Research Journal of Agriculture and Environmental Management. Vol. 2(7), pp. xxx-xxx, July, 2013
Available online at http://www.apexjournal.org
ISSN 2315 – 8719 ©2013 Apex Journal

Full Length Research Paper

Reaping the benefits of small-scale irrigation dams in North-Western Ghana: Experiences from three districts in the Upper West Region

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Accepted 27 June, 2013

The Government of Ghana since independence has undertaken the construction of a considerable number of small-scale dams in the Upper West Region to increase water accessibility for small-scale irrigation. The aim is to promote all year round cropping, increase income and eventually improve standard of living of the populations in the dam communities. This study which was conducted in north-western part of Ghana sought to investigate whether the provision of these small-scale irrigation facilities in three of the districts of the Upper West Region have succeeded in reducing the incidence of poverty and youth out-migration in the area. Using both qualitative and quantitative techniques of data collection, the study showed that there have been some positive effects of these small-scale irrigation dams which include a steady increase in household food production, household income and the reduction in youth out-migration from dam communities. The study concludes that the construction of small-scale irrigation dams should be intensified to cover all areas in northern Ghana that have low lands for potential irrigation development. When this is done, it will be one of the surest tools to reduce poverty and stern the tide of rural out-migration of the youth from the northern Ghana to destinations south of the country.

Key words: Poverty, migration, small-scale dams, household, income.

INTRODUCTION

Water resource development which is indicated as one of the resource that easily promotes socio-economic development by the United Nations (UN) is inextricably linked to the state of human health and development. A range of water-related conditions such as safe drinking water; adequate water for irrigation (food production); minimized burden of water-related diseases; healthy freshwater ecosystems and sanitation play a key role in socio-economic development of humankind (United Nations, 2006). The fight against poverty depends on making available sufficient quantities of water to the population, both to satisfy their domestic needs and to make it possible to increase agricultural production through irrigation (Boelee and Madsen, 2006; GPRS II, 2003-2005).

Realizing the high level of poverty and lack of access to water in northern part of Ghana, The government has constructed a considerable number of small-scale dams to increase water accessibility for irrigation (Swamikannu and Berger, 2009). These small-scale dams have impacted positively on the livelihood activities of the people by increasing food security and household income through fisheries and productive agricultural activities (Boelee et al., 2009). According to Reij et al. (1996), the West-African landscape is today characterized by the presence of many small water reservoirs for livestock watering, irrigation, flood protection, groundwater recharge,

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human consumption and other purposes. As reported by IFAD (2006), small scale irrigation farmers at a small dam's site in the Upper East Region of Ghana earn a net return of USD109 and USD53 for plots of 0.05ha of tomatoes and onion respectively. Considering the incidence of poverty in Northern Ghana, these small dam site activities help in reducing poverty and out-migration in the long run. Ultimately, small dams are found to have positive impacts on the overall wellbeing of residents of small dam communities. These impacts may be related to better nutrition, increased income and improved hygiene (Boelee et al. 2009). Overall, the net effect of the small scale irrigations dams is to reduce youth out-migration in the three Northern regions of Ghana.

Out-migration in Ghana, the "North-South Debate"

Migration is an important component of population change. It constitutes a form of spatial mobility, a change of usual residence between clearly defined geographic units. Two broad types of migration are internal and international migration. In general terms, migration is understood as the movement of people across a specified boundary for the purpose of establishing a new permanent or semi-permanent residence (Perch-Nielson, 2004). For the purpose of this study however, migration is defined as the movement of people from one place to another for any reason for at least a period of two months. This operational definition therefore connotes different types of migration including rural to urban migration, urban to urban migration, rural to rural migration and international migration. The driving forces behind much of internal migration are population growth and inequalities within countries. People will usually migrate from less endowed to better endowed areas. Some other push factors are climatic variability and landlessness in the area. Rural community factors which act as push factors to encourage people to out-migrate are seasonality of agriculture, population pressure on land leading to less land per farmer, land ownership problems, inadequate agricultural resources like credit to small farmer holders, lack of rural industry, lack of social amenities, increased deprivation and lack of entitlement failure in rural areas (Ghana Statistical Service, 1995a and 1995b).

