

Dairy Cows

A Creamy Tool in Rural Development



A study on the role of a dairy cattle project in rural livelihood development in the districts of Suhum/Kraboah/Coaltar and Akuapem-South in the Eastern Region, Ghana.

Marloes van den Berg



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Utrecht University, 2008-2009

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Preface

This study is based on a three-month field research conducted in the south of Ghana in the districts of Suhum/Kraboah/Coaltar and Akuapem-South in the Eastern Region. The field research has been part of the MSc programme *International Development Studies* of Utrecht University.

The field research was carried out from March till June 2009 in cooperation with the NGO Heifer Project International – Ghana (Heifer Ghana). The main objective during the fieldwork has been to provide Heifer Ghana with relevant data on the newly initiated Dairy Project and to describe the impact of the project on the livelihoods of the participating households.

This study is the result of a literature research carried out in the Netherlands and data collected from the fieldwork in Ghana. In my own in-depth research I have focussed on the trend that could be perceived in livelihood improvement and the challenges and problems faced by the household in the initiation of the project. However, during the fieldwork it was realised that the research was subjected to my personal positionality, even though I was not an employee of the organisation and was doing research for the Heifer organisation. It might have influenced answers provided by the participants. Therefore, in this study I have also focussed on socio-economic characteristics of the participating households of the Dairy Project in order to understand what households are reached through the project. I sincerely hope that this study will contribute to a deeper understanding of the impact of similar projects on rural livelihoods in humid and sub-humid areas.

Utrecht, October 2009

Marloes van den Berg

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Marloes

Executive Summary

Chapter one

- Different views of agriculture in development thinking have existed over the years. While a strong emphasis was placed on modernization and technical support in the 1950s and 1960s, in the 1970s and 1980s top-down state intervention, Integrated Rural Development, community development and the basic need approach became the dominant focus. Also diversification of rural activities became important. However, little effectiveness was shown and during the mid-1980s it was argued that the state needed to play a more facilitating role. The private sector and NGOs were thought to be more successful and cost effective in delivering services. Market-friendly interventions through Structural Adjustment Programmes were considered to be essential for economic growth and these programmes were initiated throughout the developing world in the late 1980s. However, in the 1990s they came under attack because of the lacking result in tackling poverty, especially in rural areas. Good governance, transparency, accountability, equity and participation became the new buzz words. Meanwhile, globalization also had an impact on developing countries, creating greater disparities between regions and unevenness in global integration. The focus slowly turned to the household-level and their income-generating strategies. Sustainable social and environmental changes in development interventions became important. The Sustainable Livelihood Approach followed this way of thinking and allowed for a more comprehensive and holistic understanding of the context of poverty.
- The Sustainable Livelihood Approach, the SLA, became highly popular as it went beyond the general understanding of poverty as an economic problem and recognizes the complexity of rural life. In the SLA, the living gained by the individual and the household are determined by the assets (natural, physical, human, financial and social capital), the activities and the access to these (mediated by institutions and social relations) (Ellis, 2000:10). The shortfall in one capital can be compensated by another. The notions of diversity and diversification became highly integrated and recognised as important strategies for decreasing livelihood vulnerability as it reduces the risk of relying on one source of income. Diversification can be understood as farm, off-farm and non-farm activities. The rearing of livestock can be seen as a diversification strategy. Mixed-farming systems, incorporating crop farming and livestock rearing, are commonly found systems.
- In the past, livestock has been seen as a poor investment for rural development in humid temperatures because of inferior feed, problems in feed storage and animal product storage, as well as animal diseases, a negative impact on the environment and the consumption of grain which could otherwise feed the hungry. However, views are changing, inferior feed, feed and animal product storage and diseases are problems that can be tackled in humid temperatures. Also the environmental impact is limited when good sustainable management is

practiced and the consumption of animal products can support rural livelihood in income and in health. Moreover, livestock can provide manure for crop lands. Livestock is an investment that can be accumulated in good times and serve as a buffer in bad times.

- Constraints in livestock keeping are complex and differ from local contexts and between households. Main limitations are the acquisitions of good livestock, the maintaining and retaining and the marketing and sale of livestock products. Also the type of livestock for the type of household can pose a constraint. Even though benefits might be larger for larger livestock, requirements and investments are higher. However, successful livestock farming is dependent on more than solely household capacities. Institutions, the rules of the game, also affect livestock keeping such as international, national and local as well as organisational laws and regulations, markets and control.

Chapter 2

- Ghana is situated in West-Africa. The south has a predominantly tropical climate while the north is hot and dry. Poverty in Ghana is mostly a rural problem and poverty rates are almost three times higher in the north of the country than in any other region. The agricultural sector is the largest sector of Ghana's GDP. Maize and cassava are the most common crops grown. 60 percent of the population is active in agriculture, predominantly on a smallholder basis. Agriculture is the main economic activity for the rural poor. Targeting the poor in the agricultural sector is crucial for Ghana's economy because it is the largest sector with the highest level of poverty rates.

National productivity in the livestock sector is low and the country shows a high import dependence on livestock products. This has been addressed by the Ghanaian government as the livestock challenge and should be tackled.

- The research district of Suhum is a rural district located 60 kilometres northwest from Accra. The capital Suhum is the only urban locality in the district. The population density is higher than the regional and national averages. Houses in the rural areas are generally of lower quality than in the urban areas. Also hygienic standards tend to be lower. Boreholes are the most widespread source of water but distances can be far and some dry up during the dry season. Agriculture is the main income-generating activity for 60 percent of the population and most farmers produce at subsistence level. Plots tend to be small. Cocoyam, yam and plantain are the most common crops farmed next to maize and cassava. Livestock rearing in the district is mostly done on adhoc basis. Respectively 47 and 22.4 percent of the district's population fell under the poverty and extreme poverty line in 2000.
- The research district of Akuapem-South is located 30 kilometres north from Accra. Almost half of the district's population lives in urban areas. The population density of the district is considerably higher than Suhum, it is twice the regional average and 2.5 times the national average. However, towns and settlements are not well planned. More houses in the urban

areas are of better quality than in the rural areas. The agricultural sector employs the largest share of the labour force and subsistence farming is the most commonly practised system. Plots tend to be small and shared tenancy is the dominant system of land tenure for farming. Next to maize and cassava, cocoa, coffee and oil palm are the main crops farmed. Livestock rearing is not popular and most farm animals are reared for domestic purposes, not commercial purposes.

- Heifer Ghana is part of the Heifer organisation. Heifer Ghana focuses on rural populations within the country and one of its main objectives is poverty alleviation. The Dairy Project attempts to alleviate poverty, increase households' health and increase income opportunities through the distribution of dairy cows. The project started in 2006 in six districts in the south of Ghana. These districts have been chosen because of marketing potential, proximity to major cities and pasture possibilities. Initially Heifer Ghana will act as a project holder but will gradually shift responsibility to the established district Dairy Farmer Groups in order to build local capacity for the sustainability of the project.

Chapter 3

- The research objective of the study is to assess how the Dairy Project has resulted in livelihood improvements of the participating households. The findings will be understood as trend because of the project's short implementation in the research districts. Livelihood improvements are operationalised as human capital (health, confidence and self-esteem and education), social capital (social network, gender awareness), natural capital (land, cattle and other livestock), physical capital (physical assets, quality of the homestead) and financial capital (income, perceived income improvements and savings). The household is operationalised as people who share their income together and eat from the same pot on a regular basis. Information on the household composition, type and stage in the development cycle is important in understanding household characteristics. .
- The two districts for the research have been chosen by the organisation because of logistics and out of practical considerations. 34 of the 42 participating household in the two research districts have been interviewed of which 20 in Suhum and 14 in Akuapem-South. Also five in-depth interviews with experts have been carried out. A multi-disciplinary research has been used, incorporating a literature study and qualitative and quantitative methods such as observations, household surveys and in-depth interviews. Important limitations in the research are the small research population and the short implementation of the project.

Chapter 4

- The socio-economic characteristics of the households are highly varied. Household sizes vary considerably among participants with a minimum of four and a maximum of 15 members. Most households are male-headed and can be found in the second stage of the household

development cycle. Education levels are generally high. Heads are higher educated than their partners.

- Another socio-economic characteristic that is highly varied between respondents is the resource position. There are households with access to only a few income resources and there are households with access to many resources. Diversification of income is present in all households. Most households have two capita incomes, though generally incomes from partners are not known. Remittances do not seem to play an important role in the resource position. Land is the main capital and agriculture the main source of income. Access to land show great disparities, sizes vary between 0.2 and 16 hectares. An extrapolation of yearly dairy income could prove to be a substantial contributor to household incomes. Other livestock plays a minor economic role and is mainly used for home consumption.
- Income figures of the participating households are incomplete however crop farming seems to be the largest income source for the rural households and dairy income can prove to be an important income source in the future. Because incomes of rural households are hard to come by, stocks and wealth of the participating households have been looked at as another indicator of its socio-economic position. Most houses are owned by families and payment is mostly not required. Most houses are made from mud walls and have corrugated iron roofing. Compared to the overall district averages, the houses of the participants are in fairly good condition. Many houses are not equipped with toilets, and pit latrines are most commonly found. One in four households has an indoor kitchen. One in three households has access to electricity, however in every locality new electricity poles have been installed. The average distance to water is 264 metres though some households have to walk for two kilometres. Consumer goods such as televisions and radio are comparable to the overall average of Suhum district. Mobile phones are highly popular.
- There are six female-headed households among the 34 households in the two research districts. Household member dependency rates tend to be higher for this type of household and incomes tend to be lower than the districts' and the total average. Akuapem-South tends to perform better than Suhum. In the former, household dependency rates are lower, the resource position is better and households in Akuapem-South have access to larger pieces of land. Crop and milk production for sales are higher than in Suhum. Incomes levels tend to be higher. Reasons for this difference cannot be found on the basis of the study but are likely to be contextual such as better access to electricity and water services, higher levels of urbanisation, better conditions of roads and smaller distance to Accra.

Chapter 5

- The main initial motivation of the participants to join the project has been to improve their income. Other initial motivations were improvement of health through dairy consumption and

out of curiosity and interest for the project. 60 percent of the participants indicate that the initial motivations have been met. The remaining 40 percent is positive that these will be met in the future. Overall, all participants have noticed improvements in more than one of their livelihood capitals.

- Human capital: improvements in health have been experienced by 32 of the 34 respondents of which most indicate that it results from increased intake of dairy products. All but one household have experienced improvements in confidence and self-esteem of which one in every three respondents mentioned a higher status and more respect from the community as important reasons. The amount of children in school had not changed since the project, however, improvements in school attributes, clothing and shoes have taken place. Two household have been able to send their children to better schools because of the project.
- Social capital: 32 household have noticed an improvements in their social network. The Dairy Farmer Group, through which knowledge and experience is shared, has been valued as an important contributor. Gender awareness has improved for five out of every six participating households. Improvements mentioned are better communication, more consulting and more participating of household members in (daily) activities.
- Natural capital: Seven of the 34 farmers had not yet noticed improvements in crop farming activities since the project. The use of manure on the land, increased crop production and time management has been mentioned most often. 33 households have noticed improvements in livestock keeping of which a better understanding of animal needs and time management has been valued most.
- Physical capital: Only a few households have noticed improvements in physical assets since the start of the project. Farm tool, luxury items and better animal housing are the few mentioned improvements. Also, the homestead of only a few households has improved. Investments were made in cement and iron rods to build a new house or improve walls.
- Financial capital: Crop farming remains the most important source of income and production levels have been improved for a few farmers while some households indicate that production levels have gone down. The Dairy Project is partially responsible for both. Income levels from dairy farming show a positive trend in income improvement. Though yearly incomes have not yet been obtained, dairy income could prove to be an important contributor to household incomes. Also, dairy income is a daily income, while crop production is seasonal. Overall, three out of every five households have noticed at least a little increase in income since the project. Saving capacities have been improved by the Dairy Project for two households.

- The most important improvements because of the Dairy Project as perceived by the households have been in increased health and nutrition, knowledge and techniques and income. Experts all agree that trends of gradual improvements in the livelihoods are showing though it is too early to talk of significant changes.
- There are certain challenges in the Dairy Project that households face. These are the insemination problem, the amount of food and water needed and the pen structure. The ill health of the cow is a problem which has been overcome. The insemination problem is currently tackled through the provision of bull stations. Food and water problems need to be tackled in order to keep the cow healthy. The challenge of the pen structure is the durability of the pens made from local materials. These are degrading quickly unlike the more expensive pens made from cement and iron rods. .
- There are little differences found between answers provided by male-headed and female-headed households as well as between Suhum and Akuapem-South. All seem to have noticed similar improvements in their capitals. When comparing, female-headed households might have profited most from income improvements through the milk production.

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Introduction

In the world today, there are close to 500 million smallholder farms, with families over 2 billion people – one-third of humanity. [...] Globally, smallholder families constitute the vast majority of the poor, living on less than 1 or 2 dollars per day.

Lennart Båge, President of IFAD, February 18, 2009.

Investing in agriculture – and in particular smallholder agriculture – is indeed the most cost-effective way of reducing poverty, saving and improving lives.

Hillary Clinton, Kenya, August 6, 2009.

Most people living in the rural areas of developing countries are dependent either directly or indirectly on agriculture for their livelihoods. Even with the deagrarianisation policies over the years, agriculture remains the most important source of income for in particular rural households in Africa. After years of neglect, new attention has been given to agriculture as a tool for development, especially in tackling rural poverty. The sustainable livelihood approach forms a useful framework in rural poverty alleviation. It goes beyond understanding poverty as an economic problem and incorporates various other assets and activities important in the livelihoods of households in its framework.

Livestock forms a component of the livelihoods of at least 70 percent of the world's rural poor. In humid and sub/humid areas, while incidence of poverty is much lower than in arid places, there are still significant numbers of poor households who typically have either very small landholdings or no land at all. The rearing of livestock can have a great impact on these poverty levels. Livestock products can form an important source of income. At the same time, food security of households can be improved as livestock offers nutritional products. It also offers manure for crop land and can be used in social and cultural relations (IFAD, 2004).

Livestock projects have been implemented by many institutions and organisations to increase access for the poor to livestock and livestock services (LID, 1999). It is important to understand the value of livestock in the development of rural livelihoods. And so it is important to understand whether the availability of livestock leads to greater levels of sustainable livelihoods and who in the end are reached by these projects.

In this study these objectives will be researched in respect to the 'Smallholder Dairy Project' of Heifer Project International – Ghana (Heifer Ghana) implemented in the south of Ghana. While the tropical south is more industrialised and less poor than the north, poverty is still present and generally a rural phenomenon. The rural smallholder farmers and their households are limited by the small landholdings. The provision of dairy cows to rural households by Heifer Ghana can be a way out of poverty and improve livelihoods.

In 2006, the NGO Heifer Ghana started the Dairy Project in cooperation with Heifer Nederland and the project was implemented in six rural districts in the south of Ghana. The objective of the project is to offer small-scale farmers the opportunity to obtain dairy cattle in order to improve their livelihoods. The main objective of this research is to understand what households are reached via this project and whether a trend in livelihood improvements, incorporating the set objectives of the organisation, can be found since the implementation of the project. To this end, the following research question has been formulated: *What are the socio-economic characteristics of the participants of the Dairy Project of Heifer Ghana and how has the Dairy Project improved the livelihoods of the participating households?* Household surveys will be carried out among the participants of the project in two of the six districts in the Eastern Region in the south of Ghana. The main findings will be presented in this research.

First a thematic-theoretical framework of the recent return to agriculture and livestock in development thinking and policy will be provided. Here, the foundation for the field research on the project in the south of Ghana will be provided. The chapter will be followed by discussing the setting of the study. In this chapter the context of the project and the research will be clarified. Various topics such as the physical environment, poverty levels, economy and agriculture will be discussed on the national and local level. Then, the methodology for the research will be provided after which the results of the conducted research will be provided. Socio-economic characteristics of the household, farm and income generating activities will be presented and discussed after which the livelihood improvements will follow. This chapter will also address the main problems faced by the farmers concerning the Dairy Project. In the conclusion the main research findings will be discussed in the light of the theories and context provided earlier.

As both Båge and Clinton argue above, smallholder families make up the vast majority of the poor and investing in agriculture will be the best way to reduce poverty and to improve lives. The pilot project of Heifer Ghana is the first small-scale dairy cattle project in Ghana initiated to improve rural livelihoods. It has been only in place since 2006 so this research will focus on trends that can be noticed in livelihood improvements. It is important to understand what the main gains of the project are as well as problems and obstacles experienced during its implementation. It will help all stakeholders, and especially participating households and project supervisors, in the future implementation of the project. This research in front of you will offer you these insights.

Chapter 1: Thematic-Theoretical Framework, the Recent Return to Agriculture and Livestock in Development Thinking and Policy

Different views on development thinking have persisted over the years. Dominant views evolved from catching-up theories following the post-war period to import-substitution industrialization, neo-liberalist theories and sustainable and human development thinking¹. Practices changed from the importance of state and multilateral organisations to the important roles of civil society, NGOs, the private sector and local governments. It changed from top-down to a bottom-up process and the sectoral approach was replaced by the integrated and livelihood approach (de Jong, 2006:30). In the last two decades the concept of 'livelihood' has rapidly gained ground. In this new way of thinking more attention has been paid to the integration of social and environmental elements in effective development policies and interventions.

Over the years, national and international support for agriculture and rural employment has gone through many of these phases. This chapter will start with an overview of the representation of agriculture in development thinking starting in the 1950s. This will be followed by a discussion on rural livelihoods and diversification. The chapter will end with a discussion of the role of livestock in development. First, an introduction on agricultural populations and rural areas will be presented.

1.1 Agricultural Populations and Rural Areas

While figures of non-agricultural population growth in the world show an increase, agricultural population figures show a decline. Table 1.1 (Agricultural population in developing countries of 2001) shows the percentages of annual growth in both agricultural population and non-agricultural population for the various developing regions. While the figures are dated, a great disparity between agricultural and non-agricultural populations is clear. The table shows that non-agricultural population growth is greater than agricultural population growth in all regions. It also shows that

Table 1.1: Agricultural populations in developing countries of 2001 (in %)

	Developed countries	Developing countries*	Latin America & Caribbean	Sub-Saharan Africa	North Africa & Near East	South Asia	East & South East Asia*
Agricultural population	7.3	51.5	20.4	63.5	32.1	53.7	59.3
Annual growth of agricultural population (1991-2001)	-2.9	0.6	-0.8	1.8	0.5	1.0	0.2
Annual growth of non-agricultural population (1991-2001)	0.8	2.9	2.3	4.4	3.2	3.0	2.7

* Transition countries not included ** Including China
Source: FAO-STAT, 2003 In: FAO-PPLPI, 2004

¹ For further reading on views on development thinking see: Cypher and Dietz (2009), Nederveen Pieterse (2004), Rapley ea, (1996).

Sub-Saharan Africa has the highest percentage of annual growth in the world in both agricultural and non-agricultural populations. It should be noted that these figures only illustrate population growth of people who are or are not active in agriculture and do not necessarily represent rural populations and rural poverty. Still, after more than half a century of development assistance, poverty has persisted in the rural areas of the developing world. Of the world's 1.2 billion people living in extreme poverty, 900 million are found in rural areas (WDR, 2007). And most of them rely on agriculture as their main source of food and income. The lack in resources, limited availability of land and water and impassable roads are limitations for the rural poor. On top of that, environmental conditions are not optimal for most smallholder farmers, droughts and sudden floods can damage their means of income (IFAD, 2004). The focus in this study will be on smallholder farmers and their households. Different understandings on the characteristics of the group exist but here it is argued that the livelihoods of smallholders comprise of generally limited availability of land, limited capital, fragmented holdings and limited access to inputs (Chamberlin, 2008b). The following section will discuss the different views that have existed on the role of agriculture in development thinking.

1.2 Views on Agriculture in Development Thinking

In the early development models of the 1950s and 1960s the importance of agricultural innovation and improved rural productivity was stressed. There was a strong emphasis on modernisation and technical support. It was argued that greater levels of development were to be reached by quantitative growth of cash crops and food production (Huisman, 2006:39). In this way surplus capital and surplus labour could then be used in the emerging urban and industrial activities. Agricultural and rural development in the 1950s and 1960s were assumed to result from the benefits of urban, industry-led development that would trickle-down without active planning in the rural sector (Potter, 2004:84). Economic growth dominated the development policies in the years after the Second World War and much money was spend on big projects such as infrastructural development. The dominant concept of that time was the 'Green Revolution' in which national governments and the private sector were seen as the main actors. Where specific agricultural development schemes were introduced, they were often characterized by 'top-down' planning, inadequate environmental knowledge and mechanization. Rural development was considered to be mainly a technological and sectoral problem (Huisman, 2006:39). The Green Revolution, which started in 1967, referred to Western technologies and investments that were applied in agriculture in developing countries to raise production and so allowing modernisation to happen (Zoomers, 2008:147). While the Green Revolution was successful in Asia raising agricultural production figures, it had limited impacts in South-America and Africa. In practice it had very uneven regional and social impacts and critics argued that technocratic packages were used without any fundamental reform to agrarian structure (Potter, 2004:457). Also, the impact of the various policies on the environment was hardly discussed. The Green Revolution became less popular in the 1970s because it was acknowledged that the widely used central planning mechanisms were not reaching the intended goals (Huisman, 2006:40). A new outlook was needed.

In the 1970s and 1980s attention for rural development went beyond agricultural commercialisation. It became apparent that ‘the agricultural sector alone could not offer sustainable improvements in the production and living conditions of the growing numbers of rural dwellers’ (Huisman, 2004:40) Integrated Rural Development, IRD, became a popular concept in the 1980s. With the failure of modernisation and trickling down of development to the rural areas, governments and states felt that more state intervention was required to achieve higher levels of equity as well as to alleviate poverty in these areas. Also international organisations such as the World Bank stressed the importance of the need for IRD schemes. Emphasis was placed on raising agricultural productivity and improving nutrition, rural health care and education (Potter, 2004:452). Also area-based investment in infrastructure, small-scale industries and irrigation schemes gained momentum. Integrated approaches with sufficient participation such as community development and the basic needs approach, became the dominant focus (Zoomers, 2008:150). It was realized that rural problems did not have only sectoral causes but that the problems were part of a larger system. Rural development was recognized as a multi-sectoral process that involved broad segments of the population. The IRD did not remain uncontested. Over time, programmes and projects based on the IRD approach showed little effectiveness and generally failed in significant poverty alleviation in rural areas. Also, many integrated schemes did not show much integration. Rural education and health care for example were often neglected in favour of raising agricultural output (Potter, 2004:452).

The IRD strategies continued in the 1980s but at the same time more attention was drawn to the need for diversification in rural areas. Studies showed that non-agrarian production, employment and income of rural households accelerated growth. Rapidly this was adopted by policy makers and researchers as the key element in tackling rural poverty (Huisman, 2006:41). Interventions of the government remained top-down and it was only in the mid-1980s that limitations in this type of planning were acknowledged. New streams of thought came along arguing that state organisation needed to play a more facilitating or enabling role in rural development (Huisman, 2006:42). In the 1980s, issues such as accountability and efficiency were addressed which eventually led to limitations in the usage of state resources. Governments found that the private sector and NGOs were more successful and cost effective in delivering services, they were also more responsive to the perceived aspirations and constraints of local farmers (Potter, 2004:453). Market-friendly interventions were considered essential for economic development and this was to be reached by Structural Adjustment Programmes (SAPs) initiated by the International Monetary Fund (IMF) and the World Bank (Huisman, 2006:43; Potter, 2004:290). Table 1.2 shows the principal instruments of the structural adjustment. In the late 1980s, when

Table 1.2: The principal instruments of structural adjustment

The principal instruments
<ul style="list-style-type: none"> • Currency devaluation • Monetary discipline • Reduction of public spending • Price reforms • Trade liberation • Reduction and/or removal of subsidies • Privatisation of public enterprises • Wage restraints • Institutional reforms

Source: adapted from Potter, 2004:290

SAPs were initiated throughout the developing world, the concept of sustainable development also received attention. It was realized that sustainable rural development processes could not be engineered by bureaucracies but had to come from local initiatives, market mechanisms and NGOs. Together with the SAPs, a general acceptance was reached that the state would play a different role in the rural development initiatives (Huisman, 2006:43-45).

In the 1990s the SAPs came under attack because of their lacking results in tackling poverty, especially in the rural areas. The practice of macro-oriented development was disregarded. New perspectives such as the shift to sustainable development that had started in the 1980s, access to resources and knowledge and attaining welfare improvements among the rural population, prominently women, were added to the development approach (Huisman, 2006:43). The need was stressed to create an enabling environment for development as well as the need to facilitate market forces (Zoomers, 2008:150). Argued is that Agenda 21, the action plan of the Food and Agricultural Organisation (FAO) in 1992 was the turning point in rural development thinking². A new focus was needed considering, *one*: The devolution of responsibilities in decision-making at the local levels; *two*: The effective participation of all stakeholders; *three*: Better resource allocation policies and *four*: The implementation of integrated, environmentally friendly techniques and natural resource management techniques (Huisman, 2006:43). A framework of governance was implemented, encompassing governments with their new roles and responsibilities, civil society and the public and private sector. Good governance covered popular terms like transparency, accountability, equity and participation. But throughout the 1990s it became clear that local power structures, resistance to political change and the lack of capacity at the local level were found to be hindering participation processes and so limiting the success in poverty reduction (Huisman, 2006:44). It became clear that globalisation had had its impact on the developing countries showing growing disparities between macro regions and leading to highly uneven processes of global integration (Huisman, 2006:45). A new tendency became visible. Slowly more attention was given to geographical differences. The focus was turned to the rural household-level and their income generating strategies became multi-locational and multi-sectoral (Huisman, 2006:46).

In the last two decades of globalisation processes more attention has been paid to social and environmental changes in development interventions. Also agriculture and rural development were one of the subjects to gain renewed attention. Before, economists and policymakers doubted about the ability of agriculture to drive growth and development, but recently, also the World Bank has showed new interest in agriculture as a tool for development, even though the focus is still on opening up markets and economic growth (see textbox 1.1 The World Bank Report 2008). Alongside the change in focus to sustainable development also the new notions of entitlement and livelihoods came into focus. The critique on the Green Revolution and 'technology transfer' has its roots in the writings of Sen (1981). Sen argued that food crises were not simply determined by the limited availability of food or other basic needs but also by entitlements such as accessibility, appropriate technologies and sustainability of agricultural systems (Charman, 2008). The idea of livelihood followed this way of thinking and allowed for a more comprehensive and holistic

² For further reading see: UN (1992). *Earth Summit, Agenda 21*; Doyle, T., (1998). *Sustainable Development and Agenda 21: The Secular Bible of Global Free Markets and Pluralist Democracy*.

understanding of the context of poverty (Mtshali, 2002:25). This concept of livelihoods and the views on livelihood theories will be discussed in the next section. Special attention will be paid to rural livelihoods.

Textbox 1.1: The World Bank Report of 2008

The World Bank Report of 2008, *Agriculture for Development* focuses solely on the role of agriculture in development. The last World Bank Report on agriculture dates back to 1982. In its new Report the World Bank argues that agriculture is a vital tool to achieve the Millennium Development Goal to halve extreme poverty that is found in the rural areas of developing countries. With three out of every four people in developing countries living in rural areas and depending directly or indirectly on agriculture for their livelihoods, implementing agriculture-for-development agendas would make a difference (WDR, 2007). In the Report the World Bank discusses that agriculture continues to be a fundamental instrument for sustainable development and poverty reduction. Though agriculture on its own would not be enough to reduce poverty it is an essential tool in effective development strategies for most countries (WDR, 2007). In the Report it is argued that special attention should be paid to sustainable agricultural development, the role of producer organisations, gender and empowerment, food security and the diversity of rural contexts. Also the World Bank's more known topics like market failure, governance and political economic constraints were discussed (WDR, 2007). Critics of the Report do appreciate the attention given to the wide range of issues and angles on agriculture for development but are also concerned that 'the strategic implications of the issues raised have not been sufficiently followed through on and [are] not always coherently integrated' (Agri-Profocus, 2007). Examples given are the lack of attention to reforming Northern agricultural policies, influential corporate powers and power relations in the global market place and a weakened functioning of the state due to structural adjustment policies. Here, the World Bank fails to address the position and measures it had taken itself over the years and especially during the neo-liberalist doctrine (Huisman and van Lindert 2009; Oxfam, 2007) Also it is argued that the Report fails to distinguish small-scale farmers from entrepreneurs and the growing inequality between the two. According to the World Bank small-scale agriculture is not economically viable and suggested is that the poor should leave rural agriculture and move to non-farming activities (WDR, 2007). Huisman and van Lindert (2009) argue that it is more likely that this will only cause more problems, also because no attention has been given to inequalities in access to basic needs, public services and means of production. Argued is that with this Report, the World Bank, while readdressing the importance of agriculture in development, still advocates a 'business as usual' approach namely spurring growth, opening up markets, deregulations and privatization (Agri-Profocus, 2007; Huisman and van Lindert, 2009).

