

SITAM

Analysis of rural livelihoods, farming systems and resilience

Ghana

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Acronyms

ACDEP	Association of Churches Development Projects
AMSEC	Agriculture Modernization Services Enterprises Centres
CSO	Civil Society Organization
CAWs	Community Agriculture Workers
CBRDP	Community Based Rural Development Project
CIKOD	Center for Indigenous Knowledge Organization
CHPS	Community Based Health Planning and Services
DA's	District Assemblies
DSFs	Dual Season Farmers
DFID	Department for International Development
FAO	Food and Agriculture Organization
FISP	Farms Inputs Subsidy Programme
FASDEP	Food and Agriculture Sector Development Policy
GSGDA	Ghana Shared Growth and Development Agenda
GSOP	Ghana Social Opportunities Project
GSS	Ghana Statistical Services
GPRTU	Ghana Private Road Transport Union
GDP	Gross Domestic Product
iDE	International Development Enterprise
LEAP	Livelihood Empowerment against Poverty
MOFA	Ministry of Food and Agriculture
METASIP	Medium Term Agriculture Sector Investment Plan
MMDAs	Metropolitan, Municipal and District Assemblies
MTDP	Medium Term District Development Plan
MoFEP	Ministry Finance and Economic Planning
MFOF	Multiple Farms Ownership Farmers
NSPS	National Social Protection Strategy
NGO	Non-Governmental Organization
NRGP	Northern Rural Growth Programme
SFOFs	Single Farm Ownership Farmers
SSFs	Single Season Farmers
SITAM	Sustainable Intensification: Trade-off for Agricultural Management
SIA	Sustainable Intensification of Agriculture
SL	Sustainable Livelihood
VSLA	Village Savings and Loans Association (VLSA)
WUA	Water Users Association

Summary

This livelihood analysis study in the Nandom and Lawra Districts, north western Ghana was conducted as part of an on-going action research project entitled “Sustainable Intensification: Trade-Offs for Agricultural Management” (SITAM) in selected communities of Nandom and Lawra districts. The project seeks to understand how smallholder farmers in Africa manage the trade-offs between production, sustainability, environmental and socio-economic factors.

The study drew on a mixed research design comprising a desk study, expert group discussions and key informant interviews for corroborating policy reviews and analysis.

Assets and capitals include the natural savannah vegetation, farmlands (compound farms, bush farms, valley bottom farms, and river bank farms), rivers and streams such as the Black Volta, Kanbaa and others. It also includes human capital characterized by a young population, largely illiterate population and skills and knowledge of agriculture and agro-processing largely passed on from generation to generation. Others include economic infrastructure such as market centres, roads and electricity.

The primary goal of smallholder farmers is to produce sufficiently to meet (1) household food consumption needs; (2) non-food consumption needs; and (3) meet social and cultural obligations of life in a manner that enhances their health and total wellbeing. In doing this, they also aspire to maintain harmony with their spirituality, ancestors and nature.

Livelihood strategies are largely concerned with agriculture, agro-processing and related services and these are essentially shaped by the possibilities of forward and backward linkages with the capital and by the asset base in the area.

Institutions and policies for supporting livelihoods are identified at three levels: the first level are national policies and programmes implemented at the district level with a focus on supporting agriculture mechanization and services, input subsidies, food buffer stocks and livelihood empowerment; the second level is the role of District Assemblies in promoting irrigation and agriculture modernization through development planning; and finally, the third level being the role of non-governmental organizations in promoting livelihoods through water and sanitation programmes for climate change adaptation, micro-finance and integrated development programming.

An analysis of livelihood outcomes reveals the following: enhancing resilience of smallholder agriculture as one of the primary livelihoods under a changing environment; secondly, that smallholder farmers are adopting innovative soil and water conservation measures for improving environmental sustainability; thirdly, that, at the social front, the challenge of sustaining livelihoods has led to an orientation towards meeting nuclear family livelihoods and this is weakening extended family support mechanisms of livelihoods. The analysis further reveals migration as a livelihood option that leads to both positive and negative outcomes. Finally, that the proliferation of Village Savings and Loans Associations (VSLAs) is having a positive and profound effect on community cohesion and livelihoods.

Key conclusions from the study include the following:

- That smallholder agriculture remains a primary livelihood that is being driven and promoted by smallholder farmers themselves as part of an inherited tradition and promoted through policies and programmes involving the state and Civil Society Organizations (CSOs).
- There is widespread incidence of poverty and food insecurity, despite multiple layers of interventions for improving livelihoods, involving farmer-driven innovations and programmes and projects implemented by Governments and NGOs.

- There is growing incidence of out-migration as a livelihood option and as a composite phenomenon embracing environmental, economic and social dimensions and presenting both positive and negative effects on livelihoods.

There are knowledge gaps in the following areas:

- These include the need for research and understanding the effect (on yields, quality of life and resilience to climate change/environmental change) of farmer adoption of innovative soil and water conservation and management of the natural vegetation;
- The number of farmers adopting irrigation as a form of agricultural intensification, the dynamics driving adoption and the livelihood outcomes;
- Livelihood diversification and its contribution to poverty reduction (measuring the extent to which it has reduced food insecurity and increased incomes);
- Understanding the gender dimensions of livelihood changes for adapting to environmental change;
- Finally, the need for compatibility analysis of policies and programmes and coordination of implementation for improving agriculture and other livelihoods.

Introduction

This report presents the findings of a livelihood analysis study in the Nandom and Lawra Districts, north western Ghana. The purpose is to support implementation of an on-going action research project, entitled “Sustainable Intensification: Trade-Offs for Agricultural Management” (SITAM) in selected communities of Nandom and Lawra districts.

The project seeks to understand how smallholder farmers (in particular poor farmers, women and youths) in Africa manage the trade-offs between production, sustainability, environmental and socio-economic factors. The subject of managing trade-offs has become very important, given increasing complexities of the context within which smallholder farmers have to take livelihood decisions for meeting multiple household objectives. Farmers are confronted with climate change, including larger environmental changes, population growth and constraining macro-economic conditions. Thus, the expected outcome of the SITAM is that: “Decision makers and other actors at local and national level change their knowledge, awareness, attitudes and capacity in support of proven pro-poor approaches for scaling up sustainable intensification that recognise farmers’ perceptions of synergies and trade-offs.”

As a key mile stone activity, this livelihood study report analyses livelihoods of smallholder farming households in the project area. It starts with a description of the assets and capitals, and proceeds with the goals and aspirations of the people and their livelihood strategies. It also presents an overview of the institutions and policies that create the environment for livelihoods and analyse livelihood outcomes. The report then analyses livelihood vulnerability and concludes on key trends and knowledge gaps.

Objectives of the report

The objectives of this livelihood analysis study and report are as follows:

- To provide an overview of the key characteristics of the study area as context for the SITAM project (and potential future interventions by other actors including government, donors, Non-Governmental Organizations in the area).
- To inform the design of the SITAM project’s baseline survey and household case studies in particular the selection of Sustainable Intensification of Agriculture (SIA) indicators.

Methods used

This study draws on a mixed research approach comprising desk study, expert group discussions and a key informant interviews.

A desk study was employed for the review of literature and secondary data sources. The review from the desk study took into consideration content analysis of policy documents, programme and project reports, articles, books and online resources. The reviews were largely applied for analysing livelihoods in respect to the assets and capitals and institutions, policies and programmes that support livelihood development.

Key Informant Interviews were employed for interviewing certain key informants who were knowledgeable on policies and programmes being implemented at the local level. These included mainly staff of the District Assemblies, including District Planning Officers and District Directors of Agriculture. Other officers were key staff of Non-Governmental Organizations that were implementing projects in the districts. These interviews (some telephone interviews) were essentially meant to seek clarification on the implementation of certain policies and projects at the district level. Thus, the KIIs were complementary to the desk study.

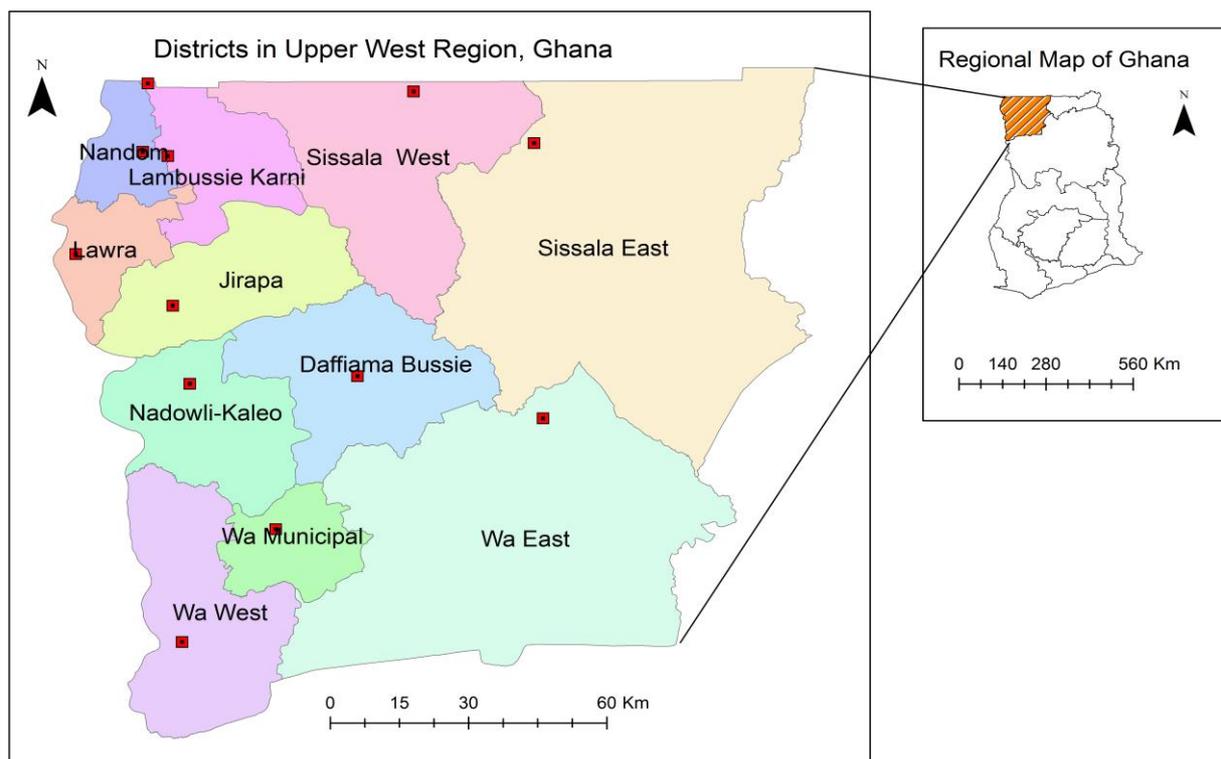
Another method that was employed was expert group discussions. This was largely applied for dealing with the analytical aspects of the study and report. The expert groups were made of staff from the Centre for Indigenous Knowledge and Organizational Development (CIKOD) and the University for Development Studies. This method was largely used for analysing people’s goals and aspirations, livelihood strategies, livelihood outcomes and the conclusions, trends and knowledge gaps.

