KWEME NKRUMAH UNIVERSITY OF SCIENCE AND TECHNOLOGY

KUMASI

THE ROLE OF ASSOCIATION OF PRODUCTION ENTREPRENEURS IN DEVELOPMENT AS A MICROFINANCIAL INSTITUTION IN REDUCING POVERTY:

TAMALE METROPOLIS AND TOLONG-KUMBUNGU DISTRICT IN NORTHERN

REGION AS A CASE STUDY.

By

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of

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CERTIFICATION

I here certify that ,this work was carried out solely by Yirisa Moses (PG4071710) in the department of Mathematics ,Institute of Distance Learning, in partial fulfillment of the requirement for the award of Masters of Science Degree in Industrial Mathematics.

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DEDICATION

I dedicate this thesis to my sweet parents Mr and MrsYirisa who toiled in making sure that I had formal education, and to my two brothers DaudaYirisa and Ibrahim Yirisa for giving support.

Lastly to Mr Wilberforce, Headmaster Northern Business Senior High School for his support.

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First, I herewith express my profound thanks to Almighty God for giving me good health, strength and courage to pursue this program.

I am also thankful to Mr. Charles Sebil for being patient to guide me through in writing this thesis.

Lastly my thanks also go to the staff of Association of Production Entrepreneur in Development (APED), especially those who assisted in gathering data.

ABSTRACT

In this research, the role of microfinance in reducing poverty in Tamale metropolis and Tolong-Kumbungu district, it was found that microfinance is a tool that can be relied in reducing poverty among the poverty endemic areas such as the three northern regions. One hundred respondents were interviewed from two districts in northern region. Forty respondents were under microfinance program and sixty were not. The study revealed that those who were under microfinance program had improvement in their income levels and improvement in standard of living as compared to the non-clients whose income levels are very low and standard of living also very low.

From the study it can be concluded that microfinance plays an active role in reducing poverty.

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LIST OF ABBREVIATIONS

PNDC	Provisional National Defense Council.
FNGO	Financial Non-Governmental Organization.
ROSCA	Rotating Savings and Credit Association.
ASCA	Accumulating Savings and Credit Association
NBFI	Non-Bank Financial Institution.
FINSSP	Financial Sector Strategic Plan.
RFSP	Rural Financial Service Project.
UNDP	United Nation Development Program.
SIF	Social Investment Fund.
CBRDP	Community Based Rural Development Program.
REP	Rural Enterprise Project.
ASSIP	Agricultural Services Investment Project.
GLSS	Ghana Living Standard Survey.
NGO	Non-Governmental Organization.
CBO	Community-Based Org

CHAPTER 1

1.0 Background of the study

Microfinance refers to providing small loans and other proportionally sized financial services to low-income individuals and the poor. The primary goal is to enfranchise these borrowers with capital, thereby enabling them to start or expand small businesses essentially fostering entrepreneurship on a micro level.

Microfinance loans are now being made domestically and around the world, with estimates of between $20 and $60 billion outstanding.(Schwarez).

Microfinance addresses a full range of banking needs of poor people. It includes Microcredit, micro- savings, insurance & also fund transfers.

The Grameen Bank of Bangladesh is often considered to be the first organization to have put contemporary microcredit into practice. In fact, it only began its activities in 1976, whilst Opportunity International, a not-for-profit organization of Christian origin, had already begun to make small-scale loans.

Grameen Bank is a Bangladesh-based microfinance institution that provides collateral-free loans to poor entrepreneurs in rural areas. It was founded by Yunus(1970) who, along with GrameenBank, won the 2006 Nobel Peace Prize for their work in developing a model aimed at lifting millions of people from poverty. As of February 2010, it reports8 million borrowers. With 2,563 branches, Grameen Bank provides services to 81,343 villages. Grameen Bank has the equivalent of USD 1.2 billion in assets. Total amount of loan disbursed by Grameen Bank, since inception, is Tk 513.70 billion (US $ 8.96 billion). Out of this, Tk 456.19 billion (US $ 7.95 billion) has been repaid. Current amount of outstanding loans stands at TK

57.51billion(US$831.01million).(DebahnaRoyandKoushikGhosh).

Poverty is pervasive in Africa and South Asia. Rather it‘s on the rise in some countries of the region, which in turn further worsening the access of the poor to the economic opportunities through which they could buildup their assets and enhance income in order to come out of poverty cycle. The potential to avail such economic opportunities mainly depends on the degree of access to financial services. The commercial banking sector does not consider the poor bankable owning mainly to their inability to meet the eligibility criteria, including collateral. Thus, the poor people in most countries virtually have had no access to formal financial services Littlefield,et al (2003). The informal financial alternatives such as family loans, moneylenders, and traders are usually limited in amount, often rigidly administered, and in most of the cases involve very high implicit and explicit costs forcing the destitute stuck in poverty cycle for generations. The more rational way to help the poor could be the provision of sustainable economic opportunities at grass root level especially provision of required financial services at competitive rates to support their investments including viable business activity. Microfinance emerged as a noble substitute for informal credit and an effective and powerful instrument for poverty reduction among people who are economically active but financially constrained and vulnerable in various countries Morduch and Haley (2002). It covers a broad range of financial services including loans, deposits and payment services, and insurance to the poor and low-income households and their micro-enterprises. Historically, the majority of microfinance activities had been confined to the on-lending of funds provided by charitable donors to eleemosynary or non-profit banks, non-governmental organizations, and other microfinance institutions. The very success of microfinance as a tool, however, has made it apparent that the need for

microfinance lending vastly exceeds the amount of funds that can be raised from charitable donors. It has been estimated, for example, that of the one-and-a-half billion people potentially eligible for microfinance loans, only a hundred million people, that isless than seven percent receive them. To satisfy this demand, worldwide attention has been turning to commercial funding sources.(Steven L and Schwarez).

In an effort to eradicate or reduce poverty to the bearest minimum in the globe, the United Nation Millennium Development Goals (UNMDG) in 2000 emphatically challenged developing countries to recognize and improve the welfare of the neediest people with economic potentials. Microfinance has therefore been identified as agents of development in most emergent economies.

Indeed, the concept of microfinance is not new in Ghana. There has always been the tradition of people saving and/or taking small loans from individuals and groups within the context of self-help to start businesses or farming ventures. For example, available evidence suggests that the first credit union in Africa was established in Northern Ghana in 1955 by Canadian Catholic missionaries. However, Susu, which is one of the microfinance schemes in Ghana, is thought to have originated from Nigeria and spread to Ghana in the early twentieth century. Over the years, the microfinance sector has thrived and evolved into its current state thanks to various financial sector policies and programmes undertaken by different governments since independence. Among these are:

- Provision of subsidized credits in the 1950s;
- Establishment of the Agricultural Development Bank in 1965 specifically to address the financial needs of the fisheries and agricultural sector;

- Establishment of Rural and Community Banks (RCBs), and the introduction of regulations such as commercial banks being required to set aside 20% of total portfolio, to promote lending to agriculture and small scale industries in the 1970s and early 1980s;
- Shifting from a restrictive financial sector regime to a liberalized regime in 1986;
- Promulgation of PNDC Law 328 in 1991 to allow the establishment of different categories of non-bank financial institutions, including savings and loans companies, and credit unions.

The policies have led to the emergence of three broad categories of microfinance institutions. These are:

- Formal suppliers such as savings and loans companies, rural and community banks, as well as some development and commercial banks;
- Semi-formal suppliers such as credit unions, financial non-governmental organizations (FNGOs), and cooperatives;
- Informal suppliers such as susu collectors and clubs, rotating and accumulating savings and credit associations (ROSCAs and ASCAs), traders, moneylenders and other individuals.

In terms of the regulatory framework, rural and community banks are regulated under the Banking Act 2004 (Act 673), while the Savings and Loans Companies are currently regulated under the Non-Bank Financial Institutions (NBFI) Law 1993 (PNDCL 328). On the other hand, the regulatory framework for credit unions is now being prepared, and this would recognize their dual nature as cooperatives and financial institutions. The rest of the players such as FNGOs, ROSCAS, and ASCAs

do not have legal and regulatory frameworks. Programmes currently addressing the sub-sector in Ghana include the Financial Sector Improvement Project, Financial Sector Strategic Plan (FINSSP), the Rural Financial Services Project (RFSP), the United Nations Development Programme (UNDP) Microfinance Project, the Social Investment Fund (SIF), the Community Based Rural Development Programme (CBRDP), Rural Enterprise Project (REP), and Agricultural Services Investment Project (ASSIP). (DrJohnson P Asiama).

In September 2000, building upon a decade of major United Nations conferences and world leaders came together at United Nations Headquarters in New York to adopt the United Nations Millennium Declaration, committing their nations to a new global partnership to reduce extreme poverty and setting out a series of time-bound targets, with a deadline of 2015, that have become known as the Millennium Development Goals. The first of these goals (MDG 1) states that the proportion of people with an income of less than $1 a day shall be halved relative to what it was in 1990. Between 1990 and 2001 the headcount ratio of poverty for all Least Developed Countries (LDCs) fell from 27.9% to 21.1%, but the ratio for Africa actually increased from 44.6% to 46.4% (Ravallion and Chen, 2004). Against this background, it is not surprising that several recent papers argue that most African countries will not achieve the target of reducing poverty by half by 2015 (UNDP(2003); Naschold (2004)).

