

Microfinance, Food Security and Women's Empowerment in Côte d'Ivoire

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Abstract

This paper deals with the effectiveness and the capability of microfinance institutions in enhancing women's livelihood and empowerment in rural areas. This study uses both a theoretical and empirical approach that represents the interaction of women's livelihood and microfinance. The empirical analysis consists of an in-depth analysis of microfinance institutions and a survey analysis applied to cross-sectional data collected from 185 women who have access to credit from MFIs and 209 women who have no access to MFIs credit. The results show that microfinance institutions have increased the income of female borrower and improved the level of farm production which is a main development goal in most African countries whose economies are based on the agricultural sector. This paper found, on the one hand that women with more power in decision-making have more chance to obtain MFI credit; On the other hand, access to MFI credit led to the improvement of women's participation in household decision making through their contribution in household standard of living.

Keywords: Microfinance, farm productivity and empowerment

I Introduction

1.1 Justification

There has been an ongoing debate on poverty during the last few decades. Poverty exists everywhere in the world. The UNDP annual report from 2006 states that 2.5 billion people live on less than 2 USD per day and account for only five percent of the global income, while the richest 10 percent account for 54 percent of global income. Furthermore, an estimated 800 million people will still be trapped in poverty and by 2015, 600 million will be left starving, most of them living in sub-Saharan Africa and South Asia (Von Braun, 2007).

There are many poor countries, especially in sub-Saharan Africa (above 40 percent), compared to Asia and the Pacific where the share of the poor fell from 30 percent in 1990 to 9 percent in 2004 (Ravallion *et al.*, 2007). In such a context, the main objective should be to continue looking for solutions that can lift the poor out of poverty and for scientific communities and policy-makers who can help make that happen.

Microfinance as a credit institution is seen as one of the relevant tools that can provide small loans for poor people who have no access to a formal bank. Microfinance institutions enable the poor to undertake income-generating activities and to improve their livelihoods. Microfinance has been recognised as a significant means of economic development in recent decades, especially during the microcredit summit held in Washington DC in February 1997. In addition, the United Nations General Assembly nominated 2005 as the International Year of Microcredit in order to boost microcredit and microfinance programmes around the world. Since then, microfinance has attracted more attention from governments, NGOs, researchers and civil servants.

Worldwide, women are more likely to be poor than men especially in developing countries where an estimated 70 percent are women (World Bank, 2007). Women are poorer than men because they often lack access to economic resources and opportunities, education and support services, and do not have access to land. There is also the lack of attention to gender equality in economic policy. Nevertheless, women contribute to the physical work in farm production and support the livelihood of the farm household in many countries (Ellis, 2000). In Africa, women now constitute the majority of smallholder farmers, providing most of the labour and managing farms on a daily basis (Saito, 1994). Women increasingly take charge of farm activities because of the migration of men from rural areas to cities or abroad, in search of paid employment. War, sickness and death from HIV/AIDS of the rural male population also explain the increase in women's workload. This trend of the growing dominance of women in agricultural production has been termed the 'feminisation of agriculture' (FAO, 1999; FAO, 2005; Hart, 1994; Cornhiel, 2006). Feminisation of agriculture makes it more necessary to take action to enhance women's ability to carry out their agricultural and non-agricultural activities and their other household tasks. Doing so will

ensure the food security in the country. As mentioned above, microfinance can address these needs by enabling women to generate income and improve their economic power.

Women in Côte d'Ivoire contribute to both food crop production and cash crop production. They also dominate the informal sector. However, just like in other countries, Ivorian women have achieved little improvement in agricultural productivity and the country is not yet self-sufficient in food production. Women's incomes are low as a consequence of low productivity, which has to do with the lack of resources available to acquire modern inputs or launch new income-generating activities. It is in this context that the state of Côte d'Ivoire is committed to supporting women financially through microfinance. Therefore, microfinance programmes have been promoted since the early 1990s in order to help women to improve their livelihood and that of their families and to positively contribute to the economic growth of the country. New microfinance institutions have been launched throughout the country, especially in rural areas where many poor people live.

Despite the proliferation of MFI programmes and the fact that it has been more than a decade since MFI programmes were first implemented in the country, little empirical research has considered the effectiveness of providing loans for the rural population in general and Abengourou rural women in particular. Moreover, little is known about gender relations within the household in relation to women's access to and the use of microfinance services.

There are some insufficiencies and weaknesses in microfinance studies, which have to be addressed in order to find out how microfinance can be made more effective in its mission to provide financial services that meet the needs of the rural population especially women. Most of the studies have revealed that women in general need financial services to carry out their activities more efficiently and to improve their standard of living. They also recognised the necessity for microfinance programmes to meet women's needs. Yet, it is not clear how this can be achieved, because few studies use a gender perspective to investigate intra-household resources allocation in relation to women's economic activities and access to financial programmes. So, in order to enhance the effectiveness of microfinance for women, and to justify the presence of microfinance institutions in rural areas, there is a need to address the question about how do MFIs improve women's position?

This paper has the ambition to combine both the standard economic aspects of microfinance for women, such as the income, food productivity, and social aspects like changes in women's status and decision-making power and control over loans (gender perspective). By doing so, the study will help identify women's needs and how microfinance programmes can address them in the Abengourou region of Côte d'Ivoire.

1.2 Research objectives and questions

This paper aims at gaining insights into rural women's needs in terms of support for economic activities and empowerment and the way in which MFIs address these needs in Côte d'Ivoire.