The study area

Location and size

The study area covers Nandom and Lawra districts, located in the extreme northwest of the Upper West Region, Ghana (Fig 1). The two neighbouring districts are bounded to the east and south by Lambussie and Jirapa districts, respectively, and to the north and west by the Republic of Burkina Faso. Precisely, they fall within 2 °25 °W and 2 °45 W and longitude 10°20" N and 11°00"N. Altogether, they cover a total land area of about 1051.2 sqkm and comprising 157 communities. Out of this, about 86% and 88% in Nandom and Lawra districts, respectively, are rural areas (Ghana Statistical Service, 2014)

Figure 1 Location of the study districts in the regional and national context



Source: Authors, 2017

Climate, drainage and vegetation

Like the rest of the upper west region, the vegetation in the study area falls within the guinea savanna ecological zone characterised by short grasses, fire resistant trees such as shea, acacia and baobab. The climate type is tropical continental with a shorter rainy season followed by a prolonged dry season. The areas thus experience a single rainy season per year for barely 5 months (May to September). The climatic conditions therefore make it

difficult for people to farm all year round. Throughout the year, temperatures remain high at 23°C at night and peak at 42°C during the day. The underlying rock here is dominated by granite and sandstone, and the soils it produces is very suitable for the cultivation of groundnuts and cereals such as maize, millet and sorghum. The districts are drained by the Black Volta River (Bagre river) which flows from Northern eastern Burkina Faso through Nandom to Lawra. There are a few dams in Nandom and Lawra for irrigation purposes and communities along the Bagre river make use of the water during the dry season for gardening and fishing. The districts are also blessed with other rivers and water bodies. However, the lack of investments to mechanise these water bodies for dry season irrigation farming is a major disadvantage for people's livelihood (van der Geest, 2004).

The people, origin and culture

There are about 54,889 and 46,040 people living in Lawra and Nandom, respectively (GSS, 2010). Historically, the people of Nandom and Lawra are predominantly the Dagaaba or Dagara tribe (van der Geest 2004). Although disputable (see Van der Geest, 2004: p49), most Dagara trace their origin to western Dagbon or present day Yendi, about 100 km from Tamale (see also Lentz 1993; 1994a & 1994b; Tengan, 2000 and Tuurey, 1982). In the Dagara history there are two main accounts. In one account, it is believed that the Dagara clan migrated "in-block" to their present-day location while fleeing from the clutch of a Dagbon king in the 15th century. Another account believes they migrated in a piece-meal approach to their present-day location in search of fertile land (van der Geest, 2004). Whatever the accounts maybe, the Dagara clan can be said to have migrated to their present-day location from present day northern region. Today however, there are other minority tribes including Hausa, Sissala, Wala and Ashantes that co-exist peacefully within Dagara communities (GSS, 2010).

Prior to the coming of the missionary, the Dagaaba people practiced traditional African religion characterized by the worship of ancestral spirits and smaller gods. They worshiped and offered sacrifices to their creator through the ancestors and lesser gods. Today, the people's religious life is dominated by the Christian faith (van der Geest, 2004). In the Nandom area for instance, about 85.7 percent of the population are Christians with a small proportion of about 1.0 percent being traditional worshiper, whilst 6.6 percent profess to the Muslims faith. Similarly, in Lawra, 61 percent of the people are Christians, 6.6 percent being Muslims and 26.3% practice African traditional religion (GSS, 2015). Perhaps, the early occupation of the catholic missionaries in this area could be ascribed as the reason for the high numbers of Catholics among the Dagaaba people. Despite the religious differences, inhabitants co-exist in relative tolerance and inter-marriages between ethnic groups across religions are also common.

The traditional chieftaincy system is one powerful aspect of people's life. The traditional governance system is structured around paramount chiefs, divisional chiefs, sub-chiefs, village chiefs and clan heads. The paramount chief is the overlord of the traditional area (which in most cases is conterminous with the MMDAs) and administers his subjects through the sub-structures. There are seven divisional chiefs and several other sub-chiefs in the Nandom district, headed by the Nandom Naa (paramount chief of Nandom traditional area). In the Lawra traditional area, there are 8 sub chiefs, 16 divisional chiefs and 32 clan heads, headed by the paramount chief, the Lawra Naa.

The two districts are culturally endowed. Traditional festivals and cultural dances are part of peoples' lives. They provide opportunities for family and community reunion, and for the chief and people to showcase their rich tradition and culture to the rest of the world. During this time, people from cities converge back home to share ideas, socialise, and strategise to develop their communities. The Kobine festival is celebrated annually by the people of Lawra to give thanks to their ancestors for a bumper harvest. Likewise, the people of Nandom celebrate the Kakube festival annually to commemorate the end of the year and to offer

sacrifices to the ancestors for a successful farming year. The “bawa dance” (which has almost become trademark of the dagara tribe) is the popular cultural dance of the people in the two districts. Generally, inheritance in the area is through the patrilineal system. The elderly male child is expected to take control of the affairs of the family after the death of his father, irrespective of age or class in society. Thus, by custom, male children are often recognised as the household heads. In a situation where there is no male child, the oldest female takes up the responsibility of the headship and the property is handed to the brothers of the deceased. Customarily therefore, female children do not inherit their fathers’ property directly (Seevan der Geest, 2004)

Access to land, agriculture and other livelihood strategies

Land for any purpose in these areas is acquired through family and clan inheritance. Individuals do not own land. It is believed among the dagaaba that land belongs to the ancestors and thus cannot be sold. Therefore, family or clan land is often vested in the clan or family head, who takes care of it and presides over its use by interested family or clan members. Therefore, indigenous people do not have any difficulty in acquiring land for any purpose. However, women in general do not have equal access to land due to culture and customs of the people in line with their inheritance system.

Agriculture is the main livelihood strategy in the two districts. The general practice is mixed farming, where people cultivate crops and rear animals together. The primary motive of crop cultivation is sustenance of the family, but that of livestock rearing is generally economic, to earn extra income to support the household. The dominant crops cultivated in the area include cereals (maize, sorghum and millet) and leguminous crops such as groundnut. Farmers raise various kinds of livestock including pigs, sheep, goats, cattle, donkeys, and poultry. However, poor soil fertility, climate variability and change, as well as desertification are the major constraints to food security in the districts.

Aside, there are other supporting non-farm economic activities that enhance households’ livelihood. Fishing is a widespread non-farm livelihood strategy, especially among communities along the Bagre River. While men embark on fishing in the Bagre River, women are generally into processing of fish for sale. Also, women take up *pito* brewing, frying of local cakes (*koosee*), pottery and ceramic, sale of firewood, processing of *dawadawa* (local spice), and the rearing of livestock as non-farm income generating source. Furthermore, due to the prolonged dry season, men often embark on the seasonal migration to southern Ghana to engage in farm labour or more recently in *galamsey* (informal mining) for extra income to support their families back home in the form of remittances (see van der Geest, 2004).