Almost every individual in Ghana has the desire to see poverty reduced. To understand poverty, poverty has to be defined, measured, and studied--and even experienced. As poverty has many dimensions, it has to be looked at through a variety of indicators levels of income and consumption, social indicators, and

indicators of vulnerability to risks and of socio/political access. In view of this, this study is designed to evaluate the role of microfinance in reducing poverty in Ghana as a means of achieving the first of the Millennium Development Goals, which is halving the proportion of people with an income of less than $1 a day relative to what it was in 1990. In Ghana over 50% of the population lives on less than $2 per day. According to the 2000 Population and Housing Census, 80% of the working populations are found in the private informal sector. This group is characterized by lack of access to credit, which constrains the development and growth of that sector of the economy. Clearly, access to financial services is imperative for the development of the informal sector and also helps to mop up excess liquidity through savings that can be made available as investment capital for national development. The Ghana Living Standards Survey (GLSS) in 1991 gave the poverty level as 51.7% but there was a reduction in 1999 to 39.5%. This dropped further to 28.5% in 2005. Of these percentages, a large number of women have been seen to be more prone to poverty (Fosu and Tsikata, 2007). The quest to reduce poverty has not been lost since it has been in the books of many governments. (Asiama and Osei, 2007). However the national poverty rate has been defined as the percentage of a country‘s population which earns less than the country‘s poverty line. This in Ghana has been estimated to be 31.4% (Development Data Group, 2002). This is revealed in the World Bank Statistics (2007), which gave the population of Ghana as Twenty-two million and nine hundred thousand (22,900,000) and out of this number 18.5% are unable to meet their daily food needs (Ghana Living Standards Survey, 2006). This is further heightened by the papers of the Ghana Poverty Reduction Strategy which estimated the poverty line of Ghana to be $2 a day and said about 88% of the Ghanaian populace lived in poverty though the World Bank defines its poverty line

to be $1 per day. Microfinance over the years has been considered to be one of the most effective and flexible strategies in the fight against global poverty. It is said to be sustainable and can be implemented on the massive scale necessary to respond to urgent needs of those living on less than $1 a day, the World‘s poorest.

In Northern Region it is argued that two out of ten people are living below the poverty level (GLSS, 2000).Hence, the need for the operation of microfinance institution in the region. Some of microfinance institutions in northern region are NGOS such as Sinapi Aba Trust, Association of Production Entrepreneurs in Development(APED) and also Rural and community Banks such as Bonzali Rural Banks.

1.1 The Statement of the Problem

In northern region two out of ten people are below the poverty level (GLSS), and as districts, municipals, and metropolises expand due to its growing economic and administrative activities, most of the suburban communities and their farmlands have been annexed. This has in no small way led to loss of farmlands, high unemployment, since majority of the population are in to farming hence low levels of income. This poses constraints on the people’s sources of income. All these have compounded the problem of funding of education of their wards, access to social services such as health facility, water, toilet. It also affects the people economically and psychologically. These conditions have together created the need for self-initiatives towards generating income through other alternatives. As well, it has also heightened the need to eradicate poverty through education and self-employment. One of such income generating alternatives is through microfinance institutions. Based on this, there are growing numbers of microfinance institutions in the

communities, hence the need to assess the impact of these micro financial institutions in trying to reduce or even eradicate poverty in the various communities.

1.2 Objectives

The objectives for this research study are;

1. to determine a relationship between income of respondents and their affording
2. Capacities using regression model.
3. to compare the poverty level of clients of Association of Productive Entrepreneur in Development and non-clients using their income levels.
4. to use the outcome of regression model to asses the impact of microfinance on the survey areas.
5. to make recommendation based on findings to policy makers, stake holders, beneficiaries and for further studies.

1.3 Significance of the Study.

The United Nations through the United Nations Millennium Declaration assigns great importance to reducing poverty among member states by 2015. In this line, the Government of Ghana since 2000 has embarked on the Poverty Alleviation Campaign through many anti-poverty reduction programmes of which micro financing is part. Although microfinance is not the only remedy for poverty and related development challenges, it has and continues to play an important role in reducing poverty through the creation of job opportunities for the poor which leads to increase in incomes, allowing the poor to build assets, reduce their vulnerability, and improve education levels by increasing school enrolment and lowering drop-out rates among those who participate in microfinance programmes. Overall, this research

work has been prepared to demonstrate that micro finance in Ghana has a major role of reducing poverty among its participating clients.

The findings are significant in the following direction;

1. It will inform the government the problems and how the sector will be restructured to meet the need of the neediest in society and hence poverty reduction.
2. The study will also reveal to NGOs, CBOs and other civil societies the important of their activities on the livelihood of their clients.
3. It will also inform the community under study and others the available credit facilities at their disposal.

1.4 Research Limitation.

Financial constraints and data collection from microfinance institutions and information on their operations and clients for me was my greatest limitation.

Since the course is distance base, I stressfully travelled from Tamale to Kumasi to either see my supervisor or when ever he needs to see me.

1.5 Organization of the Study.

The study will be structured in to five chapters as follows;

Chapter 1 covers the introduction of the study which discusses the background of the study, problem statement, methodology and significance of the study, limitation and organization of the study. Chapter 2 looks at the review of related literature. Chapter 3 is concentrate on the methodology employed in carrying out the study. Chapter 4, deals with the presentation of results, obtaining solution for the model interpretation of results. Finally, chapter 5 presents the summary of the research findings,

implications of the study, conclusions based on the study and recommendations.

1.6 Severity of Poverty

About 25,000 people die every day of hunger or hunger-related causes, according to the United Nations. This is one person every three and a half seconds and it is children who die most often. Yet there is plenty of food in the world for everyone (Maura Leen, 2002). The problem is that hungry people are trapped in severe poverty. They lack the money to buy enough food to nourish themselves. Being constantly malnourished, they become weaker and often sick. This makes them increasingly less able to work, which then makes them even poorer and hungrier. This downward spiral often continues until death for them and their families. According to the World Health Organization (WHO), diseases such as Malaria, Pneumonia, Tuberculosis Diarrheal diseases including cholera and dysentery kill more than 2 million people, most especially children each year in poor countries. Though these diseases are treatable, these huge numbers still die owing to poverty (poverty.com).

The role of poverty to mother Ghana and other developing countries have for centuries remained an issue of periodic strategic revolution. Various strategies have been discussed in almost every global and national pinnacle with great intentions to curb poverty and improve standards of living.

The unchanging factors and characteristics associated with poverty have given birth to numerous systems of measurements and strategies over the decades. This in one way or the other have been as a result of the emergent characteristics of the social observable facts that pervade through all other dimensions of life and varies through time.

The veracity of the socio-economic and cultural context of the poor within a specified space and time has continuously generated academic and policy debates as to which approach is best suited for mitigating its devastating effects. The concern for a prudent approach is heightened given the incidence of poverty on the continent and globally. Approximately, one-third of world's six billion population and specifically 300 million of the population in sub-Saharan Africa (SSA) are afflicted with poverty (UNDP, 2003; Benneh et al 1998).

1.7 Definition of Poverty

There is no single definition for poverty.

i. The Scottish Poverty Information Unit says Poverty generally is defined relative to the standards of living in a society at a specific time. People live in poverty when they are denied an income sufficient for their material needs and these circumstances exclude them from taking part in activities which are accepted parts of daily life in that society (Scottish Poverty Information Unit, 2007).
ii. The World Bank Organization asserts that "The most commonly used way to measure poverty is based on incomes. A person is considered poor if his or her income level falls below some minimum level necessary to meet basic needs. This minimum level is usually called the "poverty line". What is necessary to satisfy basic needs varies across time and societies. Therefore, poverty lines vary in time and place, and each country uses lines which are appropriate to its level of development, societal norms and values."
iii. According to the United Nations, fundamentally, poverty is a denial of choices and opportunities, a violation of human dignity. It means lack of

basic capacity to participate effectively in society. It means that one does not have enough to feed and clothe a family, not having a school or clinic to go to, not having the land on which to grow one‘s food or a job to earn one‘s living, not having access to micro financing. It means insecurity, powerlessness and exclusion of individuals, households and communities. It means susceptibility to violence, and it often implies living on marginal or fragile environments, without access to clean water or sanitation. (Human Right Facts (94).

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Mathematics is a science of patterns that is useful in many areas, the most rapid areas of growth in applications of mathematics have been in social, biological and behavioral sciences. Financial analysts, legal scholars, political pollsters, and sales managers all rely on sophisticated mathematical models to analyze data and make projections. Even artists and musicians use mathematical programs to aid in their work. No longer just a tool for the physical sciences, mathematics is a language for all disciplines. No matter what major a student chooses, mathematics can play a key role in solving interesting problems in that discipline (Zitarelli and Coughlin 1991).

Microfinance emerged as a noble substitute for informal credit and an effective and powerful instrument for poverty reduction among people who are economically active but financially constrained and vulnerable in various countries. It covers a broad range of financial services including loans, deposits and payment services, and insurance to the poor and low-income households and their micro-enterprises. Convincing research evidence exists showing significant role of MFIs in improving the lives of the deprived communities in various countries. Persuaded with the potential role of micro financing in alleviating poverty, the South Asian countries have been actively pursuing the policy of setting up formal network of microfinance institutions. These institutions include NGOs and government sponsored programs. Some leading MFIs, e.g. Grameen Bank, have created financial modes that serve increasing number of poor. They also lead to repayment rates positively comparable with the performance of many commercial banks. These approaches have helped

many MFIs in achieving a reasonable level of sustainability, and have even produced profits without government subsidies and support from donor (Hulme, 1999). Nonetheless, some of the MFIs especially the NGOs are facing serious sustainability problems indicating lapse in their financial procedures, organizational design and governance. Moreover, most of the MFIs do not provide deposit services to their clients. In contrast, some of the successful MFIs like Grameen Bank in Bangladesh and BancoSol in Bolivia have incorporated the provision of deposit services in their operations. Appropriately managing the deposit service and micro and small savings help MFIs to reach financial self-sufficiency through generating their own internal flow of funds that in turn reduce their dependency on external sources Morduch, (2002). The primary objective is to identify the most efficient/best practice MFI(s) that would in turn help improve functioning of the other MFIs in the South Asian region, which comprises of 20% of the World poor and also the birth of the first MFI the Grameen Bank started in 1976. Scores of studies are found on analyzing the efficiency and its determinants in commercial banking sectors of various countries. The MFIs are also financial institutions with a primary objective of making credit available to that segment of the population which has been ignored by the commercial banking system for not having collateral requirements. The efficient functioning of these MFIs on sustainable basis is important also for persistent financial access of the poor segment of the society.

