



Rural banks' financial capital and livelihoods development of women farmers in Ghana

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Abstract

Purpose – The purpose of this paper is to find out how financial capital from rural banks is contributing to the livelihoods development of women farmers who constitute the most vulnerable and disadvantaged group in Ghana and other developing countries.

Design/methodology/approach – Women farmers were randomly sampled, resulting in 100 beneficiary and 100 non-beneficiary women farmers who were used for the study. The incomes of women farmers were compared and the factors influencing income earnings estimated using simple regressing analysis.

Findings – Financial capital from rural banks was found to have positive contributions to the livelihood development of the women farmers and the poor in general. Whereas, the beneficiary women farmers had significant improvement in their access to health care, education and increased income among others, the non-beneficiaries only had marginal improvements.

Research limitations/implications – Women farmers do not keep accurate records on their production activities and had to rely on their memories to give costs of production and outputs obtained. This might have slightly affected the results.

Practical implications – Governments and development partners in third world countries should integrate the provision of financial capital in their development policy formulations. This is critical for the attainment of the millennium development goals (MDGs), especially on the reduction of extreme poverty and hunger as well as gender equality and empowerment.

Originality/value – This research paper brings to light the fact that financial capital is an important tool that can be used to turn life around for poor families and individuals in developing countries in Africa and elsewhere. It demonstrates how financial capital is critical for the attainment of the MDGs.

Keywords Ghana, Women, Agriculture, Capital, Developing countries, Livelihood, Rural banks, Women farmers

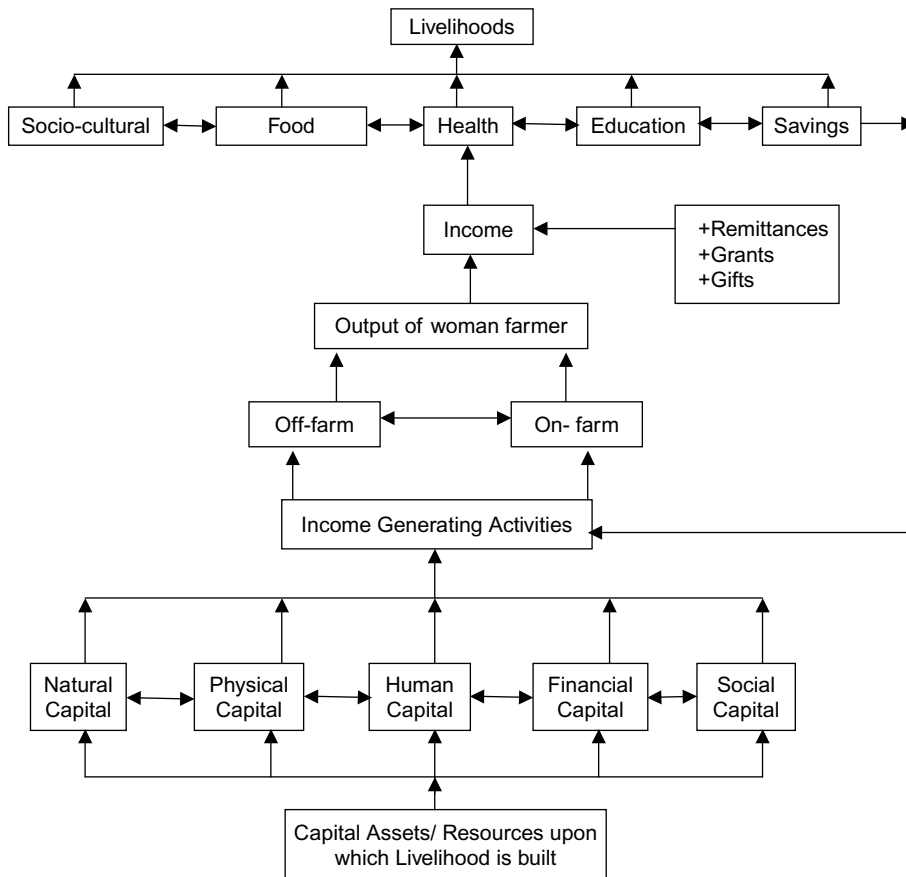
Paper type Research paper

1. Introduction

To start with, it is important to note that the impact of projects and programmes on poverty and livelihoods of beneficiaries is a complex issue to discuss. The complexity emanates from the fact that different people at different places and cultures have different understandings of poverty and indicators of improvement in livelihoods (Apusigah, 2005). Any failure to recognize these context-specific indicators of improvement in livelihoods can lead to misleading conclusions and policy implications. In this paper, the concept of livelihood is examined within the conceptualisation of the framework developed by the author (Figure 1).