1.3 Views on Livelihood Theories

1.3.1 Livelihood concept

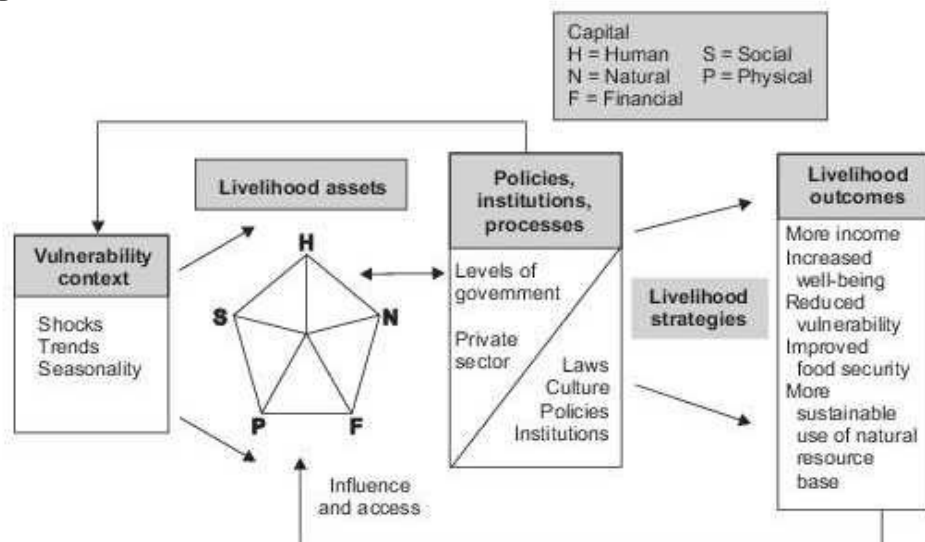
The concept of livelihood started in 1992 when at the UN Conference on Environment and Development sustainable development was put on the international agenda. In that same year Chambers and Conway (Potter, 2004:464) published a paper in which they argue that till then rural production, employment and income analyses did not address the complexities existing in rural daily lives. They presented the livelihood approach. This approach went beyond the general

understanding of poverty as an economic problem. Next to income also political, cultural, social and ecological aspects were to be involved. The emerging framework became known as the Sustainable Livelihood Approach, SLA (Ellis, 1998; Niehof, 2004; Zoomers, 2008). A livelihood comprises of:

'The assets (natural, physical, human, financial and social capital), the activities, and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual and the household' (Ellis, 2000:10).

Assets, or capitals, are an important contribution in understanding livelihoods. Assets are not just resources, they give people the capability to be and to act, and they give meaning to that person's world (Bebbington, 1999). A livelihood is understood as sustainable when it can cope with and recover from stresses and shocks, maintain or enhance its capabilities and assets and provide sustainable livelihood opportunities for the next generation (Chambers and Conway, 1992 in; Potter, 2004:468). Generally it can be argued that the greater the access to the different kinds of assets, the more secure the livelihoods are. This however does not imply that all people need access to all types of assets. A shortfall in one particular capital can be compensated by another (LID, 1999). There are many ways of applying the livelihood approach but according to Britain's Department for International Development, DFID, there are six underlying principles to all the livelihood approaches namely that they are all people-centred, responsive and participatory, multi-levelled, conducted in partnership, sustainable and dynamic. In figure 1.1 (Livelihood framework) the framework used by DFID since 1998 is provided. In this figure the pentagram represent the five livelihood capitals. The arrows indicate the direction of the relationships between the different actors and outcomes. The arrows do not implicate a causal relationship, they merely show a certain level of influence. Livelihoods are cyclical and inputs and outputs can not be separated. As argued by Bebbington (1999:2032) 'the environment that a livelihood helps build (or destroy) and

Figure 1.1: Livelihood framework



Source: DFID, 1998

the social networks that it helps create (or weaken), in turn affects any subsequent income earning activity'. With that, it should be understood that the SLF, or the sustainable livelihood framework, is a simplification of complex real life situations. It is abstract and limited but through its adaptation it proves to be 'a useful tool in the understanding of local livelihoods, for planning new development activities and in evaluating the impact of existing interventions' (Potter, 2004:465). Still critics argue that an important element that is missing in the livelihood approach is the lack of attention to power relations in social relationships which influence livelihoods as well. Also the decision-making process leading to specific livelihood strategies is barely addressed (De Haan, 2008; Eyhorn, 2003).

1.3.2 Rural livelihoods, gender and diversification

The livelihood approach has become popular among rural development practitioners as it attempts 'to understand poverty as a means of working out interventions that will reach the poor and improve their lives' (de Haan, 2006). The livelihood approach 'aims to accommodate a richness of potential livelihood goals in rural areas that have been underestimated in previous rural development approaches and have been limited within sectoral approaches to rural challenges' (Potter 2004:468). The rural livelihood approach recognizes the complexity of rural life (Mtshali, 2002:6). Gender dynamics are one of the complexities in rural livelihood analysis.

While gender incorporates both sexes, the main focus in gender related issues is on empowering women, equal rights and protection against discrimination. One of the eight Millennium Development Goals focuses solely on gender. MDG-3 states: to Promote Gender Equality and Empower Women (MDG monitor, 2009), because, as argued by the FAO, 'A person's gender is a key determinant of his or her access to resources' (FAO, 2009). And globally, women in rural areas benefit less from self- and wage employment than men. Gender is an integral and inseparable part of rural livelihoods. Men and women differ in assets, in access to resources and in opportunities (Mtshali, 2002:25). As argued by Ellis (1999) in Mtshali (2002:25), 'Women's disadvantaged position in society should be considered in any programme to improve household livelihood security'. Desai and Potter argue that presently, 'all major development agencies include a mandatory framework for all activities to check that gender is considered, even in neutral projects' (Desai and Potter, 2008:341).

Within rural livelihood approaches the notions of diversity and diversification have become highly integrated and have become recognised as important strategies for decreasing livelihood vulnerability. Some theorists even stated 'that diversification is the norm and that few people collect all their income from just one source or hold all their wealth in the form of any single asset' (Niehof, 2004:321-322). Because poverty and inequalities prevail in rural areas, households have developed multiple income sources and according to researchers, rural women play a pivotal role in these activities. They play an important role in rural livelihood contribution and through independent income earnings, women increase their influence over economic decision-making in the household as well as benefit other household members, especially the children (RDP, 1996 in Mtshali, 2002: 9).

Rural households produce on two levels, namely for own consumption and for sale. Subsistence farmers and their households are generally understood as those farmers who firstly produce food for household consumption and only then draw an income from the surplus they sell. However, earlier it was established that most household diversify their income. Also subsistence farmers draw an income from other sources. In this study, the terminology of small-scale and smallholder farmers is used rather than subsistence farmers.

In the 1990s diversification in rural communities was mentioned as an important element in development practices. Diversification then was addressed as a movement away from farming activities (Huisman, 2006:42). This type of diversification is still advocated by the World Bank and in its recent Report it is understood as a way out of rural poverty. However, there are other types of diversification possible in rural communities, incorporating agricultural practices. In this research diversification is not seen solely as a separation from agricultural activities but is understood as a concept entailing many varieties, including the processing and selling of agricultural produce. Diversification can be defined as:

'[...] the process by which rural households construct an increasingly diverse portfolio of activities and assets in order to survive and to improve their standard of living' (Ellis 2000:15 in Niehof, 2004).

As argued before, diversification in rural livelihoods decreases the vulnerability because the risk of relying on one source of income is spread. Rural diversification is a strategy of farmers and has existed before the focus in development practices turned to diversification as a way of alleviating poverty. Motives to diversification are many but the main determinants are seasonality, differentiated labour markets, risk strategies, coping behaviour, credit market imperfections and intertemporal savings and investment strategies (Ellis, 1998). In practice these determinants may not be as easily separated. The determinants are dealt with through different activities making up the rural household income. Next to farm income activities such as crop-farming and livestock keeping, there are also off-farm and non-farm activities. Off-farm income activities are for example wage or exchange of labour. Non-farm income sources refer to non-agricultural sources of income and can be divided in secondary categories. These categories are '(i) non-farm rural wage employment, (ii) non-farm rural self-employment, (iii) property income, (iv) urban to rural remittances from within national boundaries and (v) international remittances from cross-border and overseas migration' (Ellis, 1998:5). However, categorising all types of livelihood incomes will lead to numerous variations and gradations and will prove to be little useful (Ellis, 1998).

In rural Africa, rural livelihoods with livestock are better off than those who have no livestock (Niehof, 2004; Scoones, 2002). In parts of Sub-Saharan Africa, mixed-farming is seen as an important strategy to increase the productivity and sustainability of small-scale farmers. Mixed farming, the mutually advantageous relations between crop cultivation and livestock keeping on a single farm, can spread possible risks between crops and animals. Benefits accrue to cropping in the form of manure and energy and to livestock husbandry in the form of fodder from forage crops

or crop residues (PPLPI, 2006). However, this type of mixed-farming has greater potential in wetter and more fertile regions such as the sub-tropics since limited opportunities exist for crop farming in drier regions such as the northern Sahel. At the same time humid regions have their own challenges in mixed-farming and livestock keeping. In the next section the role of livestock in rural development will be discussed in greater detail.

1.4 Views on Livestock in Rural Development

Farm animals, such as poultry, pigs, sheep, goats and cattle are fairly common in developing countries, though usually they play a minor economic role when crop-farming and livestock rearing are present on the same farm. When considering mixed-farming, Reitsema and Kleinpenning (1991:98-100) argue that mutually advantageous relations are of limited importance. They argue that historically, intensive use of land was not needed, there was land in abundance in developing countries and so animal manure was not needed. Fertility would be restored through fallow the farmland for a certain period of time. Secondly, contradicting earlier statements, Reitsema and Kleinpenning argue that the humid tropics are not particularly favourable to livestock keeping, especially cattle. Inferior quality livestock feed is present and feed storage such as hay is difficult in the warm humid climates. It also affects the storage of animal products such as milk and fresh meat. Other obstacles are animal diseases affecting animal health and productivity. The parasitic tsetse fly, only found in tropical Africa, causes 'fever, protracted lethargy, tremors and loss of weight' (Reitsema and Kleinpenning, 1991:99). Also, livestock has sometimes been considered as harmful to the environment, causing desertification, deforestation and pollution as well as contributing towards global warming. With that, livestock is accused of consuming grain that could otherwise feed the hungry (LID, 1999).

Due to some of the arguments mentioned above, livestock has long been seen as a poor investment for rural development in the humid areas but this view is gradually changing. Over the years, feed has become more accessible in various places throughout the world and storage of livestock products has become easier with better electricity connections. The control of animal diseases has improved as well as measurements against the tsetse flies. Also, recent studies suggest that the former analyses of the environmental impact of livestock have been simplistic and misleading. Livestock can enhance sustainable agriculture with good management (LID, 1999).

In humid areas, where a significant number of poor households have either small or no landholdings, livestock also contributes to rural livelihoods, employment and poverty relief (LID, 1999.Upton, 2004). Animal products can support rural livelihoods in income and in human health. Marginal increases in consumption of nutritional livestock products are likely to improve the well-being of the poor significantly. And 'poor people who rear livestock tend to consume a greater quantity of livestock products than similar households that have no livestock' (LID, 1999:12). Livestock also functions as an important cash resource for the poor, especially small ruminants such as goats and poultry. These can be sold in small and regular amounts. At the same time it is also an investment, it is one of the few resources that can be accumulated in good times and serve as a buffer and offer livelihood security in bad times. Livestock can also provide draught power and

manure for farming systems. Another feature is that when privately owned it can benefit from common property resources (IFAD, 2004, LID, 1999).

Livestock can contribute to household's human, social natural, physical and financial capitals. But livestock itself is difficult to define as a capital. It can be understood both a natural and a physical capital as it has been 'produced' and should yield returns in the future (Upton, 2004). However, in this paper livestock is understood as natural capital.

Livestock has great potential to contribute in poverty alleviation and achieving the Millennium Development Goals (FAO, 2008; ILRI, 2008). Demands in livestock produce are increasing also in developing countries. Expected is that in 2015 consumption of meat and milk will have increased from 17 in 1990 to 52 percent (LID, 1999:12). Demands will increase because of 'human population increases, urbanisation, economic progress and changing consumer preferences' (Udo ea, 2007:271). Argued by the World Bank is that the growing demand for livestock products can lead to economic growth, provided that the appropriate policies and institutions are in place (IFAD, 2004). But access to livestock and quality livestock services are important in order to meet this demand as well as an understanding of the danger that the poor will be crowded out, the environment eroded and global food security jeopardized (de Haan, 2001; In IFAD, 2004). It is important to understand the differences in livestock policies and opportunities for commercial and smallholder farmers, also when considering environmental issues. When livestock numbers increase, crop-livestock interactions become more competitive for the use of land and resources (Upton, 2004). But while drawing a straight line between the two is not possible since development for one will also have consequences for the other, here the focus will be on livestock raising by small-scale farmers and their households. Commercial farming and its consequences on livelihoods, the environment and global food security will not be looked at since this is not part of the study and research.

In the 1999 published report *Livestock in Development*, funded by DFID, it was estimated that livestock contributes to the livelihoods of at least 70 percent of the world's rural poor. Livestock production systems can be categorized in three groups namely grassland based, mixed-farming and landless. The grassland based systems, including pastoralism and ranching, are dependent on ruminant livestock such as camels, cattle, sheep and goats. Mixed-farming systems, either rain-fed or irrigated, are intermediate in intensity while the landless systems are the most intensive type of livestock systems. Landless systems in developing countries are mainly based on pig or poultry production (Upton, 2004). The majority of the world's poor is involved in the mixed farming systems. 'Complementary relationships exist with livestock, fed on crop by-products and other plant material, contributing draught power, manure, additional sources of food and income, savings and buffer against risk' (Upton, 2004: iv). Livestock production systems show regional differences depending on agro-ecological features, human population density and cultural norms.

In table 1.3 poor livestock keepers are categorized by production systems and agro-ecological zone. The table shows that most poor livestock keepers are found in the arid and semi-arid areas with poor rainfall. In arid regions opportunities in crop cultivation are limited because growing

seasons in these areas are under 180 days (LID, 1999). Here, livestock provides one of the few resources for farmers' livelihoods. In semi-arid, temperate and tropical highlands, with temperatures during the growing season between 5 degrees Celsius and 20 degrees Celsius, livestock plays a role in crop-enhancement through draught power, animal manure and urine. In the humid, sub-humid and sub-tropical areas livestock also play an important role. Temperatures in these zones are high almost all-year round and growing seasons range from 180 to over 270 days a year. In these zones, population densities are usually higher and although poverty levels tend to be lower than in the other zones, as argued before, the poor households in these zones have typically small or no landholdings. Households with livestock might then choose to rear their animals on community lands and local resources (LID, 1999).

Table 1.3: Poor livestock keepers by agro-ecological zones

	Poor livestock keepers (in millions)		
	Grassland based (extensive grazers)	Mixed farmers (poor rain fed)	Landless livestock keepers
Arid and semi-Arid	87	336	-
Temperate and Tropical highlands	107	158	107
Humid, sub-Humid and sub-Tropical	-	192	-
Total	194	686	107

Source: adopted from LID, 1999

Constraints in livestock keeping are complex and differ from local contexts and between households. The main limitations are found in the acquisition of good or high-yielding livestock; in the maintaining and retaining of livestock in their physical environment; and in the marketing and sale of livestock and livestock products. Credit to livestock acquisition might be lacking and once attained, livestock is vulnerable to diseases and is in need of sufficient food and water reserves. Raising livestock can carry more risks than crop production since after a draught it might take a couple of years to rebuild a herd while crop production can be restored after a year. Selling the products of livestock or livestock itself also poses problems in remote areas due to distant markets and poor infrastructure (LID, 1999; World Bank, 2001). Findings of Udo et al. (2007) on livestock in mixed farms also suggest that a "Livestock Ladder" exists for different types of households. Poor households are likely to own small ruminants and poultry rather than large ruminants. 'The small ruminants can help to improve livelihoods, but their contributions to household incomes are relatively small' (Udo et al., 2007:271). Even though the benefits are larger for the latter, there are also more requirements and investments needed. In various case studies, smallholder dairying on the other hand has proven to be a good opportunity to increase incomes and that is has been most successful in countries with a strong dairy tradition (Udo et al., 2007).

Besides the constraints in livestock keeping on the household level, a range of institutions also affects the livelihoods of poor livestock keepers. Here, institutions are understood as 'the rules of the game' (North, 1990) which influence individual behaviour and societies. In table 1.4 (Formal and informal institutions affecting livestock keepers) a selected amount of institutional influences,

addressed by the LID³, are shown which affect the livestock keepers in their daily lives. International, national, organisational and local institutions all play their parts. On an international level, institutional practices such as dumping and subsidized livestock products from developed countries undermine local market prices. Dumping can be understood as 'the exposal of agricultural surpluses resulting from producer support at artificially low prices' (Upton, 2004:42). Also trade barriers limit livestock keepers to access higher-price international markets. On top of that access to the large international markets for developing countries is increasingly influenced by sharpened rules and regulations to food safety, plant and animal health, the environment and animal welfare (LID, 1999; Upton, 2004). Informal international institutions influence the sector through historical links, relationships and favouring between countries.

Table 1.4: Formal and informal institutions affecting livestock keepers

	Formal institutions	Informal institutions
International	<ul style="list-style-type: none"> • Trade barriers 	<ul style="list-style-type: none"> • Historical link and relationships
	<ul style="list-style-type: none"> • OIE standards of disease control 	<ul style="list-style-type: none"> • Common professional values
	<ul style="list-style-type: none"> • Dumping and subsidized products 	<ul style="list-style-type: none"> • Political affinities
National	<ul style="list-style-type: none"> • Property rights 	<ul style="list-style-type: none"> • Position of women
	<ul style="list-style-type: none"> • Government policies on price setting, subsidies and taxes 	<ul style="list-style-type: none"> • Cultural and religious taboos on consumption
	<ul style="list-style-type: none"> • Intellectual property rights 	<ul style="list-style-type: none"> • Attitudes to kinship and nationality
Organisational	<ul style="list-style-type: none"> • Working procedures 	<ul style="list-style-type: none"> • Attitudes to poor livestock keepers vs. modern livestock industries
	<ul style="list-style-type: none"> • Terms and conditions 	<ul style="list-style-type: none"> • Market transactions
	<ul style="list-style-type: none"> • Membership rules 	<ul style="list-style-type: none"> • Trader behaviour
Local	<ul style="list-style-type: none"> • Local movement controls 	<ul style="list-style-type: none"> • Use of communal grazing resources
	<ul style="list-style-type: none"> • Local disease-control policy 	<ul style="list-style-type: none"> • Livestock management practices
	<ul style="list-style-type: none"> • Access to other resources (forests, village grazing) 	<ul style="list-style-type: none"> • Local power structures.

Source: adopted from LID, 1999

On a national level governmental and private sector institutions influence poor livestock keepers through new developments in technologies and policies on pricing, subsidies and taxes. With that, as an informal institution, also ethnicity plays a role in livestock keeping practices, for example in pastoral nomadism, where herding of livestock involves regular migration (Reitsema and Kleinpenning, 1991). Meanwhile, also the institutions at the societal level influence the livestock sector. Like organisations, they have their own rules and conformities which are applied in their formal and informal ruling (LID, 1999). Developing organisations for example often prefer small animals, small ruminants and poultry, in improving the livelihoods of the really poor. These are found to be more effective in poverty alleviation than cattle. Argued is that larger animals can make the poor even poorer, requirements and investments are high, and when loans are in place,

³ For further details see LID (1999)

it may take some time to pay back this loan (Afifi-Affat, 1998. In: Udo ea, 2007). Successful livestock farming is thus not only dependent on the households' capacities but also on many other factors and relations.

In this study not all factors and relations of the various levels as mentioned above and in table 1.4 will be researched. Not all institutions at the local level will be researched. Still, the information above has been provided to understand that various institutions can affect the position of the livestock keepers in the research areas. The study presented in the following chapters will discuss the influence of the Dairy Project of Heifer Ghana on the livelihoods of small-scale rural households in the south of Ghana.

Chapter 2: The Setting of the Study

The country for the setting of the study on dairy cattle and rural livelihood development is Ghana. Ghana has a population of 23.4 million people and has a population density of 100 people per square kilometre. The capital city, with a population of 2.8 million people, is Accra and is situated in the south (World Factbook, 2009). The field research will be carried out in the Eastern Region, one of the ten administrative divisions in the country (see figure 2.1: Map of Ghana).

Ghana is a country situated in the west of Africa bordering the countries Burkina Faso in the north, Cote d'Ivoire in the west and Togo in the east. The south of the country connects to the Gulf

Figure 2.1: Map of Ghana



Source: MacMillan, 2007

of Guinea of the Atlantic Ocean. Ghana is a country often referred to as the country closest to the centre of the earth because the Greenwich Meridian line crosses the Accra-Tema region and the equator is found only a few degrees south of the country (Briggs, 2007:3). As also follows from the amount of towns and cities as provided in figure 2.1, Ghana has a far more industrial and populated south and a less densely populated north.

In this chapter the setting of the study will be provided. First the national and regional level will be discussed after which an overview of the study areas will follow. The topics which will be covered in these sections vary from the physical to the socio-economic dynamics and rural livelihoods. These are all important in understanding the context of the study. It is important to know the physical environment in order to understand the livestock opportunities in the areas (see chapter 1.4: Views on Livestock in Rural Development) Also the topics of 'poverty' and 'economy' will be discussed. These topics will provide a bigger understanding of the important role of agriculture in the economy as well as in alleviating poverty. The chapter will end with an outline of the project that will be researched, 'The Smallholder Dairy Project' of Heifer Ghana implemented in the south of Ghana and directed at poor rural farmers. The areas for this study are the districts of Suhum⁴ and Akuapem-South located in the south of the Eastern Region.

2.1 National and Regional Level

2.1.1 Physical environment

Ghana has a varied physical environment. The country can be divided into five geographical regions namely the coastal plains in the south, the highlands and the rainforests in the south-central region and the low altitude plains and the savannah in the north (Macmillan, 2008:11). For most of the year, the north of the country is hot and dry while the south is hot and humid, with the exception of the coastal areas in the southeast where it is comparatively dry. There are little variations in temperatures throughout the year. Temperatures vary between 25 and 32 degrees Celsius. The country is influenced by the Tropical Continental Air Mass, also known as the dry or Harmattan season. Hot dry winds following the North East Trade Route make their passage across the Sahara Desert. Between June and September the country is influenced by the Tropical Maritime Air Mass, also known as the rainy season (Macmillan, 2008:16-17). The south of the country knows two rainy seasons. This is the area where the field research will be carried out.

Various types of rock and minerals can be found in Ghana and namely gold forms an important part of Ghana's natural resources and export products. The natural vegetation in northern Ghana can be described as Guinea savannah woodland where soils and vegetation are poor. Extensive high grass, acacia, baobab and shea trees are mainly found. The vegetation in the south of Ghana can be described as a tropical forest, moist and spread with mainly deciduous trees (Macmillan, 2008:16-17). Ghana's highly varied physical environment provides different opportunities for rural farmers. Small-scale farming is carried out in all regions but the type of farming is dependent on the physical environment in the region.

⁴ The full name of this district is Suhum/Krabao/Coaltar.

2.1.2 Poverty levels and distributions

Poverty in Ghana has many roots. The history and its effect on present day activities plays a role as well as former and current political decision-making (see textbox 2.1: A historical-political profile of Ghana). Poverty in Ghana has geographical characteristics such as differences in northern and southern areas as well as differences in rural and urban places.

In Ghana, the national poverty rates have been falling over the last decade. According to the World Bank, Ghana's growth and poverty reduction rates are probably the best achievements in all of Sub-Saharan Africa over the past 15 years. And expectations are that Ghana will become the first Sub-Saharan African country to achieve the first Millennium Development Goal, to halve extreme poverty and hunger by 2015 (IFPRI, 2008, MDG Monitor, 2009). In table 2.1 national

Textbox 2.1: A historical-political profile of Ghana

Before colonisation, in the region that is now known as Ghana, trade relations date back to 500 BC (Briggs, 2007:5). In the 1700s the coast of Ghana became an epicentre of European trade and during the British colonisation gold, ivory and slaves were the main entities. The south of the country benefited most from the presence of the colonizers. Here, education was most advanced, communications were more rapidly improved and new crops were more successfully introduced. The country of Ghana was focused on the productive south; it was the area which was in contact with the rest of the world and it was the source of many of the political ideas being applied throughout the country. The north remained behind (Cole and de Blij, 2007:298).

In 1957 Ghana was the first Sub-Saharan country in colonial Africa to gain independence. After independence a socialist-based party ruled in Ghana from 1957 till 1966. Ghana became a legalized single-party state which was characterized by huge losses and flight of foreign capital. Money was spent on prestige projects and the country was suffering from problems such as political instability, bad government, mismanagement and corruption, problems which became common throughout Africa after independence. In 1968 the national debt had increased from £20 million to £652 million (Cole and de Blij, 2007:296). In the next decade military and civilian rule changed turns because of dissatisfaction with the government and their policies. In 1981 another coup was staged and flight lieutenant Jerry Rawlings took over the existing control. Rawlings led the country to sustained and significant economic growth. But at the same time executions and mass rallies took place as well as purging of the opposition, violence and nationalization (Cole and de Blij, 2007:297).

In the 1980s Ghana became one of the success stories of the International Monetary Fund, the IMF, after the implementation of the Structural Adjustment Program, the SAP (see chapter 1.2: Views on Agriculture in Development Thinking). The Ghanaian market and institutions were liberalized and public enterprises were privatized. At the same time Rawlings began 'democratization from above' leading to multiparty elections in 1992. Also a new constitution was written, political parties were legalized and freedom of the press was introduced (Cole and de Blij, 2007:297-298). Rawlings won the elections of 1992 and 1996 but was barred from running for the third term because of the constitution. In 2000 John Kufuor of the opposition party was elected and re-elected in 2004. In 2008 new elections were held and John Atta Mills became the new President of Ghana. Earlier he had served as vice-president to Jerry Rawlings between 1997 and 2001 (BBC, 2008). At the moment Ghana knows a government that has a higher degree of transparency than most African countries and the country has a free and active press (Cole and de Blij, 2007:298).

Table 2.1: Poverty index by locality in Ghana

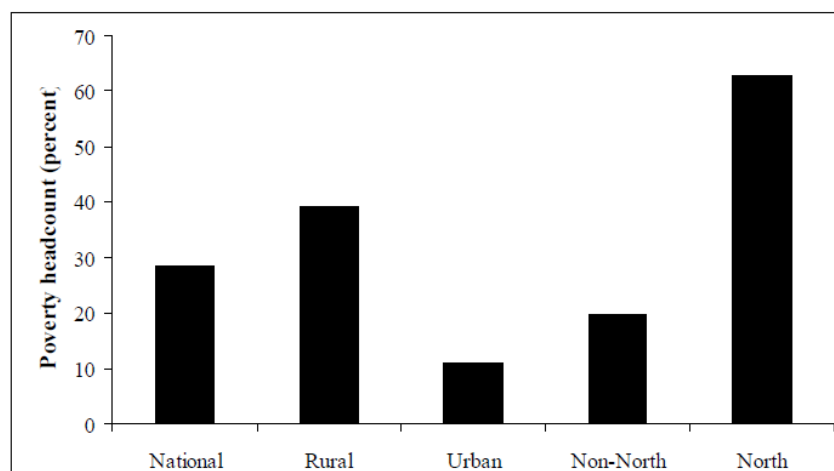
	Poverty (in %)		Extreme Poverty (in %)	
	1998-1999	2005-2006	1998-1999	2005-2006
Accra	4.4	10.6	1.9	5.4
Urban coastal	31.0	5.5	19.0	2.0
Urban forest	18.2	6.9	10.9	2.9
Urban savannah	43.0	27.6	27.1	18.3
Rural coastal	45.6	24.0	28.5	11.5
Rural forest	38.0	27.7	21.1	14.6
Rural savannah	70.0	60.1	59.3	45.4
Total	39.5	28.5	26.8	18.2

Source: UDDP-HDR 2007, Ghana Statistical Service

poverty rates by locality in Ghana of the periods 1998-1999 and 2005-2006 are provided. A decline is visible in the percentage of Ghanaians described as poor in 1998-1999 (39.5 percent) and in 2005-2006 (28.5 percent). Over the same period, extreme poverty rates have declined from 26.8 percent to 18.2 percent.