Labour migration from Northern Ghana to the Southern parts of the country has a long history dating back to colonial times. Initially, migration was the result of coercive labour recruitment (Lentz, 1998 - cited in Laube et. al. 2008), but subsequently many people went to the south voluntarily. People wanted to earn money to be able to pay bride prices, buy goods or animals, to receive education, or because they had to pay taxes. Other people travelled out of curiosity, or to escape family problems (Nabila, 1987). Causes of migration however have been a subject of debate (Akokpari, 1998; Perch-Nielson, 2004). These authors argue that migration is influenced by many factors including economic, political and socio-cultural and environmental. People have moved to southern Ghana in order to trade and escape slave raiders during the pre-colonial era. Ghana's colonial masters (British) instituted north-south migration in order to attract a labor force for commercial plantations, gold mines, timber firms and public works in the cities and coastal towns. Peripheral Northern Ghana was therefore created as a labor reservoir to feed metropolitan Southern Ghana for the benefit of Britain. The post-colonial phase entrenched the pattern of migration created by colonialism by the various developmental policies since independence ((Awumbila, 2007; Cleveland, 1991; Songsore and Denkabe, 1995; Songsore, 1983). According to Abdul-Korah (2006), this trend has increased significantly in recent years.

According to Awumbila (2007), poverty as well as the decline in agricultural production has been one of the factors that have forced large numbers of inhabitants to migrate either permanently or seasonally to the south from the north. Seasonal migration usually takes place during the dry season, when agricultural production comes to a halt and demand for labour in the south is high. However, some seasonal migrants also travel south after planting rainy season crops, and only return for the harvests. A recent phenomenon in the migration trend is where girls and women are increasingly moving from rural areas in northern Ghana to urban market centers in Southern Ghana to serve as head porters or "kayayei" (these girls and women carry bags and goods of passengers and business men and women for a fee (Abdul-Korah, 2007; Awumbila, 2007). Incidence of poverty by socio-economic groups shows the food crop farmers group to be suffering the highest poverty incidence of 59.4% in Ghana. Confirming the poverty situation in the northern regions, the Ghana Living Standards Survey reported that seven out of ten people were extremely poor in the Northern Region, in the Upper East Region eight out of every ten people were below the lower poverty line, while in the Upper West Region nine out of every ten people live below the poverty line. Adult illiteracy rate is also prevalent in this part of the country; the adult illiteracy rate of 75.6% for that of the Upper West Region is far higher than the national average of 45.9%. While the malnutrition rate of 25% amongst the children in the region is the highest in the country (GLSS, 2003; Ghana Statistical Service, 2003; Songsore, 2011). To reduce the water stress in the region and ultimately reduce poverty and youth out-migration from the region, the Government of Ghana have embarked on an ambitious policy of small-scale dams construction to promote small-scale irrigation development schemes to support all year round food production and ultimately reduce poverty. To this end, some existing dams have been rehabilitated while new dams and dugouts have been constructed to expand small-scale irrigation in the

