

Small-scale agriculture in Bolgatanga, Ghana

– a case study of how to make small-scale sustainable agriculture more profitable

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Abstract

African economies are strongly associated to natural resources and depend in great extent on agriculture for sustention. The vulnerable climate farmers in sub-Saharan Africa are facing contributes to limitations in production efficiency and makes the agriculture business more risky compared to the industry in other environments and regions. Cooperation with the local registered nongovernmental organization, TRAX Ghana, and interviews with 116 farmers in two villages in the Northern region of Ghana has been performed during a field study to the location mentioned. This resulted in a deep understanding of the current situation which includes the environmental and economical difficulties the farmers face in the agriculture production. Moreover, it contributed to a generation of ideas for development in the area. However, the study changed focus after the first interviews from an idea of the main difficulty of pricing, to the more relevant and central profitability problem. With this in mind the report aims to create strategies for farmers in the region to become more profitable in a sustainable manner. Investments and savings have been identified to play a great part in the path of development for a successful agriculture production in the region of Northern Ghana.

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1. Introduction

This chapter presents the background of the study, which embrace the profitability difficulties that the farmers in region of Bolgatanga experience. These factors are exemplified by means of the investigation, which leads into a discussion about the research area and the problem. Conclusively, the purpose, organization and delimitations of this study are presented.

1.1 Background

More than half of the population in sub-Saharan Africa (SSA) is rural and directly depending on locally produced crops or food harvested from the immediate environment. During the last 35 years, the cereal production has decreased from 150 to 130 kg per person, while it should be mentioned that an increase of 200 to 250 kg per person in Asia and Latin America has been observed. Labor and land productivity in Africa are among the lowest in the world (Bationo, 2007). SSA economies are greatly reliant on natural resources and are climate sensitive. The productivity of the poor decreases as a result of degradation of renewable resources which is devastating for them as they most rely on these resources and this makes them even more vulnerable to climate variability, such as droughts and floods (Webersik and Wilson, 2009). The problem of climate change vulnerability is one of the most pressing issues facing especially resource poor farming communities. Poor soil fertility and unreliable access to water among others has led to low crop yield, poverty and scarcity (www.trax.org). Understanding the link between livelihoods and managing important services provided by natural ecosystems is essential for achieving sustainable economic growth and poverty reduction (Webersik and Wilson, 2009).

TRAX Ghana is a local registered nongovernmental organization (NGO) which is located in Bolgatanga, the capital of the Upper East region of Ghana, see map in appendix 3. The main income for the habitants of the regions in the Upper East of Ghana is based on subsistence agriculture. Chronic poverty in the region of Upper East of Ghana is more than 65 %, of these the small-scale farmers are the poorest (Vincent Subbey, 2011). This study will focus on the two villages Pelungu and Dachio, which are located outside Bolgatanga.

TRAX Ghana works with subsistence farmers to allow them to sort out poverty, ignorance and sickness. To manage this TRAX Ghana help the farmers improve the agriculture and environmental management practices, food security, development of grassroots or local structures to formulate and manage their own development projects and development of new skills in income generation, income security. TRAX Ghana applies low cost, basic and

suitable techniques which they mean are the most suited to the poorest and most vulnerable communities (www.trax.org).

TRAX Ghana is currently active in both Pelungu and Dachio, educating and training farmers in sustainable techniques. Soil and water conservation (SWC) methods are of great importance, therefore TRAX Ghana practice a range of soil and water management techniques which are educated to the farmers. The different techniques include contour outline identification and bounding, grass tripping, composting, integrated crop production, tree growing, building of energy saving fuel wood stoves, crop residue management, construction of improved animal pen and advice on organic pesticides to restore soil fertility, prevent soil erosion and enhance food security (www.traxghana.org).

1.2 Problem description

As stated, the subsistence agriculture is the income generating source for most people in the Upper East region of Ghana. Nevertheless, there tend to be drawback in the productivity for farmers in Africa due to vulnerable environment. After discussions with TRAX Ghana I managed to get an overview of the difficulties the farmers in Pelungu and Dachio face. Due to close cooperation with farmers in Pelungu and Dachio the employees at TRAX Ghana have realized that the subsistence farmers have difficulties with profitability and pricing of items when it comes to marketing of any excess goods after home consumption. The farmers cannot tell whether they reach break even or make profit since records are not kept on production costs. If a farmer cultivates X acres of farm and harvest Y kg of crop and sells a bowl of the produced at the price of Z, is that selling price making the person better or worse off? Hence, the farmers face problem in having a profitable business and the ability of creating a sustainable cash flow is low. As well, the productivity drawback contributes to an unsustainable business as the amount of sold goods is too low to cover the production costs and to create a surplus and generate some margins.

Since the current situation cannot tell if the famers are having a profitable business or not, I found a great interest to investigate this phenomenon closer and see if the chronic poverty could be linked to the pricing difficulties that the farmers obtain or if other underlying aspects are connected to the productivity and profitability drawback. With regard to this I have developed the following purpose.

1.3 Purpose

Primary, the purpose of the thesis is to present a deeper understanding of the main difficulties to remain and increase the profitability as a farmer in Pelungu and Dachio. More specifically, I aim to track the farm related costs and inputs to investigate if the profitability difficulty that the farmers currently face really is caused by the pricing of the crops or if there are other essential factors behind the profitability drawback. Finally, I wish to come to a conclusion on a proper strategy for an individual farmer in the region to be more profitable in the future. Hence, I have developed the following research question:

1.4 Research question

R: What are the potential and future strategies for an individual farmer in Pelungu and Dachio to become more profitable?

The nature of the report will have a main focus on production, productivity improvements and sales of agriculture goods throughout the paper. Differences between the villages will be mentioned to make it easier to draw conclusions about the complexity the farmers in Pelungu and Dachio experience.

1.5 Delimitations of the report

The study is limited to the two communities Pelungu and Dachio. An important delimitation is that this report will not consider the possible influence of other external organizations, other than TRAX Ghana. Another important delimitation is that this study only considers farmers working together with TRAX Ghana, farmers educated in SWC methods.

1.6 The contribution of this report

This study will contribute to a deeper understanding of what mechanisms small-scale agriculture in a SSA country is depending on and what can be done to improve the profitability on a more individual level than reports done before in this subject.

2. Methodology

This chapter presents the practical process of how this field study was conducted as well as a brief discussion on the factors in the research method that influenced the result.

2.1 Research design

When writing a thesis a research design ought to be chosen. The design chosen will contribute the researchers' creation of the framework for the following work that the researcher intends to achieve. When research seeks to describe and explain activities and events the researcher is using a non-experimental, also known as descriptive, approach (Merriam, 1994). For my project I chose to work with the descriptive research design. I found it suitable for my study, as this study is focused on how the subsistence farmers in Pelungu and Dachio currently work.

2.2 Method

Following the decision concerning the approach there is a request for creation of the method, furthermore how should the data collection be organized. The data collection is generally divided into quantitative or qualitative methods (Esaiasson et al, 2007). The quantitative method is applied when the purpose of the study is to distinguish how different happenings are spread over for example a population and to discover relations between the ability and meaning. Through the quantitative method the study is analyzed from a part to the whole (Starrin, 1994). This project is based on interpreting data from a large group of farmers to be able to draw conclusions concerning the population chosen in the two communities Pelungu and Dachio. When the purpose of the study focus on a population, a quantitative approach allows a more general analysis. Furthermore, a characteristic of quantitative research method is that the measuring can be analyzed through numerical observations or be transformed into those (Esaiasson et al, 2007). I have worked with a quantitative method as this study strives to achieve a generalization of a population. However, I have used some qualitative method in such cases when needed, to complement the quantitative approach to get a deeper understanding of the current situation in Pelungu and Dachio. I chose to conduct an inductive approach for my study, where the purpose is to find an extensive pattern in a single occurrence rather than try to falsify a hypothesis. An optimal inductive approach is done when the researcher turn to reality, without pre-expected thoughts, collects information, and from there design the theory. The researcher collects relevant information without being replicated of subjective thoughts and meanings (Jacobsen, 2002).

2.3 The case study

To conduct a comprehensive thesis and to truly understand the situation of the farmers in Pelungu and Dachio a field study trip was arranged during the spring 2011. I got in contact with Vincent Subbey, the director of the organization TRAX Ghana, in November 2010. Vincent and TRAX Ghana had a major part in the preparation work, in order to understand the problem that the farmers in the region of Bolgatanga were experiencing. When I arrived in Bolgatanga I was introduced to the work of TRAX Ghana and the field work began in the two villages Pelungu and Dachio. Interviews with farmers were held during five weeks to get an accurate picture of the present situation. The first weeks of interviewing were held in the home environment of the farmers. As I got an overview of the life and situation of the farmers the two last weeks of interviewing were held in the center of the villages. The farmers were gathered and I was placed in a separate area and called for one farmer at the time to do my interviews more efficient.

The farmers in Pelungu and Dachio work with sustainable methods taught to them by TRAX Ghana. The majority of the farmers apply composting to improve the soil fertility. Those farmers who have livestock pick up the droppings and put it in a box made of mud. Then they spread the manure on the field just before the first rain falls. Many farmers believe this will increase soil fertility gradually. Those farmers who do not own any livestock go around in the nearby area to pick droppings from the animals walking freely. Due the flooding from the heavy rains many farmers have been taught to do air bounding and for those who have stone close by apply stone bounding, to prevent the manure from flooding away and for preventing erosion. Air bounding is the same as crop or grass residue bounding. The farmers have also stopped burning the bush and farm trash and the residues to increase the soil fertility.