Even though overall national poverty levels have declined, great disparities exist in poverty levels throughout Ghana. As follows from table 2.1, poverty is prevalently a rural phenomenon. About 70 percent of the population lives in rural areas where limited access to basic social services and safe water exists (DFID, 2009). Besides rural and urban poverty, also a geographical disparity can be found between the northern and the southern regions. This disparity has been present for a long period of time (see textbox 2.1) and efforts to tackle this problem have so far had little effect (McKay and Aryeetey, 2004). In figure 2.2 (Poverty rates in Ghana in 2005-2006) a distinction is been made between urban and rural poverty and poverty in the north and other areas in the country. Judged from this figure it is clear that poverty is more persistent in the northern regions

Figure 2.2: Poverty rates in Ghana in 2005-2006



Note: 'North' includes all rural and urban households from the Regions; Upper West, Upper East and Northern Region. Non-North includes households in all other regions. Source: IFPRI, 2008:16

than in any other of the country's regions. McKay and Aryeetey (2004) argue that the failed attempts to diminish the disparities between poverty levels in the north and the south are not a lack of political will to tackle the problem. In the past, the Ghanaian government has implemented free educational programmes as well as an agricultural programme that at the peak of its life was covering more than half of the entire national agricultural expenditure. Here, the authors argue that the failed attempts show a weakness of the public structures for dealing with the problem rather than unwillingness of the government.

2.1.3 National economy

Compared to neighbouring countries in West Africa, Ghana's national economy is performing quite well. Ghana is one of the few Sub-Saharan African countries which has experienced two decades of a positive Growth Domestic Product, GDP. But the economy of Ghana, though no longer ruled by statism and patrimonial rule, still knows structural and spatial weaknesses that impede development. Dependence on international financial and technical assistance is still rather high (Cole and de Blij, 2007:297, World Factbook, 2009). Balance payment problems exist because of a heavy reliance on imported consumer goods and equipment. Basic capital goods industries are lacking and there is a high degree of industrial concentration in the metropolitan centres and weak interregional and inter-sectoral linkages (Cole and de Blij, 2007:297-298). As was discussed in chapter one, like many developing countries also in Ghana high dependence exists on the agricultural sector. Agriculture accounts for almost 40 percent of the country's GDP and for 75 percent of export earnings. The forest zone in the south, in which the research areas are located, is the main agricultural producer, accounting for 43 percent of agricultural GDP and has the country's largest share of cocoa production. Cocoa, gold and individual remittances form the major sources of foreign exchange (Cole and de Blij, 2007:293-295; IFPRI, 2008; World Factbook, 2009).

Agriculture is the highest contributor to Ghana's GDP and is followed by services accounting for 39 percent and the industry for 25 percent. Although the percentage of the population engaged in agriculture is lower than in most African countries, 60 percent of the total population is active in this sector. Contradictions exist in the available literature whether agriculture is the fastest growing sector (Cole and de Blij, 2007; IFPRI, 2008) but agreed is that it may be difficult for the country to sustain and accelerate this growth. This is also acknowledged by the Ghanaian government claiming that one of the fundamental problems of the country is its persistent reliance on the export of a few primary products with little or no value added, such as cocoa, gold, timber and others. A diversification of the economy is needed as well as the spread of industries across the country (Cole and de Blij, 2007:298; GPRS, 2003).

2.1.4 Agriculture

In recent years, Ghana's agricultural sector has shown positive growth, though it is argued that this results from area expansion rather than from increased yield. Yield for the mainly low-value added products such as roots, cereals and vegetables have remained stagnant while expansion in

planted areas has occurred (McKay and Aryeetey, 2004). This expansion in land can also be found in the forest zone, the area of this study.

The agricultural structure and the regional distribution of the agricultural GDP differ across Ghana's five geographical regions (see chapter 2.1.1 Physical environment). The forest zones in the centre and in the south of the country are the main agricultural producers. 43 percent of the agricultural GDP is found in this zone. In comparison 10 percent, 26.5 percent and 20.5 percent are found in respectively the coastal zone and the southern and northern Savannah. In the forest zone higher value agricultural products are found, such as cocoa and livestock, mainly poultry.

Agriculture in Ghana is predominantly on a smallholder basis. Argued by the Ministry of Food and Agriculture, MoFA, about 90 percent of farm holdings are less than two hectares⁵ in size of which the smallest average holdings are found in the south (Chamberlin, 2008a). At the same time the small-scale farmers constitute the largest segment of producers. The agricultural tenure ship arrangements are argued to be unhelpful in local agricultural development. In the Abusua system, the landlord receives a third of the harvest. In the Abunu system even half of the harvest is given (MLGRDE-Akuapem-South, 2006).

Crop choices for small-scale farmers vary from agro-ecological zone but overall maize and cassava are the most frequent crops found. Also the land hold size reflects the choice and the diversity of crops. Table 2.2 (Proportion of households growing major crops) shows the proportion of households growing common agricultural commodities. The three most important crops, excluding maize and cassava, are shown by ecological zone and holding size. Plantain, grown in the coastal and forest zone is a food crop rather than a cash-crop. From the table it can be argued

Table 2.2: Proportion of households growing major crops

	Holding size (in %)				Zone average
	< 1,0 ha	1,0 - 3,0 ha	3,1 - 5,0 ha	> 5 ha	
Coast					
Plantain	26.0%	35.0%	44.5%	49.0%	34.0%
Peppers	24.5%	35.0%	37.0%	28.0%	29.0%
Oil Palm	17.5%	37.0%	42.5%	30.0%	26.0%
Forest					
Plantain	56.0%	66.0%	73.5%	79.0%	66.0%
Cocoa	17.5%	52.0%	64.5%	76.0%	44.0%
Oil Palm	16.5%	29.0%	41.0%	47.0%	29.0%
Savannah					
Groundnuts	28.5%	43.0%	48.5%	58.0%	43.0%
Sorghum/Millet	29.0%	40.0%	43.0%	52.0%	40.0%
Yam/cocoyam	21.5%	38.0%	46.0%	54.0%	35.0%

Source: adaptation from Chamberlin, 2008b:21

⁵ 2 hectares is 4.94 acres

that the average of high-value cash-crops such as oil palm and cocoa are more widespread among larger landholders. Also, it is demonstrated that the highest rates of high-value crops are found in the forest zone (Chamberlin, 2008b). This follows the earlier findings.

For the majority of the rural poor in Ghana agriculture is the main economic activity. And also for those in rural areas who are mainly involved in non-farm activities, agriculture is often an important secondary activity (McKay and Aryeetey, 2004). Targeting poverty in the agricultural sector is crucial for Ghana's economy. It is the largest sector of the national economy as well as the largest sector with the highest level of poverty rates. One of the objectives in the last published Ghana's Governmental Poverty Reduction Strategy Report, GPRSP of 2003, was to modernize agriculture through reforming land acquisition, to encourage the production of cash crops, to assist the private sector and to support them in adding value to traditional crops (GPRSP, 2003). IFPRI, the International Food Policy Research Institute, argues at the same time that policy objectives should aim to improve the delivery of services to smallholders as well (IFPRI, 2008). The focus should not be solely on increasing crop production.

2.1.5 Livestock

Within West-Africa, livestock is the highest valued agricultural commodity in intra-regional trade. The value of cattle increased in real value terms from US\$13 million in 1970 to US\$150 million in 2000. Cattle populations in the region have grown from 29 million in 1970 to 47 million in 2000 (ILRI, 2007). Numbers for livestock populations in Ghana are provided in table 2.3 (Livestock populations in Ghana in 1,000). Following this table it can be argued that the cattle population in the region is not reflected in Ghana's national figures of roughly the same time period. While the cattle population has slightly increased in absolute numbers, relative growth has declined. Both cattle and pig populations show a decrease in annual growth rate when comparing 1980-1990 with 1990-2000. This could be related to lower demand for their products as well as to the expensive nature of obtaining these animals when compared to the other ruminants. Numbers of sheep and goats and poultry have both increased in absolute and relative numbers over the same period. This might be due to the fact that they need fewer inputs.

In all livestock products, Ghana shows high import dependence. Most livestock products, such as meat from sheep, goat, pig and poultry, can be locally obtained but are not sufficient to serve

Table 2.3: Livestock populations in Ghana in 1,000

Species	Year				Annual growth rate (%)	
	1980	1990	2000	2002	1980-1990	1980-2000
Cattle	804	1,145	1,302	1,330	3.6	1.3
Sheep and goats	3,875	4,242	5,820	6,152	0.9	3.2
Pigs	379	474	324	310	2.3	-3.7
Poultry	11,500	9,686	20,472	24,251	-1.7	7.8

Source: FAO, 2005

the national demand, let alone be exported. In the 1980s and 1990s none of these products were exported⁶. This gradually changed in the new millennium. Ghana's export market of meat, milk and eggs is growing. However, still more livestock products for consumption are being imported than exported. Interestingly, milk exports have increased considerably from zero percent in the 1980s and 1990s to 6.1 percent in 2000 and 11.4 percent in 2002. At the same time, milk import increased from an average of 111.9 in the 1980s and 1990s to an average of 181.5 percentage of consumption in 2000 and 2002 (FAO, 2005a).

In the GPRS report of 2003, the livestock challenge in Ghana is addressed since national productivity in the livestock sector is low. While in many countries livestock output is 75 percent of the agricultural GDP, in Ghana it comprises of only 8 percent. When looking at cattle, it is estimated that the average of a milk producing cow in Ghana is 4 litres a day compared to a possible 30 litres a day internationally. In the GPRS report it is argued that the lack of access to high yielding breeds has been identified as the major constraint in the development of livestock in Ghana (GPRS, 2003:69). For this reason, livestock development strategies have been designed. The Livestock development strategies of the GPRS (2003:83) include:

- Production of improved breeds
- Production of good quality animal feed
- Development/processing of meat and dairy
- Control of local animal diseases and prevention of external diseases through effective surveillance and quarantine procedures
- Improvement of husbandry practices
- Discouragement of subsidized and cheap imports

The next section will present the various topics discussed above on a local level. The focus in this section will be on the two research districts in the Eastern Region in the forest zone in the south of Ghana.

2.2 The Research Districts

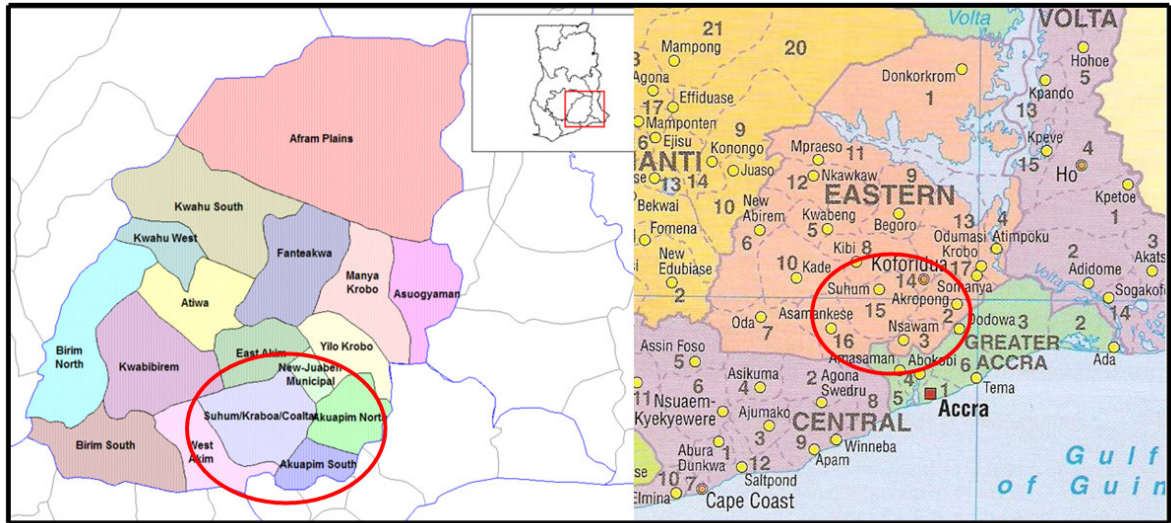
The Eastern Region is one of the ten administrative regions in Ghana and is located in the southeast of the country. The region contains 17 districts and the region's capital, Koforidua in the New-Juaben municipal, is situated close to the two research districts (see figure 2.5). The research districts, Akuapem-South and Suhum, are located in the south of the Eastern Region and have been chosen by the organisation Heifer Ghana. The districts of the Dairy Project are located within an 80 kilometre radius from the national capital Accra. In this section a profile of both Suhum⁷ and Akuapem-South⁸ will be provided.

⁶ See Appendix C, table 6.1: Export/Import dependency for livestock products, Ghana.

⁷ The profile of Suhum/Kraboah/Coaltar is based on a report of the Ministry of Local Government and Rural Development, MLGRD-Suhum, (2001). *The Second 5-Year District Development Plan (2001-2005): Profile of Suhum/Kraboah/Coaltar District (vol.1)*. Government of Ghana.

⁸ The profile of Akuapem-South is based on a report of the Ministry of Local Government and Rural Development and Environment, MLGRDE-Akuapem South, (2006). *Medium – Term District Development Plan for Akuapem South District (2006-2009)*.

Figure 2.5: Research districts Dairy Project, the 17 districts and capitals



Source: MacMillan, 2007 Wikipedia, 2009.

2.2.1 A profile of Suhum district

Physical features

The district of Suhum is situated in the south of the Eastern Region. The district capital, Suhum, is located roughly 60 kilometres northwest from Accra (see figure 2.5 and 2.6). The district lies within the wet semi-equatorial climatic zone with bi-modal rainfall and yearly temperatures ranging from 24 degrees Celsius to 29 degrees Celsius. Originally the district was covered with semi-deciduous forest types. However, human activities such as farm cultivation, lumbering and extraction of fuel wood have drastically reduced the land covered by the original vegetation. Indiscriminate felling of timber in the past and large bushfires in the 1980s has led to deforestation in the district. This has led to sheet erosion along the slopes, siltation and drying up of rivers and streams during the dry season. However, soils in the district are still rich and a wide range of traditional crops are grown.

The land use patterns of the district are provided in table 2.4. From this table it follows that agriculture takes up almost 75 percent of the land available in the district. Settlements and infrastructure take up 22 percent of the district leaving as little as 3.2 percent for rivers, reservations and slopes.

Table 2.4: Land use patterns Suhum-district

Type	Area (km2)	% of total area
Agriculture	703	74.8
Settlements	141	15.0
Transport routes, utility lines	66	7.0
Rivers, reservations, slopes	30	3.2
Total	940	100

Source: MLGRD-Suhum, 2001

Population

Almost 350 human settlements with an average size of 478 persons are found in the district. For this reason, Suhum can be described as a rural district. In 2001 the district knew a population of

167,146 persons. The district capital Suhum, counted 24,443 inhabitants and was classified as the only urban area in the district because population levels exceeded over 5,000 persons. Half of the district's population lives in small settlements which almost all lack basic social services. The population density is 178 persons per square kilometre which is far higher compared to the regional population density of 110 persons per square kilometre and the national average of 100 persons per square kilometre. The provided district's average dates back to 2001 but it is likely that the population density of Suhum district has increased in the last eight years. The district is located relatively close to major cities such as Accra and Koforidua and its fertile soil make it an attractive destination for migrants. It is argued by the MLGRD-Suhum (2001) that in-migration has had a significant impact on population changes in the district. The authors argue that 62.5 percent of the total population in the district are not originally from the district. Out-migration at the beginning of the millennium was recorded at 4.8 percent of the Suhum's population.

Housing and water supply

Results from a survey held in 2000 indicate that there is no shortfall in the provision of housing for the district's population as a whole. There are however problems with the existing stock in both the urban and rural settlements. In the rural areas, most houses are made from mudwalls and corrugated iron. In the district capital most houses are made from sandcrete or concrete. In houses in the urban areas, bathrooms, kitchens and toilets are largely present but in the rural areas these facilities are most commonly detached from the main building and hygienic standards are often lower. The type of homestead of the participants in the Dairy Project will also be provided in this study (see chapter 4.4).

In Suhum district each settlement has a form of water supply of which boreholes are the most widespread source of water. Most water sourced from these wells is not treated though some of them have been fitted with hand pumps which were provided mainly by NGOs. Due to the limited depth of the wells in relation to the water table most of them dry up during the dry season. Problems with water services are inadequacy, pollution, dry season supply and dislocation. Also, in many rural settlements distances to water sources are between one and three kilometres. This affects productivity in crop farming and livestock keeping and of small-scale industries like food processing industries.

Table 2.5: Plot sizes in Suhum-district

<i>Size in hectares</i>	<i>No. of respondents</i>	<i>% of total</i>
< 1	67	41.8
1-3	60	37.5
4-6	20	12.5
7-9	7	4.4
10-12	4	2.5
> 12	2	1.3
	160	100

Source: adopted from MLGRD-Suhum, 2001

Income and poverty level

For most of the population in the district, farming is the main income-generating activity, over 60 percent is engaged in farming. Of the total population 47 percent of the households derive their main income from crop farming. Other sources of income are trading and commerce (24 percent),

commercial livestock farming (10 percent), salaries (10 percent), food processing (4 percent) and remittances (3 percent). In the district-capital also personal services, restaurants and hotels are main occupations. The industrial sector is composed of small-scale activities such as cassava processing, palm oil extraction and handicrafts. The district shows great inequality in income levels. The average yearly income per capita of 2001 in the district was GHC 16,000,000⁹ (€2555) but its distribution was highly skewed. 50 percent of the district's income was in the hands of 14 percent of the population. Based on information from the Ghana statistical service the poverty line in the district in 2000 was given at GHC 10,800,000 (€1725) and extreme poverty below GHC 5,400,000 (€862). In Suhum district this was represented by relatively 47 percent and 22.4 percent in 2000.

Basic domestic appliances by households are seen as an indicator of the standard of living of the people in the district. A survey held in 2000 showed that 74 percent of the household owned a radio and 20 percent owned one or more television sets. When compared to neighbouring districts, Suhum district has a moderate standard of living.

Agriculture

Most farmers in Suhum-district are producing at subsistence level. This involves producing on a small-scale to feed the household and sell the surplus. In table 2.5 plot sizes in the district are provided. The table shows that more than 40 percent of the 160 respondents' plots are smaller than one hectare (2.47 acres). It is difficult for the farmers and their households to obtain more land. Farmers are inhibited by land fragmentation, lack of financial assistance and communal ownership of land. Also the land tenure systems, the system of shared-cropping as discussed in chapter 2.1.4, influences land ownership. The majority of the farmers crop more than one crop. The most common staple crops are cassava, cocoyam, yam, plantain and maize. These crops are usually inter-cropped with vegetables or beans. Crop farming is the dominant practice in the district and livestock rearing is done on adhoc basis. Most farmers are not solely livestock farmers.

Households' livestock numbers are usually small and farm animals are free to roam around and feed themselves. Table 2.6 shows the farm animals that were found in the district in 2001. Few cattle could be found. Almost all farm animals in the districts were small livestock. Poultry was then the most prominent livestock activity with fowls, ducks, turkey and Guinea fowls accounting for 56 percent. Small ruminants, namely goats and sheep, accounted for 38 percent of all livestock. Cattle represented 0.5 percent of the total of farm animals present.

Table 2.6: Type of farm animals in Suhum-district

<i>Type</i>	<i>Total no. of farm animals</i>	<i>% of total</i>
Poultry	24,853	55.6
Goats	8,634	19.5
Sheep	8,046	18.1
Pigs	2,043	4.6
Cattle	240	0.5
Other* ...	625	1.4
Total	44,441	100
*Other is rabbits		

Source: adopted from MLGRD-Suhum, 2001

⁹ Currency converter of 01-01-2001. Here the old GHC has been used. The new cedi was introduced in 2007. The conversion rate is 1:10000 with the old currency. [www.oanda.com/convert/classic].

2.2.2 A profile of Akuapem-South district

Physical features

The district of Akuapem-South is located in the south of the Eastern Region and borders with the region Greater Accra. Accra is located approximately 25 kilometres from the district's borders and 30 kilometres from the district's capital Nsawam (see figure 2.6). Like the district of Suhum, Akuapem-South lies within the wet semi-equatorial climatic zone with bi-modal rainfall. The main ecological zones identified are the semi-deciduous forest and the coastal Savannah grassland. Until recently, the forest covered 90 percent of the district but today very little of the forest remains due to uncontrolled exploitation of timber resources. The original flora and fauna of the district have been adversely affected by years of human activities. Little of the original vegetation remained due to years of slash and burn farming practices and timber logging. The extraction of fuel wood has resulted in forest degradation. Pineapple farming, a major exporting industry, also has had its toll on the environment of the district. Land devoted to pineapple farming has been cleared of trees to allow pineapple cultivation.

Population

The urban-rural split in the district is 1:1.2 which means that for every 10 people living in urban areas, 12 are living in rural areas. In comparison, the national split is 1:1.8. More than the national average, almost half of the inhabitants of Akuapem-South live in urban areas. In 2006 the district of Akuapem-South had a population of 116,344 and knew a population density of 248 persons per square kilometre. This is almost 2.5 times as much than the national average of 100 persons per square kilometre. The proximity to Accra and the fertile grounds, comparable to Suhum district, could be reasons for people to move to the district. Nsawam, the district capital, knows for 29,986 inhabitants and it is the only settlement in the district with facilities like a hospital, banks and post and telecommunication services. Adoagyiri (13,058 inhabitants) and Aburi (10,071 inhabitants) are the two other settlements in the district which can be classified as cities. There are over 300 settlements scattered all over the district.

Housing

Generally towns and settlements in the district are not well planned, they lack a good internal road network. Common building types in the towns are compound houses, accounting for 90 percent of the total housing unit. The majority of the houses are made of sandcrete and landcrete which between them constitute for 72 percent of the houses in the district. In the urban localities 90 percent of the roofing material is made up of corrugated iron and 10 percent is of tiles. In rural localities, 75 percent of the roofing material is made up of bamboo and thatch while 25 percent is of corrugated iron. Buildings in the rural localities are most common to be single storey buildings. The type of homestead of the participants in the Dairy Project will be provided in chapter 4.4.

Income and poverty level

The agricultural sector employs the largest share of the district's labour force namely 37 percent. Commerce employs 28 percent, services 20 percent and the industry 15 percent of the working population. Commercial activities are concentrated in the three main cities. The commercial sector involves the sale of clothing and toiletries, electrical equipment, foodstuffs, plastic wares and chemicals. Akuapem-South has an unemployment rate of 7.9 percent. No district averages of income levels were present though it is expected that average incomes are comparable or higher to the averages found in Suhum district since less people are employed in the agricultural sector in Akuapem-South than in Suhum.

Agriculture

Of the 37 percent of the district's population mainly involved in farming, 40 percent is female and 60 percent is male. Subsistence farming is the most common practiced system. Argued is that the majority of the people are subsistence farmers because of scarcity of land for agriculture purposes and lack of access to credit facilities. Average plot sizes for the district are not known.

Crop farming is the major activity in the agricultural sector. The main crops are maize, cassava, cocoa, coffee, oil palm, citrus, pineapple and pawpaw. Maize and cassava are grown throughout the district while pawpaw and pineapple are cultivated in certain areas of the district and than mainly at greater scale. Agriculture in the district is totally dependent on rainfall, this is because there is lack of adequate irrigation facilities which is affecting the farmers' productivity. The rearing of livestock is not a popular activity and most livestock farmers rear the animals for domestic purposes and not for commercial purposes. Table 2.7 shows the different types and populations of livestock found in the district of Akuapem-South.

Around 25 percent of all the farmers in the district have access to the land they farm through family heads. About 21 percent of the farmers acquired the land through chiefs and government lands. Shared tenancy is the dominant system of land tenure for farming in the district. 35 percent of the land tenure arrangements are between landlords and tenants. The use of the share-cropping systems of Abusua and Abunu as explained in chapter 2.1.4, in Akuapem-South and in Suhum-District are thought to be a hindrance to local agricultural development.

Table 2.7: Type of farm animals in Akuapem-South

<i>Type</i>	<i>Total no. of farm animals</i>	<i>% of total</i>
Poultry	94,751	59.9
Goats	31,922	20.2
Sheep	27,423	17.3
Pigs	3574	2.3
Cattle	506	0.3
Total	158,176	100

Source: MLGRDE, 2006

2.3 Heifer's Dairy Project

Heifer Ghana is part of the Heifer's international projects that are active throughout the world¹⁰. Heifer Ghana focuses on rural populations within the country and one of its main objectives is poverty alleviation. Neo-liberalist values can be found in Heifer's approach such as the importance

¹⁰ See Appendix A: The Heifer Organisation

of chain development and the role of farmer organisations in rural development. Also traces of IRD, Integrated Rural Development can be found in its strategies (see chapter 1.2: Views on Agriculture in Development Thinking). In its approach, Heifer integrates various concepts such as improving nutrition and health next to improving income opportunities. As discussed in chapter 1.3.2, Heifer is also one of the development agencies incorporating gender in its relatively neutral Dairy Project. A focus on gender equity in the project is perceived as important in overall livelihood improvement of the household and especially, female-headed households are important groups. All in all, it can be argued that Heifer fits into the sustainable livelihood approach as the organisation focuses on the assets of the participants in its activities to improve the rural households' livelihoods.

Earlier it was found that targeting poverty in the agricultural sector is crucial for Ghana's economy since it is the largest sector of the national economy as well as the one with the highest level of poverty rates. The Dairy Project, a pilot project of Heifer Ghana, attempts to alleviate poverty, increase households' health and increase income opportunities by the distribution of dairy cows. Ghana is the third country to adopt the Dairy Project after Cameroon and Albania. In 1974, the Dairy Project was introduced in Cameroon and so far has helped 400 families. Production, processing and marketing are all strategies adopted by various participating farmers and their households. This accounts also for the implementation of the project in Albania in 1998. Here, over time, 400 farmer families have been reached.

The pilot Dairy Project of Heifer Ghana which started in 2006 has been implemented in six districts in three administrative regions, namely the Eastern Region, the Central Region and Greater Accra. This research will focus on two of the six districts, namely Suhum and Akuapem-South located in the Eastern Region. Prior to the implementation of the project a stakeholder workshop was held in 2005. During the workshop it was discussed whether small-holder zero-grazing (stall feeding) dairy farming was a viable option for a rural livelihood improvement project in Ghana. Participants of this workshop, small-scale and livestock farmers, researchers, agriculturists and Heifer staff were all positive that such a project would work and in 2006 the Dairy Project was implemented. The project has been set up in order to link grass root dairy farmers with the dairy food chain. Its intention has been to enforce farmer groups into autonomous farmer organisations (the Dairy Farmer Groups) which at a later stage will be part of the local economy. For the project 180 Jersey heifers from South Africa were imported in 2007 and 2008. A Heifer is a young cow that has not yet given birth. For this project, the Jersey cows arrived pregnant in Ghana. They were distributed to the farmers in the six selected districts. The goal is to reach 288 farm families in five years.

Villages in the districts of Greater Accra and the Eastern and Central Region have been chosen for this pilot project because these regions were thought to be amongst the most viable for dairy production in Ghana. The marketing potential of milk was thought to be higher in these areas because of the present infrastructure and proximity to major cities such as Accra, Tema and Koforidua (see figure 2.5 and 2.6). The district capitals Suhum and Nsawam are well connected to

the main road system, even though the quality of the road varies between the two places¹¹. Nsawam is also connected to the railway system. However, trains generally only stop here once a day.

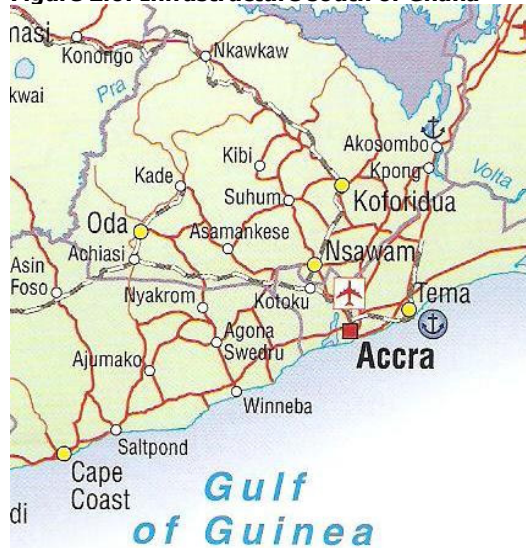
In the selected districts, poverty, poor nutrition and youth unemployment are key problems and crop farming is the main source of income. One of the main objectives of the Dairy Project is to improve sustainable economic development through improvement of income and nutrition of rural farmers with dairy farming (Heifer Nederland, 2008). Education and training on agro-ecology such as pasture development, composting of organic matter, agro-forestry and bush fire prevention, are important elements in the project. Other project

objectives are the training of the farmers in project management, gender equity and HIV/AIDS prevention. Part of the project is also to train selected farmers in each of the districts into Community Livestock Workers, CLWs. This way quick assistance can be provided and decisions can be made locally in order to save time for veterinarians from travelling down to the villages for minor injuries and so to save in additional costs. It is argued by Heifer Ghana that through CLWs, accountability for the project will be higher because of local supervision and the enhancing of ownership. Additional training for the local supervisors of the project, the veterinary-specialist extension agents of the Ministry of Food and Agriculture, is also provided by Heifer Ghana. They will be trained and provided with extra medicines and are asked to conduct regular vaccinations and tick control services (HI-PPF, 2005).

In the start-up phase of the project the selection of which participant of the Dairy Project will receive the heifer will be carried out by the organisation, the local supervisors and the Dairy Farmer Groups. The latter will receive more responsibility in a later stadium of the project. In textbox 2.2 an example of the selection criteria for new members and members of the Dairy Farmer Group who want to receive a heifer from the organisation is provided.