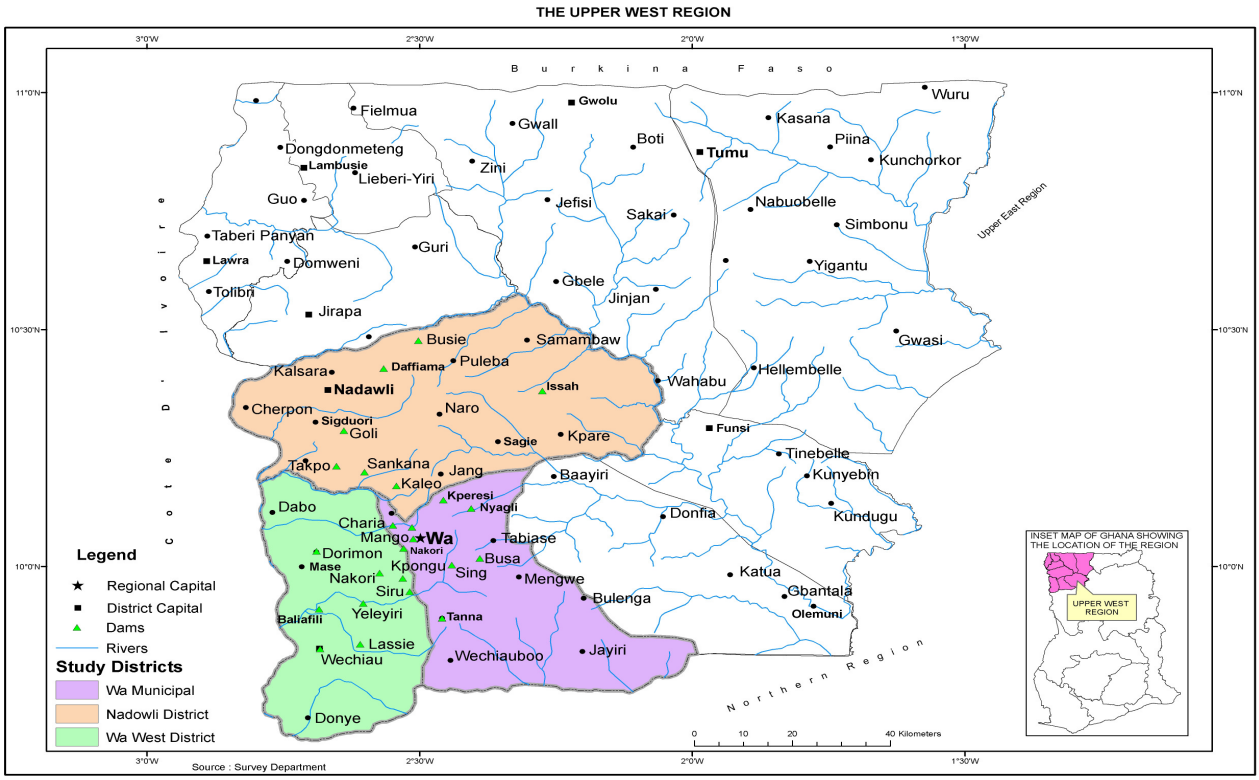

Figure 1. Map of the Upper West Region Showing the Study Area with Dams
Source: Ghana Survey Department, Accra, 2010

region. The purpose of this research is to examine the effects of Small Scale Irrigation Dams on Youth Out-Migration from the North-Western Part of Ghana.

APPROACH AND METHODOLOGY

The study area

This study was conducted in three districts of the Upper West Region of Ghana. The study area includes the Wa Municipality, Wa West and the Nadowli Districts of the Upper West Region, (Figure 1). The area covers the south-western parts of the region, stretching from longitude 1° 40'N to 2° 45'N and from latitudes 9° 32'W to 10° 20'W, thus covering an area of approximately 5,899.30 square kilometres. The area shares boundaries with the Northern Region and Wa East district to the South and North–East respectively, and to the North by Jirapa District and West with Burkina Faso (MTDP-UWR, 2004). The study communities fall within the Guinea Savannah Zone of Northern Ghana. The rainfall regime is the uni-modal type with mean annual rainfall intensity of 1000 - 1150 mm. The rain water drains rapidly into the Black Volta leaving the area without standing water bodies in the dry season thus making the water situation in the study area always precarious. The average temperature of the study area is about 32.0°C with a relative humidity ranging between 70 - 90% but falling to 20% in the dry season. As a result of these unfavourable weather conditions, the region faces water stress for both domestic and agricultural activities from November to May - about seven months of dry season in the year. Coupled with the unfavourable weather conditions, the residents of the study area also suffer enduring high levels of poverty (Ghana Meteorological Department, Wa - UWR, 2010).

Data collection

Ten small-scale irrigation dams and their communities were sampled using both the simple random sampling and the purposive sampling methods from three political districts as indicated in Figure 1. Three hundred and fifty household heads from the ten sampled dams' communities, and twenty focus groups comprising ten focus groups of chief/elders, six women focus groups and four youth focus groups. The key informants interviewed included: the Deputy Regional Director - Public Health (GHS); the Regional Director – Ghana Water Company Limited; the Regional Director – Community Water and Sanitation Agency (CWSA); the Regional Director – Ghana Irrigation Development Authority (GIDA); and the Deputy Regional Director – Ministry of Food and Agriculture.

Table 1. Reservoir Sizes of the Ten Study Dams.

Name of dam community	Reservoir area (m^2)	Year the dam was constructed	Year the dam was reconstructed	Irrigable land area (hectares)
Sankana	827923.47772	1972	Nil	60
Siiru	313670.83063	1989	2001	Not developed
Yeleyiri	156887.40217	1959	2003	11
Busa	156469.45415	1972	Nil	14
Baleofili	136115.83650	1953	2002	16
Daffiama	123872.28916	1972	2004	16 (Uncompleted)
Takpo	103346.47726	1996	2004	Nil
Goli	103294.95822	1996	2004	Uncompleted works
Dobile	91341.16793	1999	2008	Uncompleted works
Tanina	42007.58155	1967	2003	2

Source: Field Survey, November 2010.

Table 2. Effects of small scale dams on livelihoods.

