Opportunities for Small Scale Suppliers within the Tilapia Value Chain in Ghana: a case study of fish farming in Achavanya

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List of Acronyms

AFA	An Giang Fisheries Association
CSO	Civil Society Organization
FAO	Food and Agricultural Organization
GDP	Gross Domestic Product
GVC	Global Value Chain
LED	Local Economic Development
NAFAG	National Fisheries Association of Ghana
NGO	Non Governmental Organization
VASEP	Vietnam Association of Seafood Exporters of Processors

Abstract

This research investigate the constraints within the tilapia value chain in Achavanya in the Dangme West District of Ghana It highlights the chain actors and the production processes within the chain and what the mode of chain organization means to the actors and the local people.

The study found that poor management of the fish stock, lack of trust among the farmers, influential behaviour of the buyers as some of the major constraints in the tilapia value chain. The study also revealed six main chain actors and the production processes is labour intensive.

Relevance to Development Studies

Global production networks have led to small scale producers to position themselves in global value chain. Small scale producers have not been able to maintain their positions over the years due to diverse reasons. It is therefore anticipated that the results from this study will add to knowledge in development studies the constraints to economic upgrading in the tilapia value chain. The strategies identified will also help small scale tilapia farmers to position themselves in global value chain.

Keywords

Chapter 1 Introduction

1.1 Background

The failure of structural adjustment programmes to enhance economic and sustainable development necessitated countries to adopt pragmatic policies and strategies to ensure economic development. As a result of that countries begun to adopt various policies and programmes to enhance growth and development of their economies. Among such policies and programmes introduced was Local Economic Development (LED) programmes. LED programmes were introduced as an assured way to create sustainable jobs and employments for the citizens of a particular locality. In Ghana various policies and programmes have been implemented to ensure the development of the country. Specifically, the agricultural sector is being promoted by the government as one of the sectors to create sustainable jobs and employments for the people especially the youth in the country. Fish farming has been advocated as one of the areas to create jobs in the country. Due to that various incentives and packages are being put in place to attract more people into the sector.

According to Helmsing (2010: 2) in the past two decades local economic development has been gaining ground as an approach in which public, private and civil actors define and manage resources to create and maintain place prosperity in a well defined territory. Special LED programmes such as incubators, clusters and value chains programmes are being promoted. However, this study places emphasis on clusters and value chain analysis.

Value chain analysis has been used to analyze global production and domestic production networks from different perspectives and contexts. Various scholars in development studies have written on value chain analysis in the area of footwear (Schmitz and Knorringa, 2000), horticulture (Dolan and Humhrey, 2000) and apparel (Gereffi, 1999). Knorringa and Pegler, 2006: 472) have noted that the first wave of global value chain studies attention was almost exclusively focused on inter firm relationships, basically neglecting impacts on labour. Recent studies on global value chains have begun to 'address specific labour issues in the value chain' (ibid: 471). However, little have been done on how small-scale holders can improve their economic opportunities within the value chain.

Fish farming started during the 1950's in Ghana, it has received much attention in recent times and it is being practiced in many part of the country. The fishery industry in Ghana contributes significantly to the Ghanaian economy by contributing '5% of the country's agricultural GDP' (NAFAG)[1]. The sector serves as a source of employment and as a means to support the livelihood of large numbers of people (Hiheglo, 2008: 25). According to the

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[1] See: http://www.nafagfish.org accessed 11 May 2012

NAFAG, about 75% of the total domestic production of fish is consumed locally. The fishing industry is based on resources from the marine and the inland (freshwater) sectors, coastal lagoons and aquaculture (ibid).

.Fish farming has become an ´enterprise acknowledged by both urban and rural communities, and is currently gaining ground especially in urban centres´ (Antwi-Aasre and Abbey, 2011:19). The sector employs 10% of the population from both urban and rural areas (FAO, 2011). The forms of aquaculture in Ghana are basically pond and cage cultures. Catfish and tilapia are the two main fishes cultivated in Ghana. Tilapia comprises over 80% whilst catfish account for 20% of aquaculture (ibid). The major species of fish cultivated are *Oreochromis niloticus, Clarias gariepinus and Heterotis nitloticus* (ibid).

Value chain analysis is the initial step to understanding the fish farming industry in Ghana. This is because value chain research in particular seeks to understand the nature of these relationships and their implications for development' (Humphery and Schmitz, 2001: 20). According to Knorringa and Pegler (2006: 471) value chain perspective draws attention to the sequence of activities stemming from product conception to the final consumer, stressing the importance of activities other than production itself, notably design, logistics and marketing.

In performing activities in the chain, decisions are taken by key actors in the chain. This is what is known as governance in value chain analysis (Humphery and Schmitz, 2001). The Authors have said that governance expresses that some firms in the chain set or enforce the parameters under which others in the chain operate. The control of the activities in the chain does not depend on key actors 'owning the manufacturing operation nor direct management of all activities' instead 'the leading actors in value chains focused only on a few strategic activities' (Knorringa and Pegler, 2006: 471).

1.2   Statement of the Research Problem

The dominant sector in the Ghanaian economy is the agricultural sector employing about 60% of the country's labour force. The agricultural sector[2] contributes about 45%-50% of the country's GDP and about 75% of the country's export earnings (NAFAG). The fisheries sub-sector contributes about 5% of the economy's agricultural GDP and 3% of the economy's total GDP (NAFAG; FAO: 2011).

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[2] The Ghanaian agricultural sector is composed of crop production, animal rearing and fishing. The fishing industry is based on resources from the marine and inland (freshwater) sectors, coastal lagoons and aquaculture. (NAFAG). See http://www.nafagfish.org/ assessed on 11 May 2012

The introduction and promotion of aquaculture in Ghana is contributing to bridging the gap between demand and supply of fish. According to FAO (2011), fish farming has been adopted as an assured way of meeting the deficit in Ghana's fish requirements. In the year 2003, 'Ghana produced only 51.7 percent of its requirements from its domestic sources and in 2004, achieved 68.1 percent of its fish requirement through domestic production and imports' (FAO, 2011). In 2004, the total fish cultivated was '950 tonnes, valued at GHC14.25 billion (US$1.5 million) (ibid)

The aquaculture sub-sector in Ghana comprises of mainly small scale subsistence producers and few commercial[3] and medium scale producers.

> The large scale farmers use cage culture and produce over 500 metric tonnes of tilapia per annum. They concentrate on tilapia and have fully commercialised operations with their own hatcheries, cold chain network, feed production and labour with all the needed skills ...the small scale tilapia farmers produce up to 50 tonnes of tilapia per year.(Antwi-Asare and Abbey, 2011:19).

Ghana needs to produce a total of 880,000 metric tonnes of fish to satisfy the fish protein requirements of its citizens however, only 400,000 metric tonnes is being produced currently[4]. This shows a big shortfall of 480,000 which has not been met. This is due to the fact that Fish farming in Ghana is done mainly on subsistence basis with few operations of commercial farms. Over the years the productivity level of the small scale farmers have not increased as indicated above. The reasons are as a result of the fact that fish farmers in the country are bedevilled with diverse constraints hence affecting the growth and development of the industry. Considering the fact that Achavanya is one community where fishing farming is done. Therefore, this research investigates the constraints encountered by the small scale producers in Achavanya.

1.3 Justification and Relevance

This study is important for both theory and policy. In terms of theory, the study would add to existing literature on value chain analysis of tilapia farming in Ghana. In terms of policy the study will inform practitioners in the field about the constraints to economic opportunities for small scale tilapia farmers. This will then form the basis to find ideas and practical solutions to curb the constraints in the industry.

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[3] Commercial tilapia farms in Ghana are owned by foreigners. An example is Tropo Farms Ltd. Tropo is Africa's second largest tilapia farm. Tropo's annual tilapia production and sales is over 2000 metric tonnes.
See:http://www.voltacatch.com/About%20Us.html assessed 24 May, 2012

[4]Based on interview with the manager of the government hatchery at Ashaiman Municipality

1.4   Objectives of the Research

The major aim of this study is to investigate the constraints to economic opportunities for small scale suppliers. Specifically the study set to achieve the following;

1. To examine the actors and the production processes in the chain
2. To find out what the mode of chain organization means to the actors and the local people
3. To investigate the principal constraints encountered by the farmers

1.5   Research Questions

Main question: what are the main constraints to economic upgrading for small scale tilapia farmers? The study is also guided by the following specific questions:

1. What are the actors and the processes in the chain?
2. What does this mode of chain organization mean to local farmers and other local residents?
3. What are the principal constraints to small scale fish farmers?
4. What factors can help small scale fish farmers to upgrade themselves?

1.6   Research Methodology

The study is focused on the value chain analysis of tilapia farming specifically in Achavanya. To gain insight into the area, the study used both primary and secondary data. This section covers the study area, the various methods, techniques of data collection used to carry out this research and finally the scope and limitations of the study.

1.6.1 Study area

The study employed a case study approach in Achavanya. Achavanya is one of the communities located in the Dangme West District of Ghana. Dangme West District is one of the 10 districts located in the Greater Accra Region. Achavanya was selected as the study area because large numbers of small scale farmers are concentrated and located along the Volta Lake of Ghana. The study revealed that over 50 small scale farmers are located in the community.

1.6.2 Sampling Technique employed

The study employed non-probability sampling technique for the study. Under this technique snowball sampling technique was used in identifying the sample size for the research. This technique was employed because I did not have information about the population to be interviewed and the exact place to locate them. Since I did not know exactly where to locate the farmers, on 13th July,

2012, I visited a hatchery centre (one of the two government hatcheries in the country) at Ashaiman Municipality. The director in charge of the hatchery briefed me about the work of the hatchery. Since most the farmers have been buying fingerlings from the hatchery, the director suggested that I conduct my interviews in Achavanya, a community in the Dangme West District in the Greater Accra Region instead of Akosombo in the Asuogyaman District in the Eastern Region as originally planned. The reason was that in Achavanya significant numbers of the small scale tilapia farmers were concentrated in the area and was very easy to locate them. However in Akosombo, the director noted that the farmers were few and also dispersed and scattered in the area. Due to that the director gave me the contact addresses (specifically farm names, name of owners/managers name and contact numbers) of some the farmers who buy fingerlings from the hatchery.

Before I went to the field to conduct the interviews, I proposed to investigate the constraints to improved livelihoods for small scale suppliers. I proposed this objective because I thought the small scale farmers are people who are engaged in farming activities with their families and without any other economic activities. However, the situation was totally different when I went to the field. The study revealed that the farmers are highly skilled personnel from diverse fields of works and employed in big organization and institutions in the country. The farmers mainly engage in tilapia farming as an alternative source of income. Some of the farmers are employed as lecturers, engineers, soldiers, medical doctors among others. The farmers are not residents from the community but located in different parts of the country. Due to the above the famers have employed residents in the community to see to the day to day running of the farms. As a result I changed the focus of the study to constraints to improved economic opportunities for small scale suppliers.