Heifer Ghana will initially act as a project holder and will then gradually shift responsibility to the Dairy Farmer Groups in order to build local capacity for the sustainability of the project. The Heifer head office in Accra will be responsible for progress and financial reporting while the executives of the districts' farmer groups will act as project contact-persons seeing to the day-to-day implementation of the project (HI-PPF, 2005). With Heifer's goal to hand over the project locally in five years, the farmer groups are in control and are the owners of the project. Through the Dairy Farmer Groups' monthly meetings, farmers can exchange ideas on dairy farming as well as

Figure 2.6: Infrastructure south of Ghana



Source: MacMillan, 2007

¹¹ The road between Accra and Nsawam has been newly constructed and is of a good quality. The road between Suhum and Nsawam is of poor quality. A new road is under construction, but it will take some time before it will be in use (estimations in April 2009 were 2011).

Textbox 2.2: An example of selection criteria for (new) members in the Dairy Farmer Group

Criteria for selection into HPI-Ghana Dairy groups

- Willingness to join group and to patiently wait for one's turn to receive an animal. All commitments to group should be fulfilled in interim
- Willingness and ability to carry out zero-grazing of animals (Provision of suitable structures and the development of at least one acre of secured pasture and the conservation of fodder)
- Availability of water and grass (Guinea/elephant or any suitable grass) in the vicinity
- Accessibility or closeness to the road
- Willingness to undertake training and to share knowledge acquired with other farmers
- Willingness to abide by the rules of HPI-Ghana, including readiness to 'pass on' the gift at the opportune time.
- A promise to consult other members of the group before any animal is culled or disposed off. Group members should have the first choice in buying 'project' animals when one decides to wind up
- Willingness to work with members of the opposite sex who may be in the group
- Willingness to handle fresh milk

Source: Heifer Milk Producers Association Suhum/Kraboaa/Coaltar District, 2006

on other subjects. Argued is that these meetings can motivate them, punish them and can pull them together; it is also an extra control in the field (Local supervisors Ms. Ababio and Mr. Marshall, 2009). The executives of the Dairy Farmer Groups can then discuss these problems with the local supervisors and with the Heifer organisation in Accra

In the past, projects of Heifer were evaluated by the technical standards of husbandry, not through socio-economic evaluations. It was found that even though a technical evaluation is highly important, insufficient knowledge was obtained on what the implemented project meant to stakeholders. This study will address specific socio-economic aspects and will study the impact of the Dairy Project on the livelihoods of its participants. Livelihood improvements since the start of the project will be discussed. The following chapter will go deeper into this study and research objective.

Chapter 3: Methodology

In this chapter the methodology used in the study on Heifer Ghana's Dairy Project and livelihood improvements will be presented. First the research objective and the research questions will be discussed. This will be followed by the operationalisation of the concepts 'livelihood' and 'household'. They are seemingly easy concepts but are open to various interpretations. The conceptual model will be presented after the operationalisation and will be followed by the data collection and methods used. The working hypothesis for this study will then be discussed and the chapter will end with limitations in this study.

3.1 Research Objective and Research Question

The main objective of the study on the Dairy Project and livelihood improvements is to assess how the Dairy Project, implemented in the two research districts in the Eastern Region of Ghana and chosen by Heifer Ghana, has resulted in improvements in the livelihoods of the participating households, incorporating the project objectives set by Heifer Ghana (increase of income; improved nutrition and health; improved gender equity; more knowledge on and better practice of agro-ecology¹²). The findings in this research will be considered as a trend in livelihood improvements because the project has only been implemented since 2006. Significant livelihood improvements therefore cannot be expected. In order to answer this question it is also important to understand who the participants in the Dairy Project are. The main research question in this study is: *What are the socio-economic characteristics of the participants of the Dairy Project of Heifer Ghana and how has the Dairy Project improved the livelihoods of the participating households so far?* In order to answer this, the main research question is divided into three sub-questions:

- 1) What are the socio-economic characteristics of the participating households?
 - a. Household characteristics
 - b. Household resources
 - c. Economic activities
 - d. Stocks and flows
- 2) So far, what has been the impact of the Dairy Project on the livelihoods of the participating households?
 - a. Initial motivations and expectations
 - b. Livelihood improvement (including: impact on income, human health, social relations, knowledge and techniques on agro-ecology)
- 3) Related to the Dairy Project, what challenges do the participating households face?

¹² Another main objective of Heifer-Ghana has been to improve knowledge on HIV/AIDS. This objective has not been included in the research since little relevance to the overall theme can be found.

3.2 Operationalisation

This section will discuss the operationalisation of two complex concepts used in this study. It is important to create measurable categories in the household surveys¹³ and also in the in-depth interviews in order to analyse the outcomes. The concepts which will be explained in this section are 'livelihood' and 'household'. Clarifying both concepts will be useful in the presentation of the research findings and analyses since the research will be carried out on the household level.

3.2.1 Livelihood

The Sustainable Livelihood Framework, the SLF, has been discussed in Chapter 1.3 (Views on Livelihood Theories). It is a concept that has been introduced only fairly recently but which has changed already so much overtime. When using the livelihood concepts in field research one has to understand that simplification cannot be avoided. Livelihoods encompass many capitals, relations and levels and within a three-month field research it is hardly possible to understand and cover all. But, even though the SLF is abstract and complex, as argued by Potter (2004:468) it is useful in understanding local livelihoods and evaluating the impact of existing interventions.

Before starting the actual fieldwork, a selection is needed of which livelihood capitals of the households are to be researched. Since the research will be carried out for the host organisation Heifer Ghana, their objectives on livelihood improvement will be incorporated in this research. The assets researched will be placed in the five capitals of the SLF. A test-round of the household survey will show whether the right operationalisation has been used. The capitals that will be researched are:

- Human capital: health, confidence and self-esteem, education
- Social capital; social network, gender awareness
- Natural capital; land, cattle and other livestock
- Physical capital; physical assets, quality of the homestead
- Financial capital; income, perceived income improvements, savings.

This qualification is a simplification of the actual situation and it is understood that the chosen research topics of the five capitals will not cover all livelihood capitals. However, the topics chosen relate to the objectives set by the organisation and are manageable to research within the timeframe of the project.

The operationalisation of the livelihood improvements will be done through the use of pre-coded questions in the household survey. In test rounds open questions on livelihood improvement will be asked. The answers will be evaluated and coded. Still, the answer 'other' will remain an option in the surveys. In the survey, the respondents can indicate for each asset whether they have perceived improvements since the start of the project. They can also indicate the most important improvements on a scale from one to three with one as the most important improvement as experienced by the households. For example, a household will be able to indicate if there has been an improvement in overall health since the project. They can then also indicate the three most important improvements noticed in overall household health. It will then be asked whether the

¹³ See Appendix B: The Household Survey

household thinks these improvements have occurred because of the project or because of other reasons.

Some capitals in this research are more difficult to operationalise than others. For example, intangible assets such as 'confidence and self-esteem' are difficult to research and it can be questioned whether they are actually social or human livelihood capitals. In this research they are understood as human capital. And even though measurements for 'confidence and self-esteem' are difficult and highly subjective, it proves to be an important asset in this research. It is one of the objectives of the Dairy Project set by Heifer Ghana and it is an important human capital as 'confidence and self-esteem' are related to other capitals such as social capital for example.

One of the most difficult social capitals to operationalise is social networks. 'Social networks are mechanism that connect individuals to society, providing patterns of social interaction, social cues and social identities' (Dalton et al., 2002 in: Hoang, Castella and Novosad, 2006). They are an important intangible component of individuals' and households' assets. Membership to these networks provides access to information and economic resources but this access is still dependent on the nature of different networks and the kind of benefits they deliver to its members (Hoang, Castella and Novosad, 2006). It follows that the households of this research have had access to various social networks and their benefits before the Dairy Project, these will not be looked at. In this research, improvements in social networks because of the Dairy Project will be looked at. When applicable examples will be provided on how social networks have improved.

In this study, agro-ecology, an important objective of Heifer Ghana, and as explained in chapter 2.3 as pasture development, composting of organic matter, agro-forestry and bush fire prevention, is seen as land, a natural capital. This way it can be operationalised as a livelihood improvement, including the mentioned elements.

3.2.2 Household

The household is a dynamic concept and various categorisations can be found in contemporary research. However, in order to avoid a diffuse understanding of the household in this research, one definition will be used. Rudie defines the household as: 'a co-residential unit, usually family-based in some way, which takes care of resource management and primary needs of its members' (Rudie, 1995:228 in Mtshali, 2002:17). It is possible that more people are considered as members of that same household while they are not taking part of the household on a daily basis or are contributing to the household income on a regular basis. Therefore, in this research, the household is understood as people who share their income together and eat from the same pot on a regular basis.

There are many compositions of households. The modal and widely used household structure is nuclear; a married couple with unmarried children. But there are also households composed of *extended families*, *complex families* and *other families* (Barto, et al., 1999). An *extended family* can be understood as the nuclear family plus for example grandparents, brothers and sisters or the offspring and their possible partners and children. The *complex family* includes a nuclear or extended family plus any other relatives or persons living within the household. *Other families* are

for example incomplete households, a single person household or households consisting of only the grandparents and grandchildren (Barto, ea, 1999).

Next to the discussed different compositions of households, it will also be interesting to look at the different type of households in this project, especially since 'gender' is an important focus of the project. Knowing the type of household provides insight in the household socio-economic characteristics. In this research the type of household has been narrowed down to the categories: male-headed household, female-headed household and female-managed household. More categories are possible but are not applicable for this research. The difference between the female-headed household and the female-managed household is that in the former no male partner or other dominant male household member is present because of for example death of the male-head or divorce. In the latter the male head of the household tends to be removed from the household due to various reasons such as work-migration, and so leaving the management of the household up to his wife.

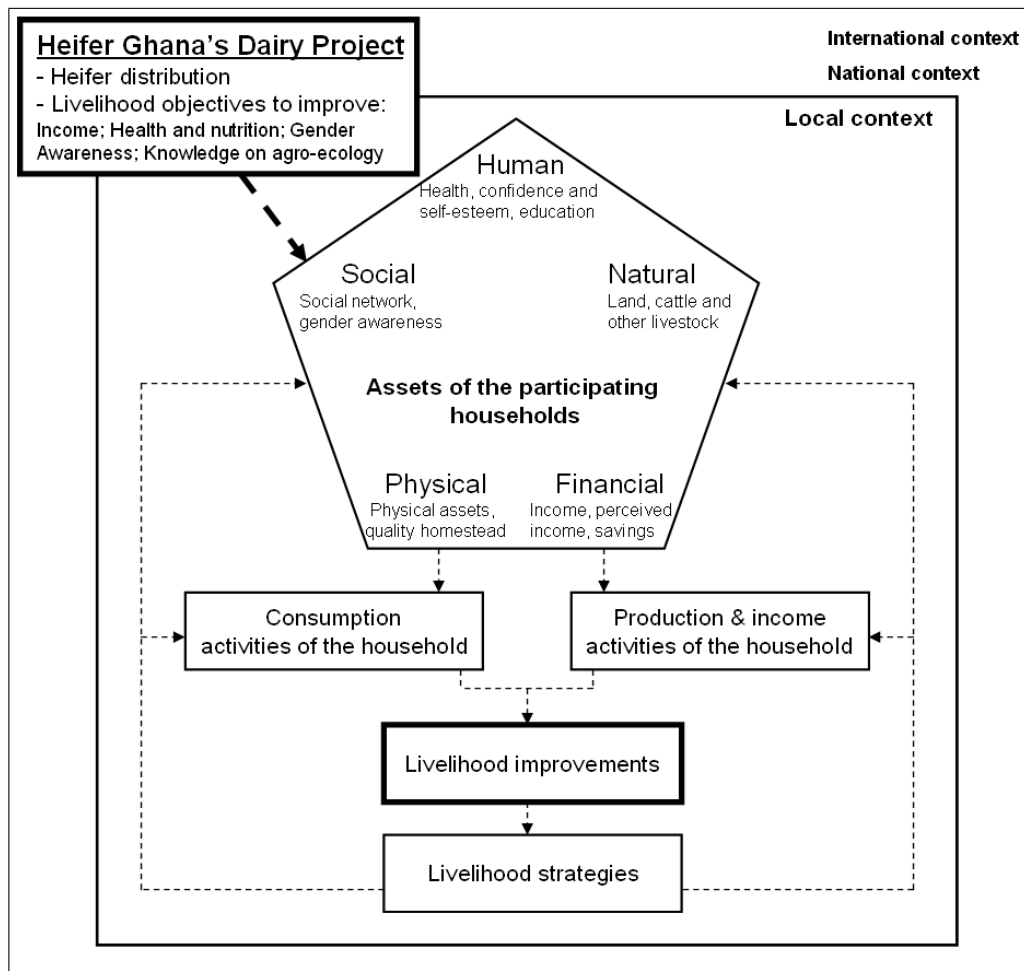
Not only is it important to understand the size, composition and type of the household, it is equally important to understand in which 'stage' of the development cycle the household is in. Knowing the stage of each household will provide insight in what sort of household is reached by the project. Are they merely young households with young and motivated adults or are they mostly older households with adults who for example hope that in the near future, their children will take over the care of the farm and the cow? Four main stages in the household development cycle can be distinguished. The first stage, where the cycle begins, starts with the formation of a new household. Young couples without children become couples with young children. The mother spends her time on taking care of the children and can no longer spend her time on economic activities. Income activities tend to be weak. The second stage is when the young children come to an age in which they can be economically active themselves, which is generally the age of 15. The income increases and can be used as new inputs or investments. The third stage is when the children have grown up and start their own families. Households tend to increase because spouses move in and children are born. In the fourth stage, the final stage, the couple is not able to perform (all of their) economic activities. They live alone or with their children and become dependent on the support of their social network (Barto, ea, 1999; Cain, 1978). The development cycle and its stages are a generalisation of the actual situation. Also the cycle is country and culturally dependent. In this study's fieldwork a test-round will be carried out first in order to define the household's composition, type and stage in the development cycle.

3.3 Conceptual Model

A conceptual model offers a clear outline of the subject which will be researched. In figure 3.1 the conceptual model is presented, incorporating the research objective, the concepts and showing the relation between them. The arrows in the model indicate the relationship between the concepts and outcomes. They do not imply a causal relationship. The livelihood model of DFID¹⁴ has been

¹⁴ DFID is the Department for International Development in the UK promoting development and the reduction of poverty [<http://www.dfid.gov.uk/>]. See the model in chapter 1: thematic-theoretical framework.

Figure 3.1: Conceptual model



Source: M. van den Berg, 2009

adopted and adjusted to the conceptual model of figure 3.1 in order to fit this research. Comparable to the DFID model (see figure 1.1) outcomes will be discussed while it is understood that livelihood processes are cyclical.

Livelihood improvements as presented in this research may lead to different consumption and production activities which lead to different strategies and are followed back to the asset base of the participating households. Policies, institutions, processes and vulnerability context as mentioned in the DFID model have been incorporated in the three levels of context, namely the local, national and international context. The Dairy Project of Heifer Ghana has been placed in local, national and international context. This is because the Dairy Project is implemented and researched at a local scale while it is in fact a national project. Other actors in the local context will influence the livelihoods of the participating households as well, such as family, neighbours, communities, local governments and environmental shocks and stresses. Within a national context the livelihoods are for example subjected to decisions of the Heifer organisation or national policies. Though less prominent, the participating households are also placed within an international context. Various countries and organisations are part of the implementation and

direction of the project. Even though it is realised that the context of the Dairy Project is important in respect to the household livelihoods, time constraints will not permit to research all these aspects. The most important aspects found in this study will be discussed.

The pentagon in figure 3.1 represents the five capitals of the participating households, the human, social, natural, physical and financial capitals. The weight of the lines and boxes represent the researched objectives, in this case the Dairy Project and its effect on specific elements in the asset base of the participating households. The livelihood improvements that are expected to follow from the implementation of the Dairy Project will then be looked at. This will all be carried out on the local level. However, in order to start with the analyses and understand the livelihood improvements, first an analysis of the socio-economic household characteristics will be carried out.

The households of the Dairy Project and their asset base already existed before the implementation of the project. There was already a relation present between the assets, the consumption and production patterns, the livelihood improvement and the subsequent livelihood strategies influencing on their turn the assets, the consumption and production patterns and the livelihood improvement. In this research the external input from the Dairy Project has affected this cyclical process and its implication on the livelihoods is researched in this study.

In the model, consumption and production activities have been separated because for rural households and small-scale farmers, agricultural production is mostly used for home consumption with the surplus being sold as production. In the model consumption and production activities have been separated because activities in agricultural production, and its subsequent changes through the Dairy Project, are both influencing consumption and production activities of the household differently.

3.4 Data Collection and Methods

A multi-disciplinary research has been carried out in order to answer the main research question and its sub-questions. Prior to the 15 weeks of field research a literature study has been carried out in order to gain insight into the subject. Topics for the literature research were; agriculture in development thinking; livestock in development; livestock in Ghana; and the Heifer organisation. In the field research, qualitative and quantitative methods were used such as observations; household surveys; and in-depth interviews with government officials, Heifer staff and experts. Table 3.1 (Research objectives and methods) shows the various methods which were used in the field research. Participatory research was not carried out even though it would have been valuable for the research findings. Focus group discussions are useful in confirming earlier results in research and analyses. They also provide more and new insights into the research and problems found. In this research, focus groups could have provided more insight in collective views on social issues in the two districts (Lloyd Evans, 2006). However, time constraints for both the farmers and the interpreters as well as logistic constraints made it impossible to arrange useful focus group discussions at an appropriate time. Meetings of the two dairy farmer groups were attended in order to gain more insights in the group dynamics.

Table 3.1: Research objectives and methods

	Research objectives	Methods
1	Socio-economic characteristics of the household	Observations, household surveys; in-depth interviews
2	Initial expectations and motivations of the Dairy Project	Household surveys, in-depth interviews
3	Changes and improvements in researched livelihood capitals of the participants	Observations, household surveys, in-depth interviews
4	Project challenges	Observations, household surveys, in-depth interviews

During the 15 weeks of field research 34 household interviews and 12 in-depth interviews were carried out. Of the 12 in-depth interviews, seven proved to be useful for the research for Heifer Ghana but were of limited use for this study. The remaining five useful interviews were with two local supervisors of the Dairy Project in Suhum and Akuapem-South; the Dairy Project Coordinator of Heifer Ghana; a governmental agriculturist and the assessor of the districts at the start of the Dairy Project; and a researcher on livestock and development at the University of Ghana.

The research population in this fieldwork is small because of practical reasons and because the fieldwork has been highly dependent on local assistance in location, time and language. It is understood that little generalisation can be made because of the limited research population. Significant improvements in livelihoods will be difficult to present since the research population is small and farmers have only obtained their cow in 2007 and 2008. However, with these finding trends in livelihood improvements can be spotted as well as problems in the Dairy Project identified. The household survey was directed at the household level and answers were usually provided by the head of the household. In two cases, answers were provided by the partner and children of the head. In a few cases, whole households were present at the time of the interview. The two districts of the research have not been chosen at random but were chosen by Heifer Ghana. The organisation had chosen these districts out of logistical and practical considerations. The most important reason was that interpreters in the two districts were present who were also able to locate the dairy farmers at their farms in the villages throughout the districts. These interpreters were essential since the farmers were not easily found or easily accessed. In the other four districts of the Dairy Project, interpreters were not present or practicalities such as places to stay could not be arranged. All 24 and 18 participating households of the Dairy Project in respectively Suhum and Akuapem-South were to be interviewed. These 42 interviews were scheduled over 12 weeks but eventually eight interviews were cancelled because of time constraints of interpreters and farmers or because of personal reasons.

The first two weeks of the field research in south of Ghana were scheduled for observations and preparation of the household survey which were to be used in the interviews with the

participating households of the Dairy Project. The household survey¹⁵ included both open and closed questions. Questions on livelihood improvements were first tested in a test round with open questions and were later coded into pre-coded questions for the actual household survey. The data collection for this research was carried out in 12 weeks in the district of Suhum and Akuapem-South. A high dependence existed on the interpreters since they had their own main economic activity as well. However, they were essential in locating the farmers and in the interviews. In Suhum district there were two male interpreters present and in Akuapem-South district there were four. Transportation to the farmers throughout the districts was done by public transport, but also by motorcycle and rented car when transportation to the designated areas proved to be difficult.

During the 12 weeks of fieldwork also interviews with experts were held. The remaining two weeks of the fieldwork were used for data analysis and the writing and presentation of the report for the Heifer organisation in Accra.

3.5 Working Hypotheses

Working hypotheses have been used in the preparation and analysis of the findings in the research on the Dairy Project. The three main research questions and the working hypotheses are provided below:

Question 1: What are the socio-economic characteristics of the participating households?

Expected is that when looking at household characteristics, the participating households show variations in size and composition. Generally the households are expected to be large, over six household members, and to consist of nuclear and extended family members. Most likely there will be a substantial share of female-headed households among the respondents since Heifer Ghana stresses the importance of gender in its project and because reaching female-headed households is a main objective. Domestic tasks are expected to be carried out by mainly the female heads or the wives and possible other female household members because of existing traditional patterns.

Major household expenditures will be mainly food and school fees and attributes. The decision-making will be done most likely by the head of the household, which will be the oldest male or the oldest female in female-headed households. Homes will be owned mainly by the household¹⁶ or the family and are likely to be free of payment when in possession of the household or family. Only a few households are expected to rent their house and will need to pay a regular amount of money for living in the house. All respondents will be small-scale farmers. Land farmed by the household will most likely be rented or owned by the family and shared with more than one household. Payment for using the land is expected to be done by yearly (or longer) fees or through offering a share of the harvest. Land sizes are likely to be small because mainly smallholder farmers are thought to be reached through this project and they will not have access to large shares of land.

Agriculture will be the main source of income for most households and most income will come from crop production since the Dairy Project is targeting small-scale rural farmers. The income from

¹⁵ See Appendix C: The Household Survey

¹⁶ In this research no distinction is made on which household member owns the house and land (See Chapter 3.6 Limitations)

the cow will likely be an additional source of income. Besides the crop production and milk income, it is likely that most of the households have diversified incomes. Some household members will draw an extra income from keeping small ruminants, from processing and selling foodstuff and from working as vendors at local markets. For some households, members are likely to have moved to the capital, other major cities or even abroad for work and gain income there. The household will then receive remittances as an extra income.

Question 2: So far, what has been the impact of the Dairy Project on the livelihoods of the participating households?

It is expected that the initial motivations and expectations of the households to join the project have been to improve their income through the sale of milk. It is likely that a few will argue that obtaining the heifer itself was the main reason, which could be because of prestige or respect from the community. Others might argue that their initial motivations were to increase household health or to become a member of a group. Expectations are that when looking at the objectives set by the Heifer organisation, not all objectives will have been reached yet because the heifers have only been distributed in 2007 and 2008. Still, incomes will have likely gone up through the sale of the milk as an additional income. Improvements in health are likely to have occurred, while it is difficult to relate this to solely milk consumption. Social relationships are likely to have been improved when looking at an increased network. A main reason for this increase in network will be the Dairy Farmer Groups which have been created since the start of the project. Also, the Dairy Project is a pilot project and cow ownership is uncommon in the south of Ghana. Local communities might have shown great interest in the households that are now cow owners. It will be a novelty in the community. Through the project it is likely that household relations have been improved. The Heifer organisation has provided education on various subjects of which some were on gender equity and household participation. It is likely that more knowledge on these subjects have been put into practice by a considerable share of the households. It is also likely that knowledge and techniques on agro-ecology such as pasture development and composting of organic matter, taught by the Heifer organisation, have shown positive effects on household practices.

It is expected that most of the participating households will be generally positive about the impacts of the project on their household's livelihood now and in the future.

Question 3: What challenges do the participating households of the Dairy Project face?

Expected is, that problems concerning the Dairy Project are; taking proper care of the cow in unknown situation and; low milk production. Keeping dairy cows is uncommon in the districts and challenges for participants might be taking proper care of the cow for example when it is sick. Detection of illness might be done too late. Another challenge might be low milk production because of the relative newness of the project. Participating households might not be aware of all the factors that are needed for high milk production, of which feeding is the main factor. Low milk production would mean little or no additional income for the household while inputs for the cow and milk production are still needed.

Another problem which households might face is the destination of the bulls. There is little use in keeping the bulls because they will only cost money, and there will probably only be limited possibilities for the households to sell their bulls because of the limited market opportunities and the passing-on principle¹⁷ of the Heifer organisation as well. When households are planning to sell their bull they will need to inform and consult with the Dairy Farmer Group (see textbox 2.2).

3.6 Limitations

In chapter 1.3, the concept of a livelihood has been explained. Livelihood capitals are plentiful and not always known. Chapter 3.2 showed that the operationalisation of livelihood capitals is complex. In this research it has been decided to incorporate Heifer Ghana's objective in operationalising livelihood improvements. The Heifer objectives are; improved income, improved human health, improved gender equity and improved knowledge and techniques in agro-ecology. It is understood that the chosen indicators will not capture all the characteristics which are part of a household's livelihood. A baseline survey of livelihood levels before the Dairy Project was not available, therefore 'soft' indicators have been used, such as perceived improvements in human health, rather than 'hard' indicators, such as a decrease in hospital visits by 20 percent.

The operationalisation of the concept of a household has been discussed in chapter 3.2. But besides defining a household, also relations between household members play a role in understanding the household. In this research the household is seen as a joined decision-making unit though it is understood that in reality this may not be the case. Decision-making may not be done as harmonious as might follow from this study and resources may not always be pooled as well as benefits and powers equally distributed (Niehof, 2004). Still the household level as a unit has been used for this study because the aims and objectives of the Dairy Project are to reach and improve the livelihoods of rural households. In the household surveys and analyses of the interviews the focus will be on the household unless questions are specifically directed to individual members, such as questions on domestic tasks and main economic activity. Overall the focus is on the household's income and the household's stocks and assets.

In this study the concept of the household development cycle will be used. As was discussed before, knowing what stage of the development cycle the household is in, will provide insight in what sort of household is reached by the project. Still, the development cycle is a simplification of the real life situation. Households might not fit to just one stage. Age and the characteristics of both the head and possible partner of the head will be determining factors. But, even with various complications that might occur in using the household development cycle, it will prove to be useful in understanding households that are reached by this project. More insights in household characteristics will follow even when the amount of respondents is low.

The Dairy Project in Ghana is a pilot project and has started only recently. It has been implemented for less than four years and farmers have only received their cows in 2007 and 2008. It is also the first lactation for most heifers in the project. Usually the first lactation is lower than the following lactations (when the cow has had more than one calf). It is thus too early to speak of

¹⁷ See Appendix A: The Heifer Organisation

significant livelihood changes. That is why this study will focus on trends perceived in livelihood improvements. Nonetheless research on this project is still valuable since a trend can be perceived and problems and difficulties can be detected at an early stage of the project.

Another limitation is that the districts, in which this research will be carried out, have been chosen by the Heifer organisation. As has been mentioned before in chapter 3.4, the districts have been chosen out of logistical and practical considerations. However, it means that the districts have not been chosen at random. Rather than choosing households at random throughout the six participating districts, all participants in two provided districts are interviewed. Next to the small research population, this also leads to limitations in analyzing the results since the respondents have not been chosen at random and findings are not necessarily true for the households in other districts taking part in the Dairy Project. It is expected that the results will show little statistical significance when comparisons are made between the two districts because of the small amount of interviews in the two districts. Findings will be compared in type of household (male/female-headed) and district (Suhum/Akuapem-South). Frequency tables and figures will be generally used. In the following chapters the findings of the research will be presented.

Chapter 4: Socio-Economic Profile of the Participating Households

This chapter offers a socio-economic profile of the participating households in the Dairy Project of Heifer Ghana. As was discussed in earlier chapters the population of the districts are highly dependent on agriculture. With the Dairy Project, Heifer Ghana tries to reach the poorer segment of these rural households. Understanding the type of household that is targeted will offer better insights in the reach of this project and its influence on the participants' livelihoods.