Successive governments in Ghana realizing that financial capital is a critical component of any rural development strategy never relent in their efforts to pursue livelihood sector transformations aimed at ensuring effective and efficient provision





Source: Author's Conceptualisation, 2008

Figure 1.
Conceptual framework of
livelihoods development
and rural banking

of financial capital to the productive sectors of the economy. Prominent amongst the transformations undertaken by successive governments of Ghana is the financial sector reforms which started in the late 1970s and this led to the establishment of rural banks across the country. These rural banks are mandated among other things to provide financial capital to rural dwellers irrespective of gender, age or wealth status to help mitigate their capital constraints and boost their productivity and well-being. This led to the establishment of the first rural bank in Southern Ghana at Nyakrom in the Agona District of the Central Region in 1976. In Northern Ghana, the first rural bank to be established was in 1981 at Paga in the Kassena/Nankana West District of the Upper East Region. Currently, there are five rural banks operating in the Upper East Region.

Poverty continues to be a systemic bottleneck with eight out of every ten people in the Upper East Region of Ghana being reported to be poor (GSS, 2007). The high incidence of poverty is said to be closely linked to inadequate access to productive resources particularly financial capital (Akudugu and Gbene, 2005). Poor access to financial capital especially by women correlates strongly with deficiency in their income earnings

and lack of assets that can be used to enhance their livelihoods development (Johnston and Jonathan, 2008). It has been demonstrated in literature that access to financial capital by people in rural areas who are mostly peasant farmers help build their asset base that allows them to mitigate risk, plan for the future, and invest in education and other life cycle needs (Kibaara, 2006) thereby leading to improvement in their livelihoods. In addition, access to financial capital plays valuable roles in reducing the vulnerability of farmers in general and women farmers in particular through asset creation, income and consumption smoothing, provision of emergency assistance and empowering and emboldening women by giving them control over assets and increased self-esteem and knowledge (Zaman, 2001; Morris and Barnes, 2005). Also, access to financial capital provides the opportunity for beneficiaries to transform their lives from that of extreme poverty and hopelessness to one of dignity and self-integrity (Stephens and Tazi, 2006). It is important to state that financial capital is not only for the purchasing of inputs for production purposes upon which livelihoods development revolves but also for the buying of goods and services for household consumption. It has been shown that access to financial capital help in the development and growth of the local economy. This is because individuals and families engaged in small-scale farming are able to move past subsistence living and increased disposable income levels thereby improving the livelihoods of beneficiaries and their communities as a whole (Khandker, 2005).

Improving households' access to capital is a common element of rural development strategies that are designed to induce growth (Fletschner and Carter, 2008). A number of researchers have sought to inform this claim with empirical data by assessing the impact of credit constraints on farms' and households' efficiency (Suresh *et al.*, 2007; Guirkingner *et al.*, 2007; Petrick, 2005; Chavas *et al.*, 2005; Foltz, 2004; Petrick, 2004; Carter and Olinto, 2003). According to Ntifo-Siaw and Bosompem (2008), credit from rural banks help reduce the vulnerability of beneficiaries by increasing their incomes and food security and improved livelihoods in general. Access to financial capital helps increase output and profit levels of farmers which positively affect their livelihoods. An assessment study conducted in India on dairy cattle farmers' groups confirmed that positive profit levels were recorded after accessing credit, a component of financial capital (Lalitha and Nagarajan, 2002). It was found that earnings generated from such income-generating activities have been central in increasing the physical well-being of the beneficiary households through better nutrition and sanitation (Lalitha and Nagarajan, 2002).

While discussion access to financial capital and livelihoods development, it is important to make the point that in most cases small-scale farmers who consider farming as a way of life and not business have very limited access to credit. This category of farmers to a large extent do not benefit from financial capital programmes implemented in poor and impoverished areas across the world because they may not be able to provide collateral (Copestake *et al.*, 2001; Dugger, 2004) or face serious repayment difficulties. Though microfinance institutions such as rural banks located in rural areas are supposed to play an important role of effectively providing low-cost financial capital to households and individuals especially women to help transform their lives (Miller and Martinez, 2006), those individuals and households that appear to represent high default risks are excluded.