Infrastructure and social services

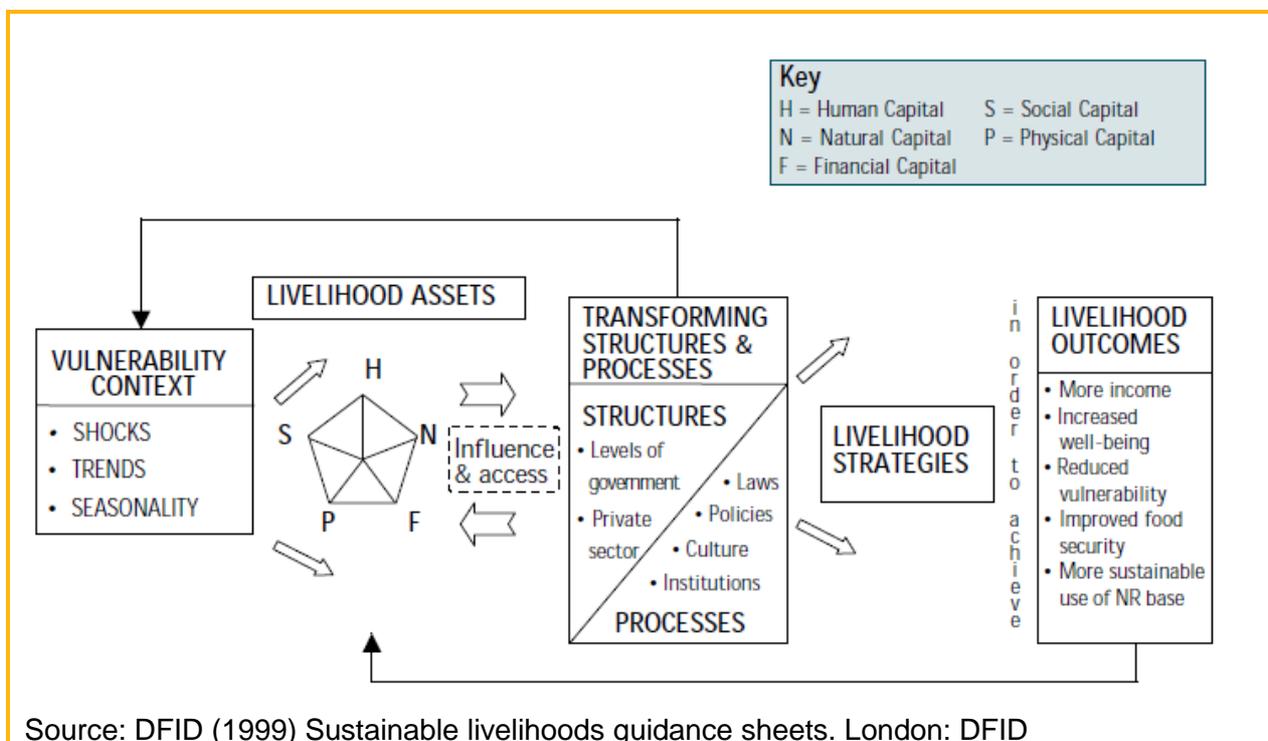
In terms of infrastructure, the two districts are well endowed compared to their counterparts in the region. Both districts have a district hospital, health centres, polyclinics and several CHPS compounds that provide a wide range of health services to the people. In addition, both districts are blessed with all levels of educational infrastructure; from basic to tertiary levels, and evenly distributed. There are also a number of NGOs supporting various sectors; agriculture, health, sanitation, and education. However, inadequate employment opportunities, early marriages, high school drop-out rates, teenage pregnancy, and logistical inadequacies are the major constraints hindering full realisation of the districts’ potentials. In terms of transportation, the districts are generally accessible with a trunk road linking the two districts through to Burkina Faso, feeder roads, and footpaths. The commonest means of transport include walking, bicycles, motorcycles, mini buses, metro buses, cargo tracks and some few private saloon cars. The Ghana Private Road Transport Unit (GPRTU) place their buses to

service major roads within and outside the district to area such as Jirapa, Wa, Nandom, Hamile, Techiman, Kumasi and Accra. Most of the roads in the district are feeder roads which are usually not accessible by vehicles in the rainy season, even though some few roads are tarred, including the Lawra-Nandom road, Lawra-Babile road and the township of Lawra and Nandom. These roads lead to major markets such as Nandom, Eremon, Babile, Wa, Nadowli, Leo, and the Lawra market, which serves the people and neighbouring Burkina Faso for their economic activities. Petty trading is one major aspect of livelihoods that cannot be overemphasised. Women and men alike trade in basic provisions, food stuff, livestock and many other goods and services in the major markets.

Livelihoods analysis

A framework for understanding the context of farmers' decision making

Figure 2 Sustainable Livelihoods Framework



The Sustainable Livelihood Framework (SL, see Figure 1) is used by programmes and projects that aimed to reduce poverty in poor communities. The SL is useful because it is centred on people and their livelihoods, stresses their inherent capabilities and knowledge, and is based on community level actions (Chambers, 1986). With its aim of ensuring livelihood security, it recognises that people's livelihood can only be secured when external support focuses on what matters to them, with the resources that they control, and work with them in a way that will not compromise their current livelihood strategies and their ability to adapt (Chambers, 1988; Ashley and Carney, 1999). In this case, development should begin with what people have (assets and capabilities) within their local environment and then develop to higher levels (Mazibuko, 2012). According to Scoones (1998, p.5) and Carney (1998, p.4): *A livelihood comprises the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks and*

maintain or enhance its capabilities and assets both now and in the future, while not undermining the natural resource base.

Inferring from the definition, participation and empowerment, and adaptive capacity are key in SL. Participation brings on local knowledge, values and livelihood priorities which provides the best guide to how livelihood can be made more sustainable (Helmore & Singh, 2001).

According to (Helmore & Singh, 2001, p. 3), adaptive strategies are defined as *“the changes and adjustments people make in their livelihood systems in order to cope under difficult circumstances”*. People become vulnerable when they are unable to adapt, cope with, or recover from the impacts of external ‘shocks’ to their system of livelihood (Adger et al., 2004; Bebbington, 1999).

The framework explains how the socio-cultural and political environment affects households’ or communities’ assets and their livelihood strategies. The capital assets owned or controlled by households are categorised into five (see Flora & Flora, 2008, p. 50; 84, 117, 175, and 206; Carney, 1998, p. 3 and 7; Scoones, 1998, p. 7–8). These are;

- **Natural capital** includes land, water, and biological diversity. Lack of access to productive land for example may greatly compromise the livelihoods of families, particularly farming households. Therefore, the relationship between natural capital and the vulnerability context is very close, especially in communities that derive their entire livelihood from natural resource-based activities such as farming and gathering products in forests.
- **Human capital** consists of education, knowledge (including knowledge gained from experience and traditional knowledge passed on from elders), interpersonal skills, good health, labour and leadership capacity, which together enable people to pursue different livelihood strategies. Changes in human capital may consequently affect the other types of assets. For example, poor education and ill-health can have tremendous effect on individuals, families, communities and the nation at large.
- **Financial capital** is probably the most versatile form of capital. It consists of incomes, access to credit and any other financial means. Financial capital can be a means to some other forms of capital. For example, having a good financial base implies a household can afford to do many other things such as sending children to school, paying medical bills, accessing potable water and buying enough food to feed the family. A household with good financial capital is therefore better placed to achieve its well-being than one without.
- **Physical capital** forms the basic infrastructure and means needed to support livelihoods. It includes affordable transport, secure shelter and housing, adequate water supply and sanitation, clean affordable energy, agricultural implements and equipment, and means of communication. Without adequate access to potable water, human health deteriorates and people, particularly women spend most of their productive time collecting water. Similarly, without proper roads, people struggle to reach markets or access health care services especially in rural communities.
- **Social capital** refers to resources upon which people draw in pursuit of their livelihood. It includes their ability to socialise with people, access to information, social support from friends and family members, associations, kinship and peer-group networks that people can rely on in times of difficulties.

Inferring from the framework, these capital assets do not exist in isolation, but are dependent or influenced by certain factors referred to as vulnerability context. Shocks, trends and cultural practices influence livelihoods. Trends refer to prevailing technologies, national and international politics and rapid increases in food and fuel prices. Shocks in this context could

mean job losses, crop failure and ill-health, loss of farm lands. Cultural trends refer to the effect culture has on how people manage and chose their livelihoods (Carney, 1998, p. 11).

Households' access and control of these capital assets is enabled or restricted by policies, institutions, legislations and power relations. Informal restrictions on land ownerships, local conventions on land allocation or entitlement are of course associated with any resettlement program. They operate at all levels and have a direct impact on peoples' ability to achieve a feeling of inclusion or well-being (DFID, 1999).

Capital assets influence households' choice of livelihood strategies. Though livelihood strategies have varied requirements, households who are endowed with assets are likely to make better livelihood choices (DFID, 1999). Finally, the framework shows livelihood outcomes. At this strand of the framework, a livelihood is said to be sustainable if people are able to reduce their vulnerability to external shocks, stabilise or better their living standards (improved income and wellbeing, more income, improved food security) whilst maintaining the natural resource base (Adger et al., 2004; Bebbington, 1999; Chambers and Conway, 1992).

Vulnerability Context

For the past two decades, Ghana's political environment has been stable. National inflation rate ranged between 10-25 per cent for the period 2003 and 2010 (Barclay & Salam, 2015). After declining to 7.5 per cent in 2011 with a GDP growth 14.3 per cent, combined inflation rate recorded a successive increase from 16.4 percent to 17.4 percent in 2015. During this period, the country recorded a decline (-1.7 percent) in the food crop sub-sector (MoFEP, 2016) which consequently triggered a significant increase in food prices with an erosive effect on the purchasing power of poor rural households.

In the research area, food insecurity is a major problem confronting most household, especially during the lean season. Households adopt diverse strategies to meet their food requirements, including purchasing food stuff from the market place, seasonal migration and fishing to supplement household food needs. Therefore, unstable market prices of goods, high inflation and the general macroeconomics conditions in the country will have significant impact on the livelihood of households in these areas, particularly for poorer households.

The general climate and soil conditions here make agriculture (the major livelihood of the people) extremely vulnerable. Many rural households in this area seek their livelihoods on marginal lands which are exposed to drought, flood and bush fires (Rademacher-Schulz & Mahama, 2012; Derbile et al., 2015). The majority of farmers use traditional methods of farming and are highly dependent on rain fed agriculture (GSS, 2014). These conditions perpetuate poverty. Erratic rainfall patterns have negatively affected crop production and in turn worsened the poverty of households. Dry spells and heavy rainfall during the peak of the farming season affect crop production negatively, leading to poor crop yields and postharvest losses, and consequently causing food shortages and high food prices. Erratic rainfall patters also negatively affect animal production, thereby reducing the 'safety net' of most households during lean periods or difficult times (AFC, 2012). Similarly, the diminishing vegetation cover has affected hunting of wild animals as a source of livelihood (Van der Geest, 2004).