Hence, the farmers interviewed working with TRAX Ghana has a deeper knowledge and they have a clear motivation to create something better and aim to increase their productivity and income. However it should be mentioned that there is a huge demand from farmers to work with TRAX Ghana (Interview Solomon 110412). This indicates that farmers not working with TRAX Ghana also have a motivation to improve their living standard.

I believe that the patterns considering everyday struggles found in Pelungu and Dachio can be applied to villages and farmers with similar circumstances, comparable possibilities, living standard and background. This I base on the large amount of farmers interviewed and the fact

that the two villages observed are different but yet have similar difficulties. In other words the problematic shown in Pelungu and Dachio could be representative for a greater and wider area.

2.4 Data collection

In a respondent survey it is the respondents themselves that is the study object and their thoughts that are taken into consideration (Esaiasson et al, 2007). A respondent survey is feasible for my study as I want to find out how the farmers in the region of Bolgatanga experience their work done and what they think could be improved by them.

Question surveys make use of standardized questions for all the respondents however there can be open questions in question surveys as well. For question surveys the questions are normally asked to a sample of people from one population to be able to generalize the results on the entire population (Esaiasson et al, 2007). I chose to work with a question survey as I aim to do generalizations from the selected population in the regions of Pelungu and Dachio. I will use both standardized questions and open questions to make sure that all information required will be covered. The question survey can be based on oral communication; interview surveys (Esaiasson et al, 2007). I will do my research through individual interviews, face to face. There are several reasons for me choosing individual interviews. First the farmers chosen for the research have limited reading and writing skills thus to get proper answers the questions need to be asked face to face. The English level of the farmers is also limited therefore there will always be an interpreter with me during the interviews. However, the most important reason for me choosing individual interviews is that I can control the situation and I can get as much information as possible and I have the opportunity to ask further and more detailed questions when needed. I will take direct notes on the questionnaire document and sum the answers into a coding system in SPSS when returning back from the field. Moreover the data from questionnaire will be analyzed both quantitatively and qualitatively. Quantitative analysis will be done using the summary from the coding system in SPSS, a statistical computer program.

2.4.1 Selection

To get a precise picture of the subsistence farmers in the region of Bolgatanga I chose to focus on two villages Dachio and Pelungu. Both villages are located 20-45 minutes by car from Bolgatanga. I wanted to question both men and women to get an honest picture of the

situation, and therefore the respondents were selected randomly. The amount of interviews, 116 interviews, were based on the time available although a state of saturation was achieved in the sense that any further interviews would have added little or no new information.

2.4.2 Interview creation

The questionnaire was constructed with the research questions in mind and after discussion with employees at TRAX Ghana. After a first draft the questionnaire was brought to the field for a first trial and from there some minor adjustments were made. The questionnaire used is presented in appendix 1.

2.5 Validity and reliability

When theoretical questions and problems are linked and concluded with operational information it could result in translations difficulties (Esaiasson et al, 2007). Is the research truly investigating the empiric as stated in the theory? Moreover, how the validity of the research is acknowledged. The concept validity can be explained as conformity between theoretic definition and operational indicator and the absence of systematic errors, additionally result validity is mentioned as if we actually measure what we claim we measure. To achieve good result validity there is a need for good concept validity and high reliability, high reliability means the absence of systematic *and* unsystematic errors (Esaiasson et al, 2007). To increase the validity of this study I have interviewed a large amount of farmers to get as correct picture of the situation as possible. Since I constructed a questionnaire with structured fixed answers it is easier to maintain a higher reliability, even though some of the questions are open I have taken direct notes in the questionnaire so I would not forget or make any mistakes regarding the answers. Since I have been the only person interviewing, the questions have been asked in the same way during the interviews which also led to a higher reliability. A disadvantage is that I was required to use an interpreter during the interviews since the English level of the farmers were limited. This could have an effect in the translation process. However, I went through the questions before starting interviewing with both my interpreters in order to prepare them for how the questions were constructed and the meaning of them.

3. Theoretical framework

In this chapter the literatures studied will be presented. First an introduction to the agriculture related systems and the environmental problems that the farmers in Ghana experience will be presented to give the reader an understanding of how the farming works in the region. Secondly a brief introduction regarding agriculture productivity, foreign direct investments and financial development will be mentioned.

3.1 Agriculture systems in the Upper East region of Ghana

3.1.1 Farming systems

In the area of northern Ghana the main occupation of the habitants is subsistence farming. The farming can be divided into two categories, compound farms which are located with direct connection to the farmers' house, and bush farms which are located on the boarder of the compound farms or several kilometers away from the houses (Slaymaker and Blench, 2002).

Because of using household waste and livestock droppings the compound farms normally result in higher productiveness. The spread of manure is done on purpose but is by some means unconsidered. Crops that are usually planted by the farmers are early and late millet, sorghum and maize. The compound farms have on average a size of 0,8 ha and they are normally planted in May, directly after the first heavy rains and before the bush farms are planted (Slaymaker and Blench, 2002). A variety of farmlands make use of characteristic a concentric spatial arrangement, with human settlements in the middle. These inner rings of more productive compound farms represent an intensively managed area and are usually cultivated annually (Yiridoe et al, 2006). Table 1 shows the farming activities in the region of Northern Ghana during a season.

Season/Activity	Period	Main operation
Dry season	January-March	Clearing, making mounds
Early planting	April-May	Land preparation, planting
Normal planting	May-June	Land preparation, planting, weeding
Weeding	July-August	Weeding, harvesting (maize, legumes)

Harvesting 1	September-October	Harvesting (cereals, legumes)
Harvesting 2	November-December	Harvesting cereals, making mounds

Table 1. *Activity schedule* Source: Yiridoe et al (2006)

There is no spread of manure on the bush farms and the land is usually rotated, allowed to rest for some years. The bush farms are normally planted with mixed sorghum and late millet intercropped with groundnuts, Bambara beans and cowpeas. The size of bush farms vary but are normally about 1,2 ha (Slaymaker and Blench, 2002).

Livestock are raised by most subsistence farmers but tend to be on a smaller scale compared to the agriculture. The purpose of the livestock production is connected to security reasons or as a capital investment; therefore the livestock are very seldom slaughtered for consumptions, exceptions are made for traditional occasions (Slaymaker and Blench, 2002). Cattle production has turned to be a social status symbol and gradually becoming an important part of the household food security and financial management strategy. Smaller livestock such as pigs, sheep, goats and poultry are brought up to secure and provide cash income or for purchasing food during season with scarce food availability (Yiridoe et al, 2006).

There is no artificial irrigation in the region of Northern Ghana; farmers depend on the natural rainfall. There are mainly two climatic seasons, with the amount of rainfall as the greatest variation. In March/April the rain season begins with spotted mark out of rain and then rising to hit the highest point in August. By November there is almost no rain at all. The dry season is between November and March then it's very hot and the soils are frequently exposed to bush fire (Yiridoe et al, 2006). Nevertheless, the rainfall varies from year to year which results in a risk of crop failure (Tiffen, 2003).

3.1.2 Economic systems

There are no tax duties for the agricultural products in Ghana. Credit facilities exist in banks but due to high interests rate there are very few farmers who are able to take a loan. The agriculture is seen as a risky business and banks are seldom interested in lending capital to farmers (Slaymaker and Blench, 2002).

A rather small amount of African incomes is given in cash, which is necessary to fuel demand for off-farm activities and generate growth associations. African consumers spend a high share of their income on farm produced goods due to the low income level and road density, which make it difficult for farmers to attend to markets. Moreover the majority of the farming goods is for own consumption (Jayne et al, 2010).

3.2 Agriculture system dynamics

Agricultural systems change constantly when individual crops and their human managers react to ever-adapting pests, diseases, weed species and environmental situations. In natural environments, the pressure from the changing surroundings, plants and animals change genetically, whereas humans are responsible for the reproductive achievement of domesticated plants and animals (Gabre-Madhin and Haggblade, 2003).

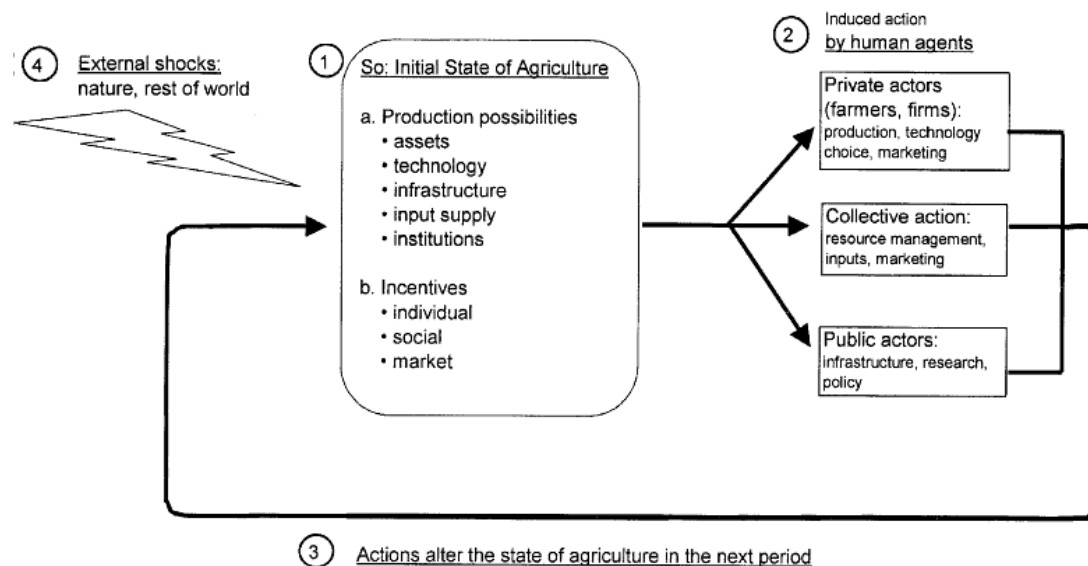


Figure 1. *The dynamics of agricultural change*. Source: Gabre-Madhin and Haggblade, (2003)

Gabre-Madhin and Haggblade (2003) mention that in this naturally dynamic system, two central features of the agricultural system handle human response at any given point in time (Figure 1). First, production possibilities put initial limits on the capacity of actions available to farmers. These opportunity sets depends on the available quantity, productivity, and distribution of main productive resources such as land, labor, capital and water; on the supply of existing biological and agronomic technology; on the state of physical infrastructure; and on supporting organizations for resource management, input supply and marketing. Second,

from existing opportunity sets, current incentive structures consequently decide which of the number of offered options farmers, marketing agents, collective organizations, and public agencies will choose. Individuals and households are influenced by incentives concerning improved food security, social solidarity or risk reduction whereas the market price concern both input supply as well as production, storage, processing and marketing of outputs (Gabre-Madhin and Haggblade, 2003).