1.6.3 Data collection tools

Three main data collection tools were employed for the study specifically semi-structured interviews, documentation and observation. The study used semi-structured interview to solicit the views and responses from the respondents. With semi-structured interview the 'interviewer can start with a defined questioning plan, but will shift in order to follow the natural flow of conversation' (O'Leary, 2010:195). During the interview questions which were initially not part of the questions were asked to get more insight about specific issues which came out during the discussions. The study proposed to interview fish farmers, transporters, buyers, processors and officials at the fisheries commission. However, not all the respondents were interviewed because most of them were not applicable in the study area. Table 1.1 shows the total number of respondents who were interviewed. The interviews conducted were all recorded. All the interviews conducted were transcribed verbatim and used for the analysis. Additionally, I also observed how the farm workers (feeder, diver and security) carried out their duties and responsibilities on the farm. Additionally, I observed on three different farms how harvesting is done and the processes involved.

Tabel 1: Number of respondents to interviewed

Respondents	Number
Farm owners	5
Farm managers	10
Customers	2
Fish Cleaners	3
Official at the Fisheries Commission	1
Total	21

Source: Own construction

In terms of documentation, relevant documents were also used for the study. Relevant documents from organizations such as FAO, NAFAG, and other relevant case studies were used. In terms of observation, I went onto the cages with the feeders to see how the cages have been constructed as clearly seen on Map 1 below. I also observed from the farms how the fish are fed, the harvesting process, sorting process, negotiation process, packing and storage process and how the fish are transported to the final destination.

Figure 1: Observing the cages with a farm manager

Source: Fieldwork

1.6.4 Scope and Limitations

The paper is an academic study hence works within a particular time frame. As a result the study was limited and conducted in Achavanya, a community under the Dangme West District of the Greater Accra Region even though fish farming is carried out throughout the entire country. The study was conducted in Achavanya in order to do an in-depth analysis. Hence the results of the study should not be generalized to the entire country but should be taken and seen as a smaller portion of what is happening in the country. In terms of constraints it was very difficult to convince some of the respondents especially the farm managers to be interviewed. Though I presented an introductory letter which stated clearly the mission of the study, one farm manager noted *'you want to interview us to know the processes involved in tilapia farming so that you will start your own farm'*. It was also very difficult to get into contact with the farm owners to be interviewed because they go to their offices during the week days and visit the farms during weekends. Also, I proposed to interview some transporters and processors within the value chain; however it was realized that the proposed respondents were not part of the chain. Additionally, the times which were scheduled for harvesting by some of the farmers was changed several times and coincided with the time I had to meet some of the farmer owners.

However the above constraints were managed to make the study a successful one. I convinced the respondents that the study was purely an academic work and had no intention of venturing into tilapia farming. I also modified the interview questions since some of the proposed respondents were not part of the chain process in the community. Finally I changed most of the time for my appointments which enabled me to have time to visit the farms to observe how harvesting and selling of tilapia is carried out in Achavanya.

1.7 Organization of the paper

This paper has been organized into five main chapters. Chapter one covered the introduction of the study. It includes the background, statement of the research problem, justification and relevance, objectives of the research, research questions, research methodology and scope and limitations of the research. Chapter two presents the conceptual and theoretical framework of the study. Chapter three discusses the overview of aquaculture in Ghana. Chapter four comprises the presentation, analysis and interpretation of the findings from the field. The last chapter presents the conclusions and recommendations of the study.

Chapter 2 Conceptual and Theoretical framework

2.1 Introduction

This chapter reviews the concepts and theories employed for the research. The main concepts and theories are LED, clusters, value chains, governance and upgrading. In order to better understand the issues relating to opportunities for small scale farmers within the tilapia value chain in Achavanya, the above concepts and theories are discussed as follows:

2.2 Local Economic Development (LED)

LED is defined 'as a process in which partnerships between local governments, community and civic groups and the private sector are established to manage existing resources to create jobs and stimulate the economy of a well defined area' (Helming, 2003:70). According to him LED initiatives usually emphasizes local control, using the potentials of human, institutional and physical and area natural resources. Furthermore, he noted that LED initiatives mobilise actors, develop new institutions, resources and organisations, and local systems through dialogue and strategic actions.

There are three main types of LED initiatives namely; community economic development, enterprise development and locality development (ibid). However, this study focuses on enterprise development. The fundamental concern of LED initiatives is to develop the local economic base of a particular area. According to Helmsing (2003: 72) the economic base may consist of one single or various concentrations or clusters of local producers in particular industries. According to Perry (2009:148) the theory behind business clusters spatial agglomeration is encouraged as it is easier to form and maintain cooperative linkages with enterprises that are geographically as well as functionally close to your own. Furthermore, agglomeration economies are the cost that firms enjoy as a result of concentration of production a particular locality (ibid). Usually firms and clusters may grow and specialize in their various activities. Specialization is however an important growth mechanism:

> Clustering and specialisation may contribute to the emergence of agglomeration economies. These are advantages that accrue to local producers, which arise from the geographical concentration, such as specialised labour and inputs and knowledge spillovers. Once a cluster has come into existence, a new phase of local economic development may set in, namely that of 'active collective efficiency' (Schmitz, 1995; Schmitz, 1999a). There are three components here. One is that local producers, especially of a medium or small size, may find it advantageous to specialise amongst themselves. A second component is joint action among local producers to create institutions that support their activity. The creation of a local producer association is often indicative of a potential for 'private governance'. The third component refers to collec-

tive action of local producers towards government and external actors to lobby for public support institutions and infrastructure; for example, vocational training, technology development or a local transport terminal. An area that has developed these three types of 'active local efficiency' endows its economic base with cumulative capabilities (Helmsing, 2003:72).

In contrast to the Ugandan fishing sector, it is seen that the Ugandan fishing sector had over 600 landing sites around Lake Victoria alone and over 16 landing sites around Lake Albert side of Nebbi District' (Okumu, 2009:17). Also, he stated that the government of Uganda upgraded the transport sector in the industry hence making the landing sites accessible. Additionally, he explains that the Kasenyi landing site presents over 65 boats operating along the landing sites comprised of 52 motorized engines of 15 horse power. Again, he said the clusters present a complex nature of diverse activities ranging from capture fisheries, processing, boat making and other fishing gears making especially local ones (ibid).

This implies that in developing of a particular locality or sector, there is the need for the role of the state and also the operation of related industries to provide special services and support for the cluster. These will enhance the growth and development of the locality or sector.

Furthermore, local producers can significantly increase their capacity to learn as a result of being part of an agglomeration. Learning usually takes place through 'supply chain linkages (supplier and customer relations), mobility of skilled labour and spin-off activity (creation of new start-ups)' (ibid).

According to Porter (1998: 90) the sophistication with which companies compete in a particular location, however, is strongly influenced by the quality of the local business environment. He also notes that companies cannot employ advanced logistical techniques without quality transportation infrastructure. Porter further indicated that clusters affect competition in three broad ways: first, by increasing the productivity of companies based in the area; second, by driving the direction and pace of innovation, which underpins future productivity growth; and third, by stimulating the formation of new businesses, which expands and strengthens the cluster itself. Additionally, a cluster allows each member to 'benefit as if it had greater scale or as if it had joined with others formally-without requiring it to sacrifice its flexibility' (ibid).

Also, when businesses and companies are part of clusters there is the opportunity to operate more productively in 'sourcing inputs accessing information, technology, and needed institutions; coordinating with related companies; and measuring and motivating improvement' (ibid).

2.3 Value Chain Analysis

The concept 'Value chain, describes the full range of activities which are required to bring a product or service from conception through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use' (Kaplinsky and Morris, 2000: 4). Among the activities in the chain include 'design, logistics and marketing' (Knorringa and Pegler, 2006: 471). Disintegrating activities in the chain leads to efficiency and effectiveness in the production process since activities are executed by different actors in the chain (Kaplinsky and Morris, 2000: 4).

In this regard, it can be seen in figure 1, that in the capture fisheries in Uganda, Okumu (2009) mapped the actors in the chain as Boat owners/fishers, factory agents/middlemen, processing factories, exporters/importers and retail markets.

Figure 2: Depicting Value Chain segment in capture fisheries in Uganda

Actor	Responsibility in the Chain Segment
Boat owners/fishers	Production and management of resources
	Including artisanal capture fisheries
Factory Agents/middlemen	Buying of fish from fishermen and
	Transporting it to the factories
Processing Factories	Filleting, freezing, quality assurance of fish products
Exporters/importers	Governance of global value chain: shipping/distribution
Retail markets	Sales services to consumers

Source: Okumu (2009: 18)

In contrast, the Pangasius value chain in Vietnam shows different chain actors. As clearly indicated in figure 2, the Pangasius value chain consist of five distinct actors including a 'general group of input suppliers, grow-out and hatchery, farmers, traders, processors and retailers' (Loc et al., 2010: 892).

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Figure 3: Pangasius value chain in Vietnam
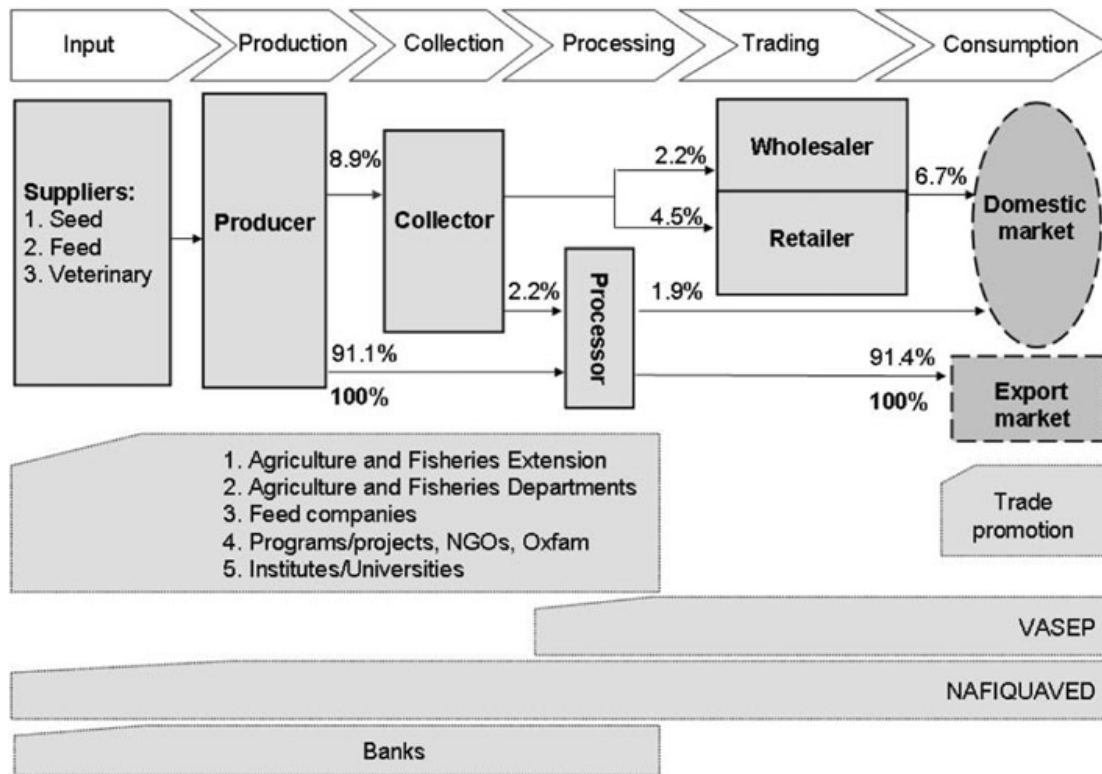
Source: Loc et al., (2010: 893)

From the above cases, we can see that each of the actors in the chain is responsible solely for a particular activity in the chain. These responsibilities are undertaken by the actors in the chain before the fish reaches the final consumer. Such a situation leads to efficiency and effectiveness since each actor does what he/she is good at. Additionally identifying the chain actors and their responsibilities is very important because it helps to identify what goes wrong at any stage of the chain.