The seasonality of food prices in the research communities negatively affects poor subsistence households. Seasonal price fluctuations present twin problems for subsistence farmers: high pre-harvest food prices for consumers and low post harvest food prices for farmers. After harvesting, farmers are forced to sell part of their produce at 'give away prices' in order to meet certain household needs or settle creditors (Van der Geest, 2004; AfC, 2012). During the lean season, silos and grain banks run low and poor households are again compelled to buy the food they sold cheaply at higher prices. There are attempts to introduce market support mechanisms such as community-ware house systems for storage and marketing in some communities, but these are still at early stages and the effects are yet to be seen.

Looking at poverty trends, Upper West Region records the highest poverty incidence in the country (Cook et al., 2016). Within the Region, Nandom and Lawra districts recorded an average poverty incidence of 74.5 percent in the 2015 poverty mapping report (GSS, 2015). The depth of poverty in these areas is about 42.5 percent (GSS, 2015). This implies that rural districts such as Lawra and Nandom lag behind in economic development and access to basic social services. Poverty trends differ between communities and among economic sectors, with agriculture being the most affected. In the study communities, poverty is profound and manifest in the form of lack of money; poor infrastructure, poor sanitation; and poor access to health facilities (Rademacher-Schulz and Mahama, 2012; Van der Geest, 2004). Generally road conditions are bad in these areas and public transport runs less frequently. The most common mode of travel to health facilities and markets is by foot, transiting on bicycle or motorbikes. This may be a contributing factor to poverty and inequality as geographic isolation is highly correlated to poverty (Anderson & Broch-Due, 2000; Stark & Hine, 2014)

Assets / capitals

The livelihoods framework is concerned first and foremost with understanding people's way of survival. It seeks to gain an accurate and realistic understanding of how people convert their strengths (assets or capital endowments) to positive living outcomes to improve their lives (Ahmed, 2010). Essentially, livelihood assets are the basic building blocks from which peoples' livelihoods are generated. Therefore, a household's asset endowment conditions determine its productivity and vulnerability in the context of social, natural, human and financial assets. In general, these assets are interconnected and interact to give a meaningful livelihood for the household. For instance, education might facilitate learning about new technologies, and given the physical intensity of most agricultural labour, health and nutrition can affect agricultural productivity. The natural condition of soil (quality and quantity) for agriculture has direct influence on productivity and the wellbeing of people, particularly poorer people who depend directly on agriculture. The existence of, and degree of access to, livelihood assets is therefore important in influencing the livelihood options that people may, or may not, have. As a result, any single asset cannot holistically provide sustainable livelihood. Households have to seek ways of nurturing and combining what assets they have in innovative ways to ensure survival (Ashley, & Carney, 1999). This complex system has been explicitly explained in the asset pentagon; which lies at the core of the livelihood framework. The asset pentagon replicates the interconnectedness of the components of the livelihood assets and brings to clarify the connectivity among the different components of human, natural, physical, and social assets.

The human capital entails the knowledge, skill, health, and labour of people. In the study areas, local or endogenous knowledge plays a very important role in people's livelihood system. People's creativity and ingenuity brings in extra income to supplement household needs. Both men and women alike engage in diverse industrial and manufacturing activities to make extra income for the household. In the manufacturing industry; craftsmanship in the production of xylophone, bow-and-arrow, farm implements/tools, brewing of local beer (*pito*) and the combination of different farming techniques and implements, create avenues for people to earn extra income for sustainable livelihoods.

Although kinship ties and social networks still exist, the potential for enhancing a sense of mutual interest and oneness among people and communities is weakening because of a strong interest in meeting the needs of the nuclear family under scarcity as opposed to meeting extended family needs. This has been reinforced by marriage, and the persistence of the extended family system among communities and tribes reinforces this kinship and sociocultural ties among communities and individuals. In the district, the traditional chieftaincy systems exist to complement efforts of people's adherence to rules, and respect for authority. The paramount chiefs (Lawra and Nandom Naa) exert utmost powers over the people through the traditional substructures of chiefs, sub-chiefs and clan heads. The relationship of trust and

mutuality of interest among people in the district constitute a major strength that supports peace and stability in the district.

The availability of credit, savings and remittances from family and friends elsewhere constitute the financial capital. In rural areas, women are organised in social groups of village savings and loan associations (VSLA) to facilitate savings and credit amongst members. In addition, remittances from family, relatives and friends are other sources to support family back home. Seasonal migration forms part of people's livelihood. Family and friends who migrated elsewhere to work for extra income usually remit home regularly to support their family back home. Regular remittances are often used to support the purchase of food stuff to supplement the upkeep of the family and also to support farming activities back home. They are used to purchase farming inputs such as fertilisers, hire labour, and purchase of seed and tractor services.

In terms of natural capital, the conditions in the district are a source of vulnerability. Generally, the soil conditions in the districts are suitable for the cultivation of groundnuts and cereals such as maize and sorghum, and the availability of grazing land creates opportunities for the rearing of livestock, which constitutes part of people's livelihood system. In addition, the presence of water resource such as the Bagre River are another source of livelihood for the people. Fishing along the Bagre River is one important livelihood source especially for communities along the river bank.

Generally, most households are less endowed with physical asset such as land resource, farm implements, cattle and cars. Every household, however, has access to physical asset such as housing, land resources, bicycles and some form of livestock such as goats, sheep, cattle, and pigs. These assets are often used to support daily livelihood activities such as farming, transport and access to markets to make ends meet. In the district, people's livelihood is tied to their access to land, which forms most part of their living. Land for agricultural purposes is generally inherited or gifted by others.

People's goals or aspirations

Generally, the basic motive of every household to engage in agriculture is for the sustenance of their families. However, surplus food produce are sold for extra income to cater for other needs of the household (GSS, 2014). Basically, the farming system practiced here is mixed farming; cultivating crops and rearing livestock together. Therefore, every household cultivates crops and keeps some type of livestock as well, to generate extra income to support household's needs. Subsistence farming, which employs well over 80% of the population, is practiced in two main forms. First, most households keep two farms as a way of sustaining households' food needs. There are backyards farms (generally smaller in size) often used for the cultivation of staple cereals such as maize and sorghum, while the bush farms (main farms, larger in size) are equally used for the cultivation of cereals and other crops, including beans and tubers. In addition, keeping of livestock such as pigs, goats, poultry, and cattle is also an important part of the agriculture system (Ghana statistical service, 2014). Although the main aim of people going into agriculture in these areas is to feed the family, the sale of livestock and surplus food produce account for the major part of the household's income in recent years (GSS, 2010; 2014). As a result of the prolonged dry season, dry seasonal gardening forms part of the agriculture systems and constitutes a major livelihood strategy for the people. Communities with access to water, such as those close to the Black Volta River, often cultivate vegetables such as tomatoes, egg plants, green pepper and pumpkin during the dry season to make some extra income.

Non-farm economic activities

Economic activities in the districts are dominated by small and agro-based industries, typical of a rural agrarian economy. Typical of a rural economy, there exists gender-based economic

and livelihood segregation among men and women. There are some economic activities noted as preserve of women, such as *pito* brewing, making of local cakes, shea butter processing, and sale of firewood. On the other hand, activities such as fishing, sale of pork (pig meat), manufacturing of xylophone, and the manufacturing of cultural artefacts are the preserve of men. There are, however, other activities such as cultivation of crops, rearing of livestock, dry seasons gardening and seasonal migration that are open to both men and women. As a result of prolonged dry seasons that characterise the climate regime, the youth (male and female) often migrate down south between April and October to engage in other income generating activities such as weeding, *galamsey* (artisanal mining), and other menial jobs to earn some income.

Institutions, policies

The SL framework pays particular attention to the component of institutions and policies because they facilitate the processes of harnessing available resources to pursue various livelihood strategies and to achieve varied livelihood outcomes (Tao & Wall, 2009). This forms the governance structure that provides a framework within which institutions, organizations, communities and individuals operate. They have a great impact on whether people are able to access livelihood resources. Hence, this section presents a review of institutions, policies and programmes that create an enabling environment for livelihood opportunities and outcomes. The review takes into consideration three levels of interventions. These include national policies and programmes, District Assemblies and the Medium-Term Development Planning (Plans) and Civil Society Organizations and development programmes and projects.

National Policies and Programmes Implemented at District Level

Several policies and strategies were implemented at the national level to promote sustainable agriculture production, food and nutrition security and industrialization (FAO, 2015). They include the following:

- *Food and Agriculture Sector Development Policy (FASDEP II, 2007)*, which aim at modernizing agriculture and increasing productivity of Ghanaian farmers (FAO, 2007),
- *the National Social Protection Strategy (NSPS, 2008)*, launched in 2008 with social protection programmes to improving access to livelihood opportunities,
- *the Ghana Shared Growth and Development Agenda (GSGDA 2010-2013)* with aims to fight against poverty through agricultural modernization, investment in infrastructure amongst others (FAO, 2015),
- *The Medium Term Agriculture Sector Investment Plan (METASIP 2010-2015)* with priority on food security, the major targets were Ghanaian rural farmers (FAO, 2015).

Other national programmes that were implemented at the district levels included the Agriculture Mechanization Services Enterprises Centres, Farms Inputs subsidy programme, Youth in Agriculture/Block farming programme (MOFA), the Irrigation Development programme, National Food Buffer Stock Company, LEAP etc. (FAO, 2015).

Agriculture Mechanization Services Enterprises Centres' (AMESECs) Programme

The districts implemented the 'Agriculture Mechanization Services Enterprises Centres' (AMSECs) programme in 2007 (MOFA, 2012; FAO, 2015) to contribute towards the Food and Agriculture Sector Development Policy. The major goal of the programme was to increase farmers' access to mechanised agriculture services in the country by supporting the private sector to provide farmers with affordable and timely access to farm power machinery. The expected outcomes were to ensure timely access to mechanised services at the districts levels, efficient utilisation of agricultural machinery, the reduction in drudgery and tedium in

agriculture production, the generation of rural employment and the reduction of post-harvest losses (Benin *et al.*, 2011).