The first Microfinance operation started approximately 30 years ago in South Asia. There are number of institutions, such as donor agencies, international NGOs and research institutions, which have played an important role in developing microfinance programs and institutions by supporting microfinance initiatives financially. They assisted in creating capacity building and good governance

practices in microfinance programs. The most famous MFIs established in the late 1970s are Grameen Bank and Bangladesh Rural Advancement Committee (BRAC). In the early 1980s the Grameen Bank became a private sector bank and with a limited license the BRAC became a non-government organization (NGO). These two institutions have had a global influence as there have been many successful attempts at replicating them in other developing countries Remenyi,(1997).

The history of microfinance activities in Pakistan starts with the launching of Orangi Pilot Project (OPP) in Kutchi Abadies of Karachi in early 1980‘s. Now there are more than sixteen Micro Finance Institutions working in Pakistan. The MFIs in Pakistan can be divided into different groups based on their uniqueness that separates them from other financial institutions and makes them similar in terms of the way they function. The first group consists of Financial Institutions with microfinance as a separate product line. The share of microfinance related activities of these institutions is up to 10 percent. This group includes Orix Leasing and the Bank of Khyber both are profit making organizations and consider microfinance as a separate product line. The second group refers to the specialized MFI's, which includes two microfinance banks - The Khushhali Bank and First Microfinance Bank Limited (FMBL) and two NGOs - KASHF Foundation and ASASAH. All these institutions completely focus on provision of financial services and also have commercial focus as well. Third category MFIs related to activities of the Rural Support Programs which deals with integrated Rural Development Programs with microfinance as one of its activities. These organizations are Rural Support Programs (NRSP), Punjab Rural Support Programs (PRSP) and Rural Support Programs (SRSP). The last group consists of private NGOs. These NGOs are basically integrated development organizations with microfinance as one of its activities. These include like Orangi

Pilot Project, Sungi Foundation, Taraqee Foundation, Development Action for Mobilization and Emancipation (TRDP), Sindh Agricultural & Forestry Workers Coordinating Organization (SAFWCO) and Development Action for Mobilization and Emancipation (DAMEN), among others. There were less than a half million beneficiaries of the microfinance institution during the financial year 2003. They distributed more than 87 million dollars to the poor people. The Khushhali Bank remains on the top position by serving approximately 168,105 active borrowers with gross loan portfolio of about 23.54 million US dollars. The sources of finance of these MFIs include grants, loans, share capital and savings. The organizations engaged in microfinance activities in India may be categorized as the Wholesalers, NGOs supporting Self Help Group Federations (SHGF) and NGOs directly retailing credit borrowers or groups of borrower. The wholesale agencies which provide bulk funds to the system through NGOs include the National Bank of Agriculture and Rural Development (NABARD), Rashtriya Mahila Kosh-New Delhi and the Friends of Women's World Banking in Ahmedabad. The NGOs that are supporting the SHG Federations include MYRADA in Bangalore, Self-help Women‘s Association (SEWA) in Ahmedabad, PRADAN in Tamilnadu and Bihar, ADITHI in Patna, SPARC in Mumbai, and the Association for SarvaSeva Farms (ASSEFA) in Madras, the Small Industries Development Bank of India (SIDBI) and the Tamil Nadu Womens' Development Corporationetc. The NGOs that are directly enhancing credit to the borrowers include SHARE in Hyderabad, ASA in Trichy, RDO Loyalam Bank in Manipur. There are perhaps 250-300 NGOs in the field of microfinance. Currently there are more than 10 million active borrowers in India. Players of microfinance sector in Bangladesh consists of at least 15 International NGOs, ten Government Ministries and Projects, five Commercial Banks, ten Grameen and more than 1000

other NGOs and Cooperatives. They have more than 15 million active borrowers Rashid and Matsaert. (2005). The micro finance operation in Bangladesh starts with the establishment Grameen Bank in 1976. It has over 1000 branches spread all over Bangladesh. The Grameen Bank has borrowing groups in 28,000 villages and it has more than 3.7 million borrowers. Most of the borrowers are women. Its gross loan portfolio during 2004 was more than 337 million dollars. The most important feature is the recovery rate of loans, which is as high as 98%. Moreover the Bank provides credit without any collateral security. Considering outreach numbers the BRAC remained at the top with 3.99 million active borrows. These Indicators concept of development has evolved from 'an almost exclusive focus on bricks and mortar and investments in physical capital to an approach that recognizes human and social capital as critical factors for sustainable development' (The World Bank 1997:1). Mentioning the integration of the social aspect in its development work, the report continues to state that 'with this evolution, building social infrastructure, like the creation of physical infrastructure, has become a cornerstone of development ongoing process of incorporating the social dimensions of development in its work. Micro-lending initiatives endeavour much more than mere asset building and raising savings. The social development of the population that they cater for is increasingly becoming one of their foremost purposes, and as the World Bank puts it: 'development and poverty reduction has shifted from the initial brick and mortar approach to targeting basin human needs' (1997). Thus, current development literature makes continual references to social capital, social development, social analysis, social evaluation, social policy and social impact.

2.2 The Role of Microfinance.

The literature suggests that microfinance creates access to productive capital for the poor, which together with human capital, addressed through education and training, and social capital, achieved through local organization building, enables people to move out of poverty. By providing material capital to a poor person, their sense of dignity is strengthened and this can help to empower the person to participate in the economy and society.

The aim of micro-finance is not just about providing capital to the poor to combat poverty on an individual level, it also has a role at an institutional level. It seeks to create institutions that deliver financial services to the poor, who are continuously ignored by the formal banking sector. The poor are generally excluded from the financial services sector of the economy so MFIs have emerged to address this market failure. By addressing this gap in the market in a financially sustainable manner, a MFI can become part of the formal financial system of a country and so can access capital markets to fund their lending portfolios, allowing them to dramatically increase the number of poor people they can reach Otero, (1999). More recently, commentators such as Littlefield, Murduch and Hashemi (2003), Simanowitz and Brody (2004) and the IMF (2005) have commented on the critical role of micro-credit in achieving the Millennium Development Goals.

According to Simanowitz and Brody (2004), micro-credit is a key strategy in reaching the MDGs and in building global financial systems that meet the needs of the most poor people. Littlefield, et al (2003) state "micro-credit is a critical contextual factor with strong impact on the achievements of the MDGs. Micro-credit

is unique among development interventions: it can deliver social benefits on an ongoing, permanent basis and on a large scale".

However, some schools of thought remain sceptical about the role of micro-credit in development. For example, while acknowledging the role micro-credit can play in helping to reduce poverty, Hulme and Mosley (1996) concluded from their research on micro-credit that "most contemporary schemes are less effective than they might be" (1996). The authors argued that micro-credit is not a panacea for poverty-alleviation and that in some cases the poorest people have been made worse-off. This notwithstanding, microfinance has emerged globally as a leading and effective strategy for poverty reduction with the potential for far-reaching impact in transforming the lives of poor people. It is argued that microfinance can facilitate the achievement of the Millennium Development Goals (MDGs) as well as National Policies that target poverty reduction, empowering women, assisting vulnerable groups, and improving standards of living. As pointed out by the former UN Secretary General Kofi Annan during the launch of the International Year of Micro Credit (2005), Sustainable access to microfinance helps alleviate poverty by generating income, creating jobs, allowing children to go to school, enabling families to obtain health care, and empowering people to make the choices that best serve their needs. Kofi Annan, (December 2003). Although microfinance is not a panacea for poverty reduction and its related development challenges, when properly harnessed it can make sustainable contributions through financial investment leading to the empowerment of people, which in turn promotes confidence and self-esteem, particularly for women.

2.3 Microfinance and Poverty Reduction

Poverty reduction has been a key objective of most development policies and programmes, including microfinance programmes (United Nations 1997). Microfinance has proven to be an effective and powerful tool for poverty reduction. Like many other development tools, however, it has insufficiently penetrated the poorer section of society. The poorest form the vast majority of those without access to primary health care, good shelter, good food and basic education; similarly, they are the majority of those without access to microfinance.

While there is no question that the poorest can benefit from all these good things, it is not as intuitive that they can also benefit from microfinance. In most developing countries, most commercial banks do not serve several categories of people. Von Pischke (1995) describes a frontier between the formal and informal financial sectors. According to him, those outside the frontier do not have regular access to formal financial services. They comprise a heterogeneous population, whose degree of exclusion from financial services may vary, and whose distance from the poverty line in either direction in their respective countries may differ (Hulme and Mosley, 1996). Microfinance basically seeks to provide financial assistance to those who the banks have ignored over the years. There is overwhelming evidence to demonstrate that families that participate in microfinance programs enjoy an increase in household income. They also benefit from consumption smoothing and the ability to sustain gains over time Murdoch and Haley (2002) . Microfinance makes an impact on more than just household income. Case studies indicate that microfinance has substantial effect on the nutrition and health of the poor, especially for children. Integrated Microfinance Institutions are known for their direct involvement in nutrition and health through provision of education on AIDS Awareness and classes

on nutrition and hygiene. Indirectly, microfinance has a positive influence on nutrition and health because increased income through participation in microfinance programs invariably will lead to higher nutrition and greater access to health care. Nutritional indicators also seem to improve where Microfinance institutions have been working. Graham Wright (2000).