2.4 Governance

Governance is essential to Global Value Chain (GVC) approach (Humphery and Schmitz, 2001: 20) because it enable researchers to identify the dominant actors in the chain. Governance of global value chain refers to the 'inter-firm relationships and institutional mechanisms through which non-market or explicit coordination of activities in the chain is achieved' (Humphery and Schmitz, 200: 97). Control of a value chain does not require owning the manufacturing operation nor direct management of all activities instead the leading actors in value chains focused only on a few strategic activities (Knorringa and Pegler, 2006: 471).

According to Humphery and Schmitz (2004: 96), governance has to do with the exercise of coordination and control along the chain. This arises when a dominant actor 'coordinates the product, processes and scheduling/logistics parameters followed' (ibid: 97) by other actors in the chain.

Applying this to the fishing sector, the case of Pangasius production in Vietnam is primarily export oriented hence dominated by processing companies as seen in figure 2 (Loc et al., 2010: 892). Due to this, producers selling to 'export markets have a direct contact with processing companies thereby avoiding the extra costs incurred by collectors' (ibid).

In contrast to the shrimp farming in Indonesia, tokeh (middlemen) 'dominate the buying market in the remote regions' (Ardjosoediro and Goetz, 2007: 16). This is because the tokeh usually provide micro finance and rental of transportation services to farmers during the production and the harvest periods respectively (ibid). However, these often create a 'non-official contract farmer system' and also restrict the farmers to sell to the tokeh usually at 'an unfair prices' iIbid).

In these two instances, the processing companies and the middlemen are the dominant actors in the Pangasius and shrimp production in Vietnam and Indonesia respectively. This is as a result of the fact that the processing companies and the middlemen control the entire production processes. Identifying the lead actors in the chain is very relevant in the sense that it helps in identifying which of the actors in the chain coordinate and control decisions along the chain.

Scholars have identified five main categories of chain governance. These are markets, modular, relational, captive and hierarchy value chains (Gibbon et al., 2008, Gereffi et al., 2005). According to Gibbon et al., markets relations are dominant when transactions are easily codified, product specifications are simple and suppliers have the capability to produce without much input from buyers. This implies decisions as to what to produce, how to go about the production process and when to produce are solely dictated by the suppliers. Hence buyers have no control over the production process. With regards to modular value chains, suppliers usually produce products to a customer's specification, which may be more or less detailed. (Gereffi et al., 2005). Under this chain governance, suppliers take full responsibility for the competences for the full supply of packages and modules thereby lowering the need for buyers to control the design and production processes and monitor closely (Gibbon et al., 2008).

Relational value chain is the type whereby product specifications cannot be codified easily this is because products are complex and additionally the capabilities of suppliers are very high (Gibbon et al., 2008). This a situation however leads to 'frequent communication between buyers and suppliers within the framework of a certain degree of mutual dependence, which may be reg-

ulated through reputation, social ties and/or spatial proximity' (ibid: 84). Additionally, captive value chains arise when small suppliers are transactionally reliant on larger buyers (Gerreffi et al., 2005). According to Altenburg (2006:503) in captive value chains, suppliers face high costs of switching to other customers, mainly due to relation-specific investments. As a result suppliers depend heavily on the lead firm. Furthermore, in this type of chain, suppliers are however assumed to have generally limited capabilities, hence their operations are strongly influenced by lead firms (ibid). Hierarchy value chain on the other hand is a type of governance usually characterized by vertical integration (Gerreffi et al., 2005). Under this type of governance, products are complex, capabilities of suppliers are limited hence buyers develop design and production skills in-house (Gibbon et al., 2008). Moreover, the 'dominant form of governance is managerial control, flowing from managers to subordinates, or from headquarters to subsidiaries and affiliates' (Gerreffi et al., 2005:84).

The consideration of the government type is relevant to the consideration of the relationship between different actors in terms of the role of the state. It helps to differentiate between the types of chain and also to identify factors important to good cluster development. This will be fully considered in chapter 4

2.5 Upgrading

A dominant characteristic in the global value chain literature is the consensus on the idea that in order to deal with the pressures of globalization and to remain competitive firms need to upgrade continuously (Knorringa and Pegler, 2006). Upgrading has been identified as a move to higher-value added activities in production, to improve technology, knowledge and skills, and to increase the benefits or profits deriving from participation in global production networks (Barrientos et al., 2010: 6). Upgrading comes about either by shifting to more functional positions in the chain or producing products that have more value added to them. As such, upgrading can occur either by the level and type or increasing the number and type of functions in a value chain. (Khiem et al., 2010).Upgrading in the value chain literature is usually broken down into process upgrading, product upgrading and functional upgrading (Knorringa and Pegler, 2008, Khiem et al., 2010).

A significant concern of Global value chain literature is the degree at which 'asymmetrical relationships with buyers provide suppliers with opportunities for learning and upgrading' (Knorringa and Pegler, 2008: 471). However, global value chain studies focused their attention solely on 'inter-firm relationships, basically neglecting impacts on labour' (ibid: 474). It has been argued by various scholars that there are difficulties in maintaining the independence of small suppliers in GVCs due to the challenges the suppliers encounter. Some of these challenges include 'accessing and processing information, developing adequate production and managerial capacity, accessing finance, and improving their bargaining power considering their poor economy of scale' (Bernhardt and Milberg, 2011: 7).

According to Bernhardt and Milberg (2011: 6), a strength of the GVC approach is its focus on the strategies of actors to 'upgrade' their position in global, regional or local markets. However, 'this strategic focus draws attention to the embeddedness of value chain actors within their social, political and economic milieu' (Ibid). Some schools of thought have argued that in order for small scale suppliers to position themselves in the global value chains, there is the need for them to upgrade their productions processes. However, other schools of thought have argued that 'upgrading' is necessary but not sufficient. As a result, these scholars are advocating that there is the need for economic and social upgrading

Moreover, it is being advocated that the inclusion of small suppliers in global value chains also requires 'requires addressing their social and economic embeddedness in a given production context' (ibid: 7). Additionally, inclusion of small suppliers at the national or the local level also requires conditions such as 'credit relations, resource access, and patronage networks, or more structural issues such as public subsidies, spatial planning and environmental policy' (Ibid: 6).

Economic upgrading is defined as 'the process by which economic actors firms and workers – move from low-value to relatively high-value activities in global production networks' (Barrientos et al., 2010: 6, Bernhardt and Milberg, 2011: 3). This indicates that economic upgrading is 'a multi-faceted and complex process, involving changes in business strategy, production structure and technology, policy and the organization of markets' (Bernhardt and Milberg, 2011: 3). However, it has been noted that simply raising the productivity in a particular industry does not indicate the 'gains from economic upgrading are distributed and thus how social welfare and, ultimately, economic development are affected' (ibid). There are four main types of economic upgrading and these are elaborated below;

> (i) Process upgrading involves changes in the production process with the objective of making it more efficient. (ii) Product upgrading, where more advanced product types are introduced, which often requires more skilled jobs to make an item with enhanced features. (iii) Functional upgrading involves firms changing the mix of activities performed towards higher value added tasks. (iv) Chain upgrading, or shifting to more technologically advanced production chains, involves moving into new industries or product markets, which often utilize different marketing channels, manufacturing technologies (Barrientos et al.,2010: 6).

The various types of economic upgrading usually require different skills (ibid). Scholars have argued that the skills needed at the different types helps to improve the production process and the conditions of work of labour.

Social upgrading has been defined as a 'process of improvement in the entitlements and rights of workers as social actors, which enhances the quality of their employment (Barrientos 2010: 7, Bernhardt and Milberg, 2011: 5). Social upgrading includes' access to better work, which might result from economic

upgrading' however it also involves' enhancing working conditions, protection and rights'(Barrientos et al., 2011:324).

2.5 Conclusion

This chapter presented the theories and the concepts employed for the study. The concepts reviewed included LED, value chain analysis, governance, upgrading. The chapter also reviewed some empirical case studies from other countries. The next chapter looks at overview of aquaculture in Ghana. Chapter 4 compares my empirical materials to this ideal type and secondary literature. But before we go there, chapter 3 gives a brief introduction about the case study area.

Chapter 3 Overview of Aquaculture in Ghana

3.1 Introduction

This chapter presents an overview of aquaculture in Ghana. The first part describes the history of fish farming in Ghana. The second part discusses policy initiatives for promoting fish farming in Ghana. The third part discusses tilapia farming in Ghana. The last part focuses on some important the research district focusing on some important features of the area including the nature of fish farming in the area.

3.2 History of Fish farming

Aquaculture started around the 1950's in the Upper Region of Ghana now divided into Upper East and Upper West Regions specifically for administrative reasons (Hiheglo, 2008). 'The policy was to allocate 5% of all irrigable lands for pond construction' (ibid, 18). As a result fishponds were constructed in 1953 by the former department of fisheries in the northern regions (FAO, 2011). The fishponds served as hatcheries to support the culture-based reservoir fishery development programme of the colonial administration and a means of supplementing the national demand for fish and increasing livelihood opportunities (ibid). This led to the teaching of fishing skills in communities living near small reservoirs which were not traditionally used for fishing. Nonetheless, the initiative by the former department of fisheries was not successful due to 'poor site selection, ponds not being drained and farmers not having any business focus' (Hiheglo, 2008: 18).

Though the industry was bedeviled with various constraints during the 1950's, the industry has been promoted in recent times. As part of government's efforts to meet the fish requirements needs of the people and also to bridge the gap between demand and supply of fish, the government has been advocating for individuals to venture into fish farming in the country. As a result of that people from all walks of life have been investing their resources into the industry. As indicated in chapter one, cat fish and tilapia are the two main types of fishes farmed in Ghana. Also, the main forms of farming are cage and pond cultures.

3.2 Policy Initiatives for Fish Farming in Ghana [5]

In Ghana, there are two main institutions are responsible for planning and development in the fish farming industry. These are the Directorate of Fisheries and the Fisheries Commission. The Directorate of Fisheries under the Ministry of Food and Agriculture is solely responsible for policy formulation and implementation, management. The control of the fishing sector is vested under the general guidance and direction of the Minister of Food and Agriculture. The Fisheries Commission on the other hand advises the Minister of Food and Agriculture in all issues pertaining to the fishing sector.