Human agents contribute the agriculture systems as they react to changes and in turn concern succeeding stages of this active evolutionary progression. Private participators include individual farmers, private agri- business, and NGOs who, together, establish crop mixes, technologies approved, and production and marketing results. Combined action and institutions for instance general land management systems, farmer relations, cooperatives, trading networks, and rotating credit associations, help control land and water resources, govern property rights, enable markets and input availability. The public affect policies, technology, and the condition of public goods (Gabre-Madhin and Haggblade, 2003).

Actions or involvement established in a certain phase decide production outcomes. They also modify opportunity sets and incentives in the next period; thereby extracting another round of responses in a continuous succession of change. External shocks such as natural disasters change in rainfall, disease, pest adaptation, and advances in human medicine similarly modify the state of both opportunities and incentives in ways that prove irregular over time (Gabre-Madhin and Haggblade, 2003).

3.3 Environmental dilemmas

70% of the deforestation in Africa is caused by farmers, as a consequence of land expansion. Due to increased human population, the periods of leaving areas of land uncultivated are no longer possible. This has resulted in poor soil fertility and organic carbon is reduced to lengths that no longer can regenerate soil productivity leading to the non-sustainability of the farming systems. This also causes environmental degradation through soil erosion and nutrient mining due to the farming on flat marginal lands. Therefore the increase in land use is more result of land extension rather than crop development. The deduction of crop remainders, residues, from the land has caused a negative nutrient balance. As well have the low and irregular rainfall, high air and soil temperatures, low water holding capacities and

degraded soil structure lead to low crop productivity in this environment. Therefore, the present farming systems are not sustainable (Bationo, 2007).

Droughts are the particular most significant natural vulnerability in SSA. If global temperatures as estimated will increase by 2-3 °C within the next 50 years, crop yields are expected to decline; undernourishment and heat stress will increase and around 15-40 percent of species will be driven to extinction (Webersik and Wilson, 2009).

Prevention of soil fertility and the environment must be made to change the declining trend in the agriculture productivity. Soil fertility is strongly connected to soil organic matter, whose condition depends on biomass input and management, mineralization, leaching and erosion. Soil organic matter raises the structure stability, resistance to rainfall impact, rate of infiltration and faunal activities (Bationo, 2007). Soil organic carbon is vanished through erosion, runoff and leaching. Erosion and runoff contribute to a great part of carbon losses and these are highly enlarged in cultivated land as compared to untouched forest or savanna. Nutrients on the topsoil layer and organic carbon in general decrease with increasing erosion with the amount of eroded carbon depending more on the erosion quantity than on the carbon content of the eroded sediments (Bationo, 2007).

Bationo (2007) mentions that rotations and intercropping systems have been reported to contribute to maintenance of soil organic carbon. An example of this can be illustrated by a rotation trial of millet/cowpea intercrop plots that were rotated with pure cowpea compared to constant millet plots, whereas after five years period there was significant advantage for the cowpea system. The falling of leaves from the legume crop was at least partly a cause of the higher level of the soil organic carbon. Mulching declines soil temperature, preserve approving soil structure and infiltration rate, and improve microbial and mesofaunal activities. Mulches also contribute to carbon stock through their mineralization and the effect of reduced erosion (Bationo, 2007).

3.4 Agriculture productivity

By specializing of labor the productivity could be increased. Specialization requires concentrations of populations, primary in villages and as the specialization increase in towns and cities, to make the exchange of services, products and information even greater. If all the farmers in the same area are involved in the same business, manage the same crops etcetera,

they are not likely to be able to sell their excess crops and they have no contact to others center of demand (Tiffen, 2003).

As the rainfalls in the semi-arid areas are very irregular a diversification of the income generating activities could be of great importance. By combining farming and non-farming activities within in the household a great advantage occur, especially when it comes to spreading the risk. There could be specialization both in the household and on an individual level. Within the household, where the man is concentrated in outside activities other than farming activities and the women concentrated on the farm related activities, or vice versa, they both gain advantage from sharing resources. For individual level the farmer could focus on the farm activities during wet season and for example trading when dry season, thus the full concentration is given in both cases and the farmer is able to buy inputs to farming season with resources given from the external business. It is however important to distinguish between those who sell small amounts out of requirement, and those who buy in from others and trade on a substantial level. The latter are generally in the upper echelons of small farmers (Tiffen, 2003).

The distribution of labor is limited by the size of the market. The size of the market is determined in great part by the costs of transport in relation to the value of the product, and also by the numbers and incomes of the potential buyers. An enlarged market makes it possible for the farmer to be “seen” and motivates efforts to generate an excess for the family apart from the daily needs (Tiffen, 2003). The size of the market increases for every single farmer and demand becomes more expandable whereas the cost of transportation decreases (Jayne et al, 2010).

Investments of either or both capital or labor are needed if outputs per labor day or per acre would to increase, conversely there could be receding returns when adding units of the same input except if there is, besides the investments, also an adjustment of the technology or in the nature of the output. Therefore, constant growth is depending on the combination of investment with new or changed technologies. This concerns both agriculture and industry. The technology is developed by specialization as earlier mentioned but also the link to information from external sources provides as well to its development (Tiffen, 2003).

To improve outputs and incomes there is a need for investment; conversely there is not an assurance for the output and income to increase due to the investment. An investment of a

certain amount cannot guarantee a certain amount of growth. Investments arise risks and are more likely to be successful if there is information about the character of the risks and the market, and if the investor has been able to increase his or her abilities (Tiffen, 2003).

Tiffen (2003) mention small private investments such as increasing new land, purchase of new tool or other input, raise the number of livestock held, etcetera, to be characteristically for the productivity to be increased by the small-scale farmers. As business managers, farmers have to make a decision how they should react to changing product and markets, and whether, and in what, to invest. Some of the most efficient farmers, with the highest gross revenue per acre and the highest net revenue per farm, were those purchasing in the most crop remains and other inputs, to maintain more than double the average number of livestock in addition to crops, using three times much manure as the average. Moreover, the poorest farmers spend small amounts on farm inputs and the investments made by the farmers that are better-off went directly to livestock before crop activities (Tiffen, 2003).

Having access to land rights could support investments. An investment is more likely to enhance if there is less risk involved, which is the case if the land tenure is secure. Land rights can be used as a security and consequently increase access to capital. When having access to land there is an opportunity of either selling or leasing out the land, which makes the investment a profitable business (Fenske, 2011).

3.5 Investments

3.5.1 Foreign direct investment

As a consequence to the globalization of capital, foreign direct investment (FDI) has become a constant and large part of the capital flow in the developing world. A number of motivations have recognized FDI as an important inflow, including stimulation of employment, technological know-how and improved competitiveness (Adams, 2009). The majorities of the countries in SSA do not have access to the international capital markets and hence have to rely on the further two types of foreign finance, FDI and official loans which are loans from multilateral organizations such as the World Bank (Asiedu, 2002).

In the theoretical review there are two central perspectives that can be distinguished, the modernization and dependency theories. Modernization theories advocate that FDI could stimulate economic growth in developing countries, and is based on a primary principle in

economics; that economic development requires capital investment. In modernization theories the transfer of technology is also known as an important factor to increase growth. Developing countries generally require the necessary infrastructure that FDI can bring; such as educated population, liberalized markets, economic and social stability which is part of the technology that are needed to increase growth (Adams, 2009).

On the contrary to the modernization perspective, dependency theorists believe that the reliance on foreign investments is likely to have a negative effect on growth and the distribution of income (Adams, 2009). Adams (2009) mention that foreign investments generate an industrial structure in which monopoly is principal, which leads to what Adam describes as “underutilization of productive forces”. The argument is based on that an economy supervised by foreigners would not grow naturally. Instead the economy in the country receiving the investment would develop in a disarticulated way. The reason for this is the multiplier cause by which demand in one segment of a country creates demand in another is fragile and thereby leading to stagnant growth in developing countries. This argument is essential since most FDI to Africa is in the natural resources sectors which have significant barriers to entry (Adams, 2009).

3.5.2 Differences for sub-Saharan African countries

Asiedu (2002) mention a negative effect on SSA countries affected by FDI. She describes this with two explanations. First, the African continent is perceived as being essentially risky. The observation is supported by the fact that commercial risk-rating agencies often rate SSA countries as riskier than reasonable by the fundamentals. Second, there is less knowledge about the SSA countries. Investment decisions are often made based on information from environment of neighboring countries and not guided by country-specific conditions. Consequently, foreign investors see SSA countries as one big country instead of what they actually are, separately and different countries (Asiedu, 2002).