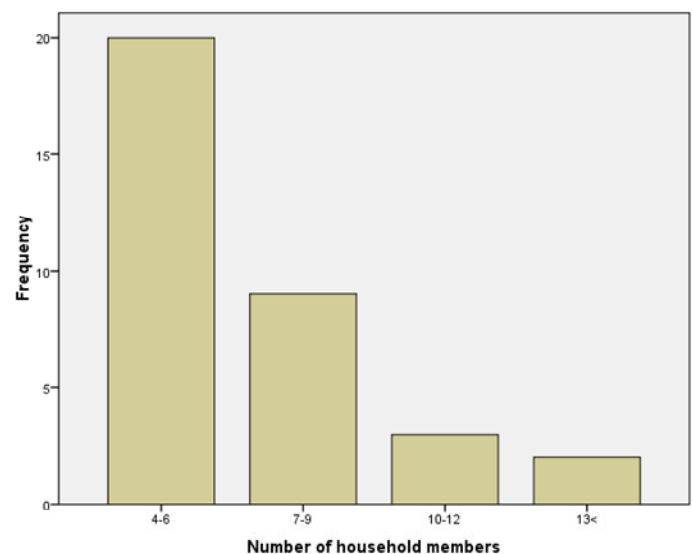
This chapter provides a socio-economic profile of the participating households and uses the pentagram as found in figure 3.1 in understanding the livelihood of the household. While livelihood improvements will be discussed in chapter 5, this chapter will look at the current position of the households. First the household characteristics (4.1) will be discussed such as size, composition and type of household. Then the resource position of the household (4.2) will be examined. Here units of household production namely land and labour, will be looked at. Capitals of the households such as finances, homestead and amenities will be discussed in section 4.4: Stocks and flows of the household. The economic activities of the household will be looked at in greater detail in section 4.3. In this section activities such as crop production and income from livestock and non-agricultural activities of the household will be discussed. Section 4.4 will discuss the households' most important sources of income, expenditures and assets as indicators of wealth. This chapter will end with a discussion, incorporating the main findings on the socio-economic profile of the participating households and its relation to previous chapters.

4.1 Household Characteristics

Size and composition of the household

The average household size of the participating households in the two districts conform the definition of chapter 3.2.2, is seven people. Suhum has an average of seven to eight persons which is higher than the average household size of Akuapem-South, namely five to six persons. Taken together, the average size of the nuclear household, the immediate family, is five persons. Of the 34 respondents, overall household sizes range from four to fifteen people. Figure 4.1 shows the different household sizes

Figure 4.1: Frequencies of household sizes in the research districts



N = 34
Source: Fieldwork, 2009

and their frequencies found in the research districts. No household smaller than four persons is present and most households consist of four to six people. In most households in the research districts extended family members are included, mainly nephews, nieces and grandparents. On two occasions workers are included as being members of the household. Some respondents indicate that through the project they are now able to take care of more extended family members or even take some in because they are now better able to take of them than before the project.

Household type

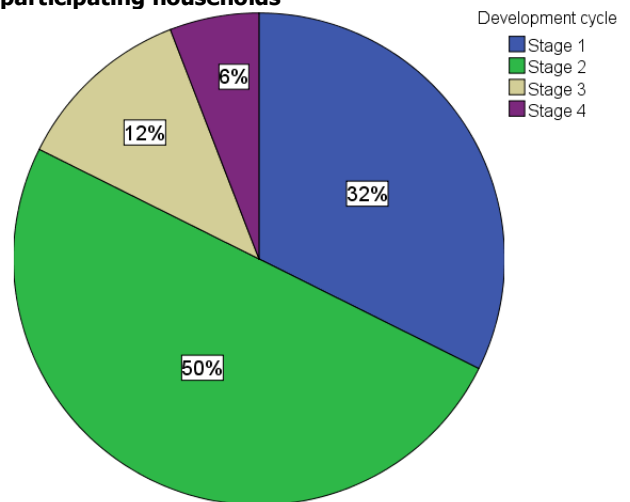
One of the objectives of the Dairy Project is to reach female-headed households and to improve the position of the female by increased ownership, in this case ownership of cattle. Of the in total nine registered female members in the Dairy Project, six households are female-headed households. Reasons for the household to be female-headed are the death of their partners or a divorce. One household is female managed because of seasonal work-migration to the capital city of the male head. The two remaining households of the registered female members are managed by the husband. Of all male registrations, the households are headed by the oldest male, the father or the grandfather. There are two households among the participants whose head has more than one wife. None of the respondents indicate to have a multiple headed household. Overall, of the 34 households interviewed, 31 of the registered household members in the Dairy Project consider him or herself as the head of the household.

Age and household development cycle

The average age of the households' registered members is 50 years, with the youngest being 25 and the oldest being 77 years. For the female-headed households this is 57 years, with the youngest being 47 and the oldest 76. The average age of the household head is also 50 years and the average age of the head's partner is 40 years old. Female partners thus tend to be a lot younger than households with a female-head.

However, age itself does not provide many insights into household characteristics, but the household's stage in the household development cycle does provide interesting information on the household's economic activity (see textbox 4.1: the household development cycle and the household dependency ratio). A younger household tends to have less time left for economic activities since one of the parents has to look over the young children. Figure 4.2 shows the four different stages in which the households can be categorized. From the figure it follows that half of the participating

Figure 4.2: Stages in the development cycle of the participating households



N = 34
Source: Fieldwork, 2009

households can be found in stage 2. This implies that half of the households reached by the Dairy Project have children of an age of being economically active. However, even though the children are of working age and theoretically household incomes increase and investments are made, in the interviews it was found that many of the children of 15 years and older are still in (secondary) school. This leaves the household with increased costs for education and with less economically productive time. One third of the households are found in stage 1 of the household development cycle. Overall the Dairy Project is reaching mainly 'young' households, households with young adults and children who generally have not yet started a household on their own.

Textbox 4.1: The household development cycle and the household dependency ratio

The household development cycle:

Stage 1: This is the start of the cycle, the formation on a new household. Young couples without children become couples with young children. Generally, the mother spends her time on taking care of the children and can no longer spend her time on economic activities. Income activities tend to be weak.

Stage 2: The children are of an economically active age. The income increases and can be used as new inputs or investments.

Stage 3: The children start a household of their own. The household increases because of the moving in of spouses and new children that are born.

Stage 4: This is the final stage. The now elderly couple is not able to perform (all of their) economic activities. They live alone or with their children and become dependent on the support of their social network (Barto, ea, 1999; Cain, 1978).

The household dependency ratio

The dependency ratio of a household represents the number of persons in the non-economically active ages (< 15 and >65) to the number of persons in the potentially economically active ages (15-64). This is then multiplied by 100. It follows that the higher the ratio, the more dependents in relation to potentially economically active people exist (Mtshali, 2002).

The household dependency ratio of the two districts together is almost 100. This means that on average to every person of non-economic active age stands one person of potential active age. When the districts are looked at separately, Suhum has a dependency ration of 108 and Akuapem-South of 87. This shows that among the dairy farmers, the households in Suhum know a higher share of economically dependent household members. Female-headed and female-managed households know a ratio of 90 and have less economically dependent members than the average. Overall the household dependency ratio is not very high. However, earlier it was said that many of the households have children of an economically active age who go to school. In the household survey it was asked what the main (economic) activity of the household member is. When placing the members with a main non-economic activity in the economically dependent category, both districts show a substantial increase in average dependency ratio. The total average becomes 159 in stead of 100. For Suhum the ratio becomes 165 and for Akuapem-South 152. Again, the households in Suhum have a larger share of economically dependent members than Akuapem-South. Female-headed and female-managed households have a ratio of 160 which is considerably higher than the former ratio of 90. It should be noted that overall, even though school might be the

main activity for many children of 15 years or older, some of the children earn an extra income for the household by for example helping on the farm after school and during holidays.

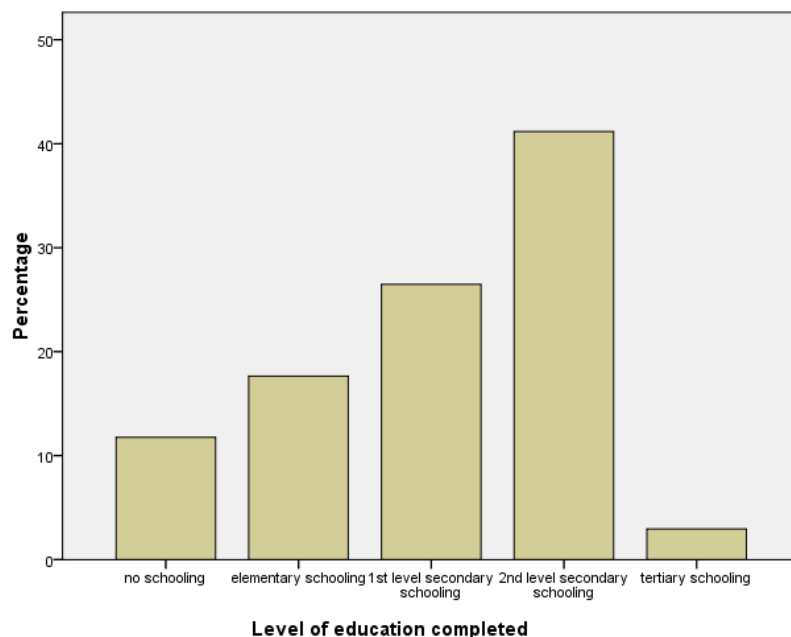
Education

The education level of the head of the household and that of their partner is important as a household characteristic for various reasons such as in decision-making and economic activity. Figure 4.3 shows the highest level of education completed by the head of the participating households in the project. It follows that most of the heads have received some form of education. More than half of the heads have finished secondary schooling of which most up to the second level¹⁸. There has been only one example of a farmer finishing tertiary schooling. One out of every ten of the heads has received no schooling at all. When looking at only the female heads, two have not received any schooling during their life and only one has made it to the second level of secondary schooling.

Figure 4.4 shows the highest level of education completed by the wives of the head. 27 cases are presented since 6 households are female-headed and one male-headed household has no partner. Like the heads, most partners have obtained some level of education

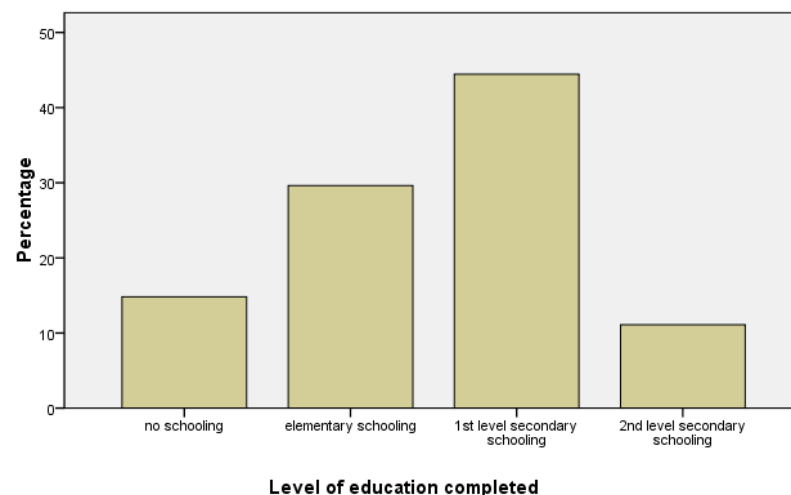
and most of them have finished the first level of secondary schooling. Clear is when comparing figure 4.3 and 4.4 that more heads have obtained a higher level of education than their partners.

Figure 4.3: Highest level of education attained by head



N = 34
Source: Fieldwork, 2009

Figure 4.4: Highest level of education attained by partner of head



N = 27
Source: Fieldwork, 2009

¹⁸ This level prepares children to tertiary schooling such as college or university.

More male heads have completed the second level of secondary schooling (40 percent) compared to their female partners (10 percent). No differences exist between Suhum and Akuapem-South.

Migrants

Earlier it was established that defining a household and its members is difficult. Some migrated members might be seen as members even though they are living somewhere else and visit sporadically, while others might visit all the time and eat with the family. In this study, migrants are those household members who do not live or eat with their family members on a regular basis. They can however contribute to the household income in cash or kind. In the research, almost half of the participating households have absent household members. The average number of absent household members is between two and three persons, ranging from one to eight persons in one family. A considerable portion of these absent household members are children of the head who have been sent to boarding schools, these are not considered migrants since the household pays for their tuition and they come home on a regular basis.

Migrated household members are generally sons and daughters of the head who have started working in a close-by city or in Greater Accra. Here, they work as sellers, taxi-drivers or shop-assistants. Only one family has a household member abroad.

4.2 Resource Position of the Household

In this section resources of the household will be discussed. Here the resources 'land' and 'labour' are a form of natural and financial capital as can be found in the conceptual model of chapter 3.3. In section 4.3 the economic activities that follow from these resources will be discussed. In section 4.4 the actual stocks and flows of the participating households will be provided. Here, specific characteristics of land and labour will be discussed.

4.2.1 Land

Size

All except one participant in the Dairy Project has access to land which he or she farms. In both districts there are no farmers who have plot sizes smaller than 0.5 acres¹⁹. The average plot size of the two districts combined is 7.6 acres (3.1 hectares). Most households have farmland between 0.5 and 12 acres. The average plot size for farmers in Suhum-districts in 2000 was 5.9 acres (MLGRD-Suhum, 2000). The average plot size for participating households of the Dairy Project in Suhum is 4.6 acres. However, when plot sizes of the participating households in Suhum are compared to the district average (see table 2.5) it follows that the majority of participating households fall into the main two categories, namely those households with plot sizes smaller than 1 hectare and plot sizes smaller than 3 hectares (79.3 percent). In Akuapem-South the average plot size is considerably higher than that of Suhum, namely 11.9 acres. However, in Akuapem-South there are a few households found with extremely large land sizes compared with other participants. Figure 4.5 (Boxplot of plot sizes per district) shows the distribution of the plot sizes of the participating

¹⁹ 1 acre is 0.405 hectares

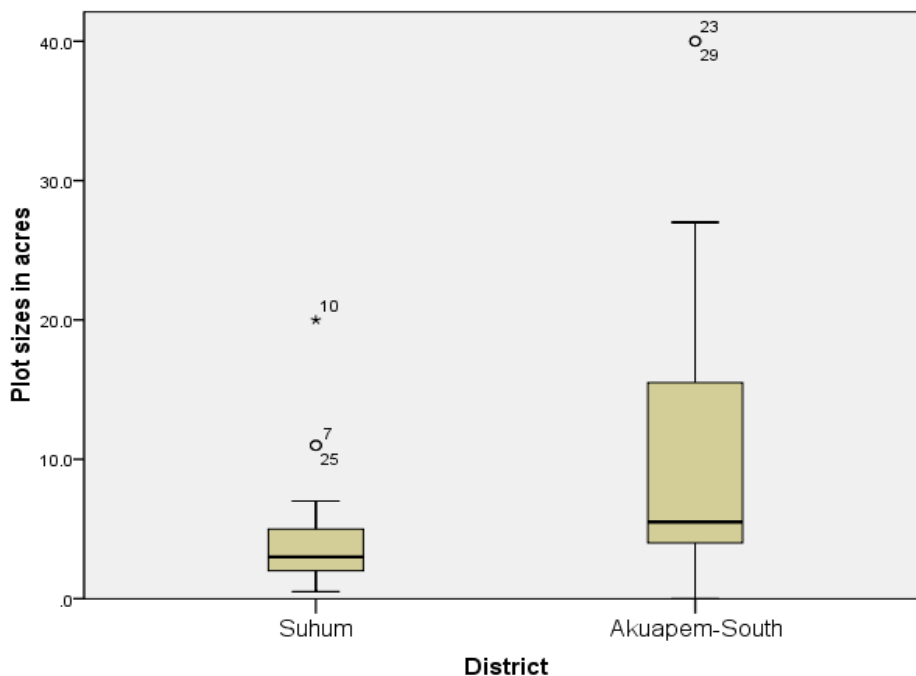
households per district. Box 4.2. explains what a boxplot is. From figure 4.5 it follows that more households in Suhum district have smaller plot sizes than households in Akuapem-South. They are however more comparable in size, while in Akuapem-South, the distribution and plot sizes are more spread. No significant statements can be made when comparing the two districts because the research population is very small. However, by using the boxplots, the distribution in plot sizes becomes visible and comparable. Three out of every four participating households in Akuapem-South have larger plot sizes than the average plot sizes found in Suhum. For both districts it follows that there are a few households that have access to significantly more land. Especially for Akuapem-South it follows that plot sizes vary considerably among the participating farmers.

Of the 33 households, 23 are momentarily using all the land available for cropping. Ten households leave some of the land fallow because they want the soil to regain its fertility.

Textbox 4.2: What is a boxplot?

A boxplot provides information on the spread of a variable. The box represents the interquartiel distance, the mid-50 percent of all the cases. The black line in the box represents the median and the top and the bottom of the box represent 25 percent of the cases. The upper and lower black lines, the whiskers, represent the highest and lowest 25 percent of the cases. Cases falling outside the figure are outliers or extremes. When the median is not found in the middle of the box the spread is skewed and the bigger the box the higher the spread of the variable (de Vocht, 2005).

Figure 4.5: Boxplot of plot sizes per district



(Suhum N = 20 and Akuapem-South N = 13)
Source: Fieldwork, 2009

Tenure arrangements

Most of the plots of the participating households are owned by families. A family in this context is understood as family members of the household head or partner who are not part of the household. Table 4.1 (Land ownership per district) shows that there are small differences in land ownership when the two districts are compared. It does follow that the district of Akuapem-South knows no shared ownership of land.

More than half of the households have to pay either their families or the landlords for using the land they farm²⁰. This

Table 4.1: Land ownership per district

N = 33	Owner of the land				Total
	Household	Family	Rented	Shared ownership	
Suhum	4	6	5	5	20
Akuapem-South	3	6	4	0	13
Total	7	12	9	5	33

Source: Fieldwork, 2009

is in line with the fact that most households do not own the land themselves. Payment is done in cash or kind, mainly a monthly fee or through sharing the harvest. The system of Abusua, when payment is done through a share of the harvest, is most common. A third of the harvest is then given to the landowner. When an amount of Ghanaian Cedi (GHC) is paid for use of the land, numbers vary considerably. There are farmers who pay GHC 6 (€3.25) per acre per year and there are those who pay GHC 80 (€43.30) per acre per year. The average amount of those farmers who pay for using the land is GHC 30 (€16.24) per year. Generally households pay more per acre when the land is rented from a landlord. However, it is unclear what the reason is for the great difference in price per acre. Fertility or location to the land might be a factor in the price per acre. Two farmers pay for their land in manure obtained through the project. Participating households in Suhum district tend to pay more in cash and kind for using the land than the households in Akuapem-South but no statistical relationship is found. Also no relationship is found when comparing ownership and payment between the two districts. In the interviews it became clear that tenure arrangements are not as straight-forward as might be expected. This is demonstrated by the examples provided in box 4.3 (Tenure arrangements in the research districts).

Textbox 4.3: Tenure arrangements in the research districts

Many households have indicated that the land they farm is owned by family members. Some do have to pay for using it, other households do not. 'It is family land, we share it with my husbands' siblings but presently only my husband uses it. Sometimes his brothers come by and then get a share of the harvest' (Household 4, 2009). Also it is not always known what amount of GHC households pay per acre or even, how many acres they own. Arrangements for tenure can be very open and informal and up to the landowner when what is paid. 'I do not know the exact land size, it is big. It is family land and I have access, sometimes I pay rent, sometimes I give a share of the crops and sometimes I give harvest away for free' (Household 9, 2009) and 'The plots I use are my family's. I use them when they are not around and when they come by, they then get a share of the land' (Household 17, 2009). Source: Fieldwork. 2009

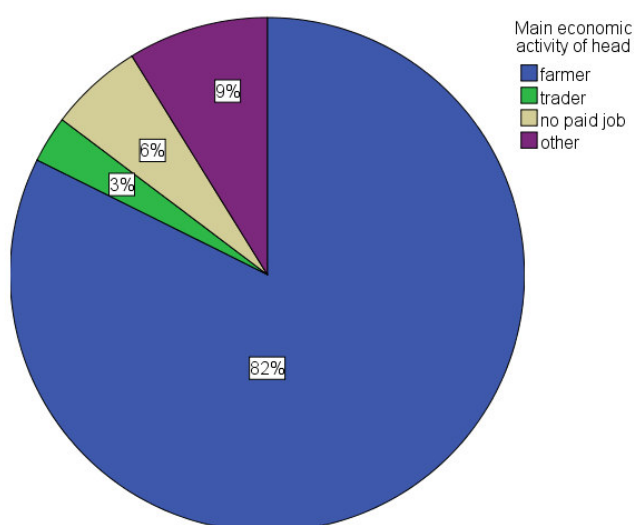
²⁰ See Appendix C, table 6.2: Payment per acre per district

4.2.2 Labour

Main occupation head and partner head

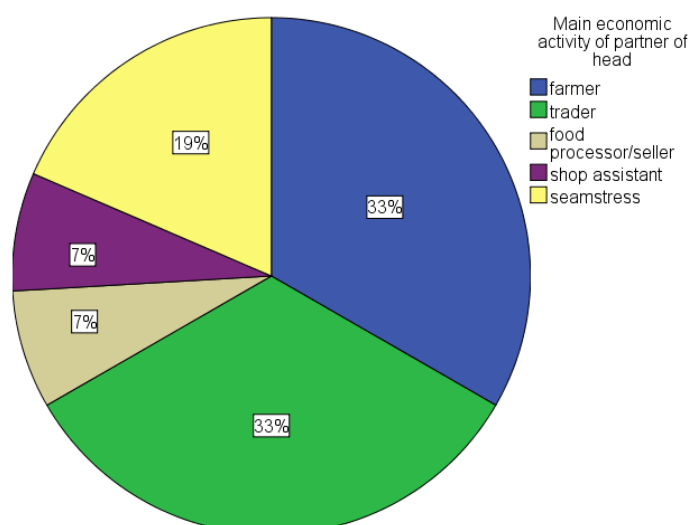
On average in every participating household there are 3.8 members of economically active age. The numbers in the research districts vary from one to ten. Two heads do not have a main economic activity. Farming is the main economic activity for over 80 percent (28 cases) of the heads of the households. Other activities mentioned are; trading, government employee and seasonal labourer. Figure 4.6 and 4.7 display the main economic activities of the head and the partner of the head. The most common main activity of the partner of the head is farming, trading and working as a seamstress. Of the seven missing values in figure 4.7, six are female-headed households and can thus be found in figure 4.6. The other missing value is because one head of the household does not have a partner. For five of the six female-headed households farming is their main activity, the remaining has no paid job. She is 76 years old, the head of the household and the registered member of the Dairy Farmer Group. Of all the respondents whose main activity is farming, two argue that taking care of the cow is their main economic activity. The main economic activity of the heads and partners between the two districts is highly comparable.

Figure 4.6: Main economic activity of head in percentage



N = 34
Source: Fieldwork, 2009

Figure 4.7: Main economic activity of partner of head in percentage



N = 27
Source: Fieldwork, 2009

Division of domestic tasks

Besides economic activities there are also non-economic activities such as domestic tasks. The researched main domestic tasks are: cooking, fetching water, washing clothes, fetching fire wood, cleaning the house and looking after the children. It is found that besides the female-headed households, the wives are responsible for all these tasks. Some wives are assisted by their children in cooking and cleaning of the house. Some heads help in fetching water, fetching fire wood and looking after the children. Some tasks are done by the whole family such as washing of

clothes. However, next to the economic activity of the wives and female-heads, they all take up more domestic tasks than any other household member. This was initially expected as well.

Hired labour

There are different types of hired labour. Some labourers can be permanent, some seasonal and some incidental workers. In the household surveys the focus was not on labourers and so no questions were asked what types of labourers were employed and what they were paid. However, during the interviews it became clear that some respondents see their labourers as part of the family who lives in their homes and with whom they share their harvest. Some households have permanent hired labourers who are considered part of the household (see chapter 4.1). Three households employ hired labourers, namely two, three and six labourers. No household members themselves are hired to work as farm labourers elsewhere.

No differences are found between female and male-headed households or between the districts. However, households with larger shares of land tend to have more labourers working on the land.

4.3 Economic Activities of the Household

4.3.1 Agriculture

Crop production

Of the 34 households interviewed there is one that does not farm land. The types of crops farmed by the households that do have land vary between one and six. The average of different types of crops is three. All the households grow maize as is shown in table 4.2. Maize is the main staple crop and for most households 50 to 75 percent of the harvest accounts for sale. Maize is a crop which can be stored and dried and sold at a later stage, mainly in the dry season when harvests are low. Also cassava is grown by most of the respondents. This follows the findings of table 2.2 (Proportion of households growing major crops). Here maize and cassava are the crops most commonly grown by farmers throughout the country. Table 2.2 shows that, excluding maize and cassava, plantain, cocoa and oil palm are the most popular crops in the forest zone to which Suhum and Akuapem-South belong to. Cocoa and oil palm are cash crops while plantain is mostly a consumption crop. This is also found in the interviews. While one third of the households grows plantain, all of them argue that they grow plantain for home consumption since little money is paid for this crop at the market. Other main consumption crops are tomatoes, cocoyam and yam. Fruits like papaya and oranges, also farmed by one third of the respondents, are mainly a production crop.

Table 4.2: Crops grown by households (in %)

Crops	% of households
Maize	100
Cassava	81
Plantain	36
Fruits	36
Oil palm	27
Vegetables	18
Cocoa	15
Other, ... *	15
* Other = beans, cocoyam and yam	

N = 33
Source: Fieldwork, 2009

Cocoa is a cash crop purely farmed for production purposes. Many cocoa farmers are found in the districts though not many cocoa farmers are found in the Dairy Project. A reason why so little respondents grow cocoa could be that the households reached through this project are smallholder farmers and they tend to grow more crops for consumption than for production. Cocoa farmers tend to have larger shares of land (see table 2.2) and a better economic position because they are producing cash crops rather than consumption crops

One of the main objectives of the Dairy Project is to positively influence the livelihoods of poor smallholder households. And in this project, one in every five farmers uses 100 percent of the harvest for home consumption. Still, it is found that for more than a third of the households, the crop harvest is less than 25 percent used for consumption, meaning that over 75 percent of the harvest is sold at markets or elsewhere. A relation can be found between the plot size and the consumption and production patterns. When households with larger plot sizes are looked at (5 acres or more) it becomes clear that they tend to use smaller shares of their harvest for own consumption but sell more. They are in the position that they can sell more of the harvest because they do not need all for consumption. The amount of crops they grow is four and is more than the group's average.

When looking at the female-headed households, maize, cassava, oil palm and fruits are the only crops grown. Like the average farmers, also female-headed households grow three types of crops. Most of the crops are grown for home consumption for at least 50 percent of the harvest.

When comparing the two districts, Suhum has a higher amount of type of crops grown (3.5) than Akuapem-South (2.5). However, in Suhum shares of land tend to be smaller and more crops are grown for mainly home consumption than in Akuapem-South. No difference between the districts was found in the type of crops grown.

Livestock

Prior to the project most of the participating households did keep some animals but were not primarily livestock farmers. None of them owned cattle before they received the heifer from the organisation. All the participating households of the Dairy Project have received their heifer in 2007 or 2008. The frequencies of the number of cows present within the households are shown in table 4.3. Though all the heifers were pregnant upon arrival, some cows had a natural abortion or miscarriage and have not been pregnant since. This has been experienced by five households. Households that have

two cows, will need to give away their calf in the future to the next participant of the project waiting for a pregnant cow since this is part of the passing-on principle of Heifer²¹. The households that have three cows can keep the third calf for themselves, when it is not a bull. From table 4.3 it

Table 4.3: Cows present at household farms

No. of cows	Frequency	In %
1	5	14.7
2	25	73.5
3	4	11.8
<i>Total</i>	<i>34</i>	<i>100</i>

N = 34
Source: Fieldwork, 2009

²¹ See Appendix A: The Heifer Organisation

follows that not many households have three cows. Three of them who do, have received their cow from the organisation in 2007. Two of the households are female-headed.

Products from the dairy cow are used for household consumption and production. However, not all cows are producing milk. Ten of the 34 cows produce no milk at all and four produce less than 4 litres a day. For most of the other households the cow is producing between 4.1 -7 litres (11 cases) and 7.1 – 11 litres (8 cases) and for more than half of the households 75 percent or more of the produced milk is sold.

Four of the six female-headed households have cows producing more than 4 litres a day. However, consumption and production patterns of these households vary. One female-headed household uses all the milk for home consumption while one sells all the milk. This household has more household members to take care of.

When looking at Suhum and Akuapem-South separately, no real differences are found. For both follows that most of the members (60 percent) have received their cow in 2008. Also the amount of cows present at the farm does not differ. Consumption and production patterns do differ between the districts. While in Akuapem-South 80 percent of the farmers are selling more that 50 percent of their milk, in Suhum-district this accounts for 35 percent. There is also a higher share of households in Suhum district whose cow is currently not producing any milk.

Six of the 34 household do not own other animals besides the cow. Two of them did own poultry before the project. For the other 28 households type and numbers of livestock are highly varied. The average type of livestock kept, excluding cattle, is 1.5. Goats, poultry and sheep are most commonly found. This also follows the national and district averages. Table 2.3, table 2.6 and table 2.7 shows that sheep, goats and poultry, including exotic and local poultry, are the most commonly owned farm animals by households in the overall districts. Table 4.4 shows that just over half of the participating households owns goats. Goats are generally seen as a consumption unit (meat) or as a quick source of cash (sale). Most of the respondents own two goats while there are also many households keeping up to seven or ten. Poultry is the second most popular livestock kept by the households. Poultry includes local and exotic breeds such as chickens, fowls and guinea fowls. Some households keep only two or four, but most households with poultry keep ten to twenty. Households with low numbers of poultry use them mainly for consumption purposes while those households with larger numbers tend to sell more poultry. The third most commonly kept animals are sheep. All households keep sheep for own consumption. Other livestock kept by the participants are pigs, rabbits, grasscutters, ducks and bees. They are almost all solely kept for

Table 4.4: Livestock owned by household

Livestock	% of households	Variations in numbers
Cows	100	1-3
Goats	53	1-10
Poultry	32	2-55
Sheep	18	2-12
Other, ... *	15	X
* Other = pigs, rabbits, grasscutters ²² , ducks and bees		

N = 34

Source: Field work, 2009

²² Grasscutter is the more common name for the Greater Cane Rat and it is a type of bushmeat.

production purposes. From these figures it follows that most of the farm animals, excluding the cow, are not kept for production but for home consumption. Also, a few households indicate that they keep their animals for sale for in times of need. Some households also keep animals to give them away as presents at weddings or other ceremonies.