According to the NAFAG, the Directorate's mission is to promote sustainable exploitation and responsible utilization of fishery resources of Ghana through sound management practices, research, appropriate technological development for both culture and capture fisheries, effective extension and provision of other support services to fish farmers, fishermen, fish processors and traders for improved income and fish food security.

In an interview with the Director of the Fisheries Commission, it was revealed that the traditional functions of the fisheries commission are as follows;

- The commission is responsible for policy review and formulation.
- The commission manages the inland fishery resources and aquaculture in the country.
- The commission's staffs in district offices manage and educate farmers on aquaculture.
- The commission is responsible for training of the regional staff and supervision of their activities.
- The commission is responsible for monitoring the activities of regional and district staffs on the field.
- The commission is also responsible for coordinating all the activities in all the regional and district offices in all the ten regions of the country.
- The commission also provides investors with information on aquaculture.
- The commission advices the government through the director of fisheries and the minister of food and agriculture on issues on inland fisheries and aquaculture.
- The commission again collaborate with international bodies such as FAO and other institutions (eg. Universities, research institutions) which have to do with inland fisheries and aquaculture.
- The commission helps in training and collaborating with interested parties into inland fisheries and aquaculture.

Furthermore, to ensure the growth and development of the aquaculture in the country the government has undertaken several steps and measures to support and accelerate the development of the sector. These steps are as follows;

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[5] Based on information from the NAFAG, FAO and interviews conducted See:
http://www.nafagfish.org/aboutus.htm accessed 4 November 2012.
http://www.fao.org/fishery/countrysector/naso_ghana/en 25 May 2012

- The provision of free extension services such as stocking of farm cages/ponds, giving of nets for harvesting and other services. This is particularly because not all the farmers are commercial oriented. Majority of the fish farmers in Ghana mainly produce on subsistence basis.
- Offering of good fishing farming techniques by conducting training programmes on aquaculture for the farmers.
- Helps in setting up fish farmers association at both regional and national level.
- The commission helps in the formation of pond construction gangs to help farmers in the construction of their ponds. Through the commission the government has purchased pond construction equipment for the construction of fish ponds at a subsidized cost.
- Two main hatcheries have been established at the southern and northern parts of the country to provide fingerlings at a subsidized rate to small scale farmers
- The commission has set aside some amount of capital to train youth who are into agriculture and those who wish to venture into farming.
- The commission does not necessarily give financial resources to farmers but give supporting documents to farmers to enable them to assess loans from the banks.
- All farming inputs are duty exempt as a means to promote the industry.
- The commission is in the process of setting up a national body with a secretariat and a vehicle which will see to the activities of fish farming in the entire country.

The above services are rendered by the commission through their regional and district offices to promote and support fish farmers particularly small and medium scale farmers to enable them to graduate to the next level. Additionally, the above indicate that the government has formal objective of initiating and promoting LED in the country. Looking at the above, it shows that theoretically the government is ready to improve the activities of fish farming in the country. This is because all the factors enumerated above are features for promoting good LED and clusters and the government role as a facilitator.

3.3 Tilapia farming in Ghana

Tilapia farming industry in Ghana has basically two main value chain models-artisanal value chain and a modern based value chain (Antwi-Asare and Abbey, 2011). As indicated in figures 3 and 4, there are different chain actors in the two main value chain models. As indicated in figure 3, it can be seen that in the artisanal tilapia chain the suppliers sell their tilapia to domestic traders or local processors who also sell the tilapia to the final consumers. On the other hand, as depicted in figure 4, the case of the urban based value chain shows that the fish farmers usually sell their tilapia to either whole sellers or retailers and they in turn sell it to consumers.

Figure 4: A diagram depicting Artisanal tilapia value chains in Ghana
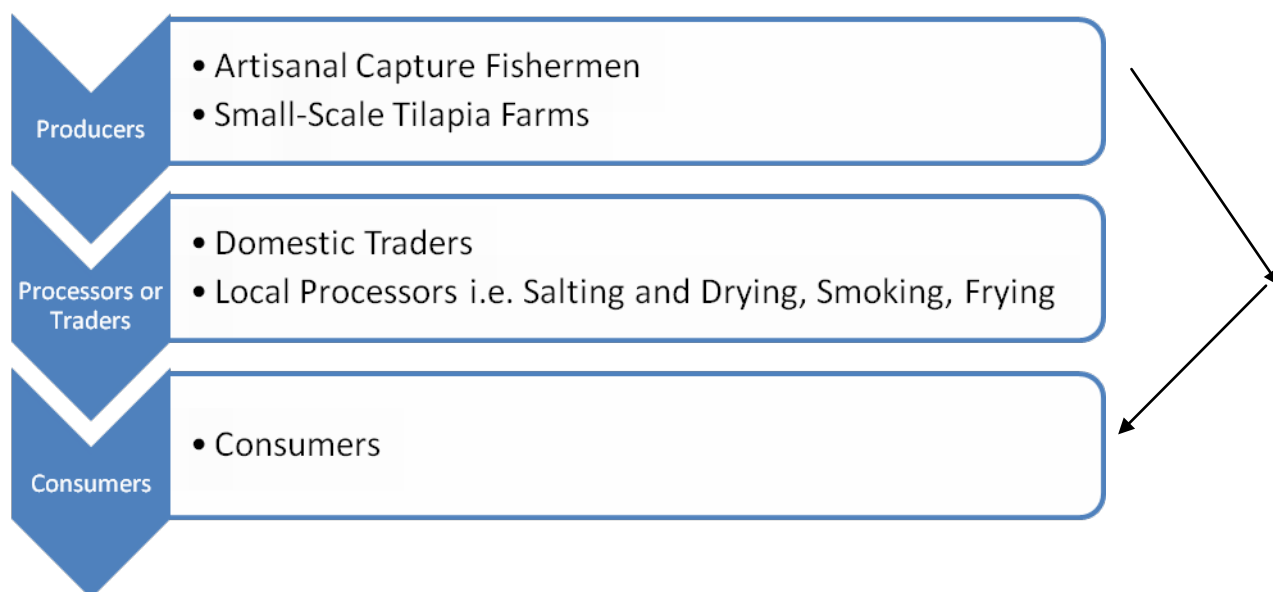
Source: Antwi-Asare and Abbey (2011)

Figure 5: A diagram depicting the modern tilapia value chain in Ghana
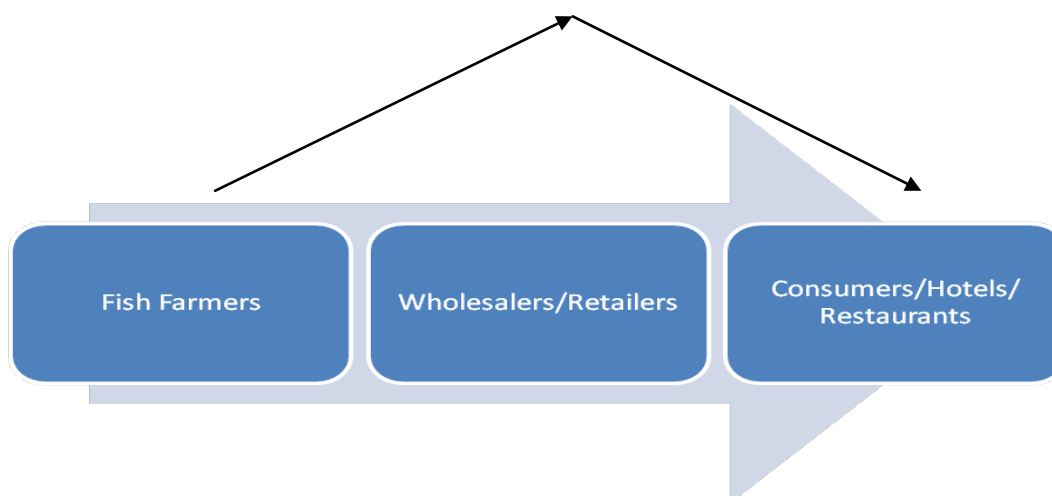
Source: Antwi-Asare and Abbey (2011)

3.4   Profile of Study District[6]

3.4.1 Location and size of the district

The study area, Achavanya is one of the fishing communities in the Dangme West District. Dangme West District is one of the six main Districts in the Greater Accra Region. As clearly indicated on figure 4, the Dangme West District is located in the Southeastern part of Ghana and lies between latitude 5° 45' south and 6° 05' North and Longitude 0° 05' East and 0° 20' West. The District is the largest out of the 10 districts in the Greater Accra Region hence having a total land area of 1,442 square kilometers. The total land area consists of total cultivable land of 129,600 hectares and has a coastline stretch of about 37kms. Also the District has 22km of the Lower Volta River running through and along the Northern to Eastern boundaries. The decentralization reforms in the country led to the creation of the district out of the former Dangme District in 1988. The district shares boundaries with the Yilo Krobo Municipal on the North- West, North-Tongu District on the North-East, Akwapim-North District on the West, Tema Metropolitan on the South-West and Dangme-East District on the East.

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[6] Based on information from:
http://www.ghanadistricts.com/districts/?r=1&_=5&sa=5083 accessed 10 October 2012

Map 1: Map of Ghana showing Dangme West District

MAP OF GHANA SHOWING DANGME WEST DISTRICT
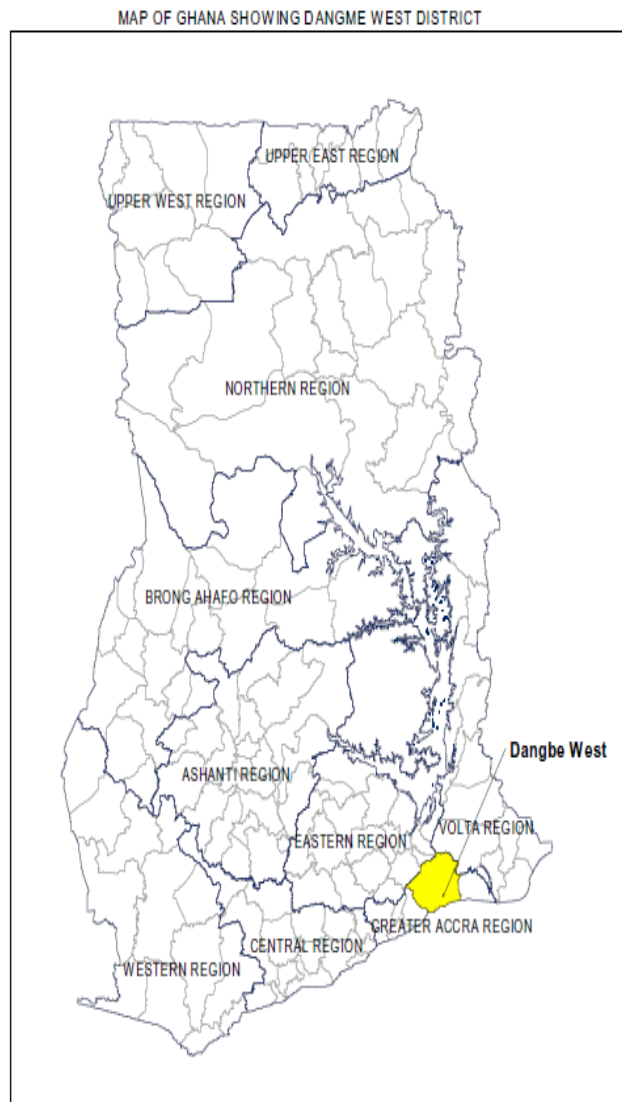
Source: Asante et al., (2010: 252)

3.4.2 Demographic Characteristics

According to the 2000 population and housing census, the Dangme West District has a population of 96,809 persons within the district. Out of this, 46,550 (48.2%) and 50,259(51.8%) are males and females respectively. The District is predominantly rural in the sense that 73,959 of the population representing (76.4%) live in the rural areas whilst the remaining 22,850 people representing (23.6%) live in the urban areas.