In an uncertain environment, higher returns may not encourage further investments. The explanation for this is that the risk-adjusted return could be low or too low, which could prevent investments. In SSA countries there is an uncertainty of government policy which have a negative impact on private investment. The policy drawbacks affect FDI more than other investment because FDI is to some extent irreversible. The cost connected to FDI is

mostly sunk costs and hence not returnable if disinvestment would occur. This can be an explanation to why higher returns do not transform into increased FDI in SSA (Asiedu, 2002).

3.6 Financial development

A vivacious private sector is an important assumption for stimulating economic dynamism, improving productivity, distributing new industrial technologies, maintaining competitiveness, contributing to entrepreneurship development and reducing poverty. Even though government actions and external support are definitely required, the compulsory growth will only be managed and continued as a result of sustained private sector activity. The private sector is recognized to create wealth to encourage growth, returns to improve public services, and employment to raise people out of poverty. Nevertheless, the level to which the private sector contributes to growth and poverty improvement greatly depends on its capability to gain access to critical financial services (Misati and Nyamongo, 2011).

Furthermore, it has been discussed by authors that financial markets are seen to be a central component in what Misati and Nyamongo call the “engine that generate growth and development”, through risk diversification, corporate governance improvement, provision of information, recruitment and pooling of savings and facilitation growth (Misati and Nyamongo, 2011).

3.7 The contribution of the literature

The literature in the framework helps to create an understanding of the agricultural system in Northern Ghana which will make it easier to understand the situation of the farmers in Pelungu and Dachio. The financial related theory will assist the analysis in develop methods for improving the productivity and profitability for the farmers in Pelungu and Dachio.

4. Empirical findings

This chapter serves to describe how the farmers in Pelungu and Dachio work and how their business is carrying out. The information is depicted by interviews with 116 farmers in the villages Pelungu and Dachio. Part of the information has been collected through personal conversations during the interviews and this information is presented without any distinction from the information gathered from the questionnaire.

4.1 An introduction to the communities

When TRAX Ghana enters a community they do it as a result of a request from the villagers. There need to be willingness from the farmers to generate results, to make the work more efficient farmers need to be in the lead to achieve results. First a need assessment is done to find out what the farmers require and from there TRAX creates groups and leaders in the groups are selected. TRAX work in a village for five years and therefore it is important that the farmers are able to work independent already from the beginning (Interview Solomon 110412). I have been studied the farming system in Pelungu and Dachio, in which TRAX currently are working.

4.1.1 Pelungu

Pelungu is a village in the newly created district Talensi-Nabdam. The district has a population of about 94 650 people, it is bordered to the North by the Bolgatanga district, South by the West and East Mamprusi districts, Kassena-Nanakana district to the West and the Bawku West District to the East. Pelungu is located 15 kilometers from Bolgatanga. The community holds 1880 habitants (Interview Vincent 110401). In 2009 TRAX begun the work in Pelungu, at the moment they work with 15 groups and a total number of 388 households (Interview Solomon 110412).

4.1.2 Dachio

Dachio is a village in the Bolgatanga Municipal, which is the home of the Upper East Regional capital and is bordered to the West by Kassena / Nankana, to the north by Bongo, to the East by Bawku West, and to the South by the West Mamprusi district, which is part of the Northern region. The population of the municipality is approximately 150 000. Dachio is located 10 kilometers from Bolgatanga. The community itself holds 1803 habitants. In 2008 TRAX begun their work in Dachio, at the moment TRAX is working with 12 groups and a total number of 699 households (Interview Vincent 110401).

4.1.3 Differences between Pelungu and Dachio

Pelungu is more commercialized than Dachio. The center of the Pelungu is far greater and the overall mentality is more “business” orientated. Every third day there is a market arranged in Pelungu, in the center of the village, to which farmers come to sell their crops, livestock etcetera. In Dachio there is a small market arranged, however the big market in Bolgatanga appends more farmers, yet the distance to Bolgatanga is problematic since most farmers lack means of transportation.

4.1.4 Introduction of the empiric

Table 2 shows the distribution of the interviewed farmers in Pelungu and Dachio.

As the information gathered from the villagers differs from each other I chose to divide the information separately between Pelungu and Dachio in those cases when significant differences occurred.

<u>Distribution</u>	Farmers	Male	Female
Pelungu	57	24	33
Dachio	59	30	29
Total	116	54	62

Table 2.

Of the interviewed farmers 77 were married, 34 widowed and 5 single. 113 of the respondents have farming as their main occupation; however 58 of the farmers have another income source in the household. On average the family size in Pelungu and Dachio is of 6,6 members and 1,8 dependents.

Pelungu

Farmers having another business expect from the farming is 67%.

Dachio

Farmers having another business expect from the farming is 34%.

4.2 Production

Many farmers own the land themselves; actually 75 % of the farmers own the land they obtain. 23 % of the farmers cultivate on land own by the family. Very few lease or co-farm

with some other farmers, in those cases it is only in addition to the land they own themselves. There are however farmers that beg for land from those who obtain more land than they can use themselves or can afford to cultivate. The land is in almost all cases inherited by a late family member. Most farmers obtain land close to the home, compound farms, nevertheless there are farmers with bush farms as well and a combination of them both. However, the means of transport is a problem for the farmers since the bush farms are located far from their home and most farmers lack means of transport, the main problem is the transportation of the crops back to the farm. The average land area for the compound farms is 2,64 acres¹.

Pelungu

The average land area is 2,95 acres.

Dachio

The average land area is 2,33 acres.

Almost all farmers produce millet, sorghum, rice and groundnuts. Some other crops produced by a fewer amount is sojabbeans, maize, Bambara beans and cowpeas.

Most farmers use some type of inputs in their production; the majority hires bullocks and /or labor. Merely one person reported that he bought fertilizer. A few number of farmers bought seed for the seeding, most farmers used the seed from the previous year. Due to high costs of seed the farmers save some of their crops from previous year even despite the fact that the food does not cover for the consume need that year. Of all the farmers it is 78 % that use labor and they do it mainly in the weeding phase. The cost of the labor, for *those who actually hire labor*, is on average 89 cedis² per year. Farmers using bullocks to plough the fields are 55 %. The average cost of the bullocks is 57 cedis per year, *for those who buy the service*. 49 % of the famers hire both labor and bullocks for their farm production. 10 % of the farmers bought seed for seeding, although it was only for supplementing the seed from last year. Of the farmer only 2,5 % reported using some other input apart from the labor, bullock and seed, and this was the purchase of fertilizer and two farmers used tractor service.

Pelungu

88 % of the farmers hired labor, 56 % used the bullock service, 53 % engaged both labor and bullocks and 16 % bought seed to supplement for the seeding.

¹ 1 acre = 4000 m² (Slaymaker and Blench, 2002)

² 1 Ghanaian cedis (GHS) = 4,14672 SEK (ww.xe.se)

Dachio

64 % of the farmers hired labor, 54% used the bullock service, 46 % engaged both labor and bullocks and 5 % bought seed to supplement for the seeding.

If the farmer him/herself would get sick 62 % have family members or relatives that were able to cover for them, whereas 38 % were forced to hire labor in case of sickness.

All farmers with one exception store the crops produced at home. Only a few number of farmers produced enough crops to cover their family needs for the whole year, 7,8% of the farmers acknowledged having enough crops to feed their family for the entire year, also it should be mentioned that these famers were from Pelungu. On average the crops produced lasts for 4,9 months.

Pelungu

The crops for the family needs last on average for 6,8 months.

Dachio

The crops for the family needs last on average for 3,2 months.

4.3 Production limitations

After the first heavy rains when the weeding is to begin, there is a big demand for bullock and plough service, and for those who can afford tractor service. Every farmer who does not own bullock him/herself, and the majority do not, very much depend on getting access to bullocks quickly, to be assured that the fields will be ploughed in correct time for the planting to be guaranteed. For a farmer to get access to the bullocks they need to have cash to pay the rent of the bullocks. Even better is if the farmer could pay for the bullock in advance to be certain that the bullock service will come to them at the correct time.

Lack of land is a big issue for the farmers. Since all the land has been cultivated for many generations the soils are of very poor nature and the farmers are not able to rotate the land and leave it for rest because they do not have anywhere else to plant.

The cost of seed is another problem. As already mentioned not many farmers buy seed for the seeding. Most of the time they save seed from the previous year to use the following year and therefore they can never increase the production.

The main difficulties that the farmers experience in their farming productivity are the lack of credit and the infertility of their soils. The irregular rainfall and too expensive input are also reported as problems that the farmers are struggling with.

Pelungu

In Pelungu the farmers rated the main difficulties as follow: 1) Lack of credit, 2) Inputs too expensive, 3) Farms too late due to lack of bullock

Dachio

In Dachio the farmers rated the main difficulties as follow: 1) Poor soils, 2) Irregular rainfall, 3) Lack of credit

When I asked the farmers what they thought could be done by themselves to improve the productivity most farmers mentioned SWC methods and smarter savings. Preparations and pooled farming groups were also mentioned as two methods to improve the productivity in the farming.

4.3.1 Women difficulties

Women living close by the village have difficulties when their husband dies, because the land is not automatically left for the wife. There is a group of head managers who are given access and control of the land; therefore many widows have very little access to land because the mangers keep the land for themselves or distribute the land to others.

Further away from the village the husbands' brothers are first in line to get access to the land. If the women are lucky the brother will let the women use the land as it was her own but it could be that there is almost nothing left for her to use.

In some of the groups women are not allowed to have livestock unless they are not given to her when the husband dies.

Widows and singles, both men and women, experience more difficulties. They have reduced possibility of an additional income and additionally they have to feed a likewise amount of family members and dependants compared to the married farmers.