The works of Professor Mohammed Yunus (Yunus, 2003, 2008, 2009; Yunus and Alan, 2003) a Nobel Prize winner and Founder of Grameen Bank and “father” of rural finance in Bangladesh demonstrate how rural people and the poor can be supported to sustainably pursue their livelihoods development. Through rural finance, Bangladesh is currently a shining example in Asia where microfinance has turned the lives of hundreds of thousands and possibly millions of impoverished individuals and families from situation of abject poverty and hopelessness to one of dignity and integrity. It is reported that a number of NGOs and financial institutions in Bangladesh serve more than ten million clients across the country. It is estimated that roughly 70 percent of poor households in Bangladesh are reached by MFIs and in some regions there is fierce competition for clients. The “success” of microfinance makes it a popular intervention for many donors working in that country and other parts of the developing and even the industrialized world. Given the successes being chalked by rural financial institutions (village banks) elsewhere in the world, the question then is, “how are rural banks in the Upper East Region of Ghana transforming the lives of people within their catchment areas and women farmers in particular?” The purpose of this paper therefore is to examine the effect of financial capital offered by rural banks in the Upper East Region of Ghana on livelihood development of beneficiary women farmers. It is important to state that very little work has been done regarding the contribution of rural banks in Ghana to the socio economic development of the country and its citizens with specific reference to the Upper East Region of Ghana. This is incomprehensible against the backdrop that these rural banks have been operating in the country for close to 30 years now. As a result, this paper examines the effect of rural banking on the livelihood development of rural dwellers and women farmers in particular in the Upper East Region of Ghana.

2. The conceptual framework

The paper examines the effect of rural banks’ financial capital on the livelihoods development of women farmers in the Upper East Region of Ghana within the confines of the author’s conceptualization of livelihoods (Figure 1). The concept of livelihood has been extensively explained by the Department for International Development (DfID) of the UK and other institutions as well as individual researchers and development practitioners. Livelihood as observed by Carney *et al.* (2000) comprises of the capabilities, assets and activities required for a means of living. The sustainable livelihoods framework developed by the DfID (2001) of the UK defined livelihood as gains made by individuals or households in the various factors that affect the level, maintenance and enhancement of these gains.

The conceptual framework developed in this paper is based on the sustainable livelihoods approach which has been recommended as an influential model for the conceptualization of rural people’s livelihoods (Bond *et al.*, 2003). It has been used by a number of researchers in assessing the impacts of projects and programmes particularly those under the DfID and UNDP spheres of influence (Ntiafo-siaw and Bosompem, 2008). The model draws attention to the complexity of rural livelihood strategies and how these are interrelated and influenced by structures, processes and policies of national- and community-level institutions.

On the basis of the conceptual framework developed by the author (Figure 1), it is assumed that the resource base upon which women farmers build their livelihoods

is categorised into natural capital such as land; physical capital such as hoes; human capital such as knowledge of a new farming technique; financial capital such as access to credit; and social capital such as membership of a social group. The central operating principle of the conceptualization employed in this paper is based on the assumption that the livelihoods strategies of individuals, households or even communities depend largely on accessibility and utilization of the capital assets in a manner that do not compromise the needs of future generations.

The capital assets are interrelated (Figure 1) and are employed by women in their off- or on-farm income-generating activities. Examples of the off-farm income-generating activities of women in the Upper East Region of Ghana include rice parboiling, pito malt processing, shea butter and groundnut oil extraction, food vending and pito brewing (local gin made from sorghum, millet or maize) among others. Examples of the on-farm income-generating activities include vegetable, maize, rice and groundnut farming, among others. The off- and on-farm income-generating activities tend to be interrelated. For example, the woman farmer parboils rice from her own or family rice farm or extracts groundnut oil using groundnut from her own or family groundnut farm or sells food prepared from produce harvested from her or family farm. These off- and on-farm income-generating activities are expected to give a certain output which is transformed into income. The income obtained from the output, in addition to remittances, gifts and grants from well-wishers is used to finance socio-cultural activities such as funerals, naming ceremonies, sacrifices and others. It is also used to finance household consumption expenditures, especially on ingredients and food to enhance food security. The income is also used to pay for health bills, school fees and buying of school uniforms and sandals for children and part of it is also saved for future use. If the savings are not used to finance consumption expenses, then, it is used as equity funds to finance the income-generating activities thereby reinforcing the cycle (Figure 1).