These enterprises aim at serving as credit facility centres for rural farmers, assisting qualified private sector companies to purchase agricultural machinery at a subsidised price and interest rate and in turn rent to rural farmers at affordable prices (FAO, 2015). The machinery included tractors and harvesting machinery. Unfortunately, the provision of the subsidy to heavy, large and costly machinery (tractors) could not increase the usage of small farm implements and machinery among smallholder farmers for agriculture production in the district (FAO, 2015).

Farm Inputs Subsidy Programme (FISP)/Fertilizer and Input Subsidy Programme

In response to the weaknesses of the AMSEC programme, the Fertilizer Subsidy Programme was implemented in 2008 as a strategy to reduce domestic food and fertiliser prices for smallholder farmers by increasing the rate of fertilisers applications among farmers (FAO, 2015). The subsidies targeted all-size crop farmers, with 50 percent reduction of the fertilizer prices decentralised to the various districts in the form of region-specific vouchers (FAO, 2015). In the year 2008, a total of 3,450 bags of NPK (15:15:15) compound fertilizers; 1,250 bags of NPK (23:10:05) compound fertilizers, 2,600 bags of Sulphate of Ammonia and 450 bags of UREA fertilizers were subsidised to farmers in the Lawra-Nandom district. In 2009, the number of subsidies fertilisers to district increased by 18.8% (4,250 bags) of NPK (15: 15:15), 1,450 bags of the NPK 23:10:05, 3,850 bags of the SA and 600 bags of the UREA (MOFA, 2012).

In 2010, the strategy changed and placed emphasis on only the subsidy system instead of the provision of direct coupons to farmers. Nine fertilizer agents within the study area (then Lawra-Nandom district) sold Government-subsidised fertilisers to the farmers in the district. Unfortunately, the strategy could not increase the application of fertilisers among small-holder farmers as expected (FAO, 2015).

Youth in Agriculture and the Block Farm Programme (BFP)

The “Block Farm Programme” was implemented in the district in 2009, as a component of the Youth Agriculture Programme (FAO, 2015), to contribute towards The Medium Term Agriculture Sector Investment Plan (METASIP 2010-2015) and the Ghana Shared Growth and Development Agenda (GSGDA). The overall goal was to improve agriculture and farming as a business by targeting large tracks of arable land (in blocks) in different locations for the production of selected commodities in areas where the district has a comparative advantage (Benin *et al.* 2011; FAO, 2015). The targets were rural poor, particularly the youth. The objectives of the programme were to generate employment for poor and rural youth, to improve incomes among farmers, and increase food security through the usage of science and technology towards productivity and higher yields (Benin *et al.* 2011; FAO, 2015).

As part of the activities, regional blocks farm management groups were formed, districts block farms management teams were also formed, block farms locations were identified, and crops were selected, beneficiaries were registered, and youth organizations were formed and sensitised (Benin *et al.* 2015). A bundle of subsidised mechanised services and inputs as well as extension services were provided with the conditions that the involved farmers repay the investment cost after harvest. About 145 males and 40 females in the study area (Lawra-Nandom district) took part in the block farm programme, all covering 122.5 acres of maize and 106 acres of rice in 2009. In 2010, the number of male beneficiaries increased to 248 males and the female beneficiaries declined to 39 females and translated to a total 272.5 acres of maize, sorghum and rice. Unfortunately, the programme could not contribute significantly to employment provision and poverty reduction in the district. Tractor services were inaccessible, and there was a delay of rainfall followed by drought and then flooding, which affected the

yields of crops and made it difficult for farmers to recover their cost of investment in order to repay the fertilizers and machinery expenses (MOFA, 2012; FAO, 2015).

National Food Buffer Stock Company (NAFCO) Program

The National Food Buffer Stock Company was established in 2010 and operated effectively for the period up to 2013 towards the Ghana Shared Growth and Development Agenda (GSGDA) and the Medium Term Agriculture Sector Investment Plan (METASIP 2010-2015).

The major goal of the programme was to

- ensure the security of farmers against losses resulting from the anticipated increases in food crops produces towards national food security. (Benin *et. al.* 2011),
- to guarantee farmers an assured income by providing a minimum guaranteed price and ready market for farm produce,
- to remove excess produce from all farmers in order to reduce post-harvest losses through poor storage and protecting farm incomes,
- provide storage facilities for agriculture produces with aims to reducing post-harvest loses, stabilizing prices of farm produces and to serve as an emergency grain reserves, t
- o purchase, sell, preserve and distribute food stuff,
- to employ a buffer stock mechanism to ensure stability in the demand and supply of the farm produce,
- to expand the demand for food grown in Ghana by selling to state institutions such as the military, schools, hospitals, prisons etc. (Benin *et. al.* 2011).

The National food Buffer Stock Company operated as a state owned enterprises that purchases, stores, sells and distributes excess grains in warehouses across the country (FAO, 2015). Nationwide, 73 companies were licensed to buying maize, rice and soya beans from farmers at minimum prices and granting farmers 10 percent profits in the districts. In 2014, financial constraint and lack of storage facilities in some regions hindered the operation of the programme. Overall, the expected outcomes of the programme (farms produce prices stability, reduction of post-harvest losses, lower prices for consumers and higher prices for farmers through increased production) were not achieved (FAO, 2015).

Livelihood Empowerment against Poverty (LEAP)

The Livelihood Empowerment against Poverty (LEAP) programme was introduced in 2008 to contribute towards the National Social Protection Strategy. The major goal is to lift the poor out of poverty, to ensure school attendance of children from poor households, access to immunization, postnatal care services, avoid child labour and trafficking through conditional cash transfer and free health insurance to extremely poor households in Ghana (FAO, 2015).

The eligibility of a household in the district is based on its poverty status. Eligible and registered households receive bimonthly cash transfers of between USD 4 to 8 USD per month on condition to register for the National Health Insurance Scheme (FAO, 2015). The program is funded from the general revenues of the government of Ghana, through donation from DFID and a loan from the World Bank. The program is currently in operation in the study area.

Northern Rural Growth Programme (NRGP)

The Northern Rural Growth programme was launched in 2008 in the then Lawra-Nandom district, implemented by the Ministry of Food and Agriculture (MOFA). The overall goal of the programme is to achieve sustainable agriculture, rural livelihoods and food security for the rural poor, particularly those depending on marginal lands, rural women and vulnerable groups in Northern Ghana (MOFA/IFAD/AfDB, 2011). The programme targeted rural households with the aim to increase rural household's income in northern Ghana on a sustainable basis, through a strong market and productivity-oriented approach, private sector led (farmers, traders, processors, exporters, services, Banks), providing an incentive framework for private operators in agriculture businesses in the North (MOFA/IFAD/AfDB, 2011).

The components of the programme included commodity chain development, rural infrastructure development, access to financial services, and programme management and coordination. The programme is currently operated in the district under the facilitation of the Association of Churches Development Projects (ACDEP). The major activities that were carried out included facilitating market linkages, farmer-based organization development, active profitable involvement of the actors in three commodity value chains, facilitating financial access, facilitating business development of inter-professional bodies, and coordinating and managing the programme (MOFA/IFAD/AfDB, 2011).

Medium Term District Development Plans and Agriculture Development

There is a dualism in governance at the local level in Ghana, where the traditional governance system runs parallel to the modern system of political governance. At the district level, district assemblies constitute the main planning and implementation unit. These assemblies prepare medium term development plans for the overall development of the district. In some cases, these District Assemblies (DAs) formulate by-laws to guide the actions of constituents. Processes (policies), implemented through the DA structures tend to cushion or restrain the impact of shocks on households in the form livelihood restoration programs and projects. In recognition of the need to help the poor and aged restore their livelihoods, DAs in the study area are implementing social programmes such as Ghana Social Opportunities Projects (GSOP) and the Livelihood Empowerment against Poverty (LEAP) programme, among others.

From a content analysis of the 5-Year Medium Term District Development Plans (MTDPs) for Lawra and Nandom Districts, two key policy interventions are identified for supporting agricultural development. These include irrigation and agriculture modernisation, and natural resource management. The development goal of the District Assemblies in the study has been to accelerate economic development, reduce poverty and promote peace whilst recognising the value of grass root and private sector involvement. As part of the strategies, the 5-year Medium Term and Development Plan (MTDP) of the districts touched several livelihood issues, including irrigation infrastructure for smallholder farmers, agricultural modernisation and sustainable natural resources management.

Promoting Irrigation Development

The districts under the CBRDP programme of its 5-year Medium Term and Development Plan (MTDP) has provided irrigation facilities to enhance dry season vegetable production. Dams have been constructed whilst others are under completion. The District constructed a dam at Kokoligu. Outlet valves and canals to the irrigable area are yet to be rehabilitated. However, the dam is currently being used for dry season vegetable production and fishing, as well as a source of water for animals.

Guo dam in another neighbouring community is also yet to be completed. The project has been abandoned and efforts are being put in place to complete it for use. The Lawra District Assembly in collaboration with Pronet North and Concerned Universal (NGO), constructed about 7 dug-outs. (4 hand dug wells and 3 tube wells) for both drinking water and dry season vegetable production in communities that are now part of Nandom District. In Lawra, these

included the *Boo* and *Brifoh-Manguo* which have been completed. Two (2) dugouts at *Methow-Yipala*, *Kalkatou* are under rehabilitation. The completed facilities are currently being used for the purpose of drinking, watering of livestock and dry season vegetable production by the beneficiary communities.

Also, dug-outs in Lawra under rehabilitation include *Brutu* dug out, *Tuopare* and *zimuopare* dug outs under the Ghana Social Opportunities Project. On the aspect of management, only the *Kokoligu*, *Babile* dams have Water Users Association (WUA).