4.4 Sales

Few farmers sold their crops; they barely had enough for the household and for the following years seeding. For those who actually sold some of the crops produced were because of

emergency, payment of labor, purchase of other ingredients, payment of children's school fees, and funerals costs. 23 % of the farmers sold some of their crops but 77 % did not sell any of their crops produced. The crop mostly sold by the farmers was rice. The reason for the farmers choosing rice was because they did not depend that much on the rice for the food coverage as compared to the millet and sorghum. Some of the farmers chose to sell the crop that gave the highest selling price per bowl.

Pelungu

37 % of the farmers sold some of their crops produced.

Dachio

6 % of the farmers sold some of their crops produced.

Of those farmers who sold their crops all sold it on the market, either in Pelungu or in Bolgatanga for those who lived in Dachio. Some farmers sold some of the crops at home, but only when it came to larger quantities. The crops were usually sold in bowls of either 2 or 5 kilos. The price of rice differs from 0,2 to 16 cedis. Differences in price are big because the rice is sold in different measurement but also because the price difference is very high depending on what time of the year the farmers sell the crops. If the farmers sell the crops after the first harvest when the demand is low, because of the greater supply, the farmers cannot sell the crops at a high price. In the opposite if farmers sell the crops during scarce food availability they will receive a high selling price.

Conclusively, no farmers are able to put a price on their crops that could cover the costs and give some margins due to the market deciding the price of the crops.

The average income *for those farmers selling crops* were 237 cedis per year. The *farmers who had an income* from another business had an income of average 197 cedis per year. Farmers save the money at home, only 9 % saved their money at the bank. Farmers saving their money on a bank account had an average income of 522 cedis. It should be mentioned that not that many farmers save money at all, only 36 % saved money for unexpected costs. Most farmers buy food directly when they get some income and are not able to save any extra money at home. When unexpected costs do occur many farmers rely on their livestock or try to borrow from people better off in the community. The reason for relying on livestock as a capital investment is because the farmers think they would use their money directly if they save the money at home. Why most farmers do not save their money is because of distance to bank

facility and they do not have that much money to save therefore they believe it would not be worth it for them.

Pelungu

The average income from farming is 195 cedis per year and from other business the average income is 248 cedis per year. 14 % saved their money at the bank however 68 % saved some money for unexpected costs.

Dachio

The average income from farming was 370 cedis per year and from other business the average income is 132 cedis per year. 3 % saved their money at the bank however 5 % saved some money for unexpected costs.

4.4.1 Income security

Many farmers rely on their livestock when they are short of food. They mostly sell guinea fowls and fowls. However if there is bigger expenses to be paid they could sell a goat or a sheep. Yet more than half of the farmers do have some other business apart from the farming because of too scarce income generation from the farming. Most of the widows need another business since they are not always allowed to raise livestock. The income vary from household to household but this is some example of what the farmers could do; pity-trading (buying and selling small items at the market), pito brewing (a local drink), serving hot drinks at home, surface mining, stone-breaking for construction firms.

4. 5 Success factors

When I asked the farmers what item they were to invest in first if credit were available the answers could be divided into two main groups, either the farmers said that they are farmers and will always be, so they would invest in some farming related item, like bullock, buy more land or engage more labor. Or the farmers already had a small business apart from the farming and would invest in that business and from the money given from the business reinvest in the farming.

Out of the 116 farmers I interviewed only 9 farmers mentioned having enough food for the whole year. Out of these 9 farmers there was one specific farmer who stood out. Apart from being a farmer he had welder firm in the center of Pelungu. Because of this business he was able to invest money into his farm land, 6 acres which is bigger than average. He used tractor service to get his land ploughed and he engaged labor to take care of the weeding and

harvesting. The crops he produced were sorghum, cowpeas and rice for household need. Except for these crops mentioned he also produced maize for commercial reason. Last year he harvested 3000 kg of maize which is way above average. This farmer was the only one who told me that he had no need for any item if there would be credit available.

Of the farmers I interviewed 34 % had a mobile phone. The usage of mobile phone indicates that the farmers have more money than only buying food for.

Pelungu

46 % of the farmers own a mobile phone.

Dachio

22 % of the farmers own a mobile phone.

4. 6 Differences between the farmers

When preparing the data some characteristic distinctions were observed. The farmers could be categorized in different paths of development.

- 1) Farmers only focusing on agriculture
- 2) Farmers with an additional occupation
- 3) Farmers having margins over for other items except for basic needs
- 4) Farmers saving their money in the bank
- 5) Farmers who are able to invest money in the business (either farming or the additional business)

In the first path farmers only focus on their own farming activities. They do not have any other business part from the farming and the income the farmers get is only from the farm related activities. In the second phase the farmers have another income except for the farming business. In the third phase the farmers are able to buy items part from basic home consumption needs. This was distinguished from the fact that some farmers were able to buy and use mobile-phone. In the fourth path farmers are able to save some of their money for unexpected cost. Not only save some money at home but enough that it is worth saving the money in a bank account. In the fifth path the farmers are able to invest in the farming with money from either or both the agriculture business and the additional occupation.

Differences between Pelungu and Dachio have also been observed therefore the data is shown separately below.

4.6.1 Pelungu

Pelungu is a village with a commercialized center and a greater business mentality within the community, compared to Dachio. The table below explains data that distinguish the differences among the habitants in Pelungu.

	Amount of farmers	Average income (cedis)	Average family*	Land (acres)	Labor**	Bullock***	Food coverage (months)
1. No other bus	19	259	10,5	3,5	16 (88)	10 (35)	6,2
2. Part-time bus	38	282	9,3	5,1	36 (92)	22 (30)	7
3. Mobile phone	20	372	10,6	3,15	19 (116)	13 (36)	7,8
4. Savings	8	593	8,5	4,5	8 (207)	4 (40)	8
5. Investments	1	1745	8	6	1 (540)	0	12

Table 3.

* Family size + Dependents

** Farmers using labor, in () average cost of labor, in Ghana cedis

*** Farmers using bullock service, in () average cost of bullock, in Ghana cedis

From the table above it can be extracted that the farmers are better off in the fifth stage compared to the first stage. The average income gradually increases the higher up in the path the farmer is. The family size is slightly decreasing which means that more money is left for other items part from cover the food requirement. The inputs are also increasing which could lead to higher yield productivity. The food coverage is significant better further up in the stage the farmers reach. When farmers save their money in a bank account it means a risk reduction since the majority of the farmers “save” their money in livestock which is an unnecessary risk due to that disease and other external causes could occur. In Pelungu only one farmer could be seen as being able to do proper investments in his farming business.

4.6.2 Dachio

Dachio is a village which is very wide. There is no real center and the villagers are depending on the market in Bolgatanga for needs except for the very basic home requirements. The table below explains data that distinguish the differences among the habitants in Dachio.

	Amount of farmers	Average income (cedis)	Average family*	Land (acres)	Labor**	Bullock***	Food coverage (months)
1. No other bus	39	121	7,2	2,5	28 (62)	22 (34)	3,1
2. Part-time bus	20	130	6,5	2,05	8 (22)	8 (24)	3,3
3. Mobile phone	3	223	7	2,83	3 (52)	2 (70)	3,3
4. Savings	1	No data	8	5	1 (360)	0	4
5. Investments	-	-	-	-	-	-	-

Table 4.

* Family size + Dependents

** Farmers using labor, in () average cost of labor, in Ghana cedis

*** Farmers using bullock service, in () average cost of bullock, in Ghana cedis

In Dachio the differences is not that distinct as shown in table 3. More farmers have farming as the only occupation and fewer farmers have another income source. The cost of inputs and the food coverage is slightly better in the later stages compared to the firsts. In Dachio no farmers could be seen as having enough surpluses to be able to do proper investments.

5. Analysis

In this chapter the empirical finding will be analyzed by using the chosen theory. Suggestion and improvements for the farmers in Pelungu and Dachio to increase their productivity will also be discussed.

5.1 Production

Fenske (2011) mention land tenure as competitive advantage when it comes to investments. Based on the result most farmers own the land themselves which could be seen as a security, however the size of the land is small and barely big enough to provide the household needs. Nevertheless, the farmers have the opportunity to decide if they want to lease, sell or farm the land. If the farmers want to focus on an additional income they could lease the land and get extra income. The farmer who rent the land could focus more on the agriculture and farming and increase the outcome if greater land is used.

According to Bationo (2007) intercropping systems and rotations of land have been observed as factors to increase the productivity in the farming. As mentioned above the size of the land is small and this has resulted in low fertility since the land is not allowed to rest. The land have been inherited and cultivated by earlier generations and need to be rotated to improve the soil fertility. Most farmers cultivate cereals like sorghum and millet but few cultivate legumes as cowpeas. Intercropping of millet and cowpeas could result in higher productiveness. Therefore these methods should be used and educated to the farmers in a greater extent to maintain higher productivity.

The Ghanaian farming system is built up by compound farms and bush farms. Since the compound land is of poor yields due to high intensity cultivating the bush farms should be obtained more frequently. The major problem with the bush farms is however the distance. Most farmers have no access to means of transport which makes it hard to get the harvested crops back to their farms.