District	Earn extra income from vegetable sales from the dam	Produce enough food through the irrigation	We fish in the dam
Wa Municipal	28.6% (30)	0.0% (0.0)	6% (6)
Wa West	100.0% (105)	100.0% (105)	48% (50)
Nadowli	7.1% (10)	5.0% (7)	12.9% (18)
Total	41.4% (145)	32% (112)	21% (74)

Source: Field Survey, November 2010.

Finally, The Global Position System (GPS) Instrument was used to collect the cordinates of each of the ten dams in the field survey. The results were analysed using the ArcGeographic Information System (ArcGIS 9.3) from wich the various reservoir sizes of the study dams were computed using their coordinates. Table 1 shows the reservoir sizes of the various study dams, the year of construction, and the irrigable land area.

RESULTS AND DISCUSSION

The total number of government constructed dams/ dugouts in the Upper West Region is 84 and 54 dugouts. However, some Non-governmental Organisations have also embarked on some dams/dugouts construction in the region (Namara, et al. 2011; MoFA/GIDA, 2010; Annette et al. 2009).

Effects of small-scale irrigation dams on livelihoods of households

The use of the reservoir water for dry season irrigation activities in the study area has greatly impacted some households' livelihoods. Basically, some households in the Wa West district (Siiru, Yeleyiri and Baliefili) have their livelihoods positively affected by the use of the small-scale irrigation dams in the three political districts in the region. As indicated in Table 2, all the respondents, (100%) from the Wa West District indicated that their household income earnings had improved due to the dry season cultivation they undertook at the irrigation site. These households reported that they earn extra income from sale of vegetables such as tomatoes, okra, and pepper among others from their irrigation plots. All the 105 respondents from Wa West also noted that enough food stuff such as rice and maize were produced for their household consumption and some for sale at the open market. Also, fish catch from the reservoirs in the Wa West Dams were also a source of income to households as about 48% of the respondents indicated that they earn much money from fish sales.

During the FGD with the chief and elders of Siiru, a dam community in Wa West District, the chief stated:

"This dam has completely eliminated youth out-migration from this area. Because we are fully engaged throughout the year; farming both in the dry and wet seasons. We produce a lot of food and vegetables from the irrigation site all year round. This dam has enabled us to produce food we used not eat in this community, such as plantain, banana, and other fruits".

The chief farmer at the Siiru community (Wa West District) also had this to say about their irrigation dam:

"Since 2002, I could make daily sales of fish catch from this dam up to 200 Ghana Cedis. We earn a lot of money from fishing. No migrations again, go where and go and do what? I was working with NADMO, in 2008 they just served me a letter to go on transfer to the Central region to report in three days' time, I just laughed and tendered in my resignation letter. I can harvest three (3) trucks of tomatoes, pepper and okra in a day; see the number of women that are in my farm right over there harvesting my pepper in one of my farms. I have bought three motor bikes, built a big house and roofed it with zinc, and I am paying my late brother's children's secondary school fees from this irrigation dam. I don't farm crops again; I only sell my catch of fish and buy enough food stuffs for my household".

The FGD also conducted with the women of Siiru: the discussants really confirmed what the village Chief and the chief farmer had said. A group member stated:

"We are farming more than our men; as such we get a lot of money to take care of all our needs. We farm vegetables, maize and rice. No worry again for cloth or money to go and mill our flour. We make a lot of money ourselves as such we don't depend on our men for anything".

Another discussant also remarked: *"Now our young men and husbands don't travel again, the way our husbands used to leave us and travel to Kumasi is no more. Our men and husbands are now at home making money from this dam".*

These sentiments were corroborated by a 17 year old boy from the community in another FGD:

"I sold fish alone from the dam and started my provisions store in the village here. I have my own farm - my father doesn't pay for my secondary school fees again. Almost all the youth in this village pay our own school fees from sale of fish and vegetables from this irrigation. We the youth have bought new bicycles from this dam. With this dam here why should we travel? For many years now none of us has travelled to the south because we are earning so much money from our irrigation project".

Another Focus Group Discussion conducted with the chief and elders of Baliefili, another dam community in the Wa West District has also confirmed that the small-scale irrigation dams are impacting positively on household livelihoods. The chief recounted:

"Almost all the houses in this village were roofed with grass not long ago but as a result of the good income we now earn from the irrigation site, members of the community are now changing their grass roofing to zinc roofing". He said that out of the 51 houses in his village, 36 grass roofed compounds are now changed to zinc roof, 14 mud and 1 thatch roof."