Agriculture Modernization and Sustainable natural Resources Management

On the aspect of agriculture modernisation, the major goal of the district has been to improve crops, livestock and fisheries production for food security, job creation and poverty reduction. During the period 2010-2013, the government aimed at increasing agricultural productivity by 30% by 2017, reduce post-harvest losses and provide a market for agricultural produce. As part of the efforts and activities, the district

- built the capacity of farmers in using best agricultural practices to increase productivity,
- increased the number of community-based extension services,
- facilitated credit to farmers,
- facilitated the availability of agricultural inputs, implements and markets for agricultural produce,
- promoted the availability of machinery under hire purchase and lease scheme,
- developed human capacity in agriculture machinery management, operation and maintenance within the public and private sectors,
- mainstreamed gender issues into agriculture mechanization by adding value to agricultural produce,
- promoted the consumption of local farm produce,
- encouraged processing of local farm produce and
- applied appropriate agriculture research and technology to introduce economies of scale in agricultural production.

Civil Society Organizations, Programmes and District Agriculture Development

Besides government policies and initiatives towards improving food security and sustaining the livelihoods of smallholders that are implemented by the district assemblies in Nandom and the Lawra districts, a number of Non-Governmental Organization (NGOs) have implemented projects to curbing poverty and reducing farmers' vulnerability to drought. Non-Governmental Organizations such as Care International Ghana, Centre for Indigenous Knowledge and Organizational Development (CIKOD), and the Association of Church Development Projects (ACDEP) have played a role in that regard.

WASH Programme/Climate Change Adaptation Programme/Food Security (CARE)

The focus areas of CARE International Ghana in the study area have been Climate change adaptation, Women empowerment towards promoting household food security, and Water and sanitation. On the aspect of Climate adaptation, the organization drilled boreholes in the project communities and facilitated the usage of the water for dry season gardening and for domestic activities. Communities located closer to river or water bodies that usually sustain water throughout the dry season were provided with water pumps with extension pipes and encouraged to go into dry season irrigation.

Prior to the drilled, the Organization identified interested households, groups comprising both men and women and provided the project communities with fences to promote dry season gardening. The essence was to enable the involved farmers earn income in the dry season to complement their seasonal harvests during the raining season. The involved farmers cultivated vegetables ranging from pumpkin leaves, beans leaves, cassava leaves, Neeli (melon), aleafu to Okro and made sales from the vegetables.

Within the project communities, the organization encouraged men to allocate lands to women (their wives, sisters etc) to cultivate their own desired food crops. Through this initiative, women cultivated groundnuts, Bambara beans, maize, and millet, made sales and used the remaining harvest to support the upkeep of their households. As part of the effort to empower women, the organization provided ruminants (Goats, sheep) to women and provided basic training to some individuals within the given communities on the treatment of basic diseases common to these animals.

Nandom Agric. Project

The organization is created by the Catholic Church, the focus area of the organization has been on climate change, agriculture and environmental research, targeting rural communities. The organization collaborates with OXFAM in the area of agriculture.

Community/Village Savings and Loan Scheme Implemented by NGOs

Community Savings and Loan Scheme (VSLA) is the trending savings program across the study districts. This savings method is operated to promote rural households' savings, particularly among rural farmers to enable them access money to address their basic problems. Several Non-governmental Organizations have facilitated the establishment and operations of the VSLA in Nandom and Lawra district, however CARE International Ghana is the major organization that has initiated the operation of the VSLA in many rural communities in the district.

To support the operation of the Village Savings and Loans Association (VLSA), CARE International Ghana formed groups comprising both men and women, provided weekly savings booklets and metal saving boxes with padlocks to the various groups. Each group has a secretary who records the weekly savings of each member in his/her saving booklet. Each member of the group is allowed to borrow an amount of money at any time but with minimal interest rate. After some years of operations, the organization often facilitates the sharing-out of the amount saved among members.

The VSLA has played an important role in consolidating households' access to livelihood strategies whilst empowering women, by promoting easy access to loans and savings. At the households, women and men roles in decision making differ and are tied to seniority and marital status (Rademacher-Schulz, *et. al.*, 2012). In a typical dagara community, gender ideology and customs have assigned men the role as heads of household, who are responsible for providing households needs. However, married women in northern Ghana are playing a dual role as mothers and the providers of children education, clothing, health and other needs (Pickbourn, 2011). They make decisions on the nutritional needs of the family and ensure their children do not starve.

ADVANCE and Promoting Agriculture Marketing

The major market centres within the study area are the Nandom and Lawra markets located in the major townships. The larger villages also have market centres (*Kuturu, Baseble, Ko, Nandom market, Eremon Market, Babile market etc.*) through which farmers from the various villages market their farm produce. Apart from the few markets, commercial activities in the district are mainly located along major arterial roads in small towns. Other commercial activities take place in corner shops and in homes. These markets operate on fixed days;

either every 7 days or every 6 days in a static market. Notwithstanding these market days' arrangements, prospective sellers are allowed to market their farm produces at their desired days and usually negotiate prices of the farm produce with their customers. Such farms either carry their farm products to prospective buyers closer to their communities or sell at the farm gate to buyers coming to them.

Besides the fixed market operations, prospective buyers outside the district (usually middle traders) often make arrangements with farmers and purchase farm products in bulk to resell in the urban areas.

Within the districts, a Non-Governmental Organization (ADVANCE) usually communicates the prices of farms products to rural farmers to ensure that they are not cheated by middle traders through the pricing.

International Development Enterprise (IDE) and Agriculture Financing and Marketing

Besides Care International, ACDEP, and NRGF operating in the area of food security, agriculture modernisation and mechanisation, the International Development Enterprise (IDE), a Non-Governmental Organization also operate in the areas of gender equity and food security, aims to enhancing farmers' yields through access to technology, products and knowledge, enabling them to sell affordable, nutritious food to local communities. On the aspect of Resilience to Climate Change, iDE helps people in rural areas build their resilience to climate extremes like floods and drought through the use of climate-smart agricultural technologies and practices.

iDE organizes farmer groups in each community around access to finance; seeds, fertilisers and soil amendment, small-scale water lifting and irrigation equipment, agricultural extension services, market linkages. The major activities carried out by the organization includes the organising and training of farmer groups on irrigation, the promotion of efficient use of water through drip irrigation technology, promoting conservation agriculture using mulching techniques, linking farmers to markets and traders, forming farmer marketing committees to bargain collectively for their products with traders, promoting digital financing (mobile money, where farm produce is transported to traders and the payment is made through mobile money), and linking farmers to access loans from Lawra Area Rural Bank, Nandom Area Rural Bank and Joseph Cooperative Credit Union. 14,514 households, 72,570 individuals have benefited from the organization's projects.

Association of Churches Development Project-Result Project (ACDEP) and Integrated Development Programmes

This organization has provided support to rural farmers in the areas of agricultural production and financing. The major focus of the organization has been on the socio-economic development of Northern Ghana. The target of the organization in the study area has been supporting the rural poor in aspects of Agricultural Development, Micro-finance, Primary Health Care, HIV/AIDS, Water and Sanitation, Climate Change Adaptation, Rural enterprise development for women's groups and Value chains / Market Access. Through these programmes, ACDEP works with rural communities to improve livelihoods, household food security, good health and poverty reduction in northern Ghana. The objectives of the project has been to increase, diversify agricultural production, and ensure that incomes and assets are distributed more equitably. Some of the activities carried out included

- the assessment of the needs and capacities of beneficiaries and the potential opportunities for appropriate and sustainable crop, animal and aquaculture production, consumption and marketing;
- selection, training and equipping community agriculture workers (CAWs) to support the delivery of training and extension services to crop farmers;

- to group crop, animal and fish farmers for the purpose of communication, information dissemination and the delivery of training;
- To select lead farmers for each group,
- to establish criteria for the provision of inputs and technology including beneficiary selection criteria and expected beneficiary contributions,
- to assess the needs and capacities of beneficiaries and the potential opportunities for agricultural and non-agricultural income-generating activities that would generate increased, diversified and more equitable incomes.

In overall, the result project has contributed towards the enhancement of food security and resilience for poor male and female smallholder farmers and their households in the study area.

Outcomes

The analysis reveals mixed livelihood outcomes from institutional, policy and programme interventions in the project area. These outcomes are diverse and reflect both positive and negative effects as analysed in terms of the three dimensions of sustainability. These include economic, environmental, social and resilience dimensions.

Economic outcomes

The primary economic outcomes are the sustenance of agriculture under a changing environment, adoption of new crop varieties, introduction of gardens and a gradual halting of a further deterioration of food insecurity.

- Sustaining agriculture, that is food crop farming, poultry and livestock farming, as one of the primary sources of livelihood under a changing environment. As a result of environmental change, sustaining agriculture has been a daunting challenge. However, the cumulative effects of farmer innovations and supportive interventions enhanced farmer capacities to sustain some form of agriculture, but there are mixed results in respect of yields. While some smallholder farmers continue to experience continuous declines in yields; others have halted declines and sustained yields for supporting household consumption;
- Adoption of new crops and early maturing crop varieties. As a result of various interventions, maize farming has been adopted among some smallholder farmers as a staple crop, primarily because of its suitability for adapting to climate change. Similarly, soybeans have been adopted because of their resilience to climate change and poor soil conditions. Together, these crops have improved resilience to climate change and significantly improved nutrition of smallholder families. While maize has become a staple food, soybeans has become a primary source of protein for improving nutrition for children and the mothers. Some traditional meals are now prepared from soybeans and new meals have been introduced;
- Another important economic outcome is the introduction of dry season gardening for the production of vegetables, a form of intensification. There are those smallholder farmer households who have made gardens under community-based supported schemes. There are those who have made gardens along river banks and around valleys and are drawing water from river beds. And yet, there are those who have backyard gardens they water from waste water and from other sources such as boreholes and wells. These gardens provide vegetables for consumption but also a source of income for farmers;

- There is still an unmet need for food security as seasonal food shortages and malnutrition remain an annual experience among most households. Nonetheless, the state of food supply and food availability for consumption and nutrition is becoming relatively stable, so that further deterioration is gradually being halted. Overall the incidence of poverty high in this area.
- Increased access to micro-finance services through the introduction and management of Village Savings and Loans Associations (VSLAs) for enhancing access to micro-finance services. These include opportunities for savings, credit and access to basic business development services.