Five out of the six female-headed households keep other animals besides the cow. They usually keep one or two types which are goats, poultry or sheep. All but one household keep livestock for solely consumption purposes.

The amount and the type of animals kept by households in Suhum and Akuapem-South are similar to the overall average previously discussed. Households in Akuapem-South tend to have more animals of one type. Also in this district, more animals are kept for production reasons than in Suhum-district where animals are more commonly kept for consumption and ceremonial reasons.

4.3.2 Non-agricultural activities

Most households in the Dairy Project are crop-farmers and see crop-farming as their main economic activity. There are however also other important income-generating activities. In chapter 4.2.2, the main occupations of the head and the partner of the head have been discussed. Four heads of households have non-agricultural activities as their main economic activity. This accounts for two thirds of the partners of the head (figure 4.6 and figure 4.7). However, more than half of the partners indicate that they help on the farm as well.

The main non-agricultural activities for the partners are trading, food processing or food selling and working as a seamstress or shop assistant. Food-processing is mainly done on the farm while the other activities are mainly off farm. Processing gari from cassava and oil-palm production are the most common food-processing activities (see figure 4.8).

When comparing the non-agricultural activities of the heads and their partners in Suhum and Akuapem-South, no differences are found. However, slightly more heads in Suhum have non-agricultural activities as main economic activities.

4.3.3 Remittances

Household remittances are in cash, such as money transfers, or in kind, such as foodstuffs. Almost three out of every four households in the Dairy Project does not receive remittances from absent or migrated household members. This is because they are either still students or because they have started a household of their own and have stopped sending remittances to the household they

Figure 4.8: Process of gari-making



Source: Fieldwork, 2009

once belonged to. The other households do receive remittances and this is mainly from former household members living in the country rather than former members who have migrated abroad.

Two of the six female-headed households receive remittances from family members in the country, one receives remittances from her husband and the other receives remittances from her migrated daughter. More households in Akuapem-South receive remittances than households in Suhum. However, overall, household contributions from remittances are small and infrequent. They should rather be seen as gifts and extra money in times of need than as an extra income.

4.4 Stocks and Flows of the Household

In this section the present financial and physical capital of the participating households will be discussed. In general, incomes of rural households are difficult to measure, farmers receive seasonal incomes from crop production and inputs and outputs are usually not registered, let alone the registration of the total yearly income from all different sources. Still, obtaining insight in rural incomes is important in understanding households' livelihoods and strategies. In order to gain these insights, figures of the harvest sale of the previous year are obtained. However, answers are distorted. Many respondents do not know their income and guessed when asked. Also, there were two respondents who did not want to provide their income figures. There might have also been households who have not provided their real income in the household survey, keeping in mind the positionality of the interviewer as a researcher for the Heifer organisation. With that, most household incomes are incomplete because many heads of the households are not familiar with the income of their partners. This also indicates that not all incomes are pooled together as suggested by Niehof (see chapter 3.6). Still, income figures have been obtained in order to provide a fuller picture of socio-economic household characteristics since income levels can be compared between types and localities.

Like natural capital, such as land and livestock, physical capital can also be used as an indicator of wealth and proves to be useful especially when household incomes are difficult to come by. In this study the home ownership will be looked at as well as the amenities at the homestead, the quality of the house and consumer durables.

Income levels

Table 4.5 provides insights in the average incomes from different type of sources for different types of households. Remittances have not been incorporated in this table because only two households receive small regular amounts of money from family members while most of the households with migrated members receive nothing. Six households receive food kinds and irregular gifts and two receive various amounts of money on a regular basis.

The yearly income from the dairy cow, as found in table 4.5 is an extrapolation of the daily income to a yearly income based on 300 days²³ of milk production. It has been incorporated in the overall household income. However, the income from dairy products is an estimation and not a

²³ In an FAO report of 1993 it was argued that on average the median milk production per cow is 320 days (Coppock, 1993). Here 300 days was chosen since a young and not a mature cow is found in the project areas.

hard figure. Also, 60 percent of the household have received their cow in 2008 and have not yet received an extra income from the cow for a full year. Therefore, the income from the cow as provided in table 4.5 shows a trend rather than an actual obtained income. However, the trend that can be perceived in table 4.5 is that the income generated from the cow could prove to be an important source for the households. It is an additional daily income for rural households and if the rates keep up, over time, dairy production can contribute greatly to overall household incomes.

Also, the income levels of table 4.5 are incomes, not profits. Inputs for taking care of the cow such as supplementary feed and tools for hygiene and feeding as well as inputs for crop production such as tools and implements for crop-production have not been deducted. From table 4.5, it follows that generally, crop production remains the main source of household income. Most households do not obtain an income from livestock, excluding the dairy cow. Only a few households obtain an income from other farm animals.

Table 4.5: Household income per districts and type on a yearly basis in GHC

Income sources		Female-headed households <i>N = 6</i>	Suhum district <i>N = 19</i>	Akuapem-South district <i>N = 13</i>	Total <i>N = 32</i>
1	Crop production	336.67	336.25	802.50	515.58
2	Livestock: Cow	300.00	455.00	767.14	591.56
3	Livestock: Other	0	2.35	217.78	76.92
4	Non-agricultural activities	200.00	433.33	410.00	429.09
Total; in GHC		GHC 836.67	GHC 1226.93	GHC 2197.42	GHC 1613.15
in €		€ 452.89	€664.14	€ 1,189.47	€ 873.20

Source: Fieldwork, 2009

The national GDP per capita in Ghana of 2008 is USD 1500²⁴ (World Factbook, 2009). The districts have an average household size of seven people (see chapter 4.1). The average per capita income of the participating households is then USD 165. This is far less than the national figure. Figures become even lower for female-headed households and households in Suhum since their household sizes are larger and average incomes are lower.

The international set line for extreme poverty line is set at less than USD 1.25 per capita per day. With the income figures obtained in this research, the average household income of the participants of the Dairy Project falls far below this level. But, as has been argued before, the figures are incomplete and table 4.5 should be put in perspective.

However, the figures obtained do provide information on female-headed households and district differences. Incomes of participating households are highly varied. Female-headed households have the lowest average household income which is almost half of the average income and almost a third of the average income of households in Akuapem-South. Akuapem-South has an income average which is almost twice that of Suhum. A reason could be that more households

²⁴ Currency converter of 01-04-2009, euro to US dollar is 1:1.328 [www.oanda.com/convert/classic]

in Akuapem-South have larger plot sizes, they use more crops for production than consumption, milk production is higher and there are more commercial livestock farmers than in Suhum.

Expenditures

In the interviews most households indicate that money earned is money spent. As was expected prior to the research, most money made by the households goes straight to food, school fees and school attributes²⁵. Once these are paid, no money is left to be spent on anything else. As was found in the household development cycle (figure 4.2) most households have children of economic active age, but most of these children are still in school. In Ghana, school fees are free for children in elementary school, but parents have to pay school fees for higher levels of education, which is the case for half of the households in the Dairy Project. Also, school attributes at all levels of education are to be paid for by the household. Clothing and medical expenses are other main expenditures.

When looking at the decision-making in the spending of income, almost all respondents indicate that decision-making of food consumption is done by the head and its partner. Half of the respondents indicate that joined decision-making also exists concerning farm production, school necessities, clothing, and other things. A small change is notable in comparing the data before and since the project, because more solely male decision-making has been replaced by combined decision-making. A reason for this shift could be the Dairy Project. In trainings household relations and gender awareness have been discussed.

Home ownership

Home ownership can be seen as a household's physical capital. Households that own the house they live in can be seen as wealthier than those who rent it. Also the quality of the house and the size of the house are related to the wealth of the household. The average amount of rooms in the house is three though some households have houses with eight or ten rooms. No differences are found when comparing female-headed and male-headed households or when comparing the two research districts. However, a variation in home ownership can be found when comparing the two districts.

Table 4.6 shows that most houses are owned by family, followed by houses rented and household ownership. The distribution of ownership is more equally spread in Suhum than in Akuapem-South. In comparison, in the latter more houses are owned by the family than by households and landlords together. In this research no distinction has been made in the household member owning the house. 23 farmers, almost 70 percent of the farmers, do not pay a third party for living

Table 4.6: House ownership per district

N = 34	House ownership			Total
	Household	Family	Rented	
Suhum	7	7	6	20
Akuapem-South	2	8	4	14
Total	9	15	10	34

Source: Fieldwork, 2009

²⁵ See Appendix C, table 6.3: Expenditures before and since the Dairy Project

in the house, even though only nine households (26 percent) are the homeowners themselves. This percentage is comparable to both districts. For those who do pay, monthly payments are usually under GHC 10. There are ten cases of which the household pays the homeowners in goods and in services rather than in cash.

Amenities on the homestead

All houses in the two districts are single story buildings, comparable to the district average (see chapter 2.2.2). Table 4.7 shows the various amenities present at the homesteads of the participating households. The 'toilet' at the homestead is understood as a W.C. in the house and a KVIP separated from the house²⁶. Pit latrines and public toilets have not been included since these are no private amenities and are less hygienic than the other two. Connection to a telephone land line has not been looked at since this has become irrelevant because of the widely used mobile phone, also by the participating households.

Table 4.7: Household amenities on the homestead (in %)

N = 30	Toilet		Water		Electricity	Kitchen
	WC	KVIP	Tap water	Well		
Suhum (<i>N</i> = 18)	18	18	18	6	35	24
Akuapem-South (<i>N</i> = 12)	39	15	46	8	39	31
Total	27	17	30	7	37	27

Source: Fieldwork, 2009

From the table it follows that more than half of the households use pit latrines and public toilets as their toilet facilities. The KVIP and the W.C. are used by 44 percent of the households. Only 37 percent of the households have access to a private water tap or well. The other households have to walk to a public well in order to obtain drinking water. The average distance is 263 metres with an average for Suhum of 184 metres and 435 metres for Akuapem-South. The largest distance to drinking water for one household is two kilometres. In both districts over half of the respondents do not have electricity at their homestead. Since poles have recently been installed, expectations are that by the end of 2009, all localities will have access to electricity. Cooking is done mainly outside, and for 75 percent of the participating households no kitchen was found inside the house. Differences in housing characteristics between male and female-headed households were not found. In general, households in Akuapem-South have better access and better amenities at their homestead.

Quality of the house and consumer durables

Earlier, home ownership and household amenities have been discussed. Another important indicator of stock and wealth of the household is the quality of the house and consumer durables that are present. In table 4.8 various aspects of house qualities, such as windows and walls, and consumer goods are provided. The windows with the highest quality are presented in this table.

²⁶ A KVIP is a special designed pit latrine working with different compartments which can be sealed off. It is more hygienic than common pit latrines.

Glass louvers with mosquito gauze or wooden panels with mosquito gauze are the highest valued since protection from wind, sun and rain is provided as well as protection from mosquitoes and possible malaria mosquitoes. The total percentage of households with these types of windows is 43 percent. A third of the household had only window frames or frames with wooden panels. Two households lived in houses without any windows. Generally, participating households in Akuapem-South live in houses with better windows. No differences were found in the quality of the houses between female-headed and male-headed households.

All households have roofs made of corrugated iron unlike the 25 percent found in Akuapem-South (see chapter 2.2.2). Most houses have either mud or cement walls which are plastered. Plastered walls protect especially mud walls from decaying from the rain.

The ownership of a mobile phone is very common and all but two households own at least one. Interestingly, as was found before, not all houses are connected to the electricity network, so these households have to find other ways for recharging their phones. Radios ownership is common, while TVs are less frequently found and refrigerators even more so. The latter two are high consumer goods and not applicable for houses that are not connected to the electricity network.

The quality of the house and the various types of consumer goods are not different from the average for female-headed households. Also when the districts are compared no real differences are found. Walls of the houses in Suhum tend to be in a better condition, while in Akuapem-South the windows are of a higher quality. More households in the latter also own a refrigerator and radio.

Table 4.8: Quality of the house and consumer goods (in %)

N = 30	Window frame*	Roof of corrugated iron	Walls*	Radio	TV	Refrigerator	Mobile phone
Suhum (<i>N</i> = 18)	35	100	83	53	39	18	90
Akuapem-South (<i>N</i> = 12)	54	100	70	77	38	31	93
Total	43	100	76	63	33	23	94

* Windows: Glass louvers and mosquito gauze & wooden panels and mosquito gauze

**Walls: Mud blocks and wattle plastered & cement blocks plastered

Source: Fieldwork, 2009

4.5 Discussion

The four sections in this chapter have shown that the household characteristics and their assets, which determine the living gained by the household, are highly varied. Prior to the research it was expected that all participating households would be poor smallholder farmers since these were to be reached through project. This was not the case. Also, one out of every five participating household were female-registered cow owners. It was expected that these levels would be higher since Heifer Ghana stresses the importance of gender in its projects (see chapter 3.5).

The participating households of the Dairy Project form a heterodox group. It is apparent that different households are reached through the project, the standards of living vary greatly among participants. First of all, when looking at the household characteristics, ages are highly varied and household sizes differ considerably. Most households are generally young when looking at the development cycle. This might be related to the nature of the project. New skills need to be

obtained and households need to be committed when joining the project. Young households in the first and second stage of the household development cycle might be more willing and capable to invest, so also to participate and invest in the Dairy Project than older households.

Most heads and partners have received some level of education and these levels are relatively high. Only a few have not had any schooling. Interestingly, the partners of the head tend to be lower educated. As was suggested in chapter 4.1, education could play a role in decision-making within the household and in economic activity. However, no such relations were found.

Access to land as a resource, is highly varied. There are households with considerable larger plot sizes than other. However, sizes are comparable to the averages in Suhum-district (see chapter 2.1.1). Plot sizes of the participating households in Suhum were smaller compared to the district average of Akuapem-South. Still, households in Suhum pay generally more for using the land. Payments for plot sizes follow earlier expectations (see chapter 3.5), however, great differences were found in amount of payment and shared-cropping.

As expected, agriculture is the main economic activity for the household and crop farming is the main source of income. The most common crops grown follow district averages of chapter 2.2.1 and 2.2.2, namely maize, cassava and plantain. None of the households derive their household income from solely one economic activity. Diversification activities are presents of which the cow could form an important additional economic activity. One out of six households do not own other livestock besides the cow. It was thought that farm animals would play a more economic role in participating households, however, most farm animals are kept mainly for consumption purposes and not for production. It does follow the general theories of chapter 1.4. Livestock usually plays a minor economic role. Experts in the field, Mr Vormavor (governmental official and agriculturalist) and Mr Adams (livestock and development researcher with the University of Ghana) argue that livestock is a back-up for investment, most farmers do not see animal rearing as a business in itself. Farmers are aware that livestock brings in cash with sale but they do not keep animals 'for a basis of daily survival, they have other income sources for that. So not taking good care of the animals is not affecting them straight away, even though it might affect them later. But generally most farmers do not keep books, or records, so they do not see that what you invest will pay off' (Adams, 2009). The livestock kept, excluding the dairy cow, are usually in small numbers and are generally small ruminants and poultry, comparable to districts averages.

Households have other economic activities at the farm, such as food-processing, and off-farm and non-farm activities, such as selling at markets and working in shops. Off-farm and non-farm activities are mainly carried out by partners of the head. Expectations were that households would receive remittances as an extra income. It was found that only a few households have migrated members who send remittances, of which most send them on occasion. These remittances are generally not perceived as an extra income, but rather as gifts or extra money in time of need.

Since rural households' income figures are hard to obtain, households' stock and wealth in the form of home ownership, amenities, home quality and consumer durables have been looked at.

Expectations were that homes would be owned by households. However, more houses are owned by family or are rented. Homes are generally not a household's stock. It was not expected that households would pay their families for rent. It was also not expected that some rents were paid in kind. When comparing the homestead of the districts averages of chapter 2.2.1 and 2.2.2 with those of the participants, more participants' houses are made from mud walls and of corrugated iron. Unlike the average in Akuapem-South (chapter 2.2.2) most households do have corrugated iron as roofing materials rather than bamboo. Compared to the district averages, the homes of the participants are in fairly good conditions.

In chapter 2.2.2 it was found that in 2000, 74 percent of the households owned a radio and 20 percent a television set. When these figures are compared to those of the participants, more participating households in both districts own television sets while fewer participating households in Suhum own radios (53 percent and Akuapem-South: 77 percent). The mobile phone is highly popular in both districts.

Many houses of the participants, especially in Suhum, are not designed with hygienic toilet systems. Most households have pit latrines. In Akuapem-South more houses are equipped with a W.C. One in four households has indoor kitchens. Distances to water are important in household activities, for own consumption but also for crops and livestock. The average distance is 264 metres. There are however households that cross larger distances. As argued in chapter 2.2.1, this affects productivity. Also, more than half of the households are not connected to the electricity network. This affects productivity as well, especially in dairy farming. Milk is a highly perishable product and in tropical climates, it will need to be consumed the same day when not refrigerated. There are milk collection points present in both districts. The average distance from rural localities to these points is 7.8 kilometres and distances range from one to 20 kilometres. Distance averages are far greater in Suhum because the district is larger and villages are more scattered than in Akuapem South-district. Taking milk to the collection points is a daily activity and can take up a lot of time and can subsequently affect productivity.

The group of female-headed households has been too small in order to find significant differences with male-headed households. However, some remarks can be made. The female-headed households have higher household dependency rates. Also, female-heads are the only household income generators and their income is considerably lower than the total and district averages. When looking at the Dairy Project, the female-headed households are performing quite well.

Overall, it can be argued that participating households of the district of Akuapem-South have a higher standard of living. The household dependency rate is lower than that of Suhum, also household sizes are smaller. The resource position of households in Akuapem-South is better, of which access to larger shares of land forms the most important resource. When obtained incomes are compared, they tend to be considerably higher in Akuapem-South. In Suhum, more crops are grown for home consumption than for production purposes. Both could be related to the larger households that are found in Suhum.

In Akuapem-south, milk collection points are closer, leaving households with more time which can be spent on other activities. Also, more households in Akuapem-South have better access to electricity and water facilities as well as better amenities than the households in Suhum.

Reasons for the differences between the two districts cannot be found on the basis of the interviews in the fieldwork. Differences could be context related. Akuapem-South is smaller than Suhum, villages are not as spread and are closer located to the district capital. Distance to milk collection points are smaller and the access to water and electricity is higher which all influence household productivity. Akuapem-South is more urbanised, the population density is more than 1.5 times higher. The district has more facilities and the infrastructure is better. Access to water and electricity is higher. Akuapem-South is closer located to Accra and the road to the capital is in considerable better conditions than that of Suhum (see figure 2.6).

Chapter 5: Livelihood Improvements

In the previous chapter a profile of the household participants in the Dairy Project has been provided. Various livelihood capitals have been discussed. In this chapter the trend in livelihood improvements since the Dairy Project, as found in the conceptual model of chapter three, will be discussed. The first section of the chapter will provide information on the initial motivations and expectations of the participating household to join the project. What improvements did they envision? Then the livelihood improvements noticed so far will be provided followed by the most important improvements perceived by participating households and experts. The challenges faced related to the project will then follow and the chapter will end with a discussion of the main findings.

It is understood that the responses given are subjective observations and may be even coloured as found in the previous chapter, with the position of the interviewer as a researcher for Heifer. Also, because of the young age of the project, hard figures can not be obtained. Still observed trends will give insight in the possible long-term impact of the project on the livelihoods of the participating households.

5.1 Initial Motivations and Expectations

One of the main initial motivations and expectations of the participating households to join the Dairy Project of Heifer has been to improve their income through the sale of milk and milk products. As expected, this is mentioned by almost all respondents. Also almost half of the households indicate that improvement of health through milk and milk product consumption was an important motivation and expectation to join the project. Curiosity and interest for the project have been reasons to join the Dairy Project for almost half of the respondents as well. Other, less often, mentioned reasons were ownership of cattle, obtaining knowledge on dairy farming and increasing the number of livestock. Prior to the research, it was thought that ownership of cattle would be a more often mentioned argument to join the project since the ownership of cattle is uncommon for households in the south of Ghana (see chapter 2.1.8). The expected improvements as mentioned by the participating households can be understood as improvements in the households' financial, human and natural capitals.

When asked whether the initial expectations had already been met, almost 60 percent of the participants agreed. The others argued that the project had not yet met their initial expectations but that they were all positive about the future (see table 5.1: Year or obtaining the cow and expectations met). No relation is found between 'the year of obtaining the cow' and 'expectations met or in the future'. Still, table 5.1 shows that expectations of relatively more households which have received the

Table 5.1: Year of obtaining cow and expectations met

Received cow in:	Expectations met		Total
	Yes	No, but positive about near future	
2007	9	4	13
2008	11	10	21

N = 34

Source: Fieldwork, 2009

heifer in 2007 have been met then those which have received their cow in 2008. Those that have obtained the cow in 2007 have had to opportunity to profit from the cow longer.

Of the female-headed households all but one claim that expectations have been met. This one household had received the heifer in 2008. For both Suhum and Akuapem-South it follows that expectations have been met for just over half of the participants. No difference between the two districts is found when comparing them with 'the year of obtaining the cow'.

5.2 Livelihood Improvements

5.2.1 Human capital

Health

Of the 34 participating households, 32 argue that since the Dairy Project their overall household health has improved. The two households arguing that no improvements in human health are noted, obtained their cow in 2008. Their cow is producing milk and more than half of the milk is sold. Table 5.2 provides information on the frequency of the noticed improvements in human health. Most respondents indicate that these noticed improvements such as a higher level of fitness (as indicated by two out of every three households) and lower levels of illness (as indicated by half of the respondents) are due to the dairy intake through the project (see table 5.3 and textbox 5.1) Interestingly, a few farmers also argue that because of the cow they have become more active. The physical labour needed in order to take care of the cow has made them less lazy and more energetic. The initial expectations of better health have been met. No differences were found when comparing male and female-headed households and when comparing the two districts.

Table 5.2: Noticed improvements in human health

	Improvements	Frequency
1	Higher level of fitness	24x
2	Lower level of illness in the household	17x
3	Gained weight	11x
4	Visibly better skin	8x
5	Lower frequency of doctor/hospital visits	7x
6	Other	4x

N = 32

Source: Fieldwork, 2009

Table 5.3: Reasons improvement in human health

	Reasons improvement	Frequency
1	Increased intake of dairy products	27x
2	Increased food diversity	16x
3	Physical labour	5x
4	Availability/use of modern medicine	4x
5	Increased intake of non-animal products	2x
6	Increased intake of other animal products	2x

N = 32

Source: Fieldwork, 2009

Textbox 5.1: Dairy intake

'My youngest son has been consuming the milk from a young age, unlike his older brother who started later. When I was in the hospital with my youngest boy, the doctor asked me what my secret was. He was looking so healthy and better than other children of his age. I knew it was because of the milk' (Household 18, Akuapem-South).

Source: Fieldwork, 2009

Confidence level and self-esteem

Though confidence level and self-esteem are rather intangible concepts and difficult to measure as a livelihood improvement, they are important to research. All, except one respondent, have noticed improvements in confidence levels and self-esteem. One in every three respondents mentions higher status and more respect from the community as an important reason of increased confidence and self-esteem. Especially female farmers and female-headed household value this highly. As a female farmer they are capable of taking care of a cow (see textbox 5.2). Also, the fact that dairy farming is uncommon in the districts and that a female has introduced the community to dairy cow rearing and milk consumption, is valued as important.

For the overall households in the research districts various other indicators are mentioned such as; the ability to become self-reliant; more interest in the farm from the community; obtained knowledge which could be passed on²⁷; foreign visitors; and ability to support social relationships.

When Suhum and Akuapem-South are compared it becomes clear that more households in Akuapem-South value the 'ability to become self-reliant' and 'more interest in the farm from the community' higher than in Suhum. In Suhum the 'ability to support social relationships' and the 'obtained knowledge which could be passed-on' are higher valued. Both value the 'higher status' and 'more respect from the community' as most important to benefit their confidence and self-esteem.

Textbox 5.2: Female cow ownership

'Many people in my community and even some family members did not think I would be able to take care of a dairy cow. Many of them are scared of cows and did not see how I would be feeding and milking it. But I am. And now they come to my farm for milk' (Household 21, Suhum). Source: Fieldwork, 2009

Education children

The number of children in school has not changed because of the project. All children of school going age were going to school before and since the project. There are two examples that due to the project, households have been able to send other children, outside their own household, to school. A nephew and the son of a labourer are in school because of the project. As one of the household's head indicates; 'through the project I have learned the importance of a good education. My child was going to school already, but now I am sending my nephew, who used to work only on my farm to school as well (household 1, Suhum).

Since the project the education of the households' children is affected in other ways. A little over half of the respondents, indicate that obtaining school attributes is an important improvement. Also, clothing, shoes, money for transportation and chop money (money for the children to buy their food and sweets at school) are more easily provided for. Some households indicate that the attendance rates have improved. Two households claim that since the project they are able to send their offspring to better schools as appreciated by the parents. Some respondents argue that since the start of the project the children have become smarter and are coming home with higher grades.

²⁷ See Appendix A: The Heifer Organisation

5.2.2 Social capital

Social network

Since the start of the project two of the in total 34 households have not noticed any improvements in their social network because of the Dairy Project. However, more than 70 percent of the households are experiencing an expanded social network with more friends and acquaintances in the community, more colleagues in dairy farming and more interest from national and international organisations and visitors. Other mentioned important improvements are a stronger social network through better relationships and the inclusion of more people with knowledge and experience. Also, more visitors to the farm and more interest from the direct community and school classes in the farm as well as from people far beyond the local community are examples given. Visitors from all over the world come and see the farm and the cow. One household in Akuapem-South indicates that through participating in a workshop of Heifer Ghana, he had an international guest sleeping over at his farm. He was known with the national organisation and they wanted him as a host. Most farmers argue that the district association, the Dairy Farmer Group, has been very important in the household network and that it has contributed a lot to their network (see textbox 5.3: changes in social network). At the monthly meetings of the associations ideas, problems and other issues are shared and discussed (see textbox 5.4: The Dairy Farmer Group).

No large differences in social network improvements are found between male and female-headed households and between districts. More than in Suhum, households in Akuapem-South value 'knowledge and experience in the social network'.

Textbox 5.3: Changes in the social network

'The moment the poultry farm of me and my husband collapsed a lot of friends disappeared from our life. Nobody wanted to know us any more. But when Grace [the heifer] arrived I decided to hand out milk for free the first few months and this way I was able to establish a new network of friends. I was creating a new market and I became self-reliant. I did not have to borrow any more and that felt good. The community respected me because I introduced the cow to the community and they saw that profit was showing off' (Household 18, Akuapem-South). Source: Fieldwork, 2009

Gender awareness

Gender awareness is incorporated as a livelihood improvement because it is considered to be important for good internal household relations and for livelihood improvements of the household as a whole. Like the international community, Heifer Ghana has placed gender relations high on the agenda in the Dairy Project (see chapter 2.3). The research in the study areas shows that not all respondents are noticing gender awareness improvements in their households due to the Dairy Project. One out of every six respondents indicates not to have noticed any improvements related to gender issues. However, most respondents do experience gender related improvements. The improvements noticed are listed in table 5.4. Better communication, more consulting between household partners and more participation of all the household members in (daily) activities are the three main improvements.

Textbox 5.4: The Dairy Farmer Group

Heifer Ghana's prerequisite at the start of the Dairy Project was for the participants in the districts to establish Dairy Farmer Groups through which the project could be implemented. Farmer groups are a common concept in Ghana. When a farmer is a member of a farmer group, he or she will find to have more access to various institutions than as an individual farmer. Information from the government is shared through these groups. Because of these associations, local supervisors of the Dairy Project can easily reach and inform the participants. Participants themselves have more easily access to money and loans as well as to specific knowledge and advice.

Overall, there are six Dairy Farmer Groups of which two of them are located in the research districts namely the 'Heifer Milk Producers Association, Suhum/Kraboah/Coaltar-district' and the 'Unity Animal Husbandry Association of Akuapem-South'. Each farmer in the Dairy Project and each potential dairy farmer has to be a member of the organisation and meet the requirements when having or obtaining the cow. Heifer Ghana leaves the criteria for selection and assignment up to the Dairy Farmer Groups' executives, the chairman, vice-Chairman, secretary, assistant-secretary, financial-secretary and the treasurer. Both associations have a constitution in which objectives, membership, resignation, criteria for selection and other rules and regulations are stated. Attending the monthly meetings is obligatory and fees and penalties are paid when they are missed. Not attending meetings can lead to forced resignation and removal of the cow. All members are expected to keep records of their cow, concerning milk production, feeding and sickness. Also they have a membership book in which monthly dues and other things such as donation and withdrawals are recorded and signed off by the executive members. The local supervisors of Heifer Ghana are expected to attend the meetings as well in order to answer questions, clarify matters, address findings in the field and communicate information from the head office with the members.