A study conducted by the World Bank in collaboration with the Bangladesh Institute of Development Studies, which showed that the Grameen Bank not only reduced poverty and improved the welfare of participating households, but also enhanced the household's capacity to sustain their gains over time. This was accompanied by an increased caloric intake and better nutritional status of children in households of Grameen Bank participants. (Hashemi et al,2000). Many poor children and adolescents do not have the chance to obtain an education because their parents cannot afford to send them to school. The costs of transportation and educational materials are too much for some impoverished families. Adolescents in particular are often forced to drop out of school to find a job to supplement the family income. Microfinance, by contributing to an increase in household income and better financial stability, enables poor families to bear the costs of sending children to school. MFIs are known for encouraging families to keep children in school and in some cases school attendance is mandatory in order to participate in the microfinance program (Murdoch et al, 2002).

Microfinance can play a critical role in the realization of the third Millennium Goal, to promote gender equality and empower women. Currently, 70% of people in absolute poverty (living on less than $1 a day) are women (Cheston and Kuhn, 2002). In order to alleviate extreme poverty, women, who suffer the most, must be empowered to break free from their marginalized status in society. Microfinance can

provide the economic opportunities that women need to control their lives. Poverty alleviation strategies that focus on empowering women not only improve the lives of women, but also positively affect entire families and communities. Studies show that when women are given greater autonomy over their lives and the lives of their children, living conditions invariably improve. This is mostly due to the fact that women are most apt to use household income to better the nutrition and educational opportunities of their children. According to the World Bank, societies that discriminate on the basis of gender pay the cost of greater poverty, slower economic growth, weaker governance, and a lower living standard of their people, overall, evidence is mounting that improved gender equality is a critical component of any development strategy. World leaders are finally beginning to realize that poverty alleviation will only be achieved through the empowerment and economic improvement of women. Thus, microfinance is an integral component to new development strategies because it allows women greater autonomy and control over their economic well-being. A case study of Sinapi Aba Trust, a microfinance institution in Ghana, was conducted in order to determine whether microfinance has an impact on women‘s empowerment. The study shows that .running a successful business does not only contribute to women‘s improved welfare, it also contributes both directly and indirectly to their empowerment. The increase in working capital is particularly important for women‘s empowerment. In almost all cases, the increase in capital has given women more options and greater control over their businesses and their lives. (Cheston and Kuhn, 2002). The Trust Bank program of Sinapi Aba Trust has clearly contributed to the empowerment of women in a number of ways. Access to credit and business training has helped women expand and improve their businesses, leading to increased respect and decision-making power in the home and

community. Advice and peer support has helped women manage their triple roles as mothers, wives, and businesswomen. Education and experience in leadership have helped women become more confident and capable leaders (Cheston and Kuhn, 2002). Microfinance clearly contributes to a greater economic stability and well-being of poor families through increase in income, health, nutrition, education, and empowerment. As opposed to economic impacts, the social impact that results from MFI lending and support services produces such results that cannot be quantified so easily. Gaining rapid popularity from the early 1980s onwards, such efforts were recently extended to the socio-political arena in an attempt to assess whether microfinance can promote empowerment (Hulme) 2000. This led to a shift in impact assessment studies; for instance, now studies may include the measurement of individual control over resources, involvement in household and community decision-making, levels of participation in community activities and social networks, electoral participation, educational status, access to health-care services, nutritional levels, and anthropometric measures. In contrast to economic impacts, however, social impacts are much more complicated to measure. How can one quantify a shift in gender relations and decision-making at the household level, for instance, or how can a researcher allocate percentages to elements such as social well-being, enhanced self-perceptions, improvements to livelihoods, and the levels of participation in social activities that make a borrower feel part of a community Naila Kabeer's (1998) seminal work on gender relations, program effectiveness and economic prosperity 'Money Can't Buy Me Love? Re-evaluating Gender, Credit and Empowerment in Rural Bangladesh', illustrates the intricacies involved in evaluating and measuring a social variable such as gender. For example, how does one measure whether women have, or have not benefited from MFI programs and

whether they feel better-off than prior to borrowing, and if so, to what extent? Kabeer attributes previous contradictory evaluations partly to conflicting empirical findings. More significant sources of conflict, according to Kabeer relate to differences in the methodologies used, in the questions asked and above all, in the models of power which underpin the various evaluations. This reiterates the fact that devising a universally acceptable methodology for social impact assessment is almost impossible, since such impacts are deeply-rooted not only in human behaviour, perceptions, beliefs and values but also in external elements such as social, cultural, political and socio-economic factors.

2.4 The Social Dimension in Development Theory and Practice.

Traditionally, development initiatives have been synonymous with raising people's incomes and employment opportunities, increasing their consumption and helping them build assets and accumulate savings. Poverty reduction programs were considered to deal primarily with helping borrowers obtain tangible, material gains. Quantifiable results were envisaged as the foremost and principal measure of assessing poverty mitigation and program success. Until a few years ago, the social dimension was not regarded as an important planning and evaluation level of development cooperation. Although initial steps towards operationalising socio-economic impacts were developed by the research community as part of the 'basic-needs approach' of the seventies, the social dimension has been the focus of project evaluation only since the public debate on the effectiveness of development projects began, and the legitimacy of the entire area of development cooperation policy was questioned. A significant step towards establishing the nexus between the economic and social impact was the rendition of the 'multidimensional view of poverty' by the United Nations Development Program particularly while preparing the National

Human Development reports (Neubert) 2000. The World Bank has been at the forefront in development-related initiatives on a global scale. According to a (1997) group report of the Social Development Task Group of the Bank, during the fifty years in which it has been in existence, the consent for this is the gradual shift in the development paradigm from building tangible, physical assets to developing human and social capital. When development professionals mention society, social policy, social capital, social change and social impact, they do not signify isolated individuals and stand-alone institutions; they connote a complex and intricate web of interactions that occur both within the population and also external to it. The 'social dimension' is thereby a cross-section of a range of elements that play a vital role in the world of development cooperation. Out of the major factors that influence the social sphere, the economic, cultural and political dimensions play the most prominent roles by overlapping with the social aspect and bringing about the social change in question.

The socio-economic area of overlapping, for instance, encompasses matters that can be physically defined and in which economic circumstances are examined, with the non-economic variables being taken into account. The focus is on the distribution of resources through rights and status or power and macro and sectoral policies and the consequent implications for individual social groups. The socio-cultural area of overlapping, on the contrary, concerns the non-physical features that relate to a society's system of values and are thought of, or represent its unique cultural identity. Issues relevant to ethnicity, gender, religion, traditions, customs, etc. form the focal point of this dimension. In the socio-political realm, areas of concern pertain to matter relevant to the civil society, issues raised by human rights affairs, and post-conflict scenarios, The World Bank,(1997).

2.5 Evolution of Microfinance

Over the past 10 years or so, microfinance has rapidly evolved and expanded from the relatively narrow field of microenterprise credit to the more comprehensive concept of microfinance (which includes a range of financial services for poor people, including savings, money transfers, and insurance) to the enormous challenge of building inclusive financial systems. The ideas and aspirations behind microfinance are not new. Small, informal savings and credit groups have operated for centuries across the world, from Ghana to Mexico to India and beyond. In Europe, as early as the 15th century, the Catholic Church founded pawn shops as an alternative to usurious moneylenders.

These pawn shops spread throughout the urban areas in Europe throughout the 15th century. Formal credit and savings institutions for the poor have also been around for generations, offering financial services for customers who were traditionally neglected by commercial banks. The Irish Loan Fund system, started in the early 1700s, is an early (and long-lived) example. By the 1840s, this system had about 300 funds throughout Ireland.

In the 1800s, Europe saw the emergence of larger and more formal savings and credit institutions that focused primarily on the rural and urban poor. The financial cooperative was developed in Germany. It aimed to help the rural population break from their dependence on moneylenders and to improve their welfare. The movement emerged in France in 1865 and Quebec in 1900.

Many of today's financial cooperatives in Africa, Latin America, and Asia find their roots in this European movement. Another early example is the Indonesian People's

Credit Banks (BPRs) that opened in 1895 and became the largest microfinance system in Indonesia, with close to 9,000 branches.

In the early 1900s, variations on the savings and credit theme began to appear in rural Latin America and elsewhere. These rural finance interventions aimed to modernize the agricultural sector, mobilize idle savings, increase investment through credit, and reduce oppressive feudal relations that were enforced through indebtedness.

Microfinance has gone through four (4) distinct phases worldwide and also in Ghana.Phase One: The provision of subsidized credit by Governments starting in the 1950's when it was assumed that the lack of money was the ultimate hindrance to the elimination of poverty.

Phase two: Involved the provision of microcredit mainly through NGOs to the poor in the 1960's and 1970's. During this period sustainability and financial self - sufficiency were still not considered important.

Phase three: In the 1990's the formalization of Microfinance Institutions (MFIs) begun.

2.5.1 Evolution of Microfinance Sector in Ghana

With almost thirty per cent of Ghanaians living below the poverty line, microfinance has been identified as an important means of providing financial services to the population. It is therefore not surprising that the countries present and past government have perceived microfinance as central to achieving the greater goal of poverty reduction.

Microfinance has been with Ghanaians for some time now and is therefore not to be seen as a new concept in the country. It has always been a common practice for people to save or borrow small loans from individual, friends and relatives within the context of self-help in order to engage in small retail business or farming ventures (Bank of Ghana, 2007).Evidence exist that the first credit union in Africa was set up in the northern part of Ghana in 1955 by the Canadian Catholic missionary for parishioners as a thrift society within the parish. The susu scheme of itinerant savings collection, which is one of the means by which micro-savings is provided in Ghana, is thought to have originated in Nigeria and spread through Ghana from the early 1900s.