Environmental outcomes

The key environmental outcomes are the adoption of innovations in soil and water conservation in agriculture and the management of natural vegetation.

- Smallholder farmers are adopting improved soil and water conservation measures. Shifting from farming practices such as use of mounds, planting on flat farmlands to increased application of composting, bunding and ridging for checking soil erosion and improving soil fertility.
- There are pockets of improved natural vegetative cover on farms and protection of some tree species due to the adoption of farmer-managed natural regeneration. However, these remain isolated pockets of change that have largely been unmeasured.
- At community level, some communities have also prevented bush fires and cutting of trees through the introduction of conservation by-laws and enforcement by traditional authorities and the communities themselves.
- There are isolated pockets of improvements of soil fertility as a result of farmers adopting improved soil water and conservation practices in agriculture. There are also indications that such farmers are either sustaining yields and or increasing yields.
- There are also indications that farmers and communities are beginning to learn and to adopt innovations from each other in conservation agriculture and the management of the natural vegetation.

Social Outcomes

The key social outcomes include more focus on strengthening nuclear family livelihoods and systems as opposed to extended family systems, increased migration, increased time, effort, burden and drudgery on livelihood activities and social cohesion at community around the management of Village Savings and Loans Associations (VSLAs).

- As a result of the struggle for sustaining livelihoods under environmental change and failure of interventions for addressing livelihood challenges, meeting food needs of families in particular, farm households are increasingly concentrating efforts at meeting nuclear family food needs. This is gradually weakening extended family systems of social and economic protection.
- Increased migration (out-migration) among the productive age groups with mixed livelihood outcomes:
 - Seasonal migration of the youth and remittances to family members at home. Such transfers range from foodstuff, money, clothes, educational materials;

- Seasonal migration and asset /innovations transfers home. These range from simple innovative farm implements to new seed varieties, household electronic appliances, bicycles and aluminium roofing sheets for roofing homes.
- Seasonal migration resulting in separation between families, breakdown in family ties, return migrant related sicknesses such as waist pains and boils, typhoid and bilharzia.
- Permanent migration resulting in family migrations and family resettlements.
- Migration reducing the number of mouths to be fed with the little farm produce at home (somewhat a coping mechanism) but at the same time leading to depletion of farm labour for some households.
- Increased time, effort and burden of livelihood activities, both farm and non-farm livelihoods, especially among women, and the consequences of less leisure time, less time for entertainment, less time for sleep, less time for child care and less time and commitment to social obligations such as funerals. Women are bearing a higher proportion of this burden of more time and effort to sustain household livelihoods.
- Increased community social cohesion and cooperation around the management of Village Savings and Loans Associations (VSLAs) for enhancing access to micro-finance services and meeting social commitments and obligations.

Resilience Outcomes

There are indications that community resilience to climate change and environmental change is being enhanced through Village Savings and Loans Associations (VSLAs) in various ways:

- Enhancing community cohesion and community-response for enhancing livelihood adaptation to climate change;
- Access to credit for investments in climate change adaptation in agriculture as in the purchase of new and early maturing crop varieties and financing least input agriculture (fertilizer and farm implements) suited to climate change adaptation;
- Credit for financing the purchase of grains and other food items for meeting food needs during seasonal shortages of food at household levels;
- Financing diversification of livelihoods, ranging from food crop farming (including crop diversification) to poultry and livestock (small ruminant) production. Others include agro-processing activities such as shea-butter processing, groundnut oil and paste production, *pito* brewing, and trading.
- Financing the hiring of tractors and bullock ploughs for speeding up the farming process for adapting to shortening rainy seasons.

Linkages between the components

Emergence of a Typology

For the analysis of livelihoods, two typologies emerge for classifying farmers. These are classifications of farmers by the number of farms owned and by seasons of production.

Categorization of farmers by number of farms owned:

1. **Single Farm Ownership Farmers (SFOFs).** Their production is characterised by compound farming only and utilisation of compound farms using family labour. They produce cereals and legumes, mainly targeted for home consumption. These farmers also keep poultry and livestock. These farmers are in the minority.
 - The primary goal of production is to meet household consumption needs;
 - The primary asset is the compound farm known as the *samane*, which essentially consists of family lands closest to the homestead;
 - The primary focus is to produce cereals, legumes and vegetables and sometimes roots and tubers.
 - These farms primarily depend on household labour for meeting labour requirements of production;
 - The farm size is reducing, and farmers are focusing on enhancing soil and water conservation through the application of manure and compost as a form of intensification for enhancing resilience to climate and environmental change;
 - These farmers are unlikely to use tractors and will rarely use bullocks for ploughing. They may even plant without ploughing as a way to dealing with delayed onset of the rains. Farmers then weed when crops have grown to a certain extent.
 - They may be involved in non-farm livelihood activities during the off-season.

2. **Multiple Farms Ownership Farmers (MFOFs).** These farmers produce on multiple farms, including compound farms, bush farms and farms along river banks and valleys. Their primary objective is for home consumption, but they also sell for an income if yield is good enough. Some production is underpinned by commercial interest such as in the production of groundnuts, maize, rice and pepper. They largely depend on large family labour size but hire labour to supplement. These farmers also keep poultry and livestock.
 - The primary goal of production is to meet household consumption needs, but also produce for an income;
 - The primary assets are the multiple farms, which may include compound farms known as the *samane*, valley bottom farms, river side farms and bush farms. The compound farms may be family lands, but the other farms may have been secured under some tenure arrangements;
 - The primary focus is to produce cereals, legumes and vegetables and sometimes roots and tubers.
 - The farms primarily depend on household labour for meeting labour requirements of production, but farmers also hire labour to supplement;
 - Expanded farm sizes for production and focusing on enhancing soil and water conservation through the application manure and compost as a form of intensification for enhancing resilience to climate and environmental change on compound farms;
 - Farmers may also apply higher volumes of agriculture inputs, especially fertilizer, pesticides and weedicides in production activities in valley bottom farms, bush farms and river bank farms;
 - These farmers are most likely to use tractors and bullocks for ploughing and preparing soils for planting.
 - They may be involved in non-farm livelihood activities during the off season.

Categorization of farmers by seasons of production:

A. **Single Season Farmers** (SSFs) who produce only during one production season, primarily the rainy season only.

- At the end of the farming season, they have nothing to do if they stay in the community;
- Such farmers may either produce from the compound farms only or in addition, produce from valley farms, river side farms and bush farms.
- They are also essentially mixed farmers producing crops, poultry and livestock.
- Such farmers may also migrate to southern Ghana to find other jobs during the dry season.
- They may be involved in non-farm livelihood activities during the off season.

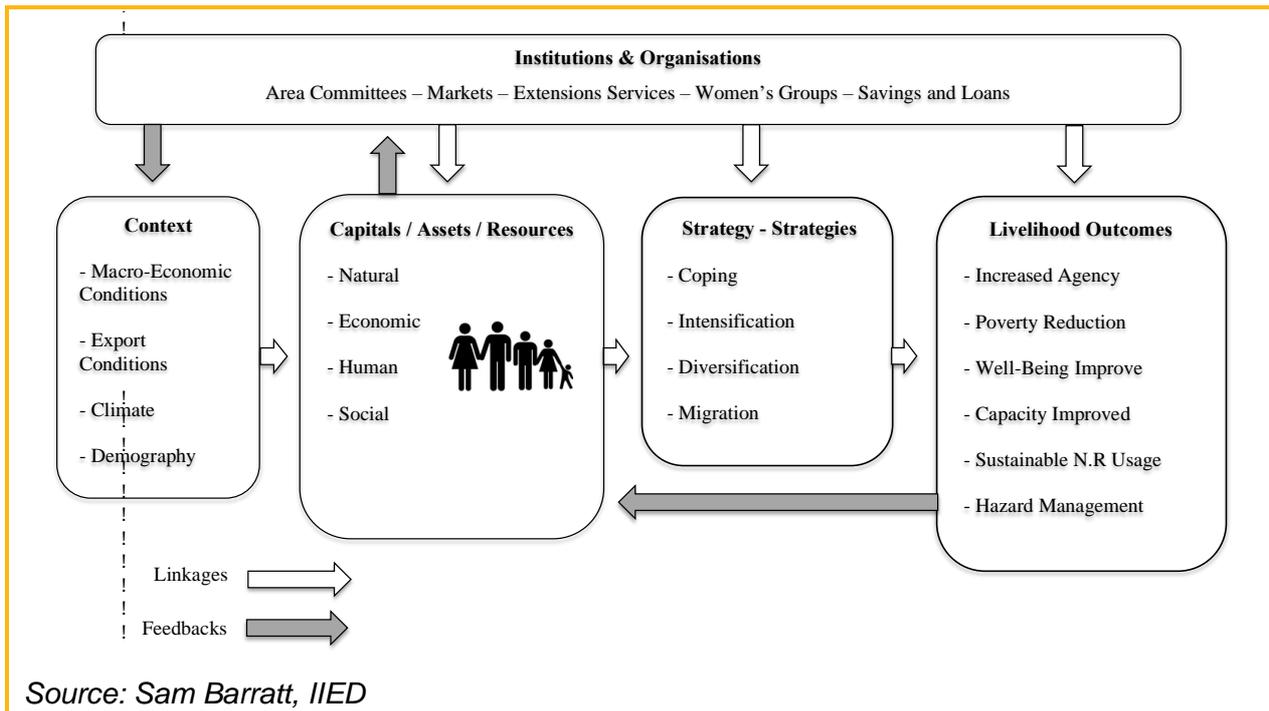
B. **Dual Season Farmers** (DSFs) who produce all year round – both during the rainy season and dry season.