The chairmen of the six associations meet up with the local supervisors and the Heifer organisation at least once every three months to discuss the progress of the project.

Source: Fieldwork, 2009

For the female-headed households all but one have noticed improvements. Most valued by female heads is for the women to have cow ownership. Most improvements provided by male-heads are 'better communication within the family' and 'more participation of all household members in (daily) activities'.

In Suhum district more often consulting between household members is the most important improvement, followed by better communication. In Akuapem-South more participation of household members is valued as the most important improvement in gender relations. This is followed by better communication.

Table 5.4: Noticed improvements in gender relations in household

	Improvements	Frequency
1	Better communication within the family	20x
2	More consulting between household partners	17x
3	More participation of all household members in (daily) activities	15x
4	Equal opportunities for male and female children	5x
5	Ability for women to have ownership	3x
6	More decision-making for women	2x

N = 29

Source: Fieldwork, 2009

5.2.3 Natural capital

Land

Integration of crop farming with livestock keeping is an important element in projects of Heifer Ghana and increasing mutual benefits is an important objective in the Dairy Project. However, one out of every five households has not noticed any improvements in their crop farming activities.

Also contradictions exist in the results of answers provided. While some households argue that due to the project they were able to cut the use of chemical fertilisation, others argue that because of the project they are able to buy chemical fertilisation for their crops. In table 5.5 improvements in crop farming as experienced by the respondents are

Table 5.5: Noticed improvements in crop farming

	Improvements	Frequency
1	Use of manure on farm land	16x
2	Increased crop production	14x
3	Time management	9x
4	Better production methods	5x
5	Record keeping	4x
6	Reducing/abandoning chemical fertilizer	2x
7	Other	3x

N = 27
Source: Fieldwork, 2009

provided. The most important improvement through the project is obtaining manure for use on the land. This is in line with the second improvement 'Increased crop production'. These two improvements have been separated because not yet every respondent has noticed a difference in crop production while they do see that using manure on the land will be beneficial to them. Many households who have obtained their cow in 2008 have not yet used the manure on the land. Record-keeping of crop production is also taught by the organisation and its implementation gives households better insight in what profits they make in a season and throughout the year. Investments and inputs can be deducted from the outcome, the income provided in this study. However, only a few respondents (4) indicate record keeping as an important improvement. A reason for not keeping records could be that time investments are needed in keeping the records up to date. Households might also not see the use of it. None of the respondents has mentioned improvements in bush-fire prevention and agro-forestry (see chapter 2.3).

Better time management has also been valued as an important improvement. The category 'other' includes increased soil fertility and compost-making techniques. Since the project, four households have obtained more cropland of which two have obtained land through the income earned from the milk, the other two households have obtained the land separately from the project.

Two out of the six female-headed households have noticed no improvements in crop-farming since the project. The four other households vary in what they find important improvements in crop farming. The two districts show no differences in improvements in crop farming.

Livestock

In order to make the necessary investments for joining the Dairy Project, a few farmers had to sell some of their livestock. Overall, the amount of livestock when joining the project decreased. These farmers have not yet had an increase in livestock. Four other farmers have had an increase in livestock numbers and type of animals. Two indicate that it was due to the project that they were

able to buy the livestock namely chickens and goats. All but one household have noticed improvements in the way they keep their livestock since the start of the Dairy Project.

Table 5.6: Noticed improvements in livestock keeping

	Improvements	Frequency
1	Better understanding of animal needs	29x
2	Time management	22x
3	More awareness animal health and hygiene	15x
4	Better food available	14x
5	Softer approach	8x
6	0-grazing of other livestock	7x
7	Other	7x

N = 33
Source: Fieldwork, 2009

Table 5.6 shows the three most important improvements in livestock keeping as mentioned by the respondents. All but one respondent notice improvements in livestock keeping of which the most important are 'better understanding of animal needs' and 'time management'. Households indicate that animals are now better taken care off since the 'understanding of animal needs' has increased. The time management in livestock keeping has increased as respondents indicate that they have become more efficient with their time. The category 'other' incorporates improvements such as 'loss of fear for livestock' and 'improved record keeping other livestock'. Record keeping entails the recording of, for example, birth and feeding. The record keeping of the cow is not included since households are expected to hand-in records of the cow to the local supervisors on a monthly basis.

All female-headed households notice an improvement in time-management and see that their time spent on livestock has become more efficient. Other often mentioned improvements are 'better understanding of animal needs' and 'more awareness of animal health and hygiene'.

Both districts appreciate a 'better understanding of animal needs'. In Akuapem-South more respondents value 'more awareness of animal health and hygiene' than in Suhum. In this district, 'time management' is appreciated more. Another important improvement for households in Akuapem-South is 'better food available'.

Interestingly, while record-keeping of milk production is important element in the Dairy Project, most households do not see its implementation as an improvement. And while records on milk production are expected to be handed over to the local supervisor, there are a few households that do not deliver them. No sanctions are yet in place for not meeting this requirement. Reasons for not keeping records might correspond to those of crop production, time needs to be invested and its goal might not be clear to the households. However, all households that deliver milk to the collection points do keep records of their milk production.

5.2.4 Physical capital

Physical assets

Many households indicate that little improvements can be found in their physical capital since the start of the project. More than 50 percent of the respondents did not notice any improvements and argue that it is too early in the project to find such improvements. Two out of every five households have noticed an improvement in tools for the farm such as shovels, spades and wheelbarrows. A few households mention an improvement in luxury items and in better animal housing. One

household mentions that through the project they were able to buy a bike (see textbox 5.5: Physical assets).

Most of the female-headed household have not noticed any improvements in physical assets. Two have obtained more tools for the farm because of extra money made from the project and one has been able to buy more luxury items for herself.

No differences exist between households in Suhum and Akuapem-South. In both district half of the respondents has not noticed any improvements in physical assets.

Textbox 5.5: Physical assets

‘Through the project I was able to buy a bike for my households. This has many advantages for the work with the cow. We are able to bring the milk to the collection point quicker’ (Household 32, Akuapem-South).

Source: Fieldwork, 2009

Quality of the homestead

Six of the 30 respondents were living in a rental house so the question whether the quality of the homestead has improved since the start of the Dairy Project was not applicable. For more than half of the other participating households the quality of the homestead has not improved. For one third of the respondents the homestead and the quality have improved (see textbox 5.6: Homestead improvements). Also investments have been made such as buying cement and iron rods for the house that will be build, or is being build. Some respondents are improving their current homestead and have bought cement to improve the walls and floors and furniture.

The homestead of three of the six female-headed households has improved since the project, and one household has indicated that it had improved because of the project. No differences were found between households in Suhum and Akuapem-South.

Textbox 5.6: Homestead improvements

‘Because of the project me and my family were able to move houses. We were living in a house of very bad quality. Then, because my mother thought I had joined such a good project, she offered me and my family a part of her house. Now we live in a good house with access to tap water and electricity’ (Household 1, Suhum).

Source: Fieldwork, 2009

5.2.5 Financial capital

Income

As chapter 4.4 has shown, obtaining information on farming and rural household incomes is difficult. Respondents do not know, are reluctant to tell or cannot provide information on the income from their farm. Many do not know the income of their partners. Also there are a lot of fluctuations in the income levels for specifically crop farmers. Bad weather leads to a bad harvest season and overproduction leads to low prices at the market. Every year and every season incomes change and so yearly incomes tend to be more likely to be rough estimations. Providing complete and accurate numbers of income improvement before and since the project is therefore not possible. Still, with the information available some general comments can be made.

Of the 34 households interviewed, 32 household incomes have been obtained. From the answers provided it follows that the seasonal income from crop production remains the household's main income. In chapter 4.4 household incomes have been provided and concluded was that most household incomes fall below the poverty line. Table 4.5 showed that the daily income from the cow can be influential for household incomes and when extrapolated to yearly incomes a substantial increase in income levels can be noted. What also followed was that female-headed household had the lowest average household income and that the average income of households in Akuapem-South were considerably higher than those of Suhum.

Since the project, some households have reduced the amount of crops. Five households have experienced a decline in income from crop production and two explain that by time which used to be spent on the cropland is now spend on taking care of the cow. Other households do not know the reason or blame the weather.

Since the start of the project none of the households have started new jobs or other non-agricultural economic activities. Also remittances have not decreased or increased. Household incomes have become more diversified, mainly through the income from the cow. While many households sell the raw milk locally or bring it to the milk collection points, a few households have started processing the milk into yoghurt, cheese and pasteurized milk and sell the dairy products (see textbox 5.7: Other opportunities through the project).

Textbox 5.7: Other opportunities through the project

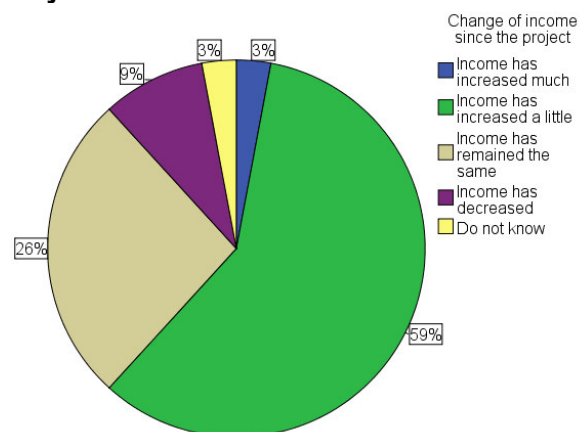
- 'Because of the project I have been able to establish my own shop. Now I sell foodstuff to commuters from my shop alongside the main road from Accra to Kumasi. It is because of the selling of the milk that I have been able to open this shop and buy a refrigerator to keep the goods cool' (household 18, Akuapem-South).
- 'I have had training in how to make yoghurt and cottage cheese. I collect the milk of three other farmers and process their milk into yoghurt and cheese and sell it. Even though my cow is now not producing any milk, I still have an income from other cows' (Household 22, Suhum).
- 'I have customers for the dung of the cow. I have only a little plot and cannot use all of it. I sell or trade the dung with them' (Household 3, Suhum).

Source: Fieldwork, 2009

Perceived income improvements

Since income figures are hard to obtain and income improvements because of the project are difficult to measure, the households have been asked to indicate if they perceive their income to be improved since the project. From figure 5.1 it can be concluded that over half of the households have noticed that their income has increased at least a little. Of the 22 respondents who indicated that their

Figure 5.1: Increase in income since the Dairy Project



N = 34
Source: Fieldwork, 2009

income has increased a little, 18 argue that it is because of the sale of dairy products that their income has improved. Four respondents have noticed an increase in income through non-farm activities and through increased crop production because of obtaining more land. The income has remained the same or has decreased for one in every four households. Only one household, whose income has decreased, mentions that this is because of the repayment of the initial investments made for the pen structure. However, most of the households face these payments.

No differences were found for female-headed households and households per district.

Initial investments

In order to join the project and obtain the heifer provided by Heifer Ghana, households had to invest in a pen structure for their cows. The amount of money spent in the pen structure varies between households. Some households made little or no investments by using existing structures, usually meant for poultry, and adjusted them for the dairy cow. Others used local materials such as bamboo and banana leaves. However, in the training provided by the Heifer organisation, households were told that local materials are more perishable than the advised use of cement and iron rods. These materials were more expensive though. In figure 5.2, two types of pen structures are shown. The upper picture shows a more durable structure. The lower picture shows a pen structure that is made from more local and rest materials. The netting in this structure has come loose which could be dangerous for the cow since it is now exposed to the deadly tsetse fly.

The average amount of money spend on a more durable pen structure included, cement, iron rods and netting is GHC 513 (€ 278), which is almost half of the average income in year (see table 4.5, excluding dairy income). Some households invested up to 1000 Cedi. Over half of the households paid for these investments through private loans or own savings. One household had obtained a loan from the bank in order to pay for the pen structure. A few used family loans or could pay for the investments through the sale of crops or livestock. One household obtained the pen as a gift. There have been households in the same locality who have shared costs by building a larger pen together.

Investments made in the pen structure have been overcome by a third of the households. Another third expects to overcome their investments within two years, while the others

Figure 5.2: Two pen structures



Source: M. van den Berg, 2009

expect that it will take up to three or four years. All argue that this will only happen if the cow gets pregnant and produces milk which could be sold by the household in order to obtain an income so that households can start paying back the loan.

Savings

Whether a household is able to save a share of their income gives insights in the household wealth. Before the Dairy Project more than half of the respondents indicate that they were not able to save money. Money went straight to the main expenditures namely schooling and food. For those households that were able to save some money, amounts were spread ranging from less than GHC 60 (€32) per year to more than GHC 300 (€162) per year.

Since the project, two additional households have indicated to also save money because of the extra money obtained from the project. The Dairy Project has thus had yet little effect on saving capacities of its participants. Also with the initial investments needed for the pen structure, it is likely that, mainly at the start, the project will exhaust the saving capacities of participating households rather than increase them. The main reasons of households that are able to save money are 'for later investments in the farm' (7 households), 'emergencies' including health and the farm (5 households) and 'future schooling of the children' (4 households).

5.3 The Perceived Most Important Livelihood Improvements

In chapter 5.2 trends in livelihood improvements, incorporating the objectives set by Heifer Ghana, have been presented. Households have also been asked what they perceive to be the three main improvements in their livelihoods due of the project. Experts in the field have been asked as well what they see as the most important improvements in the livelihoods of the project participants.

Household perspective

The three most important livelihood improvements because of the Dairy Project according to participating households vary greatly. However, as follows from table 5.8, three improvements stand out. The first most important improvement mentioned by the respondents is 'the improvement of health and nutrition in the household through the project.

Though increasing income levels was the main

motivation for most households to join the project, many argue that the improvement of health and nutrition is the most important improvement in their households so far. Respondents relate this improvement with mainly dairy consumption but also with food diversity and more active labour.

Equally valued as the most important improvement, is the obtained knowledge and techniques on farming and dairy husbandry. Improvements mentioned are improvements in animal rearing, crop production, time management and record keeping. Techniques, assistance and knowledge

Table 5.8: Most important improvements according to the participating households

	Improvement	Frequency
1	Health and nutrition	19x
2	Knowledge and techniques	19x
3	Income	14x
4	Pass on cow and pass on knowledge	7x
5	Ability to buy luxury items	6x
6	Investment in children's education	6x

N = 34

Source: Fieldwork, 2009

obtained through the Heifer project have been put into practice. While many households have not mentioned this as a motivation to join the project, many have perceived it as a great improvement in their livelihoods.

The third main improvement as valued by the respondents is the improved income level. This was the main reason for many households to join the project but so far, has not been experienced as such by all participants. It follows from table 5.8 that less than half of the households consider this as one of the three main improvements. This could be related to the fact that almost a third of the households are presently experiencing no milk production and thus have no extra income. The fact that more than half of the households only experience a slight increase in income could be related to the nature of the income increase, namely the dairy income offers a small additional daily income unlike incomes from crop production which are large amounts but seasonal.

Besides the six main improvements shown in table 5.8, other mentioned improvements are 'improvement in social network' and 'household relations', 'a positive future outlook', 'improved confidence and self-esteem' and 'additional investment in the farm' and the 'possibility of hiring labour'. Overall, according to the participating households, human, financial, social and physical capital have been improved because of the project.

Expert perspectives

Two local supervisors (Mrs Ababio and Mr Eshen) and the coordinator of the Dairy Project (Mr Kanlisi) have been interviewed as well as a specialist working at the livestock department of the Ministry of Food and Agriculture (Mr Vormavor) and a researcher on livestock with the University of Ghana (Mr Adams). All agree with Mr Kanlisi that a positive trend and gradual improvements in the livelihoods are showing but that it is too early to talk about significant changes. None of the experts have observed three most important improvements that can be generalised. However, they all have examples of improvements noticed so far. Mr. Eshen mentions that the new passion that farmers and their households have found in the Dairy Project, is an important improvement. When talking to one of the farmers, 'He was saying that his children were doing better in school and were healthier. Of course these things are difficult to quantify and maybe it is just a feeling, but it is important that they [the households] feel they are doing better' (Eshen, 2009). Mrs. Ababio notices that some households are making significant improvements. An example she gives is the opening up of a store by one of the female farmers (see textbox 5.7). Mr. Vormavor gives the example of the loss of a job of one of the households' heads and that the family was able to survive due to the sale of the milk. He also notices that more children are now sent to better schools which is according to him an important indicator that the households are doing better. Mr Adams brings the arguments to an abstract level and argues that in general households with livestock are better off than those without. Livestock is a useful tool, it is a major source of savings and it makes an extra income.

5.4 Challenges

All households have indicated that they think the Dairy Project is a good project and are positive about their household's future prospects related to the project. Still, there are many challenges faced by the households in order to make the project successful. If a basic problem like the volume of food and water needed for the cow will remain a problem, it will undermine the project's objectives.

Table 5.9 presents the challenges faced as mentioned by 26 households of the Dairy Project.

Table 5.9: Challenges in the Dairy Project

	Challenges	Frequency
1	Insemination	10x
2	Volume of food and water	8x
3	Ill health of the cow	8x
4	Construction of the pen	4x
5	Miscarriage of death of calf	4x

N = 26

Source: Fieldwork, 2009

As follows from the table, the insemination problem is one of the biggest challenges among the households. When there is no offspring, there is no milk and thus no income while taking care of the cow still takes time and money. The insemination problems and its subsequent low calving rate, is also acknowledged by the experts. This problem due to slow response of artificial inseminators is currently being solved through the provision of bull stations in the localities. This way, households can bring their cow to the bull.

The volume of food and water is an often mentioned problem as well. Many households miscalculate the amount of food and water the cow needs on a daily basis, the cow needs more care than was originally thought. The households also argue that the work is hard and tedious and cannot be done alone, help from household members or hired labourers is needed. Supplementary feed is another 'food challenge'. Grass alone is not enough for the cow and buying supplementary feed is expensive. However, the additional feed is needed for good (reproductive) health of the cow. There have been examples of farmers advising other farmers to be more creative in finding supplementary feed for their cows, such as asking for the peel of cassava and plantain from sellers in the towns and markets. Experts recognise the feeding problem, there are farmers who are not feeding their cows well. And when a cow is not fed enough, she will miss out on energy and will not be in heat, this will lead to lower calving rate and in the end lower milk production. Mrs Ababio, Mr Eshen and Mr Vormavor argue that farmers miss out on income if they do not feed their cows well.

Generally, the sickness of the cow is a problem of the past. When health problems occurred, local assistance responded rapidly. The construction of the pen on the other hand is a problem that is more current. The construction of the pen had to be paid by the farmers themselves before obtaining the cow. Cement, iron rods and corrugated iron were advised by the organisation but these items are expensive. Some households used cheaper local materials as a substitute but are now facing problems in durability. They have to replace the materials on a regular basis. Also bad floors in the pens are a common problem. Many floors are breaking up because cheaper cement mixes were used which are now badly affected by the high acidity of the urine and dung of the cows. Then there are also the grown bulls that break down the pen and tear up the netting used in the structures to protect the cows from the deadly tsetse flies. These problems have not been overcome by the farmers.

Miscarriage and death of the calf are problems which have been experienced by four households. Even though miscarriage might still lead to a milk-producing cow, there is no offspring and the process of passing-on the animal to the next farmer and increasing the dairy farm has come to a halt.

Some of the problems found in table 5.9 have been mentioned in earlier chapters as well. In chapter 2.1.8 Udo (2007) argues that the requirements and investments are higher for keeping cattle. Reitsema and Kleinpenning (1991) state that livestock and especially cattle is difficult to keep in tropical climates. Good quality feed, storage and diseases are mentioned problems. The research districts have tropical climates and as indicated by the farmers, feed and supplementary feed was and still is a problem, especially in the dry season. However, the problems in tropical livestock rearing, as mentioned by Reitsema and Kleinpenning, do not seem to be a problem in the research districts. The feed problem of the participating households are not so much related to unavailable low quality feed. Also, on occasion Heifer Ghana has provided the households with food and supplementary feed. Cow diseases as such do not seem to be a problem for households and are tackled quickly by the local supervisors. Also, the netting required in the pen structures keep out the tsetse fly but only as long as bulls are not tearing it down. A solution has also been found in both district to tackle the livestock product storage problem as mentioned by Reitsema and Kleinpenning (1991), even when there is no electricity present. Still, as argued before, distances to milk collection points can be far and can undermine productivity.

5.5 Discussion

Overall, a trend in livelihood improvements of the participating household of the Dairy Project is present, even though the cows have been received one or two years ago. All households have noticed improvements in their livelihoods since the project. Prior to the field research, expectations were that limited livelihood improvements would be found since heifers have been distributed to the farmers only in 2007 and 2008.

Expectation of human health improvements due to the project were limited but most respondents indicated to have noticed health improvements. Other *human capital* noticed improvements have been in education and confidence level and self-esteem. It was not expected that confidence levels and self-esteem would have been improved as much as they have. More respect from the community has been highly valued. According to Mtsali (2002), good education, skills and health strengthen human capital which is important in many other capitals such as productive labour, a financial capital.

Social capital, an often intangible and difficult capital to research, is an important household capital and as expected, improvements in social capital such as social network and gender awareness have occurred since the start of the project. Networks have increased and have become stronger mainly because of the Dairy Farmer Groups and more (international) visitors to the farm. Also gender awareness has grown. Interestingly, female-headed households have valued cow ownership higher than more consulting, better communication and participation. This

improvement can be related to the human capital 'confidence and self-esteem' as women speak proudly of the fact that they have earned more respect from the community and that they as women are able to take care of the cow (see also textbox 5.2).

When looking at *natural capital*, few improvements have been noticed in crop farming due to the project. However, the use of manure is valued among participants. Improvements in livestock rearing have occurred for most households. One of the main improvements is a 'better understanding of animal needs' which is now practiced on all farm animals. Interestingly, all female-headed households noticed an improvement in time management.

For many households it was too early to speak of improvements in their *physical capital*, more than half of the respondents have not yet noticed any improvements in equipment or in the quality of their homestead. Also, when improvements were found, these were not solely due to the project.

Though measuring the *financial capital* of rural households also proved to be difficult in this research, a trend is showing that the dairy income could be an important additional income for the participating household. It can serve as a regular and stable daily household income, next to seasonal crop incomes.

There are only a few differences detected in livelihood improvements mentioned by male and female-headed households of which the most interesting one is the care of the cow. While male-headed household and some of their partners argue that taking care of the cow can not be done by a female alone, female-headed households argue that all farmers need help and whether this is from the husband, the children or hired help, it does not make a difference.

No real differences can be found in livelihood improvements between Akuapem-South and Suhum. Differences in financial capital have been discussed in chapter 4.5.

As was expected prior to the research, challenges for the project participants are found in the care for the cow. Especially the feeding takes up time and investments. Illness was expected to pose a problem, but these are rapidly treated by local supervisors. Households do not perceive a low milk production as a problem, however, the experienced insemination problem will ultimately lead to low milk production rates. It was also expected that the destination of the bulls would pose a problem while this is not the case. However, in the near future it might be when bulls are grown up and households have not yet had their pass-on, as a pay-back for the loan from Heifer. In the Dairy Farmer Groups, this potential problem is now addressed.

As was also found in chapter 4.5, participating household and their standard of living vary considerably. While the objectives of the project are to reach poor rural farming households, not all participants seem to fit this category. However, Mr. Kanlisi argues that the intended people are reached and that the Dairy Project would not be suitable for the poorest of the poor. At the same time, the investments needed to participate in the project are high. Pen structures are expensive and could not be paid for by the poorest of the poor. Already the investment forms almost half of the estimated yearly average income, and then there are also the all-year round expenses such as hygiene products, buckets and towels. It should be noted that similar investment are needed for

crop farming, such as seeds and fertilizer. However, the investments needed in the Dairy Project follow the arguments made in chapter 1.4. Investments are higher for larger livestock and smaller livestock might be more suitable for poorer households. However, benefits are subsequently smaller as well. More time, and more dairy cows are needed in order to see whether initial investments have been overcome, actual profit has been made and long-term and significant livelihood improvements have occurred.

Conclusion

The central aim of this study has been to gain insights in livelihood improvements of households participating in the Dairy Project of Heifer Ghana. Socio-economic characteristics were addressed in order to understand which households were reached through the project.

In short, households reached through the project vary considerably in socio-economic characteristics and the participants form a heterodox group. There are households that have a considerably greater resource position than others. This is mainly shown through the differences in natural and physical capital such as access to land, the homestead and amenities present in the household.

Through the Dairy Project, gradual improvements in the livelihoods of the participating households are showing but it is too early to talk of significant changes and improvements because the project has only been implemented since 2006. Also the research population of this study is too small to find significant changes in the livelihoods. Rather than presenting hard results, a trend in livelihood improvements can be found among participants, especially in human and social capital, namely in health, confidence and self-esteem levels and improved social networks. Improvements in financial capital through the project are less apparent since income levels have been difficult to obtain. However, most participants are positive about the effect of the project on their household income so far and dairy income could prove to be an important additional income.

The main objectives of the Dairy Project set by Heifer Ghana are to improve income, nutrition and health, gender equity and more knowledge on and better practices of agro-ecology. Improvements in the former two are showing while improvements in agro-ecology are less apparent. A trend in improved gender equity through the project can also be noted. In most households, improvements in gender awareness have occurred. Also, income estimations show that female-headed households might profit most from the Dairy Project. Female-headed households themselves appreciate the better resource position through the ownership of the cow. This has also increased their confidence and self-esteem levels because of more recognition and respect from local communities.

In this study, the two research districts have been compared to each other. Suhum and Akuapem-South have similar physical environments and the agricultural sector employs most people in both districts. This is also reflected by the participating households. Education levels are comparable as well as livelihood improvements found. However, the standard of living of participants in Akuapem-South is generally higher than that of Suhum. These performances do not seem to be related to the Dairy Project but could be related to the geographical context. The district of Akuapem-South is smaller, more urbanised and the importance of the agricultural sector is lower than in Suhum. Also, Akuapem-South is closer located to Accra and roads are in better conditions.

Water and electricity services are better accessible as well. These observed geographical differences existed before the implementation of the project.

So far, the differences in geographical context do not seem to lead to differences in performance and livelihood improvements through the project. However, eventually they could influence household performances in the long run as access to localities and services are better. The better infrastructures found in Akuapem-South could make households more productive as less time has to be spent on for example fetching water for the cow and bringing milk to the collection points.

Dairy cattle rearing projects as poverty alleviation strategies in humid and sub-humid areas have great potential to improve the human, social, natural, physical and financial capitals of the poor. However, it also faces various challenges.

First of all, participants need to have access to certain natural, human and financial capitals in order to successfully rear cows. As the Dairy Project of Heifer Ghana shows, the poorest of the poor cannot be reached since access to land and finances are limited and people might not be able to take care of the cow. A project such as the Dairy Project that provides large livestock to its participants should not be focussed on the poorest of the poor, but on households that fall within the lower wealth strata.

Secondly, the right environment needs to be in place for successful dairy farming. Next to the capacities, capabilities and commitment of the participants, the geographical context for the project implementation is important. Access to water should not be a problem as cattle drink large amounts of water a day. Good quality food is needed for good animal health and production levels. Access to electricity is highly valuable as it helps households in the storage of the perishable dairy products. Moreover, a proper infrastructure needs to be present. This includes a good road network, good or potential market opportunities and a good animal healthcare infrastructure. As cows are an expensive investment and high-yielding breeds are more vulnerable in tropical climates than local breeds, veterinarians or assistants need to be present in project areas in order to react in time when a cow falls ill. Also an effective insemination system needs to be in place in order for the cows to become pregnant and for the household to consume and sell dairy products.

Looking back on statements made in the introduction, the Dairy Project is a livestock project that can reduce poverty and improve lives. However, smallholder households living on less than 1 or 2 dollars a day might be better assisted through the provision of smaller livestock since the investments needed will be smaller than for larger livestock.

Agriculture is an important tool in tackling rural development and when challenges as mentioned earlier are dealt with and overcome, more than any other livestock project, dairy projects, like the Dairy Project of Heifer Ghana, will prove to be a valuable contribution to the livelihoods of the rural poor. In the future the Dairy Project can become an important tool for rural development in Ghana, be it targeted at the appropriate segment of the rural poor and implemented in the right geographical context.

Epilogue

Practice is the best teacher. An overused but relevant expression, also in this research. In my preparation for this research I learned about the difficulties of doing field research in developing countries. From books I learned that you need to be flexible, adapt to local customs and be open to all new experiences. 'Of course' I thought. And 'of course' I only realised during my field research what being flexible really meant, that adapting to local customs entailed more than eating local food, and that being open to all new experiences does not mean pushing aside personal beliefs. Nonetheless, I have absolutely enjoyed my time in Ghana. I am grateful to have met all the warm, welcoming and beautiful people in my research and to have participated in Ghanaian daily life.