3.4.3 Economic Activities

As a result of the fact that large numbers of the population live in the rural areas, agricultural activities are the major economic activities in the district. Crop and livestock production, fish production, fishing and fish processing and other agro processing activities are the major agricultural activities undertaken in the district. Some of the crops produced include maize, cassava, rice, tomatoes, garden eggs, okra, pepper, sugarcane, watermelon, pineapple, pawpaw, banana and exotic vegetables for export. Also, cattle, sheep, goats and large local poultry are the major animals produced.

3.4.4 Fishing Activities in the District

Due to the closeness of the District to the Atlantic Ocean with a coastline stretching over 37 kilometers, the District therefore has a vast expanse of fish potential. Most of the residents are engaged in marine fishing along the coastline. Also the Districts proximity to the lower sections of the Volta River offers inland, fresh water fish potential. Aquaculture in the District is being engaged by foreign investors such as Tropo Farms Ltd at Asutsuare , Malaika Frams and other smaller farms in some of the communities along the Volta Lake.

Fishing as one of the major economic activities in the district has led to the concentration of small-scale fish related industries especially smoking of fish in areas such as Prampram, Lekpongunor, Dodowa and Ahwiam. Fishing is done throughout the whole year however there are two main seasons; the peak season usually around July-August and the lean season. Under the Rural Enterprise Development Project aquaculture has been selected as a priority project. Hence the district is currently sinking cages at Kasunya area as a way to improve upon aquaculture in the District. However, the major inputs used in fishing are boats or canoes (dug-out) and oars, nets, outboard motors hooks and traps.

3.4.5 Study Area[7]

Achavanya is one of the fishing farming communities in the Dangme West District in the Greater Accra Region. The community share borders with Akuse in the Yilo Krobo Municipal Assembly. Achavanya has a population of less than 1000. Achavanya is predominantly rural hence there are no formal jobs and employments in the community. As a result sand winning, farming and artisanal fishing on the Volta Lake were the main economic activities in the community before the commencement of fish farming in the community.

Due to the proximity of the community to the Volta Lake fishing farming activities are undertaken in the area. Fish farming activities in Achavanya started 5 years ago. There are over 50 fish farmers in the community. The introduction of fish farming has however reduced the unemployment situation in

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[7] Based on information collected from the field

the community. This is due to the fact that most of the residents particularly the men have been employed in the fish farming activities mostly as farm mangers, security men and divers. Additionally, the women in the community have also involved themselves in the fishing activities by cleaning the fish after the buyers buy from the farmers. The fish cleaners usually do this for a fee. The fee is usually determined by the total number of fishes cleaned.

3.5 Conclusion

This chapter discussed broadly the overview of fish farming in Ghana. It presented the history of fish farming in Ghana and the policy initiatives for promoting aquaculture in Ghana. Furthermore, the chapter discussed how tilapia farming is produced in the country and finally information about the study district and study area. With the above broad information about fish farming in the country, the next chapter presents the results from the interviews conducted in the case study area, Achavanya.

Chapter 4 Findings from the Field

4.1 Introduction

The previous chapter gave a broad overview of aquaculture in Ghana. This chapter presents the results of the interview conducted in the case study area, Achavanya. The chapter is divided into four main sections. Section one presents the actors and the processes in the tilapia value chain. Section two focuses on what the nature of chain organization mean to local farmers and other local residents. Also, the third section discusses the principal constraints encountered by the farmers. The last section focuses on factors which can help small scale fish farmers to upgrade themselves.

4.2 What are the actors and the processes in the chain?

This section analyses the actors in the tilapia value chain in Achavanya. It also discusses the responsibilities of the actors in the chain. It further discusses the production processes and the governance structure in the chain. The results from the field are as follows;

The interviews conducted revealed six main chain actors namely; hatcheries, farm owners, farm managers, customers (middlemen), fish cleaners and retailers/consumers in the tilapia value chain in Achavanya as clearly depicted in figure 1. This does not affirm what Kaplinsky and Morris (2000) have written on value chain as the full range of activities required to bring a product from conception through the different phases of production. This is because the chain does not clearly show all the activities/actors in the chain.

Comparing this to the Pangasius value chain in Vietnam, the main chain actors have been described as suppliers, producers, processors and export market are the chain actors for the first channel as seen in chapter 2. It is realised that the processors in the chain add value to the fish before exporting them to the international community.

However, this is not the case with the findings from the field since there are no processors and export markets in the chain. This shows that the result from the field does not fit in the ideal model of value chain since processors and export market are not part of the chain. This clearly indicates that there is no value addition in the chain in the tilapia value chain in Achavanya. This has implications on the rents borne by the chain actors.

Figure 6: A diagram showing the actors in the tilapia value chain in Achavanya.

Hatcheries

Farm owners

Farm managers

Customers

Finish cleaners

Retailers/consumers
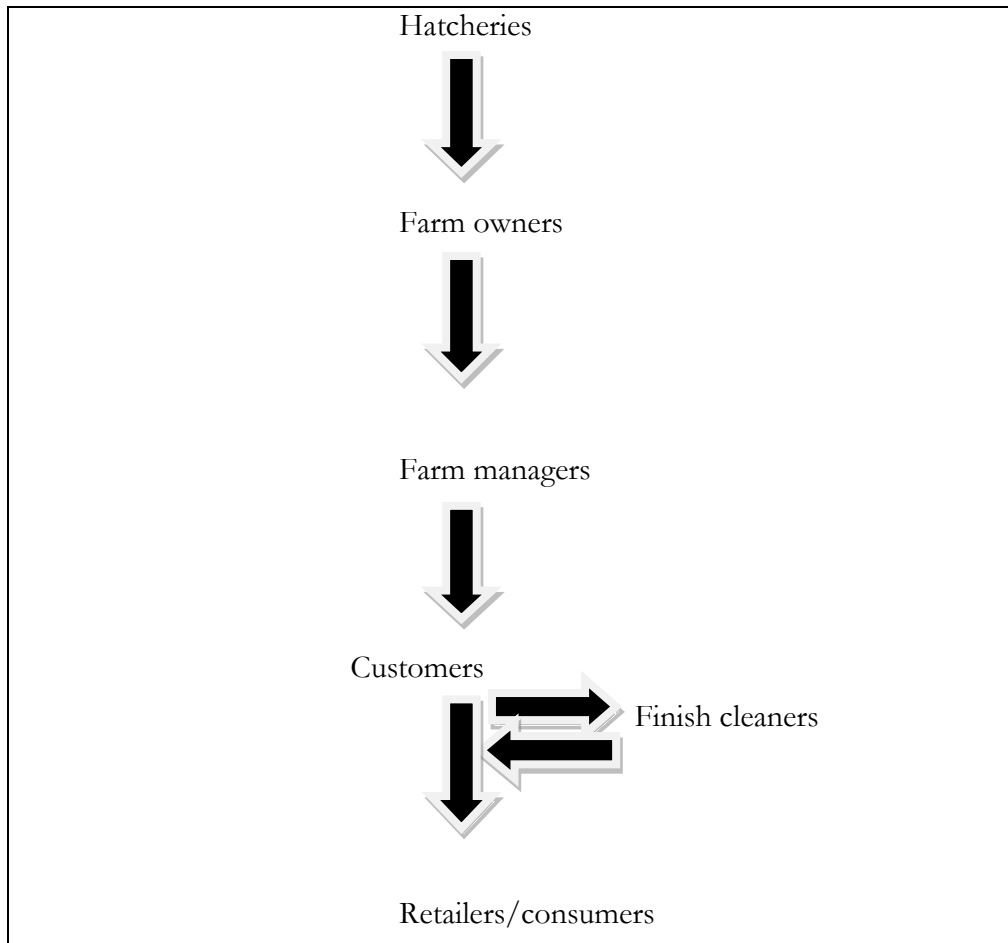
Source: Own construction

4.3 Responsibilities of chain actors

This section describes and discusses the roles and responsibilities performed by the actors in the chain. The roles and responsibilities of each of the chain actors are discussed below;

As seen in figure 5, hatcheries are the first set of actors in the tilapia value chain in Achavanya. The fish farmers in Achavanya stock their cages by buying fingerlings from hatcheries outside the community. The fingerlings are purchased from either the government hatchery in Ashaiman Municipality or other private hatcheries located outside the community. The fingerlings are transported to the farms in a plastic container. The fingerlings are sold based on their weight. For instance fingerlings with weights of 2 grams and 5 grams are sold at GHC1.10 (€ 0.46) and GHC1.50 (€ 0.62) respectively[8] .The cages are stocked based on their sizes. The farmers indicated that cages with the size

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[8] The exchange rate of the Ghana Cedis (GHC) to Euros (€) is as follows; GHC1=€2.4133. See: http://business.myjoyonline.com/ accessed 5 November 2012

of 6×6 meters are usually stocked between 12,000 and 15,000 fingerlings whilst cages with size of 5×5 meters are stocked with fingerlings between 8,000 and 10,000.

Moreover, the farm owners are responsible for providing start-up capital for the construction of the cages, acquisition of land (for the construction of shed for keeping farm materials and fish feed), purchasing of fingerlings and paying of staffs salary. The farm owners are not residents in the community. The farm owners stay and work in different parts of the country hence the farm owners hire people who are residents in the community to manage the activities on the farm. The farm owners however visit the farms from time to time to see what is going on. In almost all the farms I visited there are three people who are employed to work on the farm – farm manager (also the feeder), diver and security man.

Furthermore, the farm managers are responsible for the day to day running of the farm. The farm managers give a status report to the farm owners about what pertains on the farm. The farm manager is the one responsible for feeding the fish according to the feeding chart. This is usually done with the help of a diver who usually paddles the canoe around the cage whilst the feeder feeds the fish.

Additionally, the findings showed that the customers (middlemen) are not residents from the community. The farmers usually contact the customers when the fish are matured. Sometimes the farmers advertise when the fish are matured by putting signboards by the road sides to let the public know that the farm is ready to harvest their fish. In other cases the customers call the farmers to verify whether the fish are ready for harvest. During the interview, the customers noted that when they buy the fish from the farmers they also sell the fish to retailers and consumers hence they serve as middlemen in the chain. The customers noted that they sell to their customers either in bulk or at retail prices.