- They may own a garden in addition to a compound farm, river side farm, valley bottom farm and bush farms.
- In the rainy season they produce cereals, legumes and vegetables from compound farms, river side farms, valley bottom farms and bush farms.
- In the dry season, they produce vegetables for consumption and sale from gardens and largely drawing family labour.
- They are less likely to migrate as they have work to do in the dry season.
- They may be involved in non-farm livelihood activities during the off season.

How Context influences Capitals, influences Strategies (all supported by Institutions) and which determine Outcomes

This section analyses the linkages between different components of the livelihood framework (Figure 2). The framework presents an overarching analytical framing for understanding the linkages between the context, assets, livelihood strategies and outcomes. In simple terms, the context influences the kinds of assets that people have at their disposal, the assets shape livelihood strategies, and the strategies determine the livelihood outcomes - supported by institutional processes to a greater or lesser degree.

Figure 2: Linkages and Feedbacks in the Sustainable Livelihoods Framework



In this particular case, the context provides smallholders with the natural resource base, economic infrastructure and situation, social resources and the quality.

- **Natural:** Land is the natural savannah vegetation, water bodies, farmlands, rainfall, rivers, and valley bottoms.
- **Economic:** Macro-economy situation (monetary and fiscal policy), market centres and markets, and other forms of economic infrastructure such as roads and electricity.
- **Human:** There is a young population (more young people than aged ones) with great potential, but low level of education. It is largely an unskilled labour force, but knowledgeable in simple agro-processing technologies for driving agro-processing activities. Skills and knowledge of agro-processing are largely passed on from generation to generation within the family setups and in limited instances acquired through apprenticeships.
- **Social:** Large network of extended family relations co-existing with nuclear family arrangements. Increasing incidence of weakening extended family ties and bondages. However, kinship and social ties still playing an important role in social cohesion and patterns of interactions. Supported by institutions of governance and in the context of this study area, decentralisation and local governance, national policies and programmes implemented at local levels and the support programmes of Civil Society Organizations.
- The institutional and policy environment provides the overarching supportive framework, and this was analysed at three levels - national institutions and policies, district assemblies and their roles in district development planning and finally, programmes and projects of civil society organizations.

The context shapes the livelihoods strategies that the local population adopt based on the forward and backward linkages (capitals and strategies):

- The natural resource base (land, vegetation and water resources), combined with a largely illiterate population with knowledge on farming, presents agriculture (rain fed) and irrigation as the largest window of livelihood opportunities. Further to this are the different layers of institutional support for agriculture development;
- Most Non-farm livelihoods are largely family-based, and the knowledge and practices are largely transferred from generation to generation through socialisation within the family and through close social ties. These are mostly agro-processing related industries with direct forward and backward linkages to agriculture and or the natural resource base. Thus, the natural resource base and agriculture provide the bases for a window of diversified agro-processing livelihoods;
- A limited opportunity exists for developing non-farm livelihoods through apprenticeship not involving family and social ties. However, they require semi-formal contractual arrangements in training.

Vulnerability and resilience

Based on the analysis of people’s livelihoods, we identify two levels of vulnerability for analysing vulnerability among differentiated households. These levels include level 1 – relative low vulnerability and level 2-relative high vulnerability (Table 1). SITAM adopts the SHARP definition of vulnerability, which is “the ability of a system to recover, reorganise and evolve following external stresses and disturbances”¹.

Table 1 Types of households and levels of vulnerability

Type of Household	Level of vulnerability	Description
Multiple Farm Ownership Farmers (MFOFs) Households	Relatively low vulnerability	-Have relatively less risk of crop failure producing from multiple farms; -Have relatively higher diversified portfolios of livelihoods.
Dual Season Farming Households	Relatively low vulnerability	-Have relatively less risk of crop failure producing from two seasons; -Have relatively higher diversified portfolios of livelihoods.
Single Farm Ownership Farming (SFOF) Households	Relatively high vulnerability	Have higher risk of failure producing from one farm only;
Single Season Farming Households	Relatively high vulnerability	Have higher risk of failure producing from one season only;

¹ John Choptiany, Benjamin Graub, Suzanne Phillips, David Colozza Jami Dixon (2015): Self-evaluation and holistic assessment of climate resilience of farmers and pastoralists. Rome: FAO.

In comparative terms, Multiple Farm Ownership Farming (MFOF) households and Dual Season Farming households have relatively low vulnerability because they have a better ability to recover and reorganise from the impact of external stresses. This is because their livelihoods are much more diversified and in doing so spread risk to avoid total failure and minimise the destructive impact of stressors. They have relatively less risk of total crop failure as they are producing from multiple farms, engaging in double season production and have relatively higher diversified livelihood portfolios.

Single Farm Ownership Farming (SFOF) Households and Single Season Farming Households have a higher vulnerability because they have relatively less diversified livelihood portfolios and less opportunities to spread risk for easy recovery and reorganization if exposed to the damaging effect of a hazard.

Conclusions

First, smallholder agriculture remains a primary livelihood that is being driven and promoted by smallholder farmers themselves as part of an inherited tradition and promoted through policies and programmes involving the state and Civil Society Organizations (CSOs).

- There is a growing trend of farmers reducing farm sizes and adoption of innovations for soil and water conservation and compost application for sustaining rain fed smallholder agriculture as an alternative livelihood;
- There is an increasing trend of using tractors and bullock ploughs for speeding up land preparation, adoption of new and early maturing crop varieties and reduced application of inputs (including little application of fertiliser) for adapting to climate change;
- There is an increasing trend in the involvement of women in agriculture as ‘farm owning’ farmers and not just providing support to their husbands as farmers as a way to contributing effectively to sustaining household livelihoods;
- A growing trend on increasing irrigation as a form of intensification through small backyard gardens and the establishment of gardens along river banks and valleys for the production of vegetables for consumption and for sale.
- The challenges affecting innovations for sustaining smallholder agriculture include the following:
 - limited access to organic matter, limited access to agriculture extension services, limited access to subsidised agricultural inputs and implements due to implementation problems and trade liberalisation that make local agriculture production less competitive.
 - Secondly, there is an increasing trend of livelihood diversification among smallholder farmer households. The trend is indicative of households adding non-farm livelihoods to their portfolio of livelihoods – beyond agriculture. The livelihoods that are commonly adopted include the following: Emergence of trade as an important livelihood and different categories of people are engaged in different kinds of trade. The young men are involved in trade of livestock while women are involved in trade of grains. Both young men and women are involved in trade of petty finished consumer goods and alcoholic beverages.
- A growing trend of agro-processing activities. Women are involved in food vending, *pito* brewing, shea butter processing, flour and dough processing, groundnut oil and paste processing. Young men are involved meat processing and sale.

- Women assuming the role of ‘bread winners’ in the struggle to sustain livelihoods under failing rainfall regimes and soil fertility decline through their involvement in on-farm livelihoods.
- A growing trend in the proliferation of VSLAs for promoting access to credit and other micro-finance services (savings and business development services) for supporting livelihood diversification.
- The challenges affecting livelihood diversification are multiple: they generally include poor road and market infrastructure, poor prices and marketing of products, limited access to credit for capitalization and macro-economic instability.

There is widespread incidence of Poverty and food insecurity despite multiple layers of interventions for improving livelihoods involving farmer driven innovations and programmes and projects implemented by Governments and NGOs.

- For most smallholder households, food shortages and malnutrition especially among children (under nutrition) is an annual and cyclical experience.
- Sources of income and levels of income remain very low arising from multiple factors. These include low investments and markets for agriculture produce and products from agro-processing and low purchasing power among the populace in the region. Official records on the spatial distribution of poverty show that the Upper West Region is the poorest of 10 regions in Ghana.

There is growing incidence of out-migration as a livelihood option and as a composite phenomenon embracing environmental, economic and social dimensions.

- There is a growing trend of permanent migration for farming purposes with periodic home visitation to honour social obligations. Thus, while seasonal migration is still common, it has become a precursor for permanent migration – migration and resettlement of families for farming purpose in rural areas of southern Ghana.
- There is also an increasing trend of female migration. In the past, migration was primarily male dominated but this has changed because in some instances, females co-migrate with their husbands and settle in farming communities in southern Ghana (Brong Ahafo Region). In other instances, they migrate to smaller towns or cities to provide hired labour services to restaurants and drinking bars for irking a living.
- A key challenge associated with migration as a livelihood option are the unintended consequences: separation between families, weakening extended family ties, the health-related hazards, lack of active labour force to support farming at home, negligence of child and family care and the sifting burden on other family members.

Knowledge gaps

From the livelihood analysis, the following areas were identified as knowledge gaps and or grey areas requiring research and understanding: The overall effect of farmer adoption of innovative soil and water conservation and management of the natural vegetation on yields and the overall quality of life and overall community resilience to climate change/environmental change.

- The number of farmers adopting irrigation as a form of agriculture intensification and livelihood outcomes.
- Livelihood diversification and the contribution to poverty reduction (measuring the extent to which it has reduced food insecurity and increased incomes).

- Understanding the gender dimensions of livelihood changes for adapting to environmental change.
- Compatibility analysis of policies and programmes and coordination of implementation for improving agriculture at the institutional level.

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