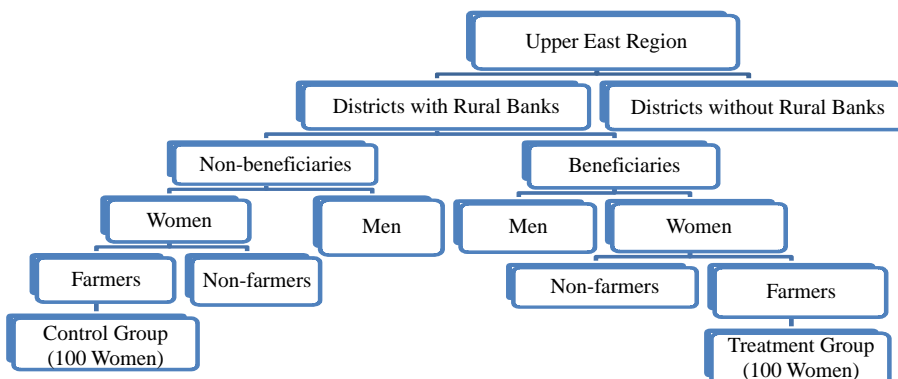
In effect, the income from sales of output from off- and on-farm income-generating activities, remittances, gifts and grants are used to finance socio-cultural activities, food expenditures, health, education and savings, all of which are interrelated and constitute livelihoods. From a logical point of view and under *ceteris paribus* conditions therefore, increase in any of the capital assets is expected to translate into a corresponding increase in output through the income-generating activities which in turn leads to increase in income. The increase in income is central to livelihoods development (Armendariz and Morduch, 2005) because it is used to promote the attainment of the other livelihood outcomes as shown in Figure 1. This ultimately constitutes improvement in livelihoods. Thus, access to credit and savings opportunities are expected to lead to increment in capital assets in general and financial capital in particular, thereby translating into improvement in livelihoods through the above described processes.

In the context of this paper, financial capital from rural banks contribute to the capital assets upon which individual women farmers draw to build their livelihoods. In other words, financial capital from rural banks help increased their productive capacity which leads to increased farm output and this translates to increased value of farm output or income. The increased income is used to enhance access to quality health care, quality education, improved food security, performance of socio-cultural rites and to make savings which can be reinvested in income-generating activities thereby reinforcing the cycle.

2.1 Study area and the survey

The survey was conducted in the Upper East region of Ghana which covers a total land area of about 8,848 km² and this forms about 3 percent of Ghana’s land area. Demographically, the region has a total population of about 914,016 (GSS, 2000). Out of this, about 484,428 representing about 53 percent are females with the remaining 47 percent being males. The Upper East Region lies within 10° 45¹N and 0° 45¹W. The region is bordered to the north by Burkina Faso, to the east by the Republic of Togo, and to the south and west by Northern and Upper West Regions of the Republic of Ghana, respectively. The capital of the Upper East Region is Bolgatanga. The Upper East Region is made up of nine administrative districts and municipalities. There are five rural banks in the region and four of them were studied. Multistage sampling technique was employed in selecting 200 women farmers including 100 beneficiaries and 100 non-beneficiaries from four districts (50 from each district) for the study. The sampling procedure is shown in Figure 2.

As shown in the sampling process above, the first stage of the sampling process was the purposeful selection of four of the five districts in the region where rural banks operate. The reason was to ensure that a level basis is laid for comparison of the study results. After selecting the districts, the second stage was to randomly select ten communities in each of those districts that have benefited from the rural banks. After the random selection of the ten beneficiary communities, the third stage of the sampling process was to separate beneficiary households from non-beneficiary households in each selected beneficiary community. After identifying the beneficiary and non-beneficiary households which are made of men and women, the women were again purposely selected. The women (both beneficiaries and non-beneficiaries) were sub divided into farmers and non-farmers. Again, the groups of women farmers (beneficiaries and non-beneficiaries) were selected. This is because the focus of the study is on women farmers. The identified beneficiary and non-beneficiary women farmers in each beneficiary community formed the strata for sampling. The fourth and final stage of the sampling process was to use the simple random sampling technique to select five beneficiaries and five non-beneficiaries from each community. It is important to state that the five women farmers selected from each stratum in each community were non-proportional to the size of each stratum. Also, to minimize the spillover effects,



Source: Author's Impression

Figure 2.

non-beneficiaries who did not have blood, marriage or business relationships with beneficiaries were selected as the control group.

2.2 *The analytical framework*

The perceptions of women farmers of improvement in their livelihoods were assessed by asking them to score the five main livelihood indicators namely income, health care, education, food security and sustainable natural resource use. Respondents were asked to score each of the indicators from 1 being worsened situation, 2 being no change and 3 being improved situation. The scores were presented under each livelihood indicator under the categories of worsened, no change and improved situation. The perceptions of beneficiaries and non-beneficiaries were compared and the difference within and between the beneficiaries and non-beneficiaries tested using the χ^2 which is a non-parametric technique.