Last but not the least the fish cleaners are women who reside in the community. They are not engaged in any economic activity in the community. During harvesting, the fish cleaners come around with their bowls and knife. When the customers buy the fish from the farmer, they contact the fish cleaners to remove the waste product from the fish. The fish scale, fins and the gills are not tempered with. The women usually do this for a fee which is determined by the number of fish cleaned. The reasons for removing the waste product are to prevent the fish from decomposing before the fish get to the final destination. This is because there are no refrigerators to store the fish.

Lastly, the retailers/consumers are the ones whom the customers sell the fish to either in bulk or at retail prices. The retailers here also sell the fish to other people whilst the consumers here buy the fish for consumption.

From the above discussions we have seen the responsibilities of each of the chain actors. This support what the literature has said about chain actors. It can be seen that the responsibilities of each of the actors relate to another actor. This is very relevant because if an actor refuses to perform his/her responsibility it would be very difficult for the others to perform their duties as well. In the nutshell we can deduce that the actors are related in the chain.

4.4 Other Chain Participants

Apart from the main actors depicted in figure 5, there are other participants who are not directly involved in the chain. However their services support in carrying out the activities in the chain. These participants include input suppliers, divers and security.

There are three main types of input suppliers. These are suppliers who provide materials for the construction of the cages, suppliers who provide fingerlings and those who provide feeds. The suppliers who provide materials for the cages provide items such as nets of different sizes, rope, metallic bar, plastic barrels and wood for the construction of the cages. The fingerlings suppliers provide fingerlings to stock the cages. The farmers usually buy fingerlings weighing 10 grams each from the hatcheries. The feed suppliers are the ones that sell fish feed to the farmers. There are different types of feeds which are used in feeding the fish depending on their sizes. Though the above three main types of input suppliers are very important in the tilapia value chain in Achavanya, however none of these input suppliers are located in the community. They are located in different towns and cities hence the farmers travel to these areas to buy the inputs when the need arises.

The main form of fish farming in Achavanya is the cage culture. The Volta Lake stretches along the community as a result the cages have been constructed and erected on the Lake. The Volta Lake is a natural habitat for different species of fish. As a result when the cages are stocked the natural fishes in the Lake try to feed on the tilapia in the cage.The diver on the other hand is responsible for diving into the water on a daily basis to check whether the protective net is not tempered with. When the protective net is torn by the wild natural fishes in the water and other living organisms, he mends the net under the water. The diver is again responsible for removing weeds and other materials which enters the net and also clean mud which enters the net.

Again, during the field interview it was revealed that security on the farms was one of the major constraints encountered in the community. Due to that every farm has hired a security person who watches the farm in the night and day time. The security is responsible for ensuring that there is adequate security at the farm site. This is because people temper with the cage and steal the fish especially during the nights.

4.5   Production Processes

When the cages are ready, the farmers go to the hatcheries to buy fingerlings to stock the cages. The fingerlings are transported in a big plastic container with lots of water. During the transportation, the fingerlings are given oxygen to enable them breath well. When the fingerlings get to the farm site, the fish is then scooped from the container into aluminum and plastic basins filled with water from the lake. The basins are then sent to the cages and the fingerlings are scooped again into the cages. The gestation period for the fish to mature is

6 months. Within the six months, the fish are fed with different feeds of various weights until they mature[9].

Also, when the fish is matured the farm owners contact the customers to inform them that the fish is matured and ready for harvest. The farm owner then schedules a date when the fish will be harvested. On the harvest day, the customers come to the farm site with their sacks with ice-blocks which are then used to preserve the fish to their various destinations. Before the fishes are harvested, the farm owner informs the customers the prices at which the various sizes of fish will be sold. After that the fish is harvested by scooping the fish from the cage into a canoe. The canoe is then paddled to the bank of the lake and then the fishes are scooped into basins which are carried unto a sorting table. The fishes are then sorted into big basins based on the sizes of the fish.

From the above discussion it is clearly seen that the production process is labour intensive. There are no modern ways and methods in carrying out the production processes. Such a situation contrast with what Barrientos et al., (2011) have said about process upgrading. According to Barrientos et al., (2010: 6), process upgrading involves changes in the production process with the objective of making it efficient. Since the production process is labour intensive without any technological method, it will be very difficult for the farmers to produce the fish effectively and efficiently. Such a case leads to the production of low quality fish. It is seen that since the chain is hierarchical, decisions on what to produce are solely determined by the farm owners.

In terms of storage, after sorting the fishes are weighed in kilos and sold to the customers based on the quantity that they have requested. When the customers buy the fish, the women (fish cleaners) in the community remove the intestines from the fish. After that the fish is washed and packed into a sack to a certain level as seen in pictures 2 and 3. Then more fish is arranged till the basket in which the sack is placed is full and finally spread more iced-block spread to prevent it from going bad. Pictures 2 and 3 shows how packaging and storage of the tilapia is done in Achavanya before transporting to the final destination.

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[9]For the first 2 months, the fingerlings are fed with a starter feed with a weight of 0.2mm. The fingerlings are feed 4 times daily with the starter feed for the first 2 months. For the next 2 months ie 3rd and 4th months, the fishes are then fed with a feed with a weight of 2mm. The fish are again fed 4 times daily. In the 5th month, the fish are then fed with a feed with a weight of 4.5mm for 4 times daily. In the last month, the fish are fed with a feed with a weight of 6mm 4 times daily. In the 6th month the fish is matured and ready to be harvested.

Figure 7: A buyer packing the tilapia to be transported

Source: Fieldwork

Figure 8: Stored tilapia to be transported to the final destination

Source: Fieldwork

Additionally, in terms of transporting the fish to the buyer's destination, the result revealed that there are no vehicles at the farm site to transport customers to their final destination. The customers carry the fish on motors bike to the road side and pick a public transport to their final destination. This is clearly depicted in picture 4.

Figure 9: Transporting of tilapia from the farm site to the main roadside

Source: Fieldwork

4.6 Governance Structure in the Chain

The result revealed that the farm owners are the ones who decide the quantity of fish to produce, how to produce the fish and when to produce the fish. In this case the farm owners decide on the production processes because they provide funds for undertaking the production processes. Additionally, it also revealed that the customers are price makers in the chain since they are able to influence the farmers to sell the fish at the price they quote. This supports confirms Humphery and Schmitz (2004) observation when they note that governance has to do with the exercise of coordination and control along the chain. This indicates that the farm owners and the buyers are the lead actors in the chain hence they coordinate and control activities along the chain.

Comparing this to the Ugandan fishing sector as noted by Okumu (2009) and discussed in chapter 2, it can be seen that the results contradicts with what Okumu have observed as the lead actors in the Ugandan fishing sector. Okumu identified processing factories as the lead actors in the Ugandan fishing sector. Similarly, comparing the result to the shrimp farming in Indonesia, it is realized that the findings does not confirm the observations as indicated by

Ardjosoediro and Goetz (2007) and discussed in chapter 2. They identified the lead actor in the shrimp farming in Indonesia as the tokeh (middlemen).

From the above it can be said that the governance structure of the tilapia value chain in Achavanya supports the observations of Humphery and Schmitz (2004). However, did not support the observations of Okumu (2009) and Ardjosoediro and Goetz (2007). The governance structure in the tilapia chain has implications on the rents of the farmers. This is because since the farmers are influenced by the customers to accept the price they quote, it would be very difficult for the farmers to earn more income.

4.7 What does this type of chain organization means to local farmers and other residents?

This section analyses how the nature of chain organization in Achavanya means to the farmers and the community members. It looks at how the concentration of fish farmers in the community has contributed to LED.

4.7.1 Type of chain organization in Achavanya

The findings revealed that the type of chain organization in Achavanya is partially hierarchical. This is because the nature of 'governance form is characterized by vertical integration' (Gerreffi et al., 2005: 84) and also the capabilities of the farmers and farm managers are very low. In other words, the governance structure in Achavanya is controlled by the farm owners since decisions on the production processes are solely taken by the farm owners. Additionally, the customers act as middlemen in the chain since they in turn sell the fish either in bulk or at retail prices to their customers. As middlemen in the chain, they influence the farmers to accept the prices they quote during harvest. With this type of chain governance in Achavanya, it can be seen that whilst the farm owners control the production processes the buyers on the other hand influence the prices of the fish during harvest times.

4.7.2 Contribution to Local Economic Development in Achavanya

As already indicated in chapter 3, sand winning, farming and artisanal fishing on the Volta Lake were the main economic activities in Achavanya before fish farming started in the community five years ago. However, the results from the study revealed that the introduction and the concentration of fishing business as an LED program in Achavanya has become the major source of employment for the residents. The introduction and concentration of the fishing business in the community has offered employment to the residents in the community as farm managers, divers, security preson and fish cleaners.

Furthermore, aside the women in the community (fish cleaners) cleaning the fish for the buyers during harvest times for a fee, they also produce fish oil from the waste product of the fish. They usually do this by washing the waste product and the oil suspends on the surface of the water. After that they put the extracted oil on fire to remove the foul smell from the oil. After that the oil is put in bottles and gallons and sold at GHC1.00 (€0.41) per bottle and

GHC10.00 (€4.14) per gallon respectively. According to the women, a lot of people have been buying the oil for cooking.

However, the results showed that there are over 50 farmers are clustered in the community yet there are no related industries and supporting businesses such as input suppliers, service providers, food vendors and others to support the industry. The findings does not support the observations made by Porter (1998) on clusters. According to him (1998: 78) clusters are geographic concentrations of interconnected companies and institutions in a particular field. He further said that clusters include a collection of related industries such as suppliers of specialized inputs, providers of specialized infrastructure and other important entities for competition. The outcome of the study does not support the arguments by Porter since none of the related industries such as input suppliers, service providers and specialized infrastructure such as cold stores, cold vans, good road networks among others does not exist in the community.

In contrast to the Ugandan fishing sector, it is clearly seen that the findings does not support the observations on the operations of related industries which support the activities of the fish farmers as noted by Okumu (2009) and discussed in chapter 2. Additionally, as discussed in chapter 2, the Ugandan government assisted in the development of the transport sector.

The above clearly shows that the idea of local economic development and cluster development in Achavanya needs effective state intervention and the operation of related industries to support the activities of the farmers.

Additionally, Porter (1998) further said clusters affect competition by increasing the productivity of businesses in the area, drive the direction and pace of innovation and eventually stimulate the formation of new businesses. However, the findings from the study were different from the ideal situation. This is because fish farming in Achavanya was done with rudimentary tools and also the capabilities of the farmer owners and farm managers are very low. Hence it is very difficult for the farmers to compete among themselves and also come out with innovative methods of production. Moreover there was no presence of new businesses in the community as already noted above.