Due to lack of available financial institutions the farmers cannot invest in their farming business which causes trouble in the productivity for many of the farmers in Pelungu and Dachio. Tiffen (2003) point out small investments to be of great importance for the small-scale farmers' productivity. As a result of high cost of seed the farmers need to save some of their seed from last year which often means that they do not have enough food for the whole year. This is a never ending "spiral" since the yield never can increase and create enough food

and seed for both feeding and seeding if no investment is made. Gabre-Madhin and Haggblade (2003) mention that the production possibilities for farmers are limited due to actions available. For the farmers in Pelungu and Dachio there is as mentioned lack of credit which results in less access to hire labor and usage of bullock service. As a consequence of the scarcity of the financial resources, the farmers face major difficulties in improving and increasing the production and making the farming business more profitable. Farmers in Pelungu using inputs in the production are observed to have a higher average income which is a logical observation. If more farmers can produce some surpluses the production would increase gradually and the farmers businesses would become more profitable. The majority of the farmers have a vision of what they want to achieve if credit were available. There is a motivation and enthusiasm within the farmers' mentality but the lack of credit and financial facilities is a big drawback when it comes to increase the productivity in both the farming and the part-time occupation. With regard to this it can be concluded that initial investment have a great part in the lack of surpluses for the farmers business.

5.2 Sales

The majority of the farmers do not sell their crops produced due to low produce outcome. The food is barely enough for the farmers home consumption. However, for those farmers actually selling some of their excess goods there is no method or structure used concerning the pricing, since the market decides the prices. Given that the farmers have low ability of writing and reading there is no records kept which make it very difficult for the farmers to have a sustainable business. To have a profitable business the costs need to be covered and margins for surpluses. Due to the absence of record keeping it is extremely difficult to put a correct price on products. TRAX Ghana educates the farmers in environmental methods but there is clearly a need for economical education, which could be part of the education as well. If a more businesslike mentality were implemented in the villagers I believe it would increase the productivity and the profitability.

Livestock is raised by the majority of the farmers in Pelungu and Dachio. The purpose of livestock is a capital investment, the farmers save their money in livestock rather than at home or in a bank account. This system is very vulnerable, if a disease were to break out the farmers are without any possibilities to get their "capital" back. They can lose all their savings in one moment and be left with nothing to cover for food shortage or unexpected costs. I believe that information and education is required to change the opinion of the farmers' mentality

regarding more rational savings. Many farmers focus on the short term perspective. If unexpected cost arises they sell a fowl to cover the cost. Most situations that occur are handled without any consideration to the future. To increase the efficiency and to generate a positive and sustainable cash flow the farmers need to look on a long term perspective. And not as the farmers do today; solve the problem when they occur without any regard and consideration to the future.

5.3 Productivity improvements and financial development

The dry weather condition and the irregular and sometimes heavy rainfalls are mentioned as a big problem by most of the farmers, many of the farmers experience the rainfall to be a cause of the low yields. The yearly crop production is always jeopardized by the uncertainty of the rain. Due to the scarce water availability the farmers are not able to use artificial irrigation. However, the weather is out of the control of the human being, the SWC methods the farmers use should be maintained and improved to assure and prevent the yields from getting destroyed by the heavy rains. Tiffen (2003) writes about specializing of labor being a factor of productivity growth and there are trends observed in the data I captured in the villages regarding the productivity. Households which have another business apart from the farming show a higher income. When having more than one income the differentiation is spread and less risk is involved. Because of the environment, the hazard climate such as irregular rainfall and droughts, the farmers live in; their yields are always jeopardized therefore having more than one income source in the household is of great importance. It is also recognized that the farmers with some small additional business are able to do some small investments and increase the productivity in the agriculture. According to Misati and Nyamongo (2011), the private sector stimulates financial growth. If more farmers are able to increase their income and farming surpluses the whole economy in the region could benefit.

Tiffen (2003) mention that investments are more likely to be successful if there is information regarding the nature of the risk and the market involved in the investment process. Information regarding the specific location is required because countries and regions are different and have different requirements. The differences between Pelungu and Dachio indicate this and will be discussed further in next section.

5.4 Differences between Pelungu and Dachio

Tiffen (2003) talks about the fact that specializing of labor requires centralization of population. In Pelungu the community is more centralized and more developed which indicates that it is easier for a more business like economy to grow. In Dachio however there is not as developed centre as in Pelungu and the market in Bolgatanga is too far away for the majority of the farmers to attend due to lack of means of transport. When a community is less developed it is difficult to attain the development stage mentioned later in this section. If farming is the major occupation in an area the excess goods that appear is most likely similar to the other farmers and the demand is therefore low. The importance of a greater market could therefore be concluded as a factor of success for individual farmers and for the economy in the area.

As frequently mentioned the credit is a big issue concerning the productivity for the farmers. Investments are clearly needed to make the farmers business running more profitable. However, the farmers in Pelungu and Dachio indicate on different progresses in their business. This could be divided into a stage of development. Which is shown below, and each of these phases require different treatment. Adams (2009) mention two perspectives regarding FDI, the modernization perspective advocates that FDI stimulate growth in developing countries whereas the dependency perspective ought to have a negative influence on the growth and the income distribution of the developing country. Of this study it could be concluded that both is true. The FDI could have a negative influence on the farmers if the investments are distributed without consideration. To generate truly and efficient FDI there should be more information regarding the area specific conditions to make the investment suit the needs of the population in that region. However, to make farmers less dependent on the FDI and to secure the stimulation of the economy the phases below could be an indicator of how to work with individual farmers. The last phase should be seen as something to strive for each individual and community to secure that the population are able to stand on their own feet and to not depend on anyone.

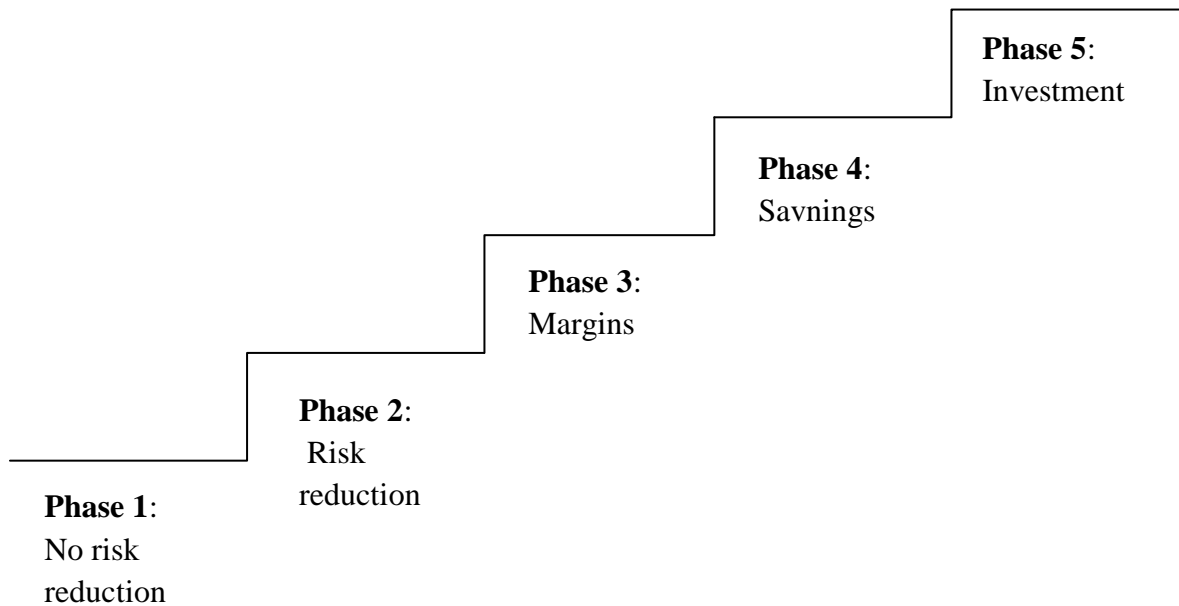


Figure 2. *The path development stage* for small-scale farmers in Northern Ghana constructed from the information in table 3 and 4.

Phase 1: In phase 1, farmers are at the bottom of the stage with farming as the only income. There is no risk reduction due to lack of differentiation of income source. In this stage there is a need for creation of another source of income to secure the finance. Most farmers have an idea of what they want to focus on. The creation of an extra small income source is essential and could generate extra surplus for the individual household.

Phase 2: In phase 2, farmers have additional income source in the household part from the farming. The risk is spread between the different sources and the farmers are not only depending on the profitability of the farming business. However, there is a need for a greater efficiency since no margin's are being left for items part from the most necessary needs. The farmers need to focus on the business and not buy unnecessary items which could jeopardize the development.

Phase 3: In phase 3, farmers have enough income to purchase items part from the most necessary needs. In this stage there is a need for further improvements to be able to increase the profitability to manage saving. Phase 2 and 3 are sensitive and the farmers need to be careful. As mentioned above focus should be on the business and purchase should be for items that could make the business more efficient.

Phase 4: In phase 4, farmers have the possibility to save some of the income they receive from their income source. Further improvements are needed to increase the additional income and to do initial and greater investments in their business.

Phase 5: In phase 5, farmers have enough capital to do further investments in either the farming or the additional business to increase the productivity and generate surpluses.

Increased growth could be more sustainable if the farmers go step by step in the progress rather than go “all in” and gamble the savings on one card.

As current situation requires availability of credit to increase the productivity, the Ghanaian farming system affects the farmers’ capabilities negatively. There are no investment possibilities available for the farmers to increase the productivity and to become more profitable. The possibility for the farmers to take a loan to invest in their business is very low which results in no further improvement in the outcome and the surplus will never increase since inputs is required to generate excess. The never ending “spiral” can never expand and create enough food and seed for both feeding and seeding if no investment is made. Therefore could this stage and phases be of great help for farmers to create a sustainable business themselves.

For farmers in a smaller and wider community like Dachio it could be difficult for them to attend the stage. In those cases when farmers not are able to increase their savings through an additional income source because of limited resources and demand, the FDI could be a complement. FDI is as mentioned by Asiedu (2002) to be more successful if information is involved. With the result in mind of a village similar to Dachio, the FDI could turn out to generate more advantages. Another important aspect that should be mentioned is that some groups are more vulnerable, such as widows, singles and women. These individual should be included and treated separately because there is a greater need for these to receive contribution, such as FDI.