According to Armendariz and Morduch (2005, p. 203), to be concrete in measuring the impact or effect of microfinance, attempts are made to measure the causal impact or effect on borrowers' income. Following this, the effect of microfinance on the livelihoods of beneficiaries is measured through income and can be estimated by using the linear regression model (Coleman, 1999 and 2002). The study therefore adopted the linear regression model to measure the effect of rural banks' financial capital particularly credit on the income earnings of beneficiary women farmers which is central to their livelihoods development. Farm income or value of output which is central to this livelihood study was estimated as:

$$\text{Total revenue (TR)} = \text{price per unit of output (P)} \times \text{quantity of output (Q)}.$$

The value of output of beneficiary and non-beneficiary women farmers were then compared and the difference between the mean income earnings of the two groups tested using the *t*-statistic. The empirical model is specified as:

$$TR = PxQ = \beta_0 + \beta_1 W_1 + \beta_2 W_2 + \beta_3 W_3 + \beta_4 W_4 + \beta_5 W_5 + U \quad (1)$$

Where:

TR = total revenue or value of farm output.

W_1 = farm size in hectares.

W_2 = production credit from the rural banks in Ghana Cedis.

W_3 = equity production funds in Ghana Cedis.

W_4 = years of formal schooling in years.

W_5 = experience in farming in years.

β s = parameters to be estimated.

U = the error term which captures all the errors due to human and natural factors.

Since the women farmers are engaged in only annual crop production, the fixed cost was assumed to be zero. As such, the total variable cost (TVC) of production was computed as:

$$TVC = P_i X_i \quad (2) \quad \text{Women farmers in Ghana}$$

where, P_i = unit price of input i ; X_i = quantity of variable input, i used.

Because it was difficult to calculate the equity production funds directly, it was implicitly computed as:

$$\begin{aligned} & \text{Total Variable Cost (TVC)} - (\text{Credit Funds } (W)_2) \\ & = \text{Equity production funds} \end{aligned} \quad (3)$$

The explanatory power of the model was judged from the R^2 . The significant levels of the individual explanatory variables included in the model were tested using the t -statistics and the joint significance tested using the F -statistic. The decision criteria of the t - and F -statistics were that the null hypotheses are rejected in favour of the alternate hypotheses if and only if the computed values of the test statistics are greater than their respective critical values. Using the relation (1), the value of output of beneficiary women farmers before access to financial capital (2004) and after accessing financial capital from the rural banks (2007) was calculated and compared. The difference in means between the two income streams (before and after access to financial capital) was then tested using the t -statistic. The same approach was followed for comparing incomes of beneficiaries and non-beneficiaries.

2.3 Choice of variables and expected effects

The farm size (W_1) was measured in hectares and expected to have a positive effect on value of output of women farmers because it is used as a proxy for volume of economic activity. To this end, women farmers who cultivated large farms are expected to have a higher value of output than those with small farms, *ceteris paribus*. Production credit (W_2), equity and funds from other sources (W_3) were expected to have positive influences on value of output of women farmers. This is because credit funds from the rural banks and funds from equity sources including savings of farmer help in the acquisition of the other variable inputs such as fertilizer, hired labour, insecticides, pesticides, herbicides, seeds among others which lead to increased value of output levels, all other things being equal. Also, the years of formal schooling (W_4) and experience of farmers (W_5) are crucial and are expected to have positive effects on value of output. The higher the level of experience and years of formal schooling, the higher the value of output expected, *ceteris paribus*.

3. The results and discussions

3.1 General perceptions of women farmers of improvements in their livelihoods

The study results (Table I) showed that about 73 percent of beneficiary women farmers interviewed perceived some improvement in their income earnings over the period (2004-2007). However, 14 percent of them did not record any improvement in their income earnings whilst 13 percent of them recorded decreased income earnings. On the other hand, 64 percent of the non-beneficiary women farmers interviewed recorded improvement in their income earnings over the period (2004-2007). However, 17 percent of the non-beneficiary women farmers did not record any improvement in their income earnings whilst 19 percent of them recorded decreased income earnings. This implies that on the average, about 68.5 percent of women farmers (beneficiaries and non-beneficiaries) in the Upper East Region recorded improvement in their

Table I.
Perception of women
farmers of their livelihood
improvement

Perception of improvement	Income earnings	Livelihood indicator being assessed (percentage)				
		Access to health care	Access to quality education	Food security	Socio cultural	Savings
<i>Worsen</i>						
Beneficiary	13	17	3	33	21	19
Non-beneficiary	19	21	21	37	39	33
<i>Same</i>						
Beneficiary	14	6	10	8	34	23
Non-beneficiary	17	16	12	19	19	37
<i>Improved</i>						
Beneficiary	73	77	87	59	45	48
Non-beneficiary	64	63	67	42	42	30

Source: Field Survey Data

income earnings, about 15.5 percent of them did not record any improvement in their income earnings and 16 percent of them recorded worsened income earnings. Since majority of them (68.5 percent) recorded improved income earnings during the period between 2004 and 2007 cropping seasons, it is concluded that there have been general improvement of income earnings of women farmers.