4.7.3 Knowledge Spillovers

The results indicated that the farmers and the farm managers do not have any technical knowledge on fish farming. The farmers do not have ideas on fish farming as a result they keep on doing trial and error till they succeed. It was only one farmer who stated that he has Masters degree in aquaculture. According to Helmsing (2003: 72) local producers can significantly increase their capacity to learn as a result of being part of an agglomeration. He further noted that learning usually takes place through supply chain linkages (supplier and customer relations), mobility of skilled labour and spin-off activity (creation of new start-ups). However, this is not consistent with the results from the study. Though over 50 farmers are concentrated in the community their capabilities have not improved since there are no learning processes in the chain. Moreover, new farmers who venture into the fishing business in the community do

not come with new ideas and knowledge. They rather practice the methods used by those who are already in the business.

The above situation is due to the fact that the farmers do not have any technical knowledge and skills on fish farming even though the farmers are highly skilled personnel from diverse fields. However, the result showed that one farmer had master's degree in aquaculture. Additionally, the Director of the Fisheries Commission noted in an interview that prospective farmers and those who are already in the industry are supposed to contact the commission for advice and technical support in carrying out their activities. However the farmers have refused to contact the commission because they feel they would be charged by the commission for such services. This situation has an effect on the production processes since most of them do not have much knowledge on environmental impact assessment, water quality, oxygen level in the water, handling of fingerlings and others.

It can be deduced from the discussions that there is clear problems of skills, ineffective government policy and lack of trust. These eventually have implications for the growth and development of the cluster and the tilapia value chain in Achavanya..

4.7.3 Tilapia Chain Facilitators

As indicated in chapter 3, though the government has noted clearly the steps and measures that have been put in place to promote fish farming in the country, however this was different from the findings from the field. The result revealed that there are no support services from the state, NGOs and CSOs. The farmers said that they do not receive any support services from the Fisheries Commission. As noted by a respondent; *'The ministry only support marine fishing industry. They do not even come to check our waters, check the place and how we should do. They don't even care. Fisheries Commission alone don't mind them. They don't care. They are only worried about the marine fishermen whom they sell premix to'*. Another respondent also noted that *'policy initiatives by the commission are only on paper but does not exist in reality. The Area Council at Asutuare only tax us'*. I further asked whether there are NGO's and private companies which support their activities aside the Fisheries Commission. The response was that the *'marketing manager at Rannan Feed comes around to educate the workers on how to handle the fish and also how to feed them'*.

Comparing this to the Pangasius chain in Vietnam as discussed in chapter 2, Loc et al., (2010: 893) noted that the chain has large number of state, private and civil society organizations facilitate both domestic and international trade of Pangasius. According to them, the Vietnam Association of Seafood Exporters and Processors (VASEP) provide market support and also offer information and training on quality and safety requirements for processors and exporters. Furthermore, they indicated that the Provincial Trade Promotion Center and the National Trade Promotion Center explore new export markets, as well as publically broadcasting market prices and new developments in farming techniques and quality standards.

This means that the Pangasius chain has adequate technical support and assistance from the state, private and civil society organizations. However, this was not the case with the outcome of this study. This clearly shows that the tilapia value chain in Achavanya lacks effective technical support and assistance from the state, private sector and civil society organizations. This has negative repercussions on the development of the chain.

Furthermore, the result revealed that there is no fish farmers association in Achavanya. One of the farm owners stated that *'there are no fish farmers associations in the community but such associations exit in other fish farming communities in other districts'.* However during the interview the farm owners expressed the desire of forming an association in order to demand for incentives and other support services from the Fisheries commission. This initiative by the farm owners to form an association support what the Fisheries Commission is advocating and promoting. In an interview with the Director of the commission it was revealed that the commission is encouraging fish farmers especially small scale farmers to form associations. The reasons given were that there are few field officers hence it is appropriate for them to work with groups instead of individuals and also forming associations will enable the farmers to have a common voice to demand for incentives from the commission.

In contrast to the Pangasius chain in Vietnam, Loc et al., (2010) not that the Pangasius chain has an association known as AnGiang Fisheries Association (AFA) which aims at advocating for farmer's interest in policy and negotiating individual contracts with processing companies. Also, the authors explained that the association provides information on inputs and market prices, production techniques and effective disease control for its members.

In the nutshell, it is seen that the farmers in the Pangasius chain has a common voice to demand for incentives, negotiate for contract with processing companies and also had information on inputs, market prices and production techniques. The above is not consistent with the result from the field. The fish farmers in Achavanya lacked all the advantages that accrue to Pangasius farmers as a result of having a common voice. Such a situation has an effect on the production processes hence this affect the income the farmers earn at the end of the day.

4.8 Economic Indicators of Efficiency and of Constraints to Efficiency

Four main economic indicators have been adopted in this study to find out whether the farmers are performing well in the chain. These indicators are negotiation, trust, productivity and income levels.

As indicated in the earlier sections, the production of tilapia in Achavanya is characterized by low capacities of farm managers to manage the fish stock, labour intensiveness coupled with lack of technical support and assistance from the government. The above situation has implications on the productivity level and eventually the income levels of the tilapia farmers. During the field interview two of the farm owners indicated that they stocked their 6 × 6 meters cage with 12, 000 fingerlings each. At the end of the gestation period, each of the farmers harvested 4000kilos and 3800 kilos of tilapia respectively. Table 2 outlines the breakdown of the total number of tilapia harvested. From the table we can see that the farmers harvested more of the smaller and medium sizes and few of the bigger sizes As indicated in table 3, it can be seen that the bigger sizes of the tilapia fetches more income than the smaller sizes.

The reason for harvesting more of the medium and smaller sizes and few of the large sizes is due to poor management practices such as overstocking of the cages, poor feeding practices and how to tender the fish stock. Furthermore, there is lack of incentives for the farm managers to motivate them to ensure effective and efficient day to day administration of the farms. This confirms what the farm managers said that when they request for an increment in their salaries the farm owners tell them to exercise restraint.

The above instances prevent the farm managers from putting up their best in order to increase the productivity level of the farms. Such a case has implications on the income level of the farmers. This is because the farmers are not motivated to put in their best to produce more of the bigger sizes which fetches high prices by kilo.

Table 2: Breakdown of tilapia harvested.

Breakdown of sizes for 4000 kilos of fish		Breakdown of sizes for 3800 kilos of fish	
School boys	600 kilos	School boys	500 kilos
Economy	800 kilos	Economy	1300 kilos
Regular	1900 kilos	Regular	1450 kilos
Size 1	500 kilos	Size 1	400 kilos
Size 2	200 kilos	Size 2	150 kilos

Source: Own construction as per data from the field.

Table 3: Prices of tilapia by sizes in Achavanya

Sizes of tilapia per kilo (from the smallest sizes to the highest sizes)	Prices per kilo	
	GHC	€
School boys	4.00	1.66
Economy	5.00	2.07
Regular	5.50	2.28
Size 1	6.00	2.49
Size 2	7.00	2.90
Size 3	8.00	3.31

Source: Own construction as per data from the field.

In terms of negotiation, the findings revealed that the terms of trade are usually not on contract basis but on arm length basis. This is because the farmers determine what to produce hence the fish are usually sold on cash basis. However the farmers are forced to sell to the customers on credit. One farmer explained that '*we do not sell on contract basis; we sell the fish to the buyers on cash basis. But sometimes we sell on credit to buyers who have used all their cash to buy the fish and still have an interest in buying more fish. But because we do not want some of the fish to remain we sell the fish on credit to our buyers'*.

Furthermore, the results indicated that the farmers are the ones who fix and quote the price during harvesting based on the sizes of the fish. However during harvesting time, the customers influence the price by dictating to the farmers how much the fish should be sold. During the interview one of the farmers stated that '*we the farmers determine the prices of the fish. We have a price that we sell to them depending on the sizes of the fish but when the buyers come they ask us to reduce the price for them. We have no option than to do so because we do not have refrigerators and cooling vans to store the fish'*. This clearly shows the different power situations in the chain therefore affecting the ability to generate rents.

With regard to trust, the findings revealed that there is a cordial relationship between the farmers and their customers. A farmer revealed that '*there is a good relationship between me and the buyers but when it comes to harvest time they want to cheat me. I do not have any problem with anybody. As for customers you meet different types so you just have to know how to handle them'*.

Again, due to the fact that there is cordial relationship between the farmers and their customers most times the farmers end up selling the fish on credit. However there is always an issue with the terms of trade. The result indicated that most customers pay back within one week but some of the customers usually take between 2 to 3 months to pay back. It was revealed that in most cases some of the buyers do not pay the money and refuse to come to the farm to buy fish. When it happens that way the farmers refuse to pursue them for their money. In such instances it clearly shows that the farmers end up losing.

The results from the above discussions suggest that there are low trust level of between the tilapia farmers and the customers, negotiation is hierarchical. In terms of productivity, the results suggest that the tilapia farmers are not using income maximizing strategies and this may relate to other factors

In order for the tilapia farmers to perform their duties effectively and effectively there is the need for the farmers to adopt diverse strategies to enable them upgrade themselves. Bernhardt and Milberg (2011) suggest that economic upgrading constitute a multi-faceted and complex process, which involves changes in business strategy, structure of the production processes and technology. However this is not the case based on the discussions above.

4.9 What are the principal constraints to small scale fish farmers?

This section discusses the principal constraints which inhibits the farmers to enjoy economic opportunities in the chain. It has been argued by scholars that it is very difficult to maintain the independence of small suppliers in GVCs due to the challenges the suppliers encounter. Bernhardt and Milberg (2011: 7) have identified the constraints small scale suppliers encounter as accessing and processing information, developing adequate production and managerial capacity, accessing finance, and improving their bargaining power considering their poor economy of scale. Though the farmers in Achavanya face a lot of constraints, however the following are the principal ones which inhibit them from enjoying economic opportunities in the chain.

First of all, there is lack of collective action among the farmers. As already indicated in section 4.7.3, the farmers do not have an association hence they tend to carry out their activities individually instead of coming together as a group. In such situation, the farmers spend so much in purchasing inputs and others things instead of coming to buy input materials, feeds at a reduced cost which is born by the entire association. Furthermore, due to lack of an association the farmers do not have a common voice to demand for incentives and other support services from the government and other organizations which will help them to improve their activities. Absence of incentives and support services such as extension services, ready market, etc for the farmers usually affect the final output of farmers. The above indicates that lack of collective action among the farmers leads to the farmers incurring high expenses and lacks a common voice to demand for support services from the government and other organizations.

Lack of learning processes among the farmers is one of the major constraints inhibiting the farmers to enjoy economic opportunities in the chain. Though there are over 50 farms in the community however there are no new technologies in carrying out their activities. The farmers use rudimentary methods in farming. All the farm owners are highly skilled personnel in diverse fields however they do not much knowledge and skills in aquaculture. Due to that they farmers engage in trial and error till they succeed. The new comers who come into the farming business also do not come with new ideas hence they in turn continue with the rudimentary way of carrying out their activities. Such situation makes very difficult for the farms improve the production process since they continue to rudimentary methods and also do not have information on new ways of carrying out their activities.

