn by Hussain and Hajira (2004) that access to irrigation water contributes to the socioeconomic uplift of rural communities and poverty alleviation by providing rural people with production, income and consumption, food security and other social impacts thereby contributing to overall improved welfare and also decrease their vulnerability to drought due to short and erratic rain fall conditions.

### *Challenges faced by Small Scale Irrigation Farmers*

According to IFAD (2000), poor people can overcome poverty through strengthening the capacity of the rural poor and their organizations, improving equitable access to productive natural resources and technology, and increasing their access to financial services and markets. The views of IFAD still remain some of the challenges confronting small scale irrigation farmers in Bugri and Gagbiri. The challenges facing farmers are enumerated below.

**Inadequate Water:** The water levels in the reservoirs continue to dwindle thereby making it difficult for the required amount of water to be distributed constantly. This was confirmed by 56% of respondents. The effects of this problem are conflict among farmers, drying up or withering of crops, low yields and loss of productive hours digging the ground to find water at the expense of other serious and rewarding activities, as such a major drag to the general productivity of farmers.

**Diseases and Pest Infestation:** Infestation of crops by diseases and pest according to the farmers has affected them drastically this farming season. This situation they contended has led to failure of crops leading to the low yields they have been experiencing, thereby also leading to a reduction in their income.

**Destruction of Crops by Animals:** The lack of a fence around the catchment area of the irrigation schemes has created a situation whereby the crops of farmers are destroyed by animals such as cattle, goats and sheep. In some instances farmers are forced to sleep in their farms to turn away animals. This sometimes creates rifts between families, especially if the farmer is married.

**Inadequate and High Cost of Farm Inputs:** The problem of farm inputs is due to the high prices of inputs such as fertilizer, improved seeds, pesticides and insecticides. The problem is exacerbated by the few dealers of farm inputs who turn to inflate the prices of the inputs. In some cases they do not even get the inputs to purchase within the communities except in Bawku and Garu. According to District Agriculture and Development Unit (DADU) the subsidies put on fertilizer the by the government and the introduction of the coupon system did not achieve the intended purpose due to political interference.

**Lack of Credit Facilities:** All farmers interviewed said they have never had any facility extended to them by any organization. The lack of credit they said affects their ability to buy the needed inputs to enhance their farming activities.

**Inadequate Extension Services:** Extension services to farmers are woefully inadequate. About 96% of farmers interviewed revealed that they have not had access to extension services for the whole year. Farmers are aware of the benefits of extension services. They acknowledged that extension services will provide them with new farming methods and also help them to control diseases and pest attacking their crops. The situation according to DADU is due to inadequate staff; only one person is in charge of managing eight communities including the study communities, hence their inability to reach all farmers.



*Marketing Challenges:* With marketing, the farmers are not always offered real value for their produce. Due to the inability of most farmers to personally transport their produce to major market centers in Bawku and the southern part of the country, the middlemen turn to offer them low prices at the farm gate. This is particularly bad for pepper and leafy vegetables since they are perishable crops. They are therefore forced to sell at the prices offered to avoid total loss.

*Inadequate and Broken-down Infrastructure at the Irrigation Schemes:* The technical infrastructures in the irrigation schemes are not adequate to ensure that farmers use the schemes without any difficulty. The lengths of the main canals are not enough to serve all farmers. The irrigation schemes lack lateral canals leading to farmers having to adopt other methods to water crops. This mostly involves the use of much physical labour. Broken down and blocked canals are also impeding the farming activities of farmers.

#### *Recommendations*

According to IWMI (2001), most transferred schemes in Africa are not performing as expected due to the financial burden on the Water User Associations (WUAs) and farmers, but with the necessary support services and readily available markets these schemes can become viable. From the analysis the major problem facing the irrigation schemes is water inadequacy. To combat this problem, the District Assembly which is the highest decision making body should provide funds or financial assistance so that the Irrigation Development Authority can assess the dams and come out with measures to rehabilitate the facilities in the irrigation schemes to ensure that they are in good shape. Top among the rehabilitation of the dams should be the expansion of the reservoirs to enable them store more water to overcome the problem of inadequate water.

The length of canals at the irrigation sites are not enough to serve the catchment area of the irrigation schemes as such farmers have to store water in trenches to water their crops. In view of this the District Assembly should provide funds to enable the canals to be expanded as this can reduce water loss and lead to efficient use of the water. Also the farms should be provided with concrete lateral canals to reduce the loss of water through seepage into the ground.

The WUAs should institute task forces to ensure that levies are paid by farmers before they are supplied with water for irrigation farming. The task force should be made up of farmers who are respected by their colleague farmers. The bye-laws of preventing defaulting farmers from engaging in farming activities using the facilities in the irrigation scheme should be enforced to the later.

The District Agricultural and Development Unit (DADU) should intensify their education and training programmes to farmers and WUAs. The training should be factored into the annual activities of DADU and should center on extension services and capacity building so as to upgrade WUAs on management practices such as effective revenue mobilization, operation and maintenance activities, proper book keeping and conflict resolution mechanism. This will

go a long way to improve upon the management of the dams and irrigation facilities as well as improve farming practices. Extension services will also help upgrade the farmers' knowledge on irrigation practices as well as new farming methods and disease control. This will enable them maximize yields from their farms. The government should therefore lift the ban on employment especially in the agricultural sector to enable the unit employ more extension officers to help in the training of farmers.

As an urgent measure the District Assembly should provide financial assistance to enable the catchment area of the irrigation schemes to be fenced. The communities should provide labour in this regard to complement the funding from the district assembly. The fence is important because it will reduce the destruction of crops by animals, in the interim farmers should be allowed and encouraged by the executives to build fences around their farms.

#### CONCLUSION

The small scale irrigation schemes in the two communities remain the major source of dry season farming. The irrigation schemes also serve as a major source of employment and income for people in the communities. The role of the irrigation schemes in the communities can be observed in the ability of farmers to secure the food requirements of their families. The study revealed that the farming period of farmers in the communities have been extended by 3-4 months. This situation has impacted positively on the communities by helping to close the hunger gap by three months. The presence and use of the irrigation schemes for irrigation farming has also reduced the vulnerability farmers since in times of drought the irrigation schemes serve as the major life wire to cushion the communities against the shocks.

This notwithstanding the irrigation schemes are faced with challenges such as inadequate water in the reservoirs due to unreliable rainfall and human activities around the catchment area of the dams. Broken down infrastructure due to inadequate capital to repair them is another challenge facing the irrigation schemes. These challenges have the tendency to threaten dry season irrigation farming. With regards to management of the schemes WUAs have in their small way done well in the management of the schemes, but due to limited technical know-how and financial constraints they have not been able to adequately maintain and manage the operations of the irrigation schemes. Therefore for small scale management transfer to succeed in the communities there is the need to link farmers to markets and institutions such as technical and financial institutions. Similarly farmers should be provided with support services to ensure that the communities improve upon the management of the small scale irrigation schemes to enable them to be sustainable as well as ensure sustainable dry season irrigation farming, thereby improving the well being of farmers.



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