Also, 77 percent of the beneficiary women farmers interviewed recorded some improvement in their access to quality health care. This finding is consistent with Al-Hassan and Sagre (2006) that women who access credit have better access to medicare. While 6 percent of the beneficiary women farmers did not record any improvement in their access to health care, 17 percent of them actually recorded decrease in their access to quality health care. On the other hand, 63 percent of the non-beneficiary women farmers included in the study recorded improvement in their access to quality health care, 16 percent of them did not record any improvement in their access to health care whilst 21 percent of them actually recorded worsening in their access to quality health care. This means that on the average, about 70 percent of women farmers (beneficiaries and non-beneficiaries) in the Upper East region recorded improvement in their access to quality health care, about 11 percent of them did not record any improvement in their access to quality health care and 19 percent of them recorded worsened access to quality health care. Since majority of them (70 percent) recorded improved access to quality health care during the period between 2004 and 2007 cropping seasons, it is concluded that there have been general improvement of access to quality health care by women farmers. The general improvement in access to health care recorded could be attributed to the implementation of government policies such as the National Health Insurance Scheme.

Similarly, 87 percent of the beneficiary women farmers interviewed recorded improved access to education. Contrary to that, however, 3 percent of them did not experience any change in access with 10 percent of them reporting worsening access to education. On the other hand, whereas 67 percent of the non-beneficiary women farmers reported improved access to education, 12 percent of them did not experience any change in access to education with 21 percent of them reporting worsening access to education. The implication is that on the average, about 77 percent of women farmers (beneficiaries and non-beneficiaries) recorded improved access to quality education,

7.5 percent of them did not record any improvement and about 15.5 percent of them recorded worsened access to quality education over the period (2004-2007). This general improvement in access to education can be attributed to the implementation of the Free and Compulsory Universal Basic Education by the Government of Ghana in 2006 coupled with the School Feeding Programme.

Besides, 59 percent of the beneficiary women farmers recorded improvement in their food security situation. Whereas, 8 percent of them did not record any improvement in their food security situation, 33 percent of them recorded worsening food security situation over the period. On the other hand, 44 percent of the non-beneficiary women farmers recorded improvement in their food security situation, 19 percent of them did not record any improvement in their food security situation and 37 percent of them recorded worsening food security situation over the period (2004-2007). Drawing from the above, it means that on the average, about 51.5 percent of women farmers (beneficiaries and non-beneficiaries) in the Upper East Region recorded improvement in their food security, about 22.5 percent of them did not record any improvement and about 35 percent of them recorded worsened food security situation over the period (2004-2007). This is a great challenge for the attainment of the millennium development goal (MDG) on halving extreme poverty and hunger by 2015.

Furthermore, 45 percent of the beneficiary women farmers recorded improvement in the performance of socio-cultural activities such as naming ceremonies, and marriages among others, 34 percent of them did not experience any change in their abilities to perform socio-cultural rites, and 21 percent of them reported a worsening situation. On the other hand, 42 percent of the non-beneficiary women farmers recorded improvement in the performance of socio-cultural rites, 19 percent of them did not record any changes and 39 percent of them recorded worsened ability to perform socio-cultural rites. It means that about 44 percent of women farmers (beneficiaries and non-beneficiaries) in the Upper East Region experienced improved ability to perform socio-cultural rites, about 27 percent did not record any change and about 30 percent of them actually recorded worsened ability to perform socio-cultural rites.

Finally, about 48 percent of the beneficiary women farmers recorded improvement in their savings, 23 percent of them did not experience any change in their abilities to save and 19 percent of them reported a worsening situation. On the other hand, 30 percent of the non-beneficiary women farmers recorded improvement in their abilities to make savings, 37 percent of them did not record any changes and 33 percent of them recorded worsened ability to make savings. It means that about 39 percent of women farmers (beneficiaries and non-beneficiaries) in the Upper East Region experienced improved ability to make savings, about 30 percent did not record any change and about 31 percent of them actually recorded worsened ability to make savings.

From the above analysis, it is generally concluded that women farmers (beneficiaries and non-beneficiaries) in the Upper East Region of Ghana experienced some improvement in their livelihoods over the period (2004-2007 cropping seasons). However, the gains made in terms of food security and ability to save must be improved if the 80 percent poverty rate (GSS, 2007) prevailing in the Upper East Region of Ghana is to be reduced. Improvement in the two indicators is also critical for the attainment of the MDGs on gender empowerment, and reduction of extreme hunger and poverty.