6. Conclusions, suggestions and further research

This chapter will present the conclusion of the thesis. I will do this by answering the research question mentioned in the purpose. I will also give suggestions to TRAX Ghana and for future research in the topic.

6.1 Conclusions

When I first began my study in the region of Bolgatanga my idea of the main concern for the farmers was related to pricing of excess goods. However, after the first weeks interviewing I concluded that the main difficulty concerned the productivity more than the pricing complexity. Therefore my analysis and my overall work have been more focused on profitability for an individual farmer rather than methods to improve the pricing complexity.

With the analysis in mind the research question can be answered.

R: What are the potential and future strategies for the subsistence farmers in Pelungu and Dachio to become more profitable?

The farmers in Pelungu and Dachio need to work more with economical methods to have a more profitable production compared to today. *The path development stage* in the analysis could help the farmers to increase the business mentality and create more activities on a wider commercial level. However, to make the whole economy in Pelungu and Dachio grow it is not necessary that all households should devote their occupation to farming. Hence, the greater development would gain more if the villagers can benefit and make use from each other and their different businesses.

Investments have been identified to play a significant role in the path of development for a successful agriculture production. Therefore it is of great value that farmers reach the final phase in *the path development stage* to be able to do the investments required for the generation of a profitable business. For the reason mentioned the different stages in *the path development stage* should be seen as strategies for individual farmers; risk reduction and additional income, margins, savings and finally investments. The strategies will contribute the individual farmers in Pelungu and Dachio to create a more sustainable business.

6.2 Suggestions

After the time I spent in Pelungu and Dachio and after understanding the process and work of TRAX Ghana I have thought about suggestions for them to help individual farmers increase the profitability in the household.

Suggestions for TRAX Ghana:

- Integrate economical education in the teaching collectively with the sustainability methods, to increase the business thinking.
- Screen the market for suitable future credit facilities to help individual farmers increase their income through an additional investment in the farming or to invest in an additional income source.
- Make use of *the path development stage* to assure that individuals will receive accurate support and inducement.
- Motivate and engage farmers with an additional income source to increase the business further.
- Make sure that farmers in villages like Dachio, with lower ability to create an additional income source, get hold of FDI.

6.3 Further research

Further research in the area is of great importance for the population in the area. Some interesting aspects would be to see if there are differences in the outcome for farmers that practice SWC methods compared to farmers who do not apply these practices. Also the dilemma with investments needs to be studied further; how can the farmers in the region get hold of suitable credit facilities?

7. List of references

7.1 Books

Esaiasson, P., Gilljam, M., Oscarsson, H., & Wängnerud, L., (2007), *Medtodpraktikan – Konsten att studera samhälle, individ och marknad*, Stockholm, Norstedts Juridik

Jacobsen, D.I (2002). *Vad, hur varför? Om metodval i företagsekonomi och andra samhällsvetenskapliga ämnen*. Studentlitteratur

Merriam, S.B. (1994), *Fallstudien som forskningsmetodik*, Lund: Studentlitteratur

Slaymaker, T. & Blench R., (2002), *Rethinking Natural Resource Degradation In Sub-Saharan Africa*, University of Development Studies Tamale, Ghana, Cyper Systems

Starrin, B., (1994), Om distinktion kvalitativ – kvantitativ i social forskning, I P-G Svensson (red.), *Kvalitativ metod och vetenskapsteori*. Lund: Studentlitteratur

7.2 Articles

Asiedu, E., (2002), *On the Determinants of Foreign Direct Investment to Developing Countries: Is Africa Different?*, World Development 30, p 107-119

Adams, S., (2009), *Foreign Direct Investment, domestic investment, and economic growth in Sub-Saharan Africa*, Journal of Policy Modeling 31, p 939-949

Bationo, A., Kihara, J., Vanlauwe, B., Waswa, B. & Kimetu, J., (2007), *Soil organic carbon dynamics, functions and management in West African agro-ecosystems*, Agriculture systems 94, p 13-25

Fenske, J., (2011), *Land tenure and investment incentives: Evidence from West Africa*, Journal of Development Economics 95, p 137-156

Gabre-Madhin, E.Z. & Haggblade, S., (2004), *Successes in African Agriculture: Results of an Expert Survey*, World Development 32, p 745-766

Jayne, T.Z., Mather, D., & Mghenyi, E., (2010), *Principal Challenges Confronting Smallholder Agriculture in Sub-Saharan Africa*, World Development 38, p 1384-1398

Misati, R.N., & Nyamongo, E.M., (2011), *Financial development and private investment in Sub-Saharan Africa*, Journal of Economics and Business 63, p 139-151

Tiffen, M., (2003), *Transition in Sub-Saharan Africa: Agriculture, Urbanization and Income Growth*, World Development 31, p 1343-1366

Webersik, C., & Wilson, C., (2009), *Achieving Environmental Sustainability and Growth in Africa: the Role of Science, Technology and Innovation*, Sustainable Development 17, p 400-413

Yiridoe E.K., Langyintuo, A. & Dogbe, W., (2006), *Economics of the impact of alternative rice cropping systems on subsistence farming: Whole-farm analysis in northern Ghana*, Agricultural Systems 91, p 102-121

7.3 Electronic documentation

www.bjchinesetranslation.com/maps_of_the_world/map_of_ghana.htm, 110542, 12:57

www.traxghana.org, link about trax, 2011-03-29, 12:10

www.traxghana.org, link project, 2011-03-29, 12:41

www.xe.com/ucc/convert/?Amount=1&From=GHS&To=SEK, 110519, 17:47

7.4 Interviews

Interview with Vincent Subbey at TRAX Ghana, Bolgatanga, Ghana, 110401

Interview with Solomon Abeinge at TRAX Ghana, Bolgatanga, Ghana, 110412

Appendix 1 Questionnaire

QUESTIONNAIRE

Name of interviewer: Name of farmer:

PERSONAL INFORMATION

1. Location:

A) Pelungu B) Dachio

2. Sex:

A) Female B) Male

3. Marital Status:

A) Single B) Married C) Divorced D) Widowed/Widower

4. Main occupation (most often):

A) Farmer B) Other

5. Numbers of family members:

6. Dependents:

PRODUCTION

7. Who owns the farm land you use:

A) Self B) Family C) Co-farmer D) Friend E) Relative F) Lease

8. How much land do you obtain per season?

9. What types of crops are cultivated in a season?

10. Quality produced (quantity)?

11. Type of *inputs* during crop production in season:

A) Labor B) Seed C) Bullocks D) Other

12. Number of days you use for the different inputs:

A) Labor B) Seed C) Bullocks D) Other

13. What is the *costs* for crop production in season for the:

A) Labor B) Seed C) Bullocks D) Other

14. Volatility: If you get sick can anyone cover for you?

15. How do you store your crops produced? (Store together in village?)

Appendix 2 Interviews

Sobeting, George, Farmer, Pelungu, Ghana, 110329
 Atia, James, Farmer, Pelungu, Ghana, 110329
 Dung, Tikamong, Farmer, Pelungu, Ghana, 110329
 Tll, Taabe, Farmer, Pelungu, Ghana, 110329
 Nondi, Musyine, Farmer, Pelungu, Ghana, 110329
 Kugve, Mbabono, Farmer, Pelungu, Ghana, 110329
 Yabil, Moonofu, Farmer, Pelungu, Ghana, 110329
 Yidana, David, Farmer, Pelungu, Ghana, 110329
 Yin, Piyel, Farmer, Pelungu, Ghana, 110401
 Akigre, Tarsui, Farmer, Pelungu, Ghana, 110401
 Tii, Bayou, Farmer, Pelungu, Ghana, 110401
 Deyine, Mbama, Farmer, Pelungu, Ghana, 110401
 Nagbil, Bamugtim, Farmer, Pelungu, Ghana, 110401
 Weenia, Pagla, Farmer, Pelungu, Ghana, 110401
 Sogya, John, Farmer, Pelungu, Ghana, 110401
 Tll, Yinlwug, Farmer, Pelungu, Ghana, 110401
 Aduka, Azugu, Farmer, Dachio, Ghana, 110404
 Akaliga, Farmer, Dachio, Ghana, 110404
 Akania, Ndoos, Farmer, Dachio, Ghana, 110404
 Assibi, Atia, Farmer, Dachio, Ghana, 110404
 Ania, Admie, Farmer, Dachio, Ghana, 110404
 Amokbue, Azuzupoka, Farmer, Dachio, Ghana, 110404
 Azugu, Mary, Farmer, Dachio, Ghana, 110404
 Atera, Charlotte, Farmer, Dachio, Ghana, 110404
 Akapeli, Azapoka, Farmer, Dachio, Ghana, 110405
 Akunnie, Awafo, Farmer, Dachio, Ghana, 110405
 Faustina, Akisimbono, Farmer, Dachio, Ghana, 110405
 Ayabua, Tanazata, Farmer, Dachio, Ghana, 110405
 Baba, Hida, Farmer, Dachio, Ghana, 110405
 Apledana, Akolgo, Farmer, Dachio, Ghana, 110405
 Akuta, Asakpa, Farmer, Dachio, Ghana, 110405
 Awafo, Atule, Farmer, Dachio, Ghana, 110405
 Assibi, Mabila, Farmer, Dachio, 110405
 Attony, Angarie, Farmer, Dachio, Ghana, 110405
 Akang, Agnoma, Farmer, Dachio, Ghana, 110405
 Paapang, Tuag, Farmer, Pelungu, Ghana, 110406
 Boya, John, Farmer, Pelungu, Ghana, 110406
 Bakomore, Eric, Farmer, Pelungu, Ghana, 110406
 Iang, Bernard, Farmer, Pelungu, Ghana, 110406
 Sampana, Zong, Farmer, Pelungu, Ghana, 110406
 Azumah, Comfort, Farmer, Pelungu, Ghana, 110406