Over the years, the microfinance sector has evolved and thrived in to its current state as a result of various financial sector policies and programmes promoted by the various government, including the provision of subsidized credits, establishment of Rural and Community Banks (RCBs),the liberalization of the financial sector and the promulgation of Financial Institutions (Non Banking) law,1993 (PNDC Law 328) (Nissanke et al,1998).

2.6 The Impact of Microfinance and Poverty Reduction in Ghana

The main goal of Ghana's Growth and Poverty Reduction Strategy (GPRS II) is to ensure "sustainable equitable growth, accelerated poverty reduction and the protection of the vulnerable and excluded within a decentralized, democratic environment". The intention is to eliminate widespread poverty and growing income inequality, especially among the productive poor who constitute the majority of the working population.

According to the 2000 Population and Housing Census, 80% of the working populations are found in the private informal sector. This group is characterized by lack of access to credit, which constrains the development and growth of that sector of the economy. Clearly, access to financial services is imperative for the development of the informal sector and also helps to mop up excess liquidity through savings that can be made available as investment capital for national development. Unfortunately, in spite of the obvious roles that microfinance institutions have been playing in the economy particularly over the last twenty years, there is lack of data on their operations.

It is known that loans advanced by microfinance institutions are normally for purposes such as housing, petty trade, and as "start up" loans for farmers to buy inputs for farming and this includes rice seeds, fertilizers and other agricultural tools. Some of the loans are used for a variety of non-crop activities such as: dairy cow raising, cattle fattening, poultry farming, weaving, basket making, leasing farm and other capital machinery and woodworking. Of course, funds may be used for a number of other activities, such as crop and animal trading, cloth trading and pottery manufacture. There are other instances where credit is given to groups consisting of a number of borrowers for collective enterprises, such as: irrigation pumps, building sanitary latrines, power looms, leasing markets or leasing land for cooperative farming.

2.7 Microfinance Institutions

Microfinance institutions are located primarily in developing countries. They vary in structure, sophistication, philosophy, size, scope of services and scale of operations. Most microfinance institutions provide small loans to the poor in the areas they

operate. Some provide additional financial services such as insurance, micro-mortgages and savings products as well as social services such as healthcare and education.

Services are delivered by employees of microfinance institutions who meet with borrowers in their towns and villages or operate local branch offices. They travel on motorcycles, bicycles or on foot, sometimes over long distances to meet with their clients. They coordinate meetings with borrowers, provide training and are responsible for making and collecting loans. Today microfinance has evolved to the point where vehicles are also being used for operations.

Informal Financial Suppliers: These institutions are usually not registered, licensed or regulated and include susu collectors, rotating savings and credit associations (ROSCA's), money lenders etc.

Semi-formal financial Suppliers: These institutions are usually registered but not licensed or regulated. These are normally financial NGOs.

Formal Financial Suppliers: These institutions are registered, licensed and regulated directly by the Central Bank of the mother country or through a Third Party.

They include Commercial Banks, Rural and Community Banks, Savings and Loans Companies, and Credit Unions.

2.7.1Definitions for the microfinance poor clients

Ultra Poor: These require grants: They are the destitute who need to deal with hunger before they can consider productive ventures. They need a combination of grants,

inputs, and intensive Business Development Services before they can graduate to subsidized loans.

Hard Core Poor: These are the poor who engage in seasonal income generating activities. They need a combination of grants and skills training. They can borrow and repay at subsidized rates. With the necessary Business Development Support Services they can graduate to market borrowing rates.The vast majority of microfinance borrowers (84%) are women. This is partly because the majority of the world's unemployed are women and therefore a natural market for microfinance services. Microfinance institutions also prefer to lend to women because they are more likely to repay their loans on time. In fact, many experts believe that empowering women is the key to ending poverty and its resulting social problems. Although many women are initially hesitant to accept loans, their self confidence soars when they realize they can run a successful business and repay their loans. They use their profits to pay for things that will enhance their family's welfare, like education, healthcare and nutritious food. Their status in their family and social circle increases. They tend to have fewer children. They can therefore invest more in the health and education of each child making it more likely that future generations will end the cycle of poverty.

CHAPTER 3

METHODOLOGY

3.0 Research Design

The method chosen for this study is a simple descriptive research, because, the writer only wants to, by means of data, establish whether the impact of microfinance among the beneficiaries has a positive impact or not.

3.1 Study Areas.

The areas under study are individuals, households, communities, in Tamale metropolis. Subject for this study were a sample of sixty clients of APED and forty non-clients between the ages of twenty one to sixty in the communities under research.

3.2 Source of Data.

The data for this analysis were primary data obtained from Yohani in Tamale metropolis and Tolong in the Tolong-Kumbungu district all in the northern region of Ghana.The data was then analyze using regression model.

3.3 Regression.

In statistics, regression analysis includes any techniques for modeling and analyzing several variables, when the focus is on the relationship between a dependent variable and one or more independent variables. More specifically, regression analysis helps us understand how the typical value of the dependent variable changes when any one of the independent variables is varied, while the

other independent variables are held fixed. Most commonly, regression analysis estimates the conditional expectation of the dependent variable given the independent variables that is, the average value of the dependent variable when the independent variables are held fixed. Less commonly, the focus is on a quartile, or other location parameter of the conditional distribution of the dependent variable given the independent variables. In all cases, the estimation target is a function of the independent variables called the regression function. In regression analysis, it is also of interest to characterize the variation of the dependent variable around the regression function, which can be described by a probability distribution. Regression analysis is widely used for prediction and forecasting, where its use has substantial overlap with the field of machine learning. Regression analysis is also used to understand which among the independent variables are related to the dependent variable, and to explore the forms of these relationships. In restricted circumstances, regression analysis can be used to infer causal relationships between the independent and dependent variables. A large body of techniques for carrying out regression analysis has been developed. Familiar methods such as linear regression and ordinary least squares regression are parametric, in that the regression function is defined in terms of a finite number of unknown parameters that are estimated from the data. Nonparametric regression refers to techniques that allow the regression function to lie in a specified set of functions, which may be infinite -dimensional. The performance of regression analysis methods in practice depends on the form of the data-generating process, and how it relates to the regression approach being used. Since the true form of the data-generating process is not known, regression analysis depends to some extent on making assumptions about this process. These assumptions are sometimes (but not always) testable if a large amount of data is

available. Regression models for prediction are often useful even when the assumptions are moderately violated, although they may not perform optimally. However when carrying out inference using regression models, especially involving small effects or questions of causality based on observational data, regression methods must be used cautiously as they can easily give misleading results.

3.4 Assumptions for Regression

Classical assumptions for regression analysis include:

- The sample must be representative of the population for the inference prediction.
- The error is assumed to be a random variable with a mean of zero conditional on the explanatory variables.
- The variables are error-free. If this is not so, modeling may be done using errors-in-variables model techniques.
- The predictors must be linearly independent, i.e. it must not be possible to express any predictor as a linear combination of the others.
- The errors are uncorrelated, that is, the variance-covariance matrix of the errors is diagonal and each non-zero element is the variance of the error.
- The variance of the error is constant across observations (homoscedasticity). If not, weighted least squares or other methods might be used.

These are sufficient (but not all necessary) conditions for the least-squares estimator to possess desirable properties, in particular, these assumptions imply that the parameter estimates will be unbiased, consistent, and efficient in the class of linear unbiased estimators. Many of these assumptions may be relaxed in more advanced treatments. Assumptions include the geometrical support of the variables (Cressie,

1996). Independent and dependent variables often refer to values measured at point locations. There may be spatial trends and spatial autocorrelation in the variables that violates statistical assumptions of regression. Geographic weighted regression is one technique to deal with such data (Fotheringham et al., 2002). Also, variables may include values aggregated by areas. With aggregated data the Modifiable Areal Unit Problem can cause extreme variation in regression parameters (Fotheringham and Wong, 1991). When analyzing data aggregated by political boundaries, postal codes or census areas results may be very different with a different choice of units.

3.5 Regression Models

Regression models involve the following variables:

- The unknown parameters denoted as ß; this may be a scalar or a vector of length k.
- The independent variable, X.
- The dependent variable, Y.

A regression model relates Y to a function of X and

- If N data points of the form (Y, X) are observed, where N <k, most classical approaches to regression analysis cannot be performed: since the system of equations defining the regression model is underdetermined, there is not enough data to recover β. If exactly N = k data points are observed, and the function f is linear, the equations Y = f(X, ß) can be solved exactly rather than approximately. This reduces to solving a set of N equations with N unknowns (the elements of β), which has a unique solution as long as the X are linearly independent. If f is nonlinear, a solution may not exist, or many solutions may exist.
- The most common situation is where N > k data points are observed. In this case, there is enough information in the data to estimate a unique value for ß that best fits the data in some sense, and the regression model when applied to the data can be viewed as an over determined system in ß. In the last case, the regression analysis provides the tools for:

1. Finding a solution for unknown parameters ß that will, for example, minimize the distance between the measured and predicted values of the dependent variable Y (also known as method of least squares).
2. Under certain statistical assumptions, the regression analysis uses the surplus of information to provide statistical information about the unknown parameters ß and predicted values of the dependent variable Y.