During my research I have experienced various obstacles. Conducting a good household survey in the right setting proved to be hard. Interviewees are influenced by the interpreter, the setting and the interviewer. I realised that the positionality of the interviewer is always taken into account by the respondents. What I have also learned from the fieldwork is that dependency levels in doing research are much higher than I initially expected. Once interviews are arranged, successful interviews are still dependent on so many other factors. Will the respondent be present, is there a vehicle that can take me to far-off locations, will the interpreter have time and will he or she know the way to the farm? Once a successful interview is conducted there is still the ride back, will my vehicle take me back and will I be back before dark in order to reach my home?

I have learned a lot from these experiences and I will take them with me personally, and in my professional work and career. It will help me to put things in perspective and to place different cultures and customs in context. I will also be more aware of my personal position in future research. Even though I see myself as an independent and objective researcher, I will always be placed in a certain context by interviewees and I should be aware of this. Practice makes perfect.

When evaluating my own research, various valuable contributions can be made. For example, it would be interesting to look at the power structures in the Dairy Project as it is also part of the livelihood approach. Since respondents of this research have access to different livelihood capitals it would be interesting to understand how the 'level of access' to these resources is of influence with the onset of the project or in the monthly meetings of the Dairy Farmer Groups for example.

Also, it would have been interesting to interview the partners of the household heads which was not possible in this research. In this study it has been found that partner's incomes are mostly unknown to the household heads. How come these incomes are unknown, what are the partners' earnings and on what do they spend their own money? Does their income benefit households, as is suggested in the literature presented in chapter 1?

As is stated in many discussions and evaluations of reports and documentations, also in this case; 'more research is needed in order to gain more and better insights'. Personally, I would find it very interesting where this project will stand in five years. I have a good feeling about its future!

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Appendix A: The Heifer Organisation

The NGO 'Heifer' was founded in 1944 in the USA out of a belief to end hunger and poverty. Now, the mission statement of Heifer International is 'to work with communities to end hunger and poverty and care for the world' (Heifer, 2007:123). Its mission is to provide inputs that enable small-holder farmers to build a foundation for sustainable livelihoods. These inputs include training in business management and environmentally sound agriculture, livestock, multi-use trees and seeds (HI-SL, 1996). The Sustainable Livelihoods Approach is part of the organisation's ideology and Heifer focuses on the improvement of the asset base of households. Heifer considers livelihoods secure and sustainable when households 'have the resources and income-earning opportunities that enable them to meet basic needs [...], have reserves and assets to offset risks, ease shocks, and meet contingencies, justice within all social relationships and are protecting the natural resources of future generations' (HI-SL, 1996:7). Table 6.1 shows the six basic assets in Heifer's livelihood approach.

Heifer's foundational idea is the provide livestock to poor small-scale farmers. As a resource livestock has the capacity to reproduce and so naturally increase as an asset. Within Heifer's livestock management the development of skills in production and husbandry are important, as well as pride and ownership. Guidance, training and technical assistance in farming activities are facilitated by the organisation. The 'Passing on' – principle is fundamental in the organisation's sustainability projects. Through passing on livestock to next project participants, through passing on obtained knowledge, resources and skills 'an expanding network of hope, dignity and self-reliance is created' (Heifer, 2007:123). The livestock provided by Heifer to project participants are a loan, and the loan is repaid when the first female livestock is handed over to the next participating farmer in the project. In return the next farmer repays the loan by passing on female livestock to the next participants.

Figure 6.1 Heifer International



Source: Heifer International, 2009

Table 6.1: Basic assets set by the Heifer organisation

No.	Assets	
1	Human capital	Skills, knowledge, ability to perform labour and the nutritional status of adults and children
2	Financial capital	Income and access to credit and savings
3	Natural capital	Land, forest, water, wildlife and natural resources availability
4	Physical capital	Equipment, basic infrastructure
5	Social capital	Informal community support networks, extended family structures and community labour sharing systems
6	Political capital	Participation in community decisions, increase power relations and access to and influence on political systems

Source: HI-SL, 1996

Heifer also facilitates inputs, credit and training for families and communities so that they in return can create sustainable economic growth for entrepreneurs, organised groups and family and business enterprises. Development beyond subsistence, generating employment and achieving higher levels of productivity are other objectives. Lastly, policy changes to support income and food security are advocated by Heifer through documentation of the impact of the project, through replication and through dissemination of information about the results and networks and training (Heifer, 2007). Heifer Project International, HPI, is the overarching organisation maintaining the Heifer principle of the organisations spread over the world. The project organisations are situated in 40 countries of which eight are autonomous NGOs (Heifer Nederland, 2008). Heifer Nederland is one of the autonomous project organisation offices of Heifer International. Heifer Nederland was established in 1999 and has started and funded many projects in Eastern Europe and West and East Africa. A cross-country project that has been implemented by Heifer Nederland is the Smallholder Dairy Project. The project has been realised in Albania, Cameroon and Ghana. Ghana has been the last country to join this project.

Heifer Ghana

Heifer Ghana is part of the Heifer network and is formally a field office of HPI. In practice, it is a semi-autonomous organisation. Heifer Ghana is a local NGO and receives funds from various bodies such as various embassies, Heifer International and Heifer Nederland. In the early 1980s Heifer started project work in Ghana and in 1999 a permanent office was opened. Heifer Ghana is one of the few NGOs in the country which focuses on livestock production as part of a poverty reduction strategy. Poverty in Ghana is mostly a rural phenomenon and malnutrition and other social problems are part of it. Increasing crop and livestock production are important steps to eradicate hunger and poverty in these areas (Heifer Ghana, 2008). Heifer Ghana targets communities with felt needs, special-needs people such as people suffering from HIV/AIDS and the visually and physically impaired. Argued is that the choice of animals is always influenced by the demands of the environment, technical and financial feasibility and individual requirements and needs (Kanlisi, 2009). The organisation is active in the Eastern, Volta, Ashanti, Brong-Ahafo and Northern Regions (see figure 2.1). The headquarter of Heifer Ghana is situated in Accra. Projects are chosen according to geographical conditions. The dryer northern regions for example are more suitable for meat type cattle, sheep, goats and poultry. In the coastal savannah and forest areas grasscutters and snails are more suitable (Kanlisi, 2009). Topics addressed by Heifer Ghana are integrated crop and livestock production, beekeeping, agro-ecological improvement, gender and HIV/AIDS training. 'Heifer Ghana envisions a community of people living in a secure, healthy environment and enjoying sustainable livelihoods' (Heifer Ghana, 2008:1). Ghana is the last country to join the Dairy Project after Albania and Cameroon where the project has been implemented for respectively 10 and 35 years. The Smallholder Dairy Project is a pilot project and Heifer Ghana's first dairy cattle project. After a stakeholder workshop held in 2005 it was concluded that Heifer Ghana was ready to implement this project and to expand its animal portfolio to dairy cows. Dairy farming holds great potential as a regular and daily income generator (Kanlisi, 2009).

Appendix B: Household Survey

Household Survey

Livestock and Development Heifer Ghana

This household survey will include questions on:

1. Household
2. House and land ownership
3. Start of the Dairy Project
4. Income generating activities
5. Livelihood resource improvement
6. Heifer Dairy Project
 - a. Local assistance of the Dairy Project
 - b. The Heifer organisation in Accra
 - c. Aspirations
7. Residence house

Date:

Number:

Name:

Village:

Village size:

Location in village:

Compound clustering:

Nearest town:

Distance to nearest town:

N.B. Questions in this household survey will be asked in different formats. Tables are used as well as Yes/No and open questions. In some tables a ranking of the three most important changes is asked, with 1 as the most important, followed by 2 and then 3.

At any given time, the respondents are free to choose whether they want to answer the question or not. The results will be used in a report for the Heifer organisation as well as my Msc. thesis. No names will be given out to other parties without the respondent's approval.

1. Household

1.1 How many people are part of your household?

1.2 Who are part of your household?

Please provide the following information on each of your household members.

	Relation household member	Sex	Age	Highest education attained	Main (economic) activity
1					
2					
3					
4					
5					
6					
7					
8					

1.3 Who is considered the head of the household? ...

1.4 If female-headed, what is the reason this household is female-headed?

- Widow
- Divorced
- Female-managed
- Other ...

1.5 Are there any absent household members?

- Yes
- No (go to question 1.7)

1.6 Please provide the following information on absent household members

	HH Member	Reason absence *	Duration absence**	Part of this or other household
1				
2				
3				

* f.e., work (seasonal migration, short term migration, long term migration), education, staying with family elsewhere, start of own household, split of household, other (specify). **Seasonal, short-term, long-term

1.7 Who is mainly involved with the following domestic tasks?

Activity	Cooking	Fetching water	Fetching fire wood	Cleaning house	Looking after children	Washing clothes
Present HH Member most involved*						
HH Member most involved before Dairy Project*						

* 1= father, 2 = mother, 3 = father & mother, 4 = son, 5 = daughter, 6 = all the children, 7 = whole family, 8 = paid help 9 = other ...

1.8 Who is considered the main decision maker now and before the Dairy project on what money was spend on?

Expenditure	Present HH member*	HH member before Dairy Project*
Food consumption		
Livestock consumption		
Food crop consumption		
Other ...		
Farming production		
Livestock sale		
Cash crop sale		
School necessities		
Clothes		
Other household products		

* 1 = grandfather, 2 = grandmother, 3= father, 4 = mother, 5 = father & mother, 6 = son, 7 = daughter, 8 = all the children, 9 = whole family, 10 = other ...

1.9 How many children are presently going to school and how many children were going to school before the Dairy Project? Please fill in the table.	Present no. of enrolment	No. of enrolment before Dairy Project
	Boys	
	Girls	
	Total	

2. House and land ownership

2.1 Who owns the house you and your household live in?

- Household
- Landlord
- Family
- Other ...

2.2 What does your household pay for living in the house?

- No payment
- Amount of Cedi per year, please specify ...
- In harvest ...
- In goods ...
- Other ...

2.3 Does your household farm land?

- Yes
- No (go to question 3.1)

2.4 How much land does your household farm? ...

2.5 Who owns this land?

- Household
- Family
- Landlord
- Household and family
- Household and landlord
- Family and landlord
- Household, family and landlord
- Other ...

2.6 What does your household pay for using the land?

- No payment
- Amount of Cedi per year, please specify ...
- In harvest ...
- In goods ...
- Other ...

2.7 Did your household farm this land before the Dairy Project?

- Yes
- No, please specify ...

2.8 What is currently done with the land?

- All is used for crops
- Part is used for crops, part is laid bare
- All is unused
- Other ...

2.9 If applicable, what is the reason (part of) the land is laid bare?

- Unsuitable land for farming
- Regain soil fertility
- Lack of labour
- Do not know
- Other ...

3. Start of the Dairy Project

3.1 Before the Dairy Project, did you own livestock?

- Yes
- No (go to question 3.4)

3.2 Please provide the following information on owned livestock before the Dairy Project.

Type	No.	HH member most involved*	Consumption Type** % of total	Use Production Type** % of total	Estimated HH - income in Cedi/month	Sale to ***	Present no.
1							
2							
3							
4							
5							

* * 1 = grandfather, 2 = grandmother, 3 = father, 4 = mother, 5 = son, 6 = daughter, 7 = grandson, 8 = granddaughter, 9 = all the children, 10 = all the grandchildren, 11 = whole family, 12 = other ** f.e draught power, meat, milk, eggs, manure, skin, sale offspring, stock/capital hard times, other *** 1 = to family 2 = to locals, 3 = to local market near residence, 4 = to market in nearby city, 5 = to market Accra, 6 = to processor Accra

3.3 If applicable, could you specify why you do not own these animals anymore? ...

3.4 Before the Dairy Project, what were your household's sources of income?

	Source	HH member most involved*	Total amount of time spend/per week	Location	Estimated HH income in Cedi/month
1					
2					
3					
4					
5					

* * 1 = grandfather, 2 = grandmother, 3= father, 4 = mother, 5 = father & mother, 6 = son, 7 = daughter, 8 = all the children, 9 = whole family, 10 = other

3.5 Before the Dairy Project, what were your main expenditures of the household income and what are they presently?

Source, purchase, or payment	Former % of household income	Source, purchase or payment	Present % of household income
1		1	
2		2	
3		3	

* f.e. *Consumption*: food, clothing, school fees & contributions, medical expenses, social contributions, house improvement, luxury items, electricity, water, transportation, savings, kerosene, gas, pay off loan, other. *Production*: Dairy cattle, vet services, other livestock, milk processing, land, diversified crops, seeds, fertilizer, hiring additional help, pesticides, other.

3.6 Before the Dairy Project, how much money was your household able to save? ...

3.7 How much money is your household currently able to save? ...

3.8 If applicable, what is the main reason your household is saving?

- Future schooling children
- Emergency human health
- Emergency animal health
- Investment in farm
- Investment in livestock
- Investment in house
- Other ...

3.9 Before the Dairy Project, what was your level of knowledge on dairy farming?

- No knowledge
- Little knowledge
- Some knowledge
- A lot of knowledge
- Other ...

3.10 How did you hear from the Dairy Project? (See also options next page)

- Extension agent MoFA at farm/local community
- Veterinary agent of MoFA at farm/local community
- Visit to district office MoFA
- Member of the Dairy Farmer Group
- Member of other farmer group
- Other members of the local community
- Other ...

3.11 When did you join the Dairy Project? ...

3.12 Please indicate in the table what your initial investments were to join the project?

Type of investment

Estimated money spend

1
2
3
4

3.13 How did you pay for these investments?

Total investment:

- Loan from bank
- Private loan
- Family loan
- Own savings
- Sale livestock
- Sale harvest
- Other ...

3.14 What has been your main motivation to join the Dairy Project? Max. of 3 answers, rank from 1-3:

- Improvement health through milk
- Improvement/obtain knowledge on farming and skills
- Improvement of income through milk
- Improve opportunities for children through schooling
- Improvement of status
- Able to support social relationships
- Being part of a group/community
- Ownership of cattle
- Increasing number of livestock
- Out of interest project
- Obtain credit
- Other ...

3.15 So far, has the Dairy Project met your initial expectations?

- Yes (go to question 3.17)
- No, please specify ...

3.16 In the future, do you think your expectations will be met?

- Yes, please specify ...
- No, please specify ...

3.17 When did you receive the cow? ...

3.18 Please provide the following information on the birth of the calf/calves in the table.

	Male	Female	Time between arrival mother and birth calf
--	-------------	---------------	---

Calf 1
Calf 2

3.19 Is the cow momentarily giving milk?

- Yes
- No (go to question 4.1)

3.20 How much milk is the cow giving per day? ...

4. Income generating activities

4.1 What are presently the three most important sources of income for your household?

- 1)
- 2)
- 3)

4.2 Please provide the following information on the household's livestock.

* Animal: f.e, goat, chicken, sheep, rabbits, grass cutter, beekeeping, other ** 1= grandfather, 2 = grandmother, 3 = father, 4 = mother, 5 = son, 6 = daughter, 7 = all the children, 8 = whole

Animal*	No. of grown animals	No. of young animals	Household member most involved**	Total amount of time spend/week	Use				Production: Estimated Cedi/month	Other uses***
					Consumption		Production			
					Type	% of total	Type	% of total		
1 <u>Cow</u>										
2										
3										
4										
5										

family, 9 = other... ***other uses: f.e, manure, saving, animal traction, social obligations, other (specify).

4.3 Please provide the following information on agriculture.

Crops	Season*	Yield (kg)/ bunches per year	HH-member most involved**	Total amount of time spend/week	Use			
					Consumption % of total	Production % of total	Production: Estimated Cedi/month	
1								
2								
3								
4								
5								

*Season: 1= whole year round, 2=long dry season, 3=short dry season, 4=long wet season, 5=short wet season, 6=both dry, 7=both wet, 8=other ** 1= grandfather, 2 = grandmother, 3 = father, 4 = mother, 5 = son, 6 = daughter, 7 = all the children, 8 = whole family, 9 = other ...

4.4 Are there any other activities for one or more household members?

0 Yes

0 No (go to question 4.6)

4.5 Please provide the following information on other activities of the household members.

Activity*	Season**	Location activity	Transportation		HH-member most involved***	Total amount of time spend/ week	Use		Production: Estimated in Cedi/month
			Type	Cedi/day			Consumption % of total	Production % of total	
1									
2									
3									
4									

f.e.,* regular job, farm work, non-farm work, trade, shop-owner, transport, other ** Season: 1= whole year round, 2=long dry season, 3=short dry season, 4=long wet season, 5=short wet season, 6=both dry, 7=both wet, 8=other *** 1= grandfather, 2 = grandmother, 3 = father, 4 = mother, 5 = son, 6 = daughter, 7 = all the children, 8 = whole family, 9 = other ...

4.6 Does your household receive any cash or kind from family or acquaintances who are not living on the farm?

0 Yes

0 No (go to question 4.8)

4.7 Please give the following information on received cash and kind.

From whom	Regular/irregular	Contribution	
		Cash	Kind
1			
2			
3			

4.8 Does your household receive cash or kind through other channels?

0 Yes

0 No (go to question 4.10)

4.9 Could you specify the received cash/kind?* ...

*f.e. hunting, fishing, gathering, gardening, fruit trees, exchange, aid.

4.10 Since the project, have changes occurred in your households' overall income?

Income has increased much

Income has increased a little

Income has remained the same, please specify ...

Income has decreased, please specify ...

Do not know

Other ..

4.11 If applicable, what is the main reason the income has increased?

Sale of milk from Dairy Project

Sale of dairy products from Dairy Project

Increased yield of crops

Increased income from non-farm activity

Other ...

4.12 Has your household overcome the initial investments of the project?

Yes (go to question 5.1)

No

4.13 When do you think your household will overcome the initial investment?

Within 1 year

Within 1 to 3 years

Within 3 and 5 years

In more than 5 years

Do not know

Other ...

5. Livelihood resource improvement*

*In the previous questions certain aspects of livelihood resources have been discussed. This part of the household survey will focus on other features of livelihood resources since the implementation of the Dairy Project.

5.1 Since the Dairy Project, have you noticed improvement of your household's human health?

Yes

No (go to question 5.4)

5.2 How have you noticed improved human health? Please fill in 3 most important reasons.

Changes	Classification
Lower levels of illness in family	
Lower frequency of doctor/hospital visits	
Less money spend on medicine	
Higher level of fitness	
Gained weight	
Visible better skin	
Other ...	

5.3 What do you think has resulted in improved health? Please fill in 3 most important reasons.

Through...	Classification
Increased intake frequency of milk	
Increased intake frequency of other animal protein	
Increased quality of other animal protein	
Increased intake frequency of plant protein	
Increased quality of plant protein	
Increased food diversity	
Availability and use of modern medicine	
Other ...	

5.4 Since the Dairy Project, have improvements occurred in the education of your household's children?

0 Yes

0 No (no go to question 5.6)

5.5 What improvements in education have you noticed? Please fill in 3 most important reasons.

Changes

Classification

Higher number of enrolment

Ability to send children to a better school

Improved attendance school

Improved school attributes (please specify)

Improved clothing

Other ...

5.6 Since the Dairy Project, has your household become more aware of equality of man and woman (gender equity)?

0 Yes

0 No (go to question 5.9)

5.7 Have changes occurred in the household because of this increased awareness?

0 Yes

0 No (go to question 5.9)

5.8 What changes have occurred? Please fill in 3 most important reasons.

Changes	Classification
Better communication within the family	
More consulting household partners	
More participation of household members in all activities (farm and house/habitat activities)	
More decision making by woman (please specify)	
Ability for woman to have ownership	
Other ...	

5.9 Since the Dairy Project, have you noticed improvement in your own self-confidence (self-esteem) and personal status (dignity)?

0 Yes

0 No (go to question 5.11)

5.10 How have you noticed these improvement? Please fill in 3 most important reasons.

Changes	Classification
Through passing on obtained knowledge of Dairy Project	
Ability to be self-reliant	
Higher status within community	
More respect from community	
Ability to support social relationships	
Ability to send children to school	
Being able to express self in public gatherings	
More interest in farm from community	
Foreign visitors to farm	
Other ...	

5.11 Since the Dairy Project, have you noticed improvements in your social network?

0 Yes

0 No (go to question 5.13)

5.12 What improvements have occurred? Please fill in 3 most important reasons.

Changes

Classification

Increased social network

Stronger social network

More knowledge/experience in social network

Position in social network

Able to support social relationships

Other ...

5.13 Since the Dairy Project have you become more aware of the risks of HIV/AIDS?

0 Yes

0 No (go to question 5.15)

5.14 What improvements have you noticed? Please fill in 3 most important reasons.

Changes

Classification

More communication of HIV/AIDS within the household

Increase of VCT's (Voluntary Counselling and Tests)

Changes in behaviour household members

If applicable, frequency in hospital visits by people living with HIV/AIDS

Other ...

5.15 Have improvements occurred in livestock keeping?

0 Yes

0 No (go to question 5.17)

5.16 What changes have occurred? Please fill in 3 most important reasons.

Changes**Classification**

Improvement in time management of livestock
 Better record keeping of other livestock
 Better understanding of livestock needs
 Better breeding of livestock
 Better food available for livestock
 Higher quality of food available for livestock
 Higher levels of animal health
 O-grazing other livestock
 Purchasing additional livestock
 Softer approach to animals
 Loss of fear for livestock
 Other ...

5.17 Have improvements occurred in farming activities?

0 Yes

0 No (go to question 5.19)

5.18 What changes have occurred? Please fill in 3 most important reasons.

Changes**Classification**

Improvement in time management of crop farming
 Better record keeping of crop farming
 Crop rotation
 Compost making
 Usage of manure on land
 Better production methods
 Reduced crop diseases
 Increased crop production
 Increase soil fertility
 Decrease soil erosion
 Better seeds
 Other ...

5.19 Have you noticed improvements in physical assets?

0 Yes

0 No (go to question 5.21)

5.20 What changes have occurred? Please fill in 3 most important reasons.

Changes**Classification**

Increase tools and equipment animal production
 Improved animal housing conditions
 Increase tools and equipment crop production
 Obtained more land
 Better housing conditions
 Improved infrastructure (please specify)
 Increase of luxury items
 Other ...

5.22 Overall, what have been the 3 most important improvements* for your household so far?

* f.e, improved dairy management, improved crop production skills, improved human health, improved animal health, availability of food, diversity of food, increased income, gender equity, ability to pay school fees, ability to save, ability to invest, self esteem, dignity and assertiveness, other.

- 1)
- 2)
- 3)

6. Heifer Dairy Project

6.1 Have you experienced problems or difficulties concerning the cow?

- Yes
- No (go to question 6.3)

6.2 Could you specify your problems or difficulties (max. of 5 problems)? ...

Problem*	Overcome (Y/N)	(Plan to) Overcome through
1		
2		
3		
4		
5		

* f.e., insemination, health of the cow, milking of the cow, treatment of the cow, lack of access to fodder throughout the year, lack of access to fodder in dry season, lack of access to supplementary fodder, lack of access to water, lack of labour, lack of medicine/healthcare provider, low productivity, drought, theft, other

6.3 Have you experienced problems with institutions*

* f.e., village communities, neighbours, government, other organisations, other ...

- Yes, please specify ...
- No

6.4 What do you think are the 3 strongest points of the Dairy Project and why?

- 1)
- 2)
- 3)

6.5 What do you think are the 3 weakest points of the Dairy Project and why?

- 1)
- 2)
- 3)

Local assistance of the Dairy Project

6.6 What are your current expectations of the local assistance?

- No expectations
- Continuation of visits veterinary checks
- More veterinary check visits
- More training on crop farming
- More training on livestock farming
- More training on dairy production
- More training in market strategies
- Assistance in artificial insemination
- Assistance in product marketing
- Other ...

6.7 Did you experience any unforeseen problems with the local assistance?

- Yes, please specify ...

No

6.8 Do you have suggestions for the local assistants?

Yes, please specify...

No

The Heifer organisation in Accra

6.9 What are your current expectations of the Heifer organisation?

No expectations

Continuation of activities

More visits to farms

More training on crop farming

More training on livestock farming

More training on dairy production

More training in product marketing

Training in diversifying activities

Provision of better fodder to livestock

Provision of more fodder to livestock

Veterinary checks

Assistance in artificial insemination

Other ...

6.10 Did you experience any unforeseen problems with the Heifer organisation?

Yes, please specify ...

No

6.11 Do you have suggestions for the Heifer organisation?

Yes, please specify...

No

Aspirations

6.12 What are your short term aspirations concerning the household? Max. of 3 possibilities.

- Obtain good manure for farmland
- Breed calves for sale
- Breed calves for enlargement dairy farm
- Provide milk for household
- Investment own land
- Investment own house
- Investment in housing of cow
- Sell milk to market to obtain other assets such as:
 - Other food
 - Improvements of the house
 - Improvements of the farm
 - Different, namely ...
- Use milk for milk-products namely
- Other ...

6.13 What are your long-term aspirations concerning the household? Max of 3 possibilities.

- Obtain good manure for farmland

- Breed calves for milk
- Breed calves for sale
- Breed calves for enlargement dairy farm
- Provide milk for household
- Investment own land
- Investment own house
- Investment in housing of cow
- Sell milk to market to obtain other assets such as:
 - o Other food
 - o Improvements of the house
 - o Improvements of the farm
 - o Different, namely ...
- Use milk for milk-products namely
- Other ...

7. Residence house

Please indicate the following,

7.1 Number of rooms in the house:

7.2 Roof:

- 0 Corrugated iron
- 0 Burned brick
- 0 Bamboo
- 0 Wood
- 0 Other ...

7.3 Walls:

- 0 Burned brick
- 0 Wood
- 0 Mud blocks and wattle
- 0 Mud blocks and wattle plastered
- 0 Cement blocks
- 0 Cement blocks plastered
- 0 Other ...

7.4 Windows:

- 0 No windows
- 0 Only frames
- 0 Frames and wood
- 0 Frames and glass
- 0 Frames and mosquito gauze
- 0 Frames, wood and mosquito gauze
- 0 Frames glass and mosquito gauze
- 0 Other...

7.5 Floor:

- 0 Soil
- 0 Cement
- 0 Clay
- 0 Burned brick
- 0 Other

7.6 Present Amenities*:

- 0 Electricity
- 0 Kitchen

- 0 Toilet, specify system** ...
- 0 Water, specify system *** ...
Distance to water
- 0 Other ...

- 7.7 Furniture*:
- 0 Beds, no. ...
 - 0 Chairs
 - 0 Benches
 - 0 Table
 - 0 Sofa
 - 0 Other ...

- 7.8 Durable consumer goods*:
- 0 Radio
 - 0 TV
 - 0 Mobile phone
 - 0 Land line
 - 0 Transportation, please specify ...
 - 0 Refrigerator
 - 0 Other ...

* more than one answer possible ** own well, communal water point, other ... *** in house, separated from house open system, separated from house enclosed system, separated from house pit latrine, public toilet, other ...

- 7.9 Has the quality of your residence house improved since the Dairy Project?
- 0 Yes, please specify ...
 - 0 No
 - 0 Other ...

*Thank you for participating in this research!
Do you have any questions or remarks?*

.....
.....

Appendix C: Additional tables

Chapter 2.1.8: Livestock in Ghana

Table 6.1: Export/Import dependency for livestock products, Ghana

Table 6.1: Export/import dependency for livestock products, Ghana

Product	Export as percentage of production				Imports as percentage of consumption			
	1980	1990	2000	2002	1980	1990	2000	2002
Meat, total	0.00	0.00	0.15	0.49	2.71	9.15	11.92	17.05
Beef	0.00	0.00	0.44	0.16	10.21	25.51	11.37	9.4
Sheep, goat	0.00	0.00	0.00	0.00	0.59	0.32	6.13	5.82
Pig	0.00	0.00	0.00	0.06	12.6	3.22	12.7	23.59
Poultry	0.00	0.00	0.7	3.34	1.55	43.75	45.3	54.69
Milk	0.00	0.00	6.11	11.37	91.24	132.6	141.11	221.96
Eggs	0.00	0.00	0.00	0.00	0.01	1.40	1.03	0.43

Source: adaptation from FAO (2005a)

Chapter 4.2.1: Land

Table 6.2: Payment per acre per district

Table 6.2: Payment per acre per district

N = 33	Payment for the land acre/year				Total
	No payment	Amount of Cedi per year	In harvest	In goods	
Suhum	6	7	6	1	20
Akuapem-South	9	2	1	1	13
Total	15	9	7	2	33

Source: Fieldwork, 2009

Chapter 4.4: Stocks and flows of the household

Table 6.3: Expenditures

Table 6.3: Expenditures before and since the Dairy Project

Before the Dairy Project		Since the Dairy Project	
1	School fees and attributes	1	School fees and attributes
2	Food	2	Food
3 (shared)	Medical expenses	3	Clothing
	Clothing	4	Medical expenses
5	Investments farm	5	Other

Source: Fieldwork, 2009