The chief continued:

"We are fully engaged working on our farms in the wet season and also on our plots at the irrigation site in the dry season. We produce enough food here which has improved household food security, increased household income, building and roofing of our homes with zinc and many young men have bought motor bikes from this irrigation. I and my community members have also built a three Class Room Block Junior Secondary School and the Headmaster's Office for our community children - all from proceeds from the irrigation. None of my men will struggle again to pay a bride price again".

An opinion leader in the Baliefili community stated: *"I farm rice, okra, tomatoes and maize. I earn between 2500 – 4000 Ghana cedis from vegetable sales alone. I have used my earnings made from the irrigation site and started a big business where I sell bicycle spare parts, foot wear, provisions and many other things. I also bought a motor bike at 1,100 Ghana Cedis (11 million old Ghana Cedis). I have built and roofed six bed rooms with roofing sheets. The last cropping season I harvested 30 maxi bags of maize and about 35 bags of paddy rice. I pay my children's school fees and our health insurance premium all from the earnings I made from the irrigation dam".*

Another opinion leader – the Chairman of the Water Users Association (WUA) at Baliefili also said: *"I bought this new motorbike that is parked over there for 1,100 Ghana cedis (11 million old Ghana Cedis) from proceeds from the irrigation site. I have also built and roofed 6 rooms with zinc; I paid my wife's bride price with 4 sheep, 4 goats, about 35 Fowls and some amount of cash, cowries and alcoholic beverages. I earn a lot of money from the irrigation dam".*

In another FGD with the elders of Yeleyiri in the Wa West District a discussant stated: *"There is no more youth out-migration to the south from this village because of the irrigation dam: It has increased our household income; we produce enough food to feed our family all year round because we have water throughout the year; we are changing all our grass roofed houses to corrugated zinc roof; we have a lot of money to pay our children's school fees at the basic and the SSS from this dam. My average earnings from the dam are between 5000 – 8000 Ghana Cedis (80 and 100 million old Ghana cedis) at the end of every cropping season".*

Another discussant also observed that the small-scale irrigation facility in their community has just stopped the young men from out-migrating. He remarked: "*What will*

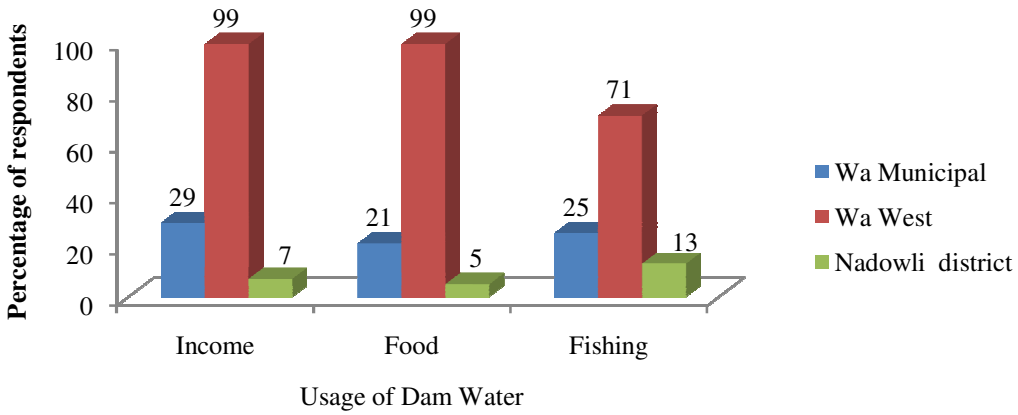

Figure 2. Benefits of the Dam Water Usage to Respondents
Source: Field Survey, 2010.

they go down to the south again for? If it is money, they are making it here at the site of the dam".

The discussants were however reluctant to disclose their actual real earnings from the irrigation site, perhaps to confirm what the WUA female treasurer said at Baliefili that they were afraid of being taxed after full disclosure of their real earnings. They were however ready to disclose what they did with some of their earnings after the cropping season. Each of the FGD members then spoke of how they used their earnings. The second discussant spoke after the chairman's disclosure – *"I paid my wife's bride price, bought a bicycle, built 2 new rooms roofed with zinc".* The third discussant – *"I bought a packet of zinc to roof 2 rooms in my house and also paid my wife's bride price". The fourth discussant – "I bought a new motor bike (parked over there) for 1,100 Ghana cedis (11 million old Ghana Cedis) and also roofed 4 rooms with zinc".* The fifth discussant: *"I bought a new bicycle and roofed two rooms with zinc."* The sixth person – *'I bought a new bicycle, roofed a room with zinc and paid my two children's SSS fees". The seventh man – "I bought a new bicycle and paid for the bride price of my new wife" and the* eighth discussant – *"I bought a new bicycle and roofed 4 new rooms with zinc".*