3.6 Statistical assumptions

When the number of measurements, N, is larger than the number of unknown parameters, k, and the measurement errors

3.7 Linear Regression.

Given a data set $\{ y_i, x_{i1}, \ldots, x_{ip} \}_{i=1}^{n}$ Of n statistical units, a linear regression model assumes that the relationship between the dependent variable y_i and the p-vector of regression x_i is approximately linear. This approximate relationship is modeled through a so called "disturbance term"

$$y = \begin{pmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{pmatrix}, \quad X = \begin{pmatrix} x_1' \\ x_2' \\ \vdots \\ x_n' \end{pmatrix} = \begin{pmatrix} x_{11} & \cdots & x_{1p} \\ x_{21} & \cdots & x_{2p} \\ \vdots & \ddots & \vdots \\ x_{n1} & \cdots & x_{np} \end{pmatrix}, \quad \beta = \begin{pmatrix} \beta_1 \\ \vdots \\ \beta_p \end{pmatrix}, \quad \varepsilon = \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \\ \vdots \\ \varepsilon_n \end{pmatrix}.$$

$x_{i1} = 1$ for i = 1,...,n. The corresponding element of ß is called the intercept.

Many statistical inference procedures for linear models require an intercept to be present, so it is often included even if theoretical considerations suggest that its value should be zero.

o Sometimes one of the regressors can be a non-linear function of another regressor or of the data, as in polynomial regression and segmented regression. The model remains linear as long as it is linear in the parameter vector ß .

o The regressorsx_i may be viewed either as random variables, which we simply observe, or they can be considered as predetermined fixed values which we can choose. Both interpretations maybe appropriate in different cases, and they generally lead to the same estimation procedures; however different approaches to asymptotic analysis are used in these two situations.

βis a p-dimensional parameter vector. Its elements are also called effects, or regression coefficients. Statistical estimation and inference in linear regression focuses on ß .

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data. Such a model is called a linear model. Most commonly, linear regression refers to a model in which the conditional mean of y given the value of X is an affine function of X. Less commonly, linear regression could refer to a model in which the median, or some other quartile of the conditional distribution of y given X is expressed as a linear function of X. Like all forms of regression analysis, linear regression focuses on the conditional probability distribution of y given X, rather than on the joint probability distribution of y and X, which is the domain of multivariate analysis.

Linear regression was the first type of regression analysis to be studied rigorously, and to be used extensively in practical applications. This is because models which depend linearly on their unknown parameters are easier to fit than models which are non-linearly related to their parameters and because the statistical properties of the resulting estimators are easier to determine.

Linear regression has many practical uses. Most applications of linear regression fall into one of the following two broad categories:

If the goal is prediction, or forecasting, linear regression can be used to fit a predictive model to an observed data set of y and X values. After developing such a model, if an additional value of X is then given without its accompanying value of y, the fitted model can be used to make a prediction of the value of y.

Given a variable y and a number of variables X1, ..., Xp that may be related to y, then linear regression analysis can be applied to quantify the strength of the relationship between y and the X_j, to assess which X_j may have no relationship with y at all, and to identify which subsets of the X_j contain redundant information about y, thus once one of them is known, the others are no longer informative.

Linear regression models are often fitted using the least squares approach, but they may also be fitted in other ways, such as by minimizing the .lack of fit. in some other norm, or by minimizing a penalized version of the least squares loss function as in ridge regression Conversely, the least squares approach can be used to fit models that are not linear models. Thus, while the terms .least squares. and linear model are closely linked, they are not synonymous.

3.8 Assumptions for Linear Regression

Two key assumptions are common to all estimation methods used in linear regression analysis:

. The design matrix X must have full column rank p. Otherwise the parameter vector ß will not be identified at most we will be able to narrow down its value to some linear subspace of R^p . For this property to hold, we must have n > p, where n is the sample size. Methods for fitting linear models with p > n have been developed, but require additional assumptions such as .effect sparsity. — that a large fraction of the effects are exactly zero.

The regressors x_i are assumed to be error-free, that is they are not contaminated with measurement errors. Although not realistic in many settings, dropping this assumption leads to significantly more difficult errors-in-variables models. Beyond these two assumptions, several other statistical properties of the data strongly influence the performance of different estimation methods:

Some estimation methods are based on a lack of correlation, among the n observations $(y_i,x_{i1},\ldots,x_{ip})$, i=1,…,n. Statistical independence of the observations is not needed, although it can be exploited if it is known to hold.

The statistical relationship between the error terms and the regressors plays an

important role in determining whether an estimation procedure has desirable sampling properties such as being unbiased and consistent.

- The variances of the error terms may be equal across the n units.
- . The arrangement, or probability distribution of the predictor variables x has a major influence on the precision of estimates of ß. Sampling and design of experiments are highly-developed subfields of statistics that provide guidance for collecting data in such a way to achieve a precise estimate of ß.

3.9 Interpretation

A fitted linear regression model can be used to identify the relationship between a single predictor variable x_j and the response variable y when all the other predictor variables in the model are "held fixed". Specifically, the interpretation of $ß_j$ is the expected change in y for a one-unit change in x_j when the other covariates are held fixed. This is sometimes called the unique effect of x_j on y. In contrast, the marginal effect of x_j on y can be assessed using a correlation coefficient or simple linear regression model relating x_j to y.

Care must be taken when interpreting regression results, as some of the regressors may not allow for marginal changes (such as dummy variables, or the intercept term), while others cannot be held fixed (recall the example from the introduction: it would be impossible to "hold t_i fixed". and at the same time change the value of t_i^2).

It is possible that the unique effect can be nearly zero even when the marginal effect is large. This may imply that some other covariate captures all the information in x_j, so that once that variable is in the model, there is no contribution of x_j to the variation in y. Conversely, the unique effect of x_j can be large while its marginal effect is nearly zero. This would happen if the other covariates explained a great deal

of the variation of y, but they mainly explain variation in a way that is complementary to what is captured by x_j. In this case, including the other variables in the model reduces the part of the variability of y that is unrelated to x_j, thereby strengthening the apparent relationship with x_j.

The meaning of the expression “held fixed” may depend on how the values of the predictor variables arise. If the experimenter directly sets the values of the predictor variables according to a study design, the comparisons of interest may literally correspond to comparisons among units whose predictor variables have been “held fixed” by the experimenter. Alternatively, the expression “held fixed” can refer to a selection that takes place in the context of data analysis. In this case, we “hold a variable fixed” by restricting our attention to the subsets of the data that happen to have a common value for the given predictor variable. This is the only interpretation of “held fixed” that can be used in an observational study.

The notion of a “unique effect” is appealing when studying a complex system where multiple interrelated components influence the response variable. In some cases, it can literally be interpreted as the causal effect of an intervention that is linked to the value of a predictor variable. However, it has been argued that in many cases multiple regression analysis fails to clarify the relationships between the predictor variables and the response variable when the predictors are correlated with each other and are not assigned following a study design.

In linear regression, the model specification is that the dependent variable, yi isa linear combination of the parameters (but need not be linear in the independent variables). For example, in simple linear regression for modeling n data points there is one independent variable: xi, and two parameters, ß0 and ß1:

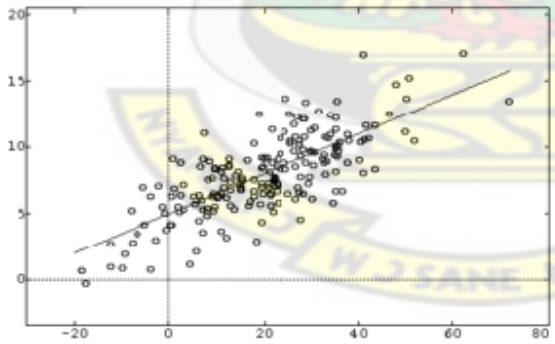
straight line: .$\Sigma y_i = \Sigma($

$$y_i = \widehat{\beta}_0 + \widehat{\beta}_1 X_i + e_i.$$

$$e_i = y_i - \widehat{y}_i$$

$$SSE = \sum_{i=1}^{N} e_i^2.$$

$$\widehat{\beta}_0, \widehat{\beta}_1$$



$$\widehat{\beta}_1 = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sum(x_i - \bar{x})^2} \text{ and } \hat{\beta}_0 = \bar{y} - \widehat{\beta}_1 \bar{x}$$

where $\bar{x}$ is the mean (average) of the x values and $\bar{y}$ is the mean of the y values.

Under the assumption that the population error term has a constant variance, the estimate of that variance is given by:

$$\hat{\sigma}_\varepsilon^2 = \frac{SSE}{N-2}.$$

This is called the mean square error (MSE) of the regression. The standard errors of the parameter estimates are given by:

$$\hat{\sigma}_{\beta_0} = \hat{\sigma}_\varepsilon \sqrt{\frac{1}{N} + \frac{\bar{x}^2}{\sum(x_i - \bar{x})^2}}$$

$$\hat{\sigma}_{\beta_1} = \hat{\sigma}_\varepsilon \sqrt{\frac{1}{\sum(x_i - \bar{x})^2}}.$$

Under the further assumption that the population error term is normally distributed, the researcher can use these estimated standard errors to create confidence intervals and conduct hypothesis tests about the population parameters.

General linear model

In the more general multiple regression model, there are p independent variables:

$$y_i = \beta_0 + \beta_1 x_{1i} + \cdots + \beta_p x_{pi} + \varepsilon_i,$$

The least square parameter estimates are obtained by p normal equations. The residu al can be written as

$$e_i = y_i - \hat{\beta}_0 - \hat{\beta}_1 x_1 - \cdots - \hat{\beta}_p x_p.$$

CHAPTER 4

4.0 Data Analysis and Results.

This chapter analyses the data collected and examines the test results, the data is solely obtained from primary source, which is face to face interview.