Moreover, low productivity is one of the principal constraints inhibiting the farmers to enjoy economic opportunities in the chain. This is basically due to the use of rudimentary methods and over stocking of the cages. For instance during the interview it was revealed that 5*5 meters and 6*6 meters cag-

es are stocked with 10, 000 fingerlings and 12, 000 fingerlings respectively. Hence the use of rudimentary methods coupled with over stocking of the cages affects the growth of the fish. This affirms the reason why the farmers harvest more *school boys and economy* sizes during harvesting. . Such a situation leads to low road development due to the use of rudimentary methods of production. This eventually affect productivity leading low income hence affecting the farmers to enjoy economic opportunities in the chain

Furthermore, poor management of the fish stock is another major constraint prohibiting the farmers from enjoying economic opportunities in the chain. This is because the farmers and the farm managers do not have any managerial and technical knowledge on how to tender the fish. They keep on doing try and error till they succeed. Even though the farm owners have different knowledge in their fields of work, they lack the managerial skills in aquaculture. In the same vein, the farm managers do not have any technical and managerial skills either. Such cases affect the sizes of the fishes produced. These also attest to the reason why the farmers harvest more of *school boys and economy* sizes. Such a situation also contributes to the issue of low productivity hence affecting farmers from enjoying economic opportunities in the chain.

Another major constraint that was revealed during the survey is the influential behaviour of customers over the prices during harvest times. This behaviour of the buyers is due to the fact that the farmers do not have refrigerators, cold stores and cooling vans to keep the fish during harvesting and to store left over fish during harvest times. The customers normally behave in this manner because they know that the farmers do not have cold stores and cooling vans to store and keep the fish. The buyers knowing that they influence the farmers to influence the farmers to accept the prices they quote. However, since the farmers on the other hand do not want their fishes to decay they end up accepting the offers of the customers. This affect the income levels of the farmers hence preventing them from enjoying economic opportunities in the chain.

Lastly lack of trust between the farmers and the buyers is another constraint inhibiting the farmers to enjoy economic opportunities in the chain. As a result of the fact that the fish farmers do not have access to refrigerators and cold vans, the farmers end up selling the fish on credit to some of their buyers. However most of these buyers refuse to pay the money to the farmers hence the farmers end up making loses. This also prevents the farmers from enjoying economic opportunities in the chain.

From the above discussions shows the principal constraints encountered by the tilapia farmers in Achavanya. However, these constraints come about due to poor governance and hierarchical nature of the chain, a disjuncture between the execution of the enterprise and the ownership of the enterprise.

5.1 What factors can help small scale fish farmers to upgrade themselves?

This section analyses factors which can help small scale fish farmers in Achavanya to upgrade their production processes.

Fish farmers in Achavanya are faced with diverse constraints which enable them to 'move to higher-value added activities in production, to improve technology, knowledge and skills' (Barrientos et al., 2010: 6). It has been argued that the inclusion of small suppliers at the national or the local level also requires conditions such as 'credit relations, resource access, and patronage networks, or more structural issues such as public subsidies, spatial planning and environmental policy' (Ibid: 6). However these conditions are totally different from the conditions which would enable fish farmers in Achavanya to upgrade their activities.

Based on the constraints enumerated above, the factors and strategies which would enable farmers in Achavanya to move to higher-value added activities in production in order for the farmers to enjoy economic opportunities are elaborated as follows;

First and foremost, there is the need for management development. It is very important that farm managers are equipped with better management practices such as how to tender the fingerlings, effective feeding of the fingerlings and the stocking of the cages. When these practices are effectively followed by the farm managers it will improve the production processes. When the production processes improves the income levels of the farmers will also improve.

Furthermore it is very important for the farmers to promote better quality. This is because when the farmers are able to improve their production processes and practice the management practices discussed above the farmers will produce high quality(produce more of sizes 3, 2 and 1) tilapia. When the farmers produce more of sizes 3, 2 and 1the prices per kilo will be more and eventually increase the income level of the farmers.

Additionally, there is the need to promote training programmes for the farm owners and farm managers. It is very important for the farm owners and the farm managers to acquire technical skills and knowledge on fishing farming. Acquiring technical skills and knowledge will build the capacities of the farm managers and they will in turn apply the skills and the knowledge to improve their production processes. Hence eventually help improve the income level of the farmers.

Again, there is the need to give incentives to the farm managers in order motivate them to perform their responsibilities effectively. Since the farm managers are the administrators on the farm, it is very important to offer them better salaries and other incentives which will motivate them to put in their best in carrying out their responsibilities. When this is done, the productivity level of the farmers will increase and eventually the income level of the farmers.

Lastly, another important strategy is that it is very important for the farmers to purchase their inputs collectively. Since there are over 50 farmers in

the community it would be advantageous for them to buy all the farm inputs in bulk instead of buying the inputs individually. When this strategy is implemented by the farmers, it will help reduce the cost incurred in purchasing inputs hence help reduce the production cost since the cost will be less. In such a situation the income levels of the farmers will improve and help the farmers to enjoy economic opportunities in the chain.

From the above discussions, it is realized that in order for tilapia producers in Achavanya to enjoy economic opportunities in the chain, they need to adopt the strategies discussed above. When these are fully adhered to by the farmers the production processes will improve leading to the production of better quality fish. This will attract higher prices per kilos and eventually the overall income levels of the farmers.

5.2 Conclusion

This chapter presented the results of the interviews conducted in Achavanya. The chapter helped in answering the research questions by analysing the results with the theories identified in chapter 2 and other case studies from other countries. Also, the chapter identified the chain actors, production processes and the governance structure in the chain. Furthermore, the chapter discussed what the nature of chain organization means to the farmers and the residents in Achavanya. Lastly, the chapter analysed four main economic indicators of efficiency and of constraining to efficiency, the challenges encountered and factors which will help them to upgrade themselves. The final chapter focuses on the conclusions and recommendations of the study.

Chapter 5 Conclusion and Recommendations

This chapter concludes the outcome of the study and the proposed some recommendations and future research areas.

5.1 Conclusion

This study sought to answer the question; what are the main constraints to economic upgrading for small scale tilapia farmer? This was done by conducting a semi-structured interview to solicit the views of respondents (mainly farm owners, farm managers, buyers, fish cleaners and an official at the Fisheries Commission).

The results from the discussions indicated that the type of chain activities in the tilapia value chain in Achavanya has no value addition since there are no processing factories to add value to the fish before it reaches the final consumer. Such a case does not conform to the ideal model of value chain. Furthermore, the findings revealed that the production processes is mainly labour intensive usually leads to the production of low quality fish. This is partly due to the governance structure in the chain. The type of chain governance is vertically integrated hence being dominated solely by the farm owners and the customers without considering the views of other chain actors. This has an effect on the final output since only the lead actors coordinate and control activities along the chain.

Moreover the findings from the discussions showed that the concentration of over 50 farmers in Achavanya does not support the ideal model of LED. This is because the cluster lacked the operation of related industries to support the activities of the fish farmers. The cluster lacked competition since there is no innovativeness among the farmers simply due to the use of rudimentary tools in the production processes. Again, the cluster presented the problems of lack of skills and knowledge, ineffective government policy of initiating development in the community and on the farm site and lack of trust among the farmers since each farmer purchased their inputs individually instead of acquiring them collectively to enjoy economies of agglomeration. Also, the cluster of over 50 fish farmers was not facilitated by the state, private sector and civil society organizations hence the farmers did not receive any technical support to improve their production processes. Moreover, the farmers lacked a common voice to demand for better incentives and to negotiate for better market prices because the farmers did not have any association. The above have an effect the production processes of the fish farmers hence leading to the production of low quality fish.

Finally, the study also identified the principal constraints which inhibited the fish farmers from enjoying economic opportunities in the chain. Based on that, specific strategies have been outlined to enable the farmers to improve their production processes which will lead to the production of better quality tilapia and eventually improve the income level of the farmers.

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5.2 Recommendations

- In order for other related businesses to be attracted to the community there is the need for total infrastructural development in the community. This is because localities which are developed attract businesses naturally to the areas. As a result there is the need for the Dangme West District Assembly and the Government to provide good road network leading to the community and also in the community. Also the District Assembly should provide street lights and other public services and infrastructure to enhance the development of the community.

- In order for the farmers to have full control over the sale of the fish and avoid the influential behaviour of the farmers, there is the need for the farmers to have access to cold stores and cold vans at the farm sites. This could be done by the government establishing cold stores at the farm sites. If the government cannot do it alone, there could be public private partnership to provide cold stores, cooling vans and other specialized facilities to enable the farmers to preserve their fish and take their time to sell to the public.

- Though the fisheries commission described the support services they offer to fish farmers through the regional and district officers, there is still the need for these officers to intensify their work and offer more extension services to fish farmers in Achavanya. There is the need for the commission to offer more training to the farmers and farm owners on good management practices to enable them boost their production processes.

- There is the need for the farmers to adopt technological methods of carrying out their production processes in order to improve their final outputs.

5.3 Areas of Future Research

Based on the findings from the field, I would suggest that future researchers can investigate why the government has a formal objective of promoting LED and cluster development in the country but these policies are not implemented in Achavanya..

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Appendix: Interview Guide

Questions for farm owners and farm managers

1. What is your educational level
2. How long have you being working in this business?
3. What kinds of activities are carried out in fish production?
4. How many workers have you employed?
5. Who is responsible for each of the activities?
6. Who decides the quantity of fish to be produced?
7. Roughly how much do you sell in a day, week and month?
8. What kinds of equipment, materials (in terms of technology) do u use in fish farming?
9. What are the problems you face in carrying out your activities?
10. Do you have any organizations that support your activities?
11. What do you think could be done to curb the problems you face?
12. On what basis do you sell the fish to your customers?
13. Who determine the price of the fish?
14. How do you and customers agree on the final price of the fish?
15. Is the final price at which you sell to your customers good for you?
16. What happens when your customers fail to buy at the price you quote?
17. How is the relationship between you and your customers?
18. On what terms do your customers buy your fish?
19. How long does it take for your customers to pay back when they buy on credit?
20. How many cages do you have?
21. How many kilos do you produce?
22. How long does it take to produce the fish?
23. What measures do you put in place when there is high demand for fish?
24. What are the costs incurred in producing a crate/tonne of fish?
25. What are the prices for the various sizes of fish?
26. Do you (farmers) have a cooperative?
27. Are the farmers adequately represented in the cooperative?
28. Are you able to voice out your grievances in the cooperative?
29. Do you normally get advice from the cooperative on how to improve your activities?

Questions for Officials at the fisheries commision

1. What are the main objectives of your organization?
2. What are the kinds of services offered to fish farmers?
3. What challenges do the farmers encounter in carrying out their activities?
4. In your opinion, what do you think can be done to enable the farmers carry out their tasks effectively?
5. What are your final comments?

Questions for the Customers

1. Between what prices do you buy a kilo of fish?
2. How much does it cost to transport the fish to your destination?
3. How much do you sell to your customers?
4. What are the terms of trade?
5. What are your final comments?

Questions for Fish Cleaners

1. Why do you clean fishes at the farm site?
2. How much do you earn for cleaning the fish?