As indicated in Figure 2, farmers in the Wa West District have benefited immensely from the small-scale irrigation dams than their counterparts in Wa Municipal and Nadowli District. Wa West District dam communities indicated they produce sufficient food, earn a lot of income through fishing, sale of their vegetables and food crops. Farmers in the Wa Municipal and Nadowli District however are not benefiting from the siting of these dams in their communities. The small-scale irrigation dams in these districts were found not to be effectively utilised due to faulty engineering works on the dams' physical structures and broken down irrigation canals as shown in Figure 4a and 4b. Farming activities at the Yeleyiri dam site where farmers are effectively utilising the irrigation facilities is captured in Figure 3.

Pattern of out-migration from the study area

The type of migration on-going in some parts of the study area is out-migration; in-migration into the communities in the study area is virtually nonexistent or insignificant. The out-migration in the area has been seasonal which is basically related to agriculture. The seasonal migration in the area involves young men and women as indicated in Figure 5, who basically are engaged in subsistence farming. About 89% of the residents in the study area are farmers, all farming activities usually come to an end by late October. Farmers mostly stay almost idle for about seven (7) months during the long dry season period. The movement of out-migrants from the area therefore takes place during the dry season period (November – May) where all agricultural activities in the area slacken. These out-migrants return around May ending to prepare the land for cropping in June/July.

The calibre of out-migrants from the region in general is mainly the youth, involving young men and women. As shown in Figure 5, the out-migration from the study area is the youth mostly from Wa Municipal and the Nadowli District where 88% and 76% respondents indicated their young men migrate out. Again, 76% and 35% of the respondents indicated young women out-migrate respectively. Youth out-migration from the dam communities in Wa West dam communities is very minimal with 10% of the respondents indicating their young men out-migrate and 4% said young women also out-migrate.

Comparing the out-migration process represented in Figure 5, the Wa West District records the least youth out-migration compared to the Wa Municipal and Nadowli

Figure 3. Yeleyiri Small-Scale Irrigation Site, 2010
Source: Field Survey, May 2010.

District. This is attributed to the effective use of the small-scale irrigation facilities in that area by households; there is an all year round employment created for the people by these small-scale irrigation dams. A youth group member in a FGD at Siiru stated with joy:

"See, I was at Sewfi (Western Region) working on a cocoa farm as a labourer, but since I returned home three years ago, I have never stepped foot there again because of the money I am making from this irrigation dam."

Another group member added, *"There were times we went down to the south and we could not make enough money to even come back home. That is why you meet many young people from this region remaining in the south".*

A woman also remarked during a FGD with the group at Siiru: "Now our young men and husbands don't travel again, the way our husbands used to leave us and travel to Kumasi is no more. Our men and husbands are now at home making money from this dam.*'* An elder at Yeleyiri

Figure 4a. Broken Down Canals, Daffiama Irrigation Site - Constructed in 2004.
Source: Field Survey, November 2010.

Figure 4b. Broken Down Canals, Daffiama Irrigation Site - Constructed in 2004.
Source: Field Survey, November 2010.

also observed that the small-scale irrigation facilities in their community have just stopped the young men from out-migrating. He questioned,

'*What will they go down to the south for? If it is money, they are making it here at the site of the dam".*

A key informant at MoFA summed it up this way*;*

"The impact of small scale irrigation dams on our youth is great, they (youth) have full employment during the dry season idling period, and no more youth out-migration to the south again; because income through irrigation is higher than normal farming, irrigated lands yield more than rain-fed agriculture; water is available for animals and fishing. Our youth make a lot of money from these dams instead of out- migrating".

Wa Municipal and the Nadowli district however recorded the highest out-migration figures of young men and women with 76% and 35% representing Wa Municipal and 88% and 68% representing that of the Nadowli district. Mobility was higher among the young men who out-migrate more than the young women as men are