Serial 1 to 50 represents respondents in Yohani in Tamale metropolis in the northern region and Serial 51 to 100 represents respondents in the Tolong in the Tolong-Kumbungu district also in the northern region. Also, Serial 1 to 20 and Serial 51 to 70 are clients of Association of Production Entrepreneurs in Development (APED), making Serials 21 to 50 and 71 to 100 non-clients. (Details of the above can be seen in Appendix A TABLE 4.1)

4.1 Data Analysis

Frequencies, percentages, regression analysis and correlation coefficient were used to analyze the data. SPSS software was used for all the analysis.

Frequency Table

Table 4.2: Represents Income(Y).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	< 40	24	24.0	24.0	24.0
	41-60	13	13.0	13.0	37.0
	61-100	26	26.0	26.0	63.0
	101-200	22	22.0	22.0	85.0
	301-400	12	12.0	12.0	97.0
	401-900	3	3.0	3.0	100.0
	Total	100	100.0	100.0	

Source: ***field survey,2012.***

The table above represents the frequency table for income levels of various respondence.Those that were earning less than forty Ghana cedis were twenty four, also those that earn between forty one and sixty Ghana cedis were thirteen, and between sixty one and hundred Ghana cedis were twenty six respondance,also between hundred and one and two hundred Ghana cedis were twenty two respondance,and within the brackets of three hundred and one and four hundred Ghana cedis were twelve respondance and finally those above four hundred were three respondance.

Table 4.3: Represents Age.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	21-30	24	24.0	24.0	24.0
	31-40	46	46.0	46.0	70.0
	41-50	10	10.0	10.0	80.0
	51-60	20	20.0	20.0	100.0
	Total	100	100.0	100.0	

Source: ***field survey,2012.***

The table above shows the age categories that were interviewed. Twenty four are in the age range twenty one and thirty, also forty six of them are in thirty one and forty years age brackets while ten respondance are in the age brackets forty one and fifty years and finally above fifty years were made up of twenty respondance.

Below are statistical graphs of the data gathered, that is the Normal P-P of Regression standardized Residual and scatter plot.

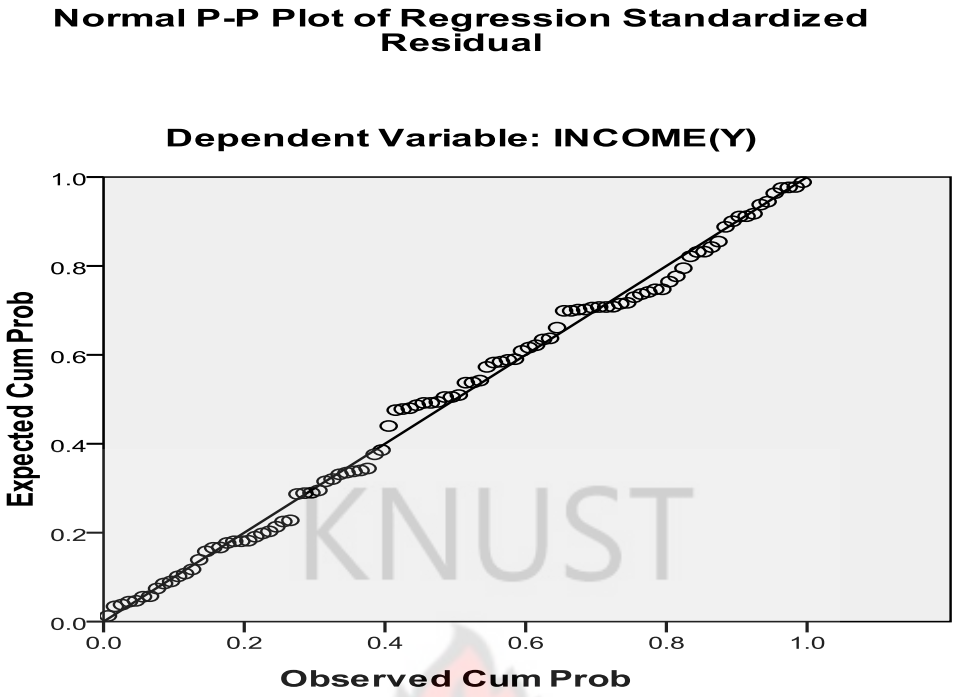


Chart 4.1: Represents the normal P-P of regression standardized residual of the data.

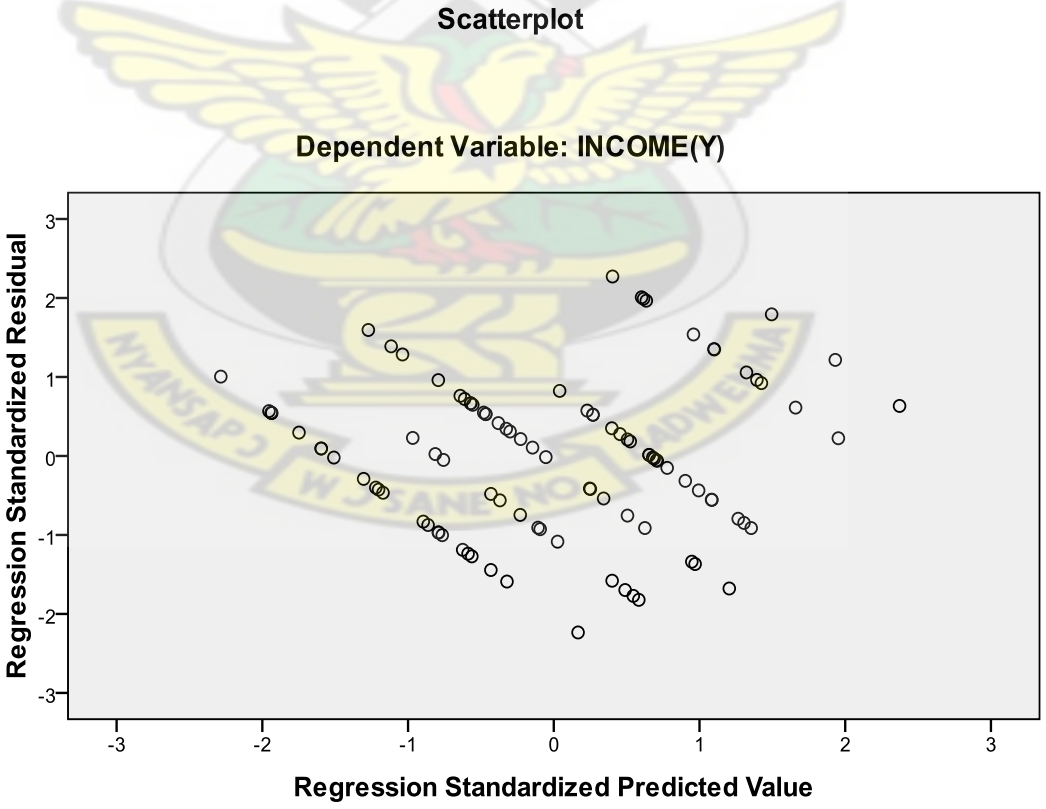


Chart 4.2: Represents the scatter plot of the data.

4.2 Regression Analysis

Regression analysis is used to observe the relationship between dependant and independent variables. Multiple simple regression was used to analysis the factors affecting poverty. The significance of the variables was tested by student F-Statistics and R2 model specification. The following model was specified for the study.

Y =

Descriptive Statistics

Table 4.4: **Represents descriptive statistics of the data.**

	Mean	Std. Deviation	N
INCOME(Y)	3.09	1.700	100
AGE(X1)	2.26	1.041	100
HSE SIZE(X2)	4.45	1.893	100
NO OF MEALS HAD IN PAST TWO DAYS(X3)	4.40	1.239	100
NO OF DAYS WITHOUT FOOD DURING PAST TEN DAYS(X4)	1.14	1.333	100
NO OF ROOMS(X5)	1.90	.859	100
NO OF BEDS AND MATTRESSES (X6)	1.51	.718	100

The Descriptive Statistics part of the output gives the mean, standard deviation, and observation count (N) for each of the dependent and independent variables. The "Monthly Income" variable has a mean value of 3.09, 2.26 for the "Age variable", 4.45 for the "House size" variable, and 4.40, 1.14, 1.9 and 1.51 for the. "Number of Meals had in past two days", "Number of days without enough food to eat

during the past 10 days", "Number of Rooms for members of household", and "Number of Beds and Mattresses", variables respectively.

Table 4.5: Model Summaryb

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.806[a]	.650	.628	1.038

a. Predictors: (Constant),NO OF BEDS AND MATTRESSES(X_6),HSE SIZE(X_2), NO OF DAYS WITHOUT FOOD DURING PAST TEN DAYS(X_4), AGE(X_1), NO OF MEALS HAD IN PAST TWO DAYS(X_3), NO OF ROOMS(X_5)

b. Dependent Variable: INCOME(Y)

The value of the correlation, R between the observed and predicted values of the dependent variable is 0.806. This R indicates a strong relationship.

R Squared is the proportion of variation in the dependent variable explained by the regression model. The value of R squared from the model summary table is 0.650, which indicates that 65% of total variation in total monthly income is explained by variation in the explanatory variable and that the regression results showed a positive relationship in all the explanatory variables. The R^2 also shows that model does fit the data well.