3.2 Comparing estimated income earnings of beneficiaries with non-beneficiaries

To determine whether or not there is any significant difference between the average income earnings of beneficiary and non-beneficiary women farmers, their incomes were computed as quantity of out multiplied by unit price of output and the means tested using the *t*-statistic (Table II). The study results showed that whereas the mean income earnings of beneficiary women farmers was found to be GH¢221.77, that of the non-beneficiary women farmers was GH¢166.01. For the purpose of confidentiality, the names of the banks will be represented by numbers (i.e. 1, 2, 3 and 4). The difference in income earnings between beneficiaries and non-beneficiaries in bank 1 was found to be the highest with 30 percentage points and that of bank four was the least with 17 percentage points (Table II). The overall difference in income earnings between the two income classes (beneficiaries and non-beneficiaries) in the four districts was found to be about 25 percent (Table II). This implies that if a beneficiary woman farmer earned an average amount of GH¢100.00 as her farm income as at the 2007 cropping season, a non-beneficiary woman farmer earned an average amount of GH¢75.00 as her farm income during the period.

In determining whether or not the difference in the income earnings between beneficiary and non-beneficiary women farmers is statistically significant, the *t*-test was employed and difference between the two income classes (beneficiary and non-beneficiary women farmers) found to be significant at 1 percent. Since the beneficiary and non-beneficiary women farmers were selected from the same communities, it can be assumed that they faced similar socio economic, political, cultural, natural, technical and institutional conditions among others in pursuance of their income-generating activities. On the basis of this assumption, it is concluded that access to financial capital from the rural banks is the intervention responsible for the difference in incomes, *ceteris paribus*. The low-income earnings of the non-beneficiary women farmers relative to the beneficiaries can be the reason for non-beneficiaries not accessing financial capital particularly credit from the rural banks. This is because it has been observed in empirical literature that households and individuals with low income especially in developing countries have difficulty accessing credit (Benito and Mumtaz, 2006; Del-Rio and Young, 2005; Crook and Hochguertel, 2005; Thaicharoen *et al.*, 2004; Magri, 2001; Crook, 2001; and Arvai and Toth, 2001).

Bank	Non-beneficiaries' income (GH¢)	Beneficiaries' income (GH¢)	Difference in income earnings (%)
1	3,908	5,546	30
2	4,337	5,954	27
3	3,918	5,331	27
4	4,437	5,346	17
Total	16,600	22,177	25
Min.	100	117	–
Max.	235	401	–
Mean	166.00	221.77	–
SD	35.71	40.10	–

Source: Field Survey Data

Table II.
Comparing incomes
of beneficiary and
non-beneficiary women
farmers

3.3 Regression results of effect of credit on the income (y) of beneficiaries

The linear regression was used to estimate the effect of credit from rural banks on income earnings of beneficiary women farmers. The adjusted R^2 of about 0.68 obtained from the estimation or regression results implies that all the exogenous variables included in the model are able to explain about 68 percent of the variations in income earnings of the beneficiary women farmers. Also, the F -statistic indicates that the included exogenous variables jointly influence the income earnings of beneficiary women farmers. Besides, out of the five variables included in the model estimation, four of them were found to be significant. From the goodness of fit measures (adjusted R^2 , F - and t -statistics), it can be said that the explanatory power of the linear regression model is above average and that the model has integrity and is appropriate.

All the variables included in the model as expected are positively related to the income earnings of beneficiary women farmers. The farm size, production credit from the rural banks, the equity funds which include savings, gifts and remittances and the experience in farming all significantly influence the income earnings of women farmers.

When the farm size of women farmers is increased by one hectare, their income earnings will be increased by about 0.3 units, *ceteris paribus*. The ability to increase farm size implicitly depends on access to land and capital among other factors. The finding that farm size positively influences farm income is consistent with that of Kibaara (2005), Benerjee (2001) and Malik (1999) that farm size significantly influences output and income levels, *ceteris paribus*.

Also, a unit increase in the funds (credit) from rural banks to women farmers will lead to a corresponding increase of about 0.45 units in their income earnings. What this means is that, a one Ghana Cedi given to a woman farmer as credit for funding her income generating activities will increase her average income earnings by about 45 Ghana Pesewas, *ceteris paribus*. The finding of positive contribution of credit to farm income is supported by those of Kibaara (2005), Yunus and Alan (2003), Duong and Izumida (2002), Nyoro (2002), Lalitha and Nagarajan (2002), Awudu and Eberlin (2001) and Diange and Zeller (2000) that credit improves farm efficiency and productivity. Similarly, a unit increase in funds from other sources (which was found to be principally from farm savings) available to women farmers will lead to about 0.48 units increase in their income earnings. This means that if a woman farmer uses about one Ghana Cedi principally from her savings to finance her farming activities, an amount of 48 Ghana Pesewas will be added to her income earnings, *ceteris paribus*. This finding implies that equity funds are better for women farmers than credit funds. Finally, a unit increase in experience in farming will lead to about 0.17 units increase in the average income earnings. This implies that an extra year of experience in farming gained by a woman farmer increases her income earnings by about 0.17 units. This finding of positive relationship of experience in farming with farm income is consistent with that of Ayambila *et al.* (2008).