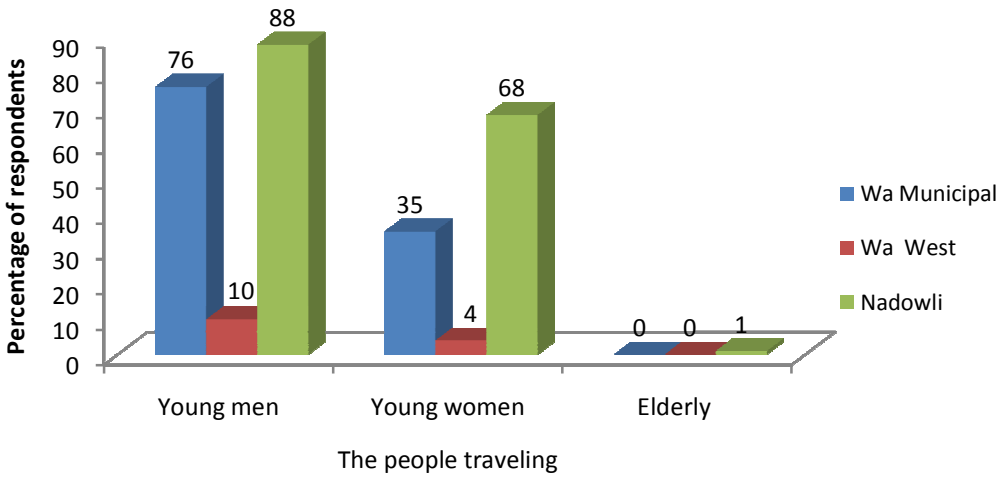

Figure 5. Calibre of out-migrants from the study area
Source: Field Survey, November 2010.

always likely to take more risk than women. The large numbers of out-migration in the Wa Municipal and the Nadowli district is largely due to the failure of the small-scale irrigation system in these areas. As remarked by a sub-chief at Daffiama:

"*Uncompleted works on our dams and the irrigable land areas is a major contributory factor for the exodus of our youth to the southern part of the country during the dry season; the outflow of our youth would have stopped completely. See, the canals are incomplete; the few that are completed are broken down due to poor construction works. The enthusiasm of our people to use these small scale irrigation facilities is therefore waning because of the shoddy infrastructural work".*

An opinion leader at Goli lamented:

"All our young men and women are gone, some to the south and others to the galamsey area. Even our wives go for the galamsey; as I speak to you right now my wife is gone to Tinga for the galamsey. If I tell her not to go how will I be able to buy her a piece of cloth? See our problem? We were thinking this dam would have been of help in solving the youth out-migration problems, bad work on the dam by the contractor is the cause".

Destination of out-migrants from the study area

The destination of the out-migrating persons from the study area as represented in Figure 6 shows Kumasi and its environs in the Ashanti Region, Techiman and its environs in the Brong-Ahafo Region and Tinga, a small-scale mining community in the Northern Region as the final destination of out-migrants. The three main ethnic groups in the region are the Dagaaba, Wala and Sisala. The 2000 Population and Housing Census did show Brong-Ahafo (BA), Ashanti and Northern Regions as the major recipients of out-migrants from the Upper West Region as follows: Brong Ahafo; Dagaaba – 155,900; Wala – 29,820; Sisala – 22,714. Kumasi Area; Dagaaba - 45,998; Wala – 20,289; Sisala -19,242. Northern area: Dagaaba – 89,385; Wala -7,770; Sisala – 9,261. The out-migration to Tinga is a very recent development following the discovery of gold deposits in that area which currently is attracting many of the youth to go and engage in galamsey (illegal mining).

Effect of out–migration

According to the GSS (1995b), labour migration appears to have an impact on the economies and societies of the sending as well as the receiving areas. Such labour if skilled; constitute a ready stock of human capital at no cost to the receiving area. At the same time, such movement results in manpower shortages in very critical areas for the sending communities. The receiving area could also suffer from environmental degradation, increasing pressure on public facilities, increasing crime wave - prostitution, armed robbery, and violence. A clear example of such is the galamsey area at Tinga in the Bole District; there are reports of degradation of farm lands, high-way armed robbery and increasing prostitution in and around the area which needs further investigation. The sending area may be receiving substantial remittances, but returning out-migrants come home with diseases such as STDs. Socially, there will be an increase in break-down of marriages and family units – divorce due to long absence of the husband or wife.