Krug, Pogyga, Farmer, Pelungu, Ghana, 110406
 Bungbuno, Zurc, Farmer, Pelungu, Ghana, 110406
 Akeleyana, Robert, Farmer, Dachio, Ghana, 110408
 Amonh, Atebrui, Farmer, Dachio, Ghana, 110408
 Asiliba, Atubiure, Farmer, Dachio, Ghana, 110408
 Ayselza, Agenina, Farmer, Dachio, Ghana, 110408
 Asuyina, Apungu, Farmer, Dachio, Ghana, 110408
 Abugei, Akunga, Farmer, Dachio, Ghana, 110408
 Aglebila, Felicia, Farmer, Dachio, Ghana, 110408
 Adoku, Abotitouno, Farmer, Dachio, Ghana, 110408
 Ayiunaas, Akunzuba, Farmer, Dachio, Ghana, 110408
 Ayandoo, Nina, Farmer, Dachio, Ghana, 110408
 Sagzabre, Yagbil, Farmer, Pelungu, Ghana, 110412
 Krugbil, Esther, Farmer, Pelungu, Ghana, 110412
 Bakooma, Tia, Farmer, Pelungu, Ghana, 110412
 Somkpalka, Kpalnzut, Farmer, Pelungu, Ghana, 110412
 Krug, Vida, Farmer, Pelungu, Ghana, 110412
 Krug, Sepoka, Farmer, Pelungu, Ghana, 110412
 Krug, Kpatibil, Farmer, Pelungu, Ghana, 110412
 Tesiko, Alice, Farmer, Pelungu, Ghana, 110412
 Nbofuu, Tule, Farmer, Pelungu, Ghana, 110412
 Krug, Hyaaba, Farmer, Pelungu, Ghana, 110412
 Ayafue, Atule, Farmer, Dachio, Ghana, 110413
 Apasibu, Adongo, Farmer, Dachio, Ghana, 110413
 Atunga, Ataga, Farmer, Dachio, Ghana, 110413
 Abagee, Aduku, Farmer, Dachio, Ghana, 110413
 Akulga, Nayahna, Farmer, Dachio, Ghana, 110413
 Ayenime, Ania, Farmer, Dachio, Ghana, 110413
 Akaliga, Naba, Farmer, Dachio, Ghana, 110413
 Adoego, Akolgo, Farmer, Dachio, Ghana, 110413
 Akundoo, Akuyaga, Farmer, Dachio, Ghana, 110413
 Ayize, Adombire, Farmer, Dachio, Ghana, 110413
 Aduku, Ajamdo, Farmer, Dachio, Ghana, 110413
 Asulidne, Asoyine, Farmer, Dachio, Ghana, 110413
 Anafo, Akuoule, Farmer, Dachio, Ghana, 110413
 Akuka, Ayiebia, Farmer, Dachio, Ghana, 110413
 Akabire, Rose, Farmer, Dachio, Ghana, 110413
 Yambire, Martin, Farmer, Pelungu, Ghana, 110414
 Zoog, Marimusimi, Farmer, Pelungu, Ghana, 110414
 Suug, Mbayole, Farmer, Pelungu, Ghana, 110414
 Tudoor, Koog, Farmer, Pelungu, Ghana, 110414
 Toabila, Bugre, Farmer, Pelungu, Ghana, 110414
 Jambuo, Saggo, Farmer, Pelungu, Ghana, 110414

Pii, Salam, Farmer, Pelungu, Ghana, 110414
 Bakpama, Pogiba, Farmer, Pelungu, Ghana, 110414
 Yimbil, Kobil, Farmer, Pelungu, Ghana, 110419
 Sampa, Banamoremina, Farmer, Pelungu, Ghana, 110419
 Yin, Peekozoya, Farmer, Pelungu, Ghana, 110419
 Tibre, Kupesiba, Farmer, Pelungu, Ghana, 110419
 Tibil, Azumah, Farmer, Pelungu, Ghana, 110419
 Segla, Zure, Farmer, Pelungu, Ghana, 110419
 Zoog, Nancy, Farmer, Pelungu, Ghana, 110419
 Sogbasi, Bademore, Farmer, Pelungu, Ghana, 110419
 Gbana, Nambasiya, Farmer, Pelungu, Ghana, 110419
 Bawunym, Martha, Farmer, Pelungu, Ghana, 110419
 Suuka, Yiyama, Farmer, Pelungu, Ghana, 110419
 Tibire, Sumaya, Farmer, Pelungu, Ghana, 110419
 Aiaomi, Daku, Farmer, Pelungu, Ghana, 110419
 Kaug, Dusi, Farmer, Pelungu, Ghana, 110419
 Kawore, Tobiga, Farmer, Pelungu, Ghana, 110419
 Akuwi, Atula, Farmer, Dachio, Ghana, 110420
 Akugtai, Akungu, Farmer, Dachio, Ghana, 110420
 Atukrye, Nyaba, Farmer, Dachio, Ghana, 110420
 Sewle, Atupesia, Farmer, Dachio, Ghana, 110420
 Adobie, Puol, Farmer, Dachio, Ghana, 110420
 Amasia, Anabme, Farmer, Dachio, Ghana, 110420
 Abukuku, Agong, Farmer, Dachio, Ghana, 110420
 Akologo, Nbayien, Farmer, Dachio, Ghana, 110420
 Amonbine, Atumah, Farmer, Dachio, Ghana, 110420
 Akaba, Agabuga, Farmer, Dachio, Ghana, 110420
 Amribu, Ayienpoka, Farmer, Dachio, Ghana, 110420
 Agaymi, Asaabu, Farmer, Dachio, Ghana, 110420
 Nyaba, Apokyaga, Farmer, Dachio, Ghana, 110420
 Agong, Akazabila, Farmer, Dachio, Ghana, 110420
 Abogon, Apusanma, Farmer, Dachio, Ghana, 110420

Appendix 3 Map of Ghana

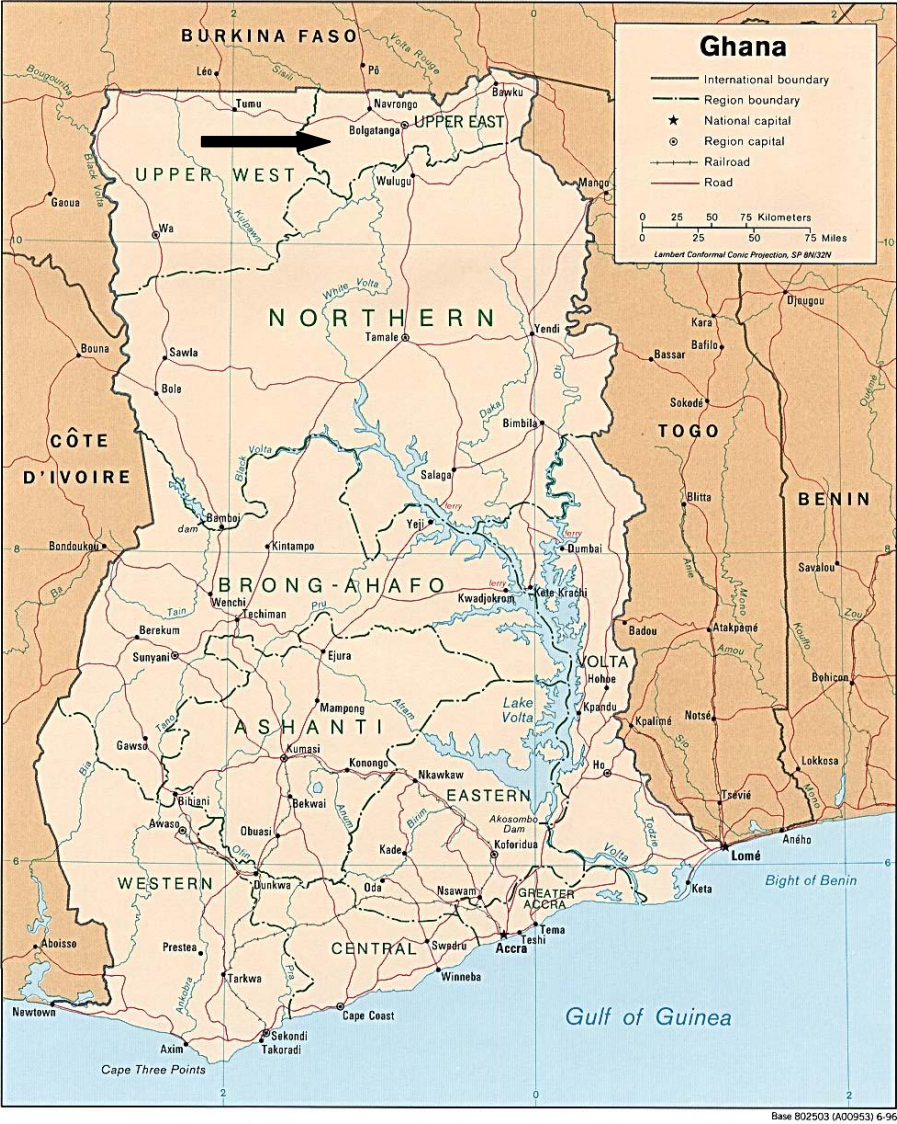


Figure 3. Source: www.bjchinesetranslation.com/maps_of_the_world/map_of_ghana.htm