Table 4.6: ANOVA[b]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	186.063	6	31.011	28.803	.000[a]
	Residual	100.127	93	1.077		
	Total	286.190	99			

a. Predictors: (Constant), NO OF BEDS AND MATTRESSES(X_6), HSE SIZE(X_2), NO OF DAYS WITHOUT FOOD DURING PAST TEN DAYS(X_4), AGE(X_1), NO OF MEALS HAD IN PAST TWO DAYS(X_3), NO OF ROOMS(X_5)

b. Dependent Variable: INCOME(Y)

The Hypotheses are H0 : $ß_1$,.., $ß_6 = 0$ and H1 : one or more of the parameters

Table 4.7: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	.020	.615		.033	.974		
	AGE(X1)	-.070	.111	-.043	-.632	.529	.810	1.234
	HSE SIZE(X2)	.048	.061	.054	.793	.430	.823	1.214
	NO OF MEALS HAD IN PAST TWO DAYS(X3)	.514	.115	.375	4.465	.000	.534	1.871
	NO OF DAYS WITHOUT FOOD DURING PAST TEN DAYS(X4)	-.446	.104	-.350	-4.275	.000	.561	1.783
	NO OF ROOMS(X5)	.447	.169	.226	2.636	.010	.514	1.947
	NO OF BEDS AND MATTRESSES (X6)	.273	.199	.115	1.377	.172	.536	1.867

a. Dependent Variable: INCOME(Y)

The unstandardized (B) coefficients are the coefficients of the estimated regression model.

The regression equation can be written as follows:

$$Y = 0.020 + (-0.070)x_1 + (0.048)x_2 + (0.514)x_3 + (-0.446)x_4 + (0.447)x_5 + (0.273)x_6$$

without enough food to eat during the past 10 days leads to a 0.446 decrease in the monthly income holding all other predictors constant.

From the above table, it can be seen that the number of people better off among the clients is fifty percent more than those of the non-clients. It is clearly shown that the number of people of clients are very few compared to those of non-clients under those who are very poor. These results indicate that clients of Association of Production Entrepreneurs in Development (APED) are under-represented in the very poor category, but over-represented in better off, the moderately poor and less poor categories of the population within the survey areas. Thus, even though APED is reaching the very poor, the programme reaches more of the moderately poor and less poor of the population in its operational areas. Additional, the microfinance programme without doubt, aids its beneficiaries to leave the very poor zone through its various kinds of services such as micro saving and micro crediting it offers to its clients to increase income in order to improve their standard of living. These results are not surprising when one considers the context within which APED is operating – including its mission and objectives as well as products and service range; client selection criteria; and, finally, its geographical focus. If micro financing is intensified, there is a high probability that affected individuals or clients may get better off, therefore reducing or alleviating poverty in Ghana.

CHAPTER 5

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Overview

This chapter focuses on the summary of the study conclusions and recommendations for state holders, policy makers, and for further studies.

5.2 Summary

The study was designed to find out the role of microfinance in reducing poverty in some selected districts in Northern Region.

In the research it was found out that women were more beneficiaries in microfinance loans than their male counterparts. It was realized that poverty is more prevalent in women than men. Most of the beneficiaries of microfinance loans are in to peasant farming and small scale businesses, but majority are in to farming.

After the research it was released that those who benefitted from microfinance loans had some improvement in their living standard, they eat three times a day almost every day, sleeping in decent homes, they can afford to pay school fees for their children hence their children go to school almost every day. It was released that the beneficiaries were able to expand their businesses and those in farming do have better harvest since from them they could now buy fertilizer and hire labor to work on the farm.

5.3 Conclusion

From the equation realized from this study, that is

$Y= (0.020) + (0.070)x_1 + (0.048)x_2 + (0.514)x_3 + (-0.446)x_4 + (0.447)x_5 + (0.273)x_6$, the income level of respondents could be identified by getting their ages, household

sizes, number of meals they had in the past two days, number of days without food to eat in the past ten days, number of rooms for members of household and the number of beds and mattresses they posses but the test of significance shows that age, house size and number of beds and mattresses are statistically insignificant hence a modified equation,

$Y = 0.020 + (0.514)x_3 + (-0.446)x_4 + (0.447)x_5$

Further studies from this project revealed the poverty levels of respondents based on their monthly income aided by a criteria set. It was evident from this research that micro financed clients of APED were well represented at the better off, less poor, moderately poor categories and were highly under represented at the very poor category due to the various kinds of services such as micro savings and micro crediting that APED offers to its clients to increase income in order to improve upon their standards of living. Hence, a confident conclusion that the microfinance programme aided the reduction of poverty in the life of participants.

5.4 Recommendations

Based on the findings of the research, the following suggestions or recommendations are made:

- Expand the scope of beneficiaries of this programme to widely affect positively the needy across all boundaries of the nation.
- Intensify public awareness to educate people on the importance of participating in micro financed programmes.
- Regularly provide technical assistance and training to all clients or beneficiaries on how to wisely use products and services to their advantage.
- . Ensure timely disbursement of credit for clients.

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APPENDIX A

Table 4.1: **Represents Data Collected.**

SERIAL NUMBER	INCOME (Y)	AGE (X_1)	HOUSE SIZE (X_2)	NUMBER OF MEALS HAD IN PAST TWO DAYS(X_3)	NUMBER OF DAYS WITHOUT FOOD DURING PAST TEN DAYS (X_4)	NUMBER OF ROOMS (X_5)	NUMBER BEDS AND MATTRESSES (X_6)
1	61-100	21-30	6	4	1	1	1
2	61-100	31-40	6	6	0	2	1
3	101-200	31-40	7	6	0	1	1
4	61-100	31-40	9	4	2	2	1
5	41-60	41-50	6	5	1	1	1
6	61-100	31-40	5	4	1	1	1
7	301-400	41-50	10	4	0	3	1
8	301-400	31-40	3	5	0	3	0
9	301-400	41-50	2	5	0	2	1
10	61-100	51-60	7	6	1	1	1
11	61-100	41-50	4	4	0	1	1
12	301-400	51-60	7	6	0	2	2
13	61-100	31-40	7	6	0	2	2
14	301-400	31-40	6	8	0	1	1
15	101-200	51-60	7	6	0	2	1
16	61-100	21-30	4	6	0	1	1
17	401-900	31-40	6	6	0	3	2
18	61-100	51-60	6	6	0	1	0
19	101-200	41-50	2	5	0	2	2
20	101-200	21-30	2	6	1	1	1

21	61-100	21-30	1	4	1	1	1
22	101-200	31-40	4	5	0	2	1
23	301-400	31-40	5	6	0	3	3
24	61-100	31-40	6	3	1	2	1
25	301-400	31-40	4	6	0	3	2
26	301-400	41-50	2	5	0	2	2
27	<40	41-50	3	4	1	1	1
28	61-100	21-30	2	5	0	2	1
29	101-200	41-50	5	6	0	2	2
30	61-100	21-30	2	5	1	1	1
31	<40	41-50	6	3	3	1	1
32	<40	41-50	4	2	3	1	1
33	61-100	21-30	5	3	2	1	1
34	61-100	21-30	6	4	1	2	1
35	101-200	31-40	4	5	1	2	2
36	401-900	51-60	4	6	0	5	4
37	61-100	21-30	2	3	0	1	1
38	<40	21-30	2	2	2	1	1
39	<40	31-40	3	2	3	1	1
40	<40	21-30	2	3	2	1	1
41	<40	51-60	4	3	3	2	1
42	61-100	31-40	3	3	3	2	2
43	101-200	51-60	6	5	2	2	2
44	<40	21-30	2	4	4	2	1
45	<40	31-40	5	4	2	1	1
46	61-100	31-40	2	3	2	1	1
47	<40	51-60	7	4	3	2	2
48	<40	51-60	6	2	3	1	1
49	61-100	31-40	5	4	2	2	1

50	101-200	31-40	2	5	0	2	2
51	101-200	31-40	2	5	0	2	1
52	301-400	51-60	4	6	0	3	2
53	101-200	31-40	6	5	0	1	1
54	41-60	31-40	3	5	0	2	1
55	101-200	31-40	5	5	0	3	2
56	41-60	51-60	5	3	0	2	2
57	101-200	31-40	6	5	0	1	1
58	41-60	21-30	1	4	0	1	1
59	101-200	31-40	2	5	0	2	2
60	301-400	31-40	4	6	0	3	2
61	401-900	51-60	5	7	0	4	3
62	101-200	31-40	2	5	0	2	2
63	101-200	31-40	3	5	0	3	2
64	101-200	31-40	2	6	0	2	2
65	41-60	51-60	5	4	2	2	2
66	41-60	31-40	6	4	2	1	1
67	41-60	51-60	2	5	0	2	1
68	301-400	31-40	5	5	0	2	3
69	41-60	21-30	4	4	0	3	2
70	41-60	31-40	6	4	0	2	1
71	<40	21-30	2	3	2	1	1
72	<40	31-40	6	4	1	2	1
73	<40	21-30	5	3	2	1	1
74	41-60	31-40	6	4	3	2	1
75	61-100	51-60	4	4	0	2	2
76	41-60	31-40	3	5	3	1	1
77	101-200	31-40	5	4	0	3	2
78	61-100	21-30	2	3	0	1	1

79	101-200	21-30	7	4	0	2	2
80	<40	31-40	3	2	3	1	1
81	<40	51-60	5	3	3	1	1
82	101-200	21-30	2	5	1	3	2
83	<40	31-40	4	3	3	2	1
84	<40	31-40	3	4	2	1	1
85	<40	51-60	6	5	1	2	1
86	61-100	21-30	3	4	3	2	2
87	<40	21-30	3	5	4	2	2
88	61-100	31-40	5	4	2	1	1
89	<40	31-40	7	3	4	1	1
90	<40	21-30	2	4	2	2	2
91	<40	51-60	8	3	4	3	3
92	61-100	31-40	5	3	3	3	2
93	101-200	31-40	6	5	2	4	3
94	61-100	21-30	4	3	2	3	2
95	41-60	31-40	5	4	0	2	3
96	<40	31-40	6	2	5	1	2
97	41-60	31-40	5	3	3	2	2
98	61-100	51-60	4	5	0	3	2
99	101-200	21-30	3	5	0	3	3
100	301-400	51-60	7	6	0	4	3