Very importantly, the upsurge of guinea worm disease

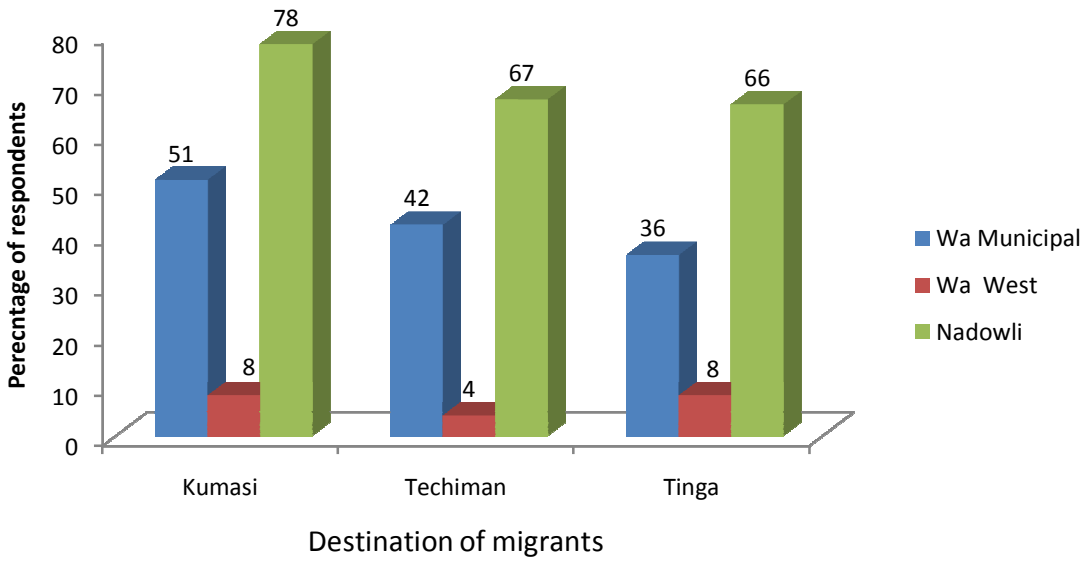

Figure 6. Destination of out-migrants from the study area
Source: Field Survey, November 2010.

Table 3. Indigenous and Imported Cases of Guinea Worm (2003-2010).

Year	Indigenous cases	Imported cases	Cases contained	Cases Un-contained
2003	112	10	91	41
2004	180	41	131	90
2005	244	89	121	212
2006	61	32	50	43
2007	8	15	18	5
2008	0	1	1	0
2009	0	1	1	1
2010	0	1	1	0

Source: GHS, UWR, 2010.

in the Upper West Region was more or less imported by returning out-migrants from farming villages in Brong-Ahafo and Northern regions. These victims re-infect water bodies that were already abated in their respective communities. Thus, the Guinea Worm Eradication Programme still lingers on since its launch in 1989. However, the greatest challenge with guinea worm disease eradication is the possibility of re-seeding of dams/ponds by imported cases that may be undetected and properly contained – given proper treatment so that the patient cannot contaminate water bodies in the area. As shown in Table 3, Guinea Worm cases for some time now are imported cases from Northern and Brong-Ahafo Regions. For example in 2006, out of the 93 reported cases, 32 were imported cases with 10 coming from the Brong Ahafo Region and 12 coming from the Northern Region (GHS Wa, 2010). A single un-contained imported case could trigger a wide range of re-infecting communities that depend on dams/ponds for their domestic water usage that has not been abated or adequately chlorinated/sanitized.

Conclusions

The use of the reservoir water for dry season irrigation activities in the study area has greatly impacted positively on some households' livelihoods. Basically, households in the Wa West district dams' communities (Siiru, Yeleyiri and Baliefili) have their livelihoods positively affected by the use of the small-scale irrigation dams in the three political districts in the region. These households earn extra income from sale of vegetables such as tomatoes, okra, pepper and others from their irrigation plots. All the Wa West dam communities produce enough food - such as rice and maize for their household consumption and some for sale at the open market. Also, fish catch from the reservoirs in the Wa West Dams' communities are

also a source of income to households. Comparing the out-migration process in the study area, the Wa West District records the least youth out-migration compared to the Wa Municipal and Nadowli District. This is attributed to the effective use of the small-scale irrigation facilities in that area by households; there is an all year round employment created for the people by these small-scale irrigation dams.

Recommendations

The construction of small-scale irrigation dams in Northern Ghana should be intensified to cover all areas that have low lands for potential irrigation development. This will be one of the surest tools to reduce rural poverty and stern the out-migration of the youth from the north to the south of the country. This policy will also ensure household food security and reduce the chronic and transitory food insecurity in the area prevailing in northern Ghana.

Secondly, provision of efficient farmer services by the Ministry of Food and Agriculture and IDA is urgently needed to guide farmers on application of fertilizers and the use of pesticides. The wrong application of these farm inputs could be hazardous to consumers of fruits and vegetables coming from these irrigation sites and the wider environment.

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