3.4 Comparing incomes of beneficiaries before and after obtaining credit

To determine whether or not the contribution of the financial capital especially credit from the rural banks to the income earnings of beneficiary women farmers is significant, there was the need to compare their average income earnings before and after obtaining credit from the rural banks (Table III). The income of beneficiaries before accessing

Table III.
Linear regression results
of factors influencing
income earnings

Dependent variable: income earnings of beneficiary women farmers			
Independent variables	Coefficient	SE	
Farm size (W_1)	0.262060	0.0677*	
Funds from the rural banks (W_2)	0.454196	0.4799**	
Funds from other sources including savings (W_3)	0.480379	0.0487**	
Years of formal schooling (X_4)	0.104990	0.03038	
Years of farming (X_5)	0.16720	0.0127*	
Constant	0.904906	0.1261**	
<i>Goodness-of-fit measures</i>			
R^2	0.6943		
Adjusted R^2	0.6814		
F-statistic	277.988**		

Notes: Significant at: *5 and **1 percent

Source: Field Survey Data

credit (2004) was computed and compared with that of the after access income (2007) and the means tested for statistical difference using the *t*-test. The difference between the average income earnings of beneficiaries before accessing credit and after accessing credit was found to be significant at 1 percent. The mean income of women farmers before obtaining credit was found to be GH¢178.27 compared to GH¢221.77 after obtaining the financial capital from the rural banks. Beneficiaries who received their financial capital from bank 4 had the highest percentage change (24 percent) in their income earnings whilst those of bank 3 had the least (15 percent) (Table IV).

The overall change in income earnings of women farmers across the four districts after accessing credit was also found to be about 20 percent. This implies that on the average if a woman farmer earned an amount of GH¢100.00 as her farm income before accessing credit in 2004, she had experienced an average increase of about GH¢20.00 in her income thereby making her income after access to credit (in 2007) to be GH¢120.00. In determining whether or not the change in income is statistically significant, the *t*-test was employed and the results showed that the change is significant at 5 percent. This finding reinforces the fact that credit from rural banks contributes significantly to the income earnings of beneficiary women farmers.

Table IV.
Comparing incomes of
beneficiaries before and
after obtaining credit

Bank	Income before credit (GH¢)	Income after credit (GH¢)	Change (%)
1	4,451	5,506	19
2	4,788	5,994	20
3	4,287	5,031	15
4	4,301	5,646	24
Total	17,827	22,177	20
Min.	94	117	–
Max.	322	401	–
Mean	178.27	221.77	–
SD	32.28	40.10	–

Source: Field Survey Data

3.5 Summary of findings and conclusion

There has been general improvement in the livelihoods of women farmers in the Upper East Region of Ghana. However, women farmers who had access to financial capital from rural banks recorded higher improvements in their livelihoods than those who did not have access. The average income earnings of beneficiary women farmers were found to be significantly higher than that of non-beneficiary women farmers. There are differences in the contribution of financial capital to the income earnings of beneficiary women farmers across the different districts and rural banks. Whereas, the effects are higher in some districts and rural banks, others though low are significantly different from the non-beneficiary women farmers. The study results also showed that equity production funds give better returns to income than credit production funds.

It can be concluded from the study results that financial capital from the rural banks contributes significantly to the livelihoods development of women farmers. This conclusion is supported by the findings of Fletschner and Carter (2008), Ntifo-Siaw and Bosompem (2008), Miller and Martinez (2006), Yunus and Alan (2003), Duong and Izumida (2002) and Diange and Zeller (2000) all of who attest to the fact that financial capital is a major component of livelihood development strategies.

3.6 Policy implications and recommendations

Based on the study results, the following recommendations are made:

- The rural banks are profit-oriented financial institutions and as such offer financial capital to women farmers who are into farming as a business and not as a way of life. It is therefore recommended that all women farmers should see farming as a business and not a way of life to be able to access financial capital from the rural banks which will help them pursue sustainable livelihoods development.
- Equity production funds give better returns to farm investment than credit production functions. As such, it is recommended that women farmers should be encouraged to rely more on their savings for financing their farming activities and less on credit.
- Financial capital generally has positive effects on livelihoods development. It is therefore recommended that all organisations that work to empower women should ensure that financial capital is made a component of their intervention packages.

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