In relation to the research objectives, this study will try to answer the following research questions:

1. What are the effects of participation in microfinance programmes on women's food production and income?
2. To what extent do microfinance programmes strengthen women's decision-making power?

II Literature review

This section presents an overview of the microfinance field and how it can be connected to poverty, a matter that has become a significant developmental issue around the world and particularly in Africa. It discusses how microfinance programmes can support women in their struggle for livelihoods of households and their empowerment.

2.1 Microfinance and poverty

In developing countries, especially in African, poverty is predominantly rural in character. Most of the poor live in rural areas, where agricultural production is the key activity (UNDP, 1997; ADB, 2000). Rural households in general and women in particular face difficulties in generating income from agriculture due to the low level of productivity, which has to do with the lack of resources for buying adequate inputs. These constraints prevent the poor from achieving food security and earning a livelihood free of hunger.

Poverty reduction has become a major issue in developmental policies. To inform policy, income earned by individuals has been used as an indicator to assess whether they are poor or not (Van Maanen, 2004; Thorbecke & Nissanke, 2005). Nevertheless, the use of income as the main indicator has been criticised, as it does not take into account all dimensions of poverty. Now it is increasingly realised that poverty is a multidimensional concept. The first dimension is income. According to the income approach, poverty is defined as the lack of income to provide for the basic needs of life: food, shelter, water, education, sanitation, and health care or lack of resources, such as land for agricultural purposes. Capabilities form the second dimension. The capability approach considers poverty to be the absence of skills and abilities to earn a livelihood (UNDP, 1997). In addition, the political dimension (no access to political decision-making, no legal protection) and the socio-cultural dimension (lack of respect for human dignity, no social acceptance) can be distinguished. Hence, income only is too limited an indicator of poverty.

In rural areas, men and women need financial support to invest in agricultural production and non-agricultural income-generating activities such as small trade, food processing, handicraft activities, etc. They may also need credit for

consumption, especially during lean periods. In spite of this fact poor households generally have limited access to formal banks to borrow from. This is because: a) poor households are not able to provide the collateral required by the banks as they do not own land or cannot prove legal ownership; b) the scale of transactions related to their activities is small and therefore results in high transaction costs (Moll, 2003).

Contrary to formal banks, microfinance institutions (MFIs) normally provide comprehensive packages, including small loans, saving facilities, payment services, money transfers and in some cases insurance, to poor and low-income households that have no access to formal banks. MFIs also provide training and information about how productive business activities should be run. By doing so, microfinance is seen as a means to alleviate poverty. MFIs can empower poor people, particularly poor women, and strengthen economic and social structures (Morduch, 1999; Rahman, 2004; Mayoux, 1999; ADB, 2000; Van Maanen 2004; Greeley, 2003). This explains the commitment of governments, international donors and non-governmental organisations (NGOs) in developing and developed countries to support and implement MF programmes (Simanowitz, 2004; Mayoux, 1999; Hulme, 2000).

Women have been the primary target of microfinance in most countries. According to the Microcredit Summit Campaign Report (2005) in a sample of 3100 programmes, 83.5 percent of the clients are women, as are 95 percent of Grameen's clients (Armendáriz & Morduch, 2005). Women are targeted for many reasons. The first is related to poverty as explained above. So, providing financial services for women may enable them to carry out income-generating activities, increase their productivity and income and achieve welfare for their households. Evidence suggests that loans to women result in meeting social goals like improving household food consumption, health and education.

The second reason for lending money to women is financial. Women generally seem to be more credit-worthy than men because they have a better repayment record (Hulme, 1991). They use money for the benefit of the household especially their children, whereas men are perceived as being more tempted to use their earnings to satisfy their own needs instead of investing it in business or using it to improve their household's welfare. Armendáriz and Morduch (2005) explained that women tend to be less mobile and more at home than men. This is an advantage for MFIs because it becomes easier and less costly for MFI managers to monitor them. Also for group borrowing it is important that the female members work in each others' proximity.

The general enthusiasm about microfinance should not obscure the fact that despite its importance, the effects of microfinance on poverty remain on the whole a controversial issue. There are doubts about whether microfinance really benefits women, since there are studies that report negative effects (Hulme and Mosley, 1996; Chua et al.(2000); Rahman, (1999); Armendáriz & Roome, (2008).

The negative effects of microfinance have been explained by several reasons, including the inability of microfinance to address all dimensions of poverty (human, economic, political, and social-cultural) as discussed above. The negative effects may also have to do with wrongly investing the credit because women have little or no control over the use of their loans. For example, Rahman (1999) found that Grameen Bank borrowers used their savings and household assets to pay weekly instalments.

However, other studies have found positive effects on poverty alleviation. Studies suggested that lending to women does improve household incomes and leads to other benefits like increased likelihood diversification, more market activity, more education and better health (Pitt and Khandker, 1998; Sebstad and Chen, 1996; Hulme and Mosley, 1996; Mosley, 2001 Chua et al.,2000; Morduch & Haley, 2002; Mosley & Rock, 2004; Zaman, 2004).

2.2 Intra-household resource allocation and decision-making power

In the process of making a living, men and women show evidence of power relations between them in terms of resource allocation and decision-making. Insight into intra-household resource allocation is needed to understand women's roles and their capability to improve their livelihood and that of their households and to take advantage of and profit from MFIs.

Household resource allocation or decision-making has been examined by the New Household Economics (NHE) approach. Developed by Becker (1965), the NHE considers the household as a single decision-making unit and a unit of production and consumption that seeks to minimise costs of production and maximise the joint objective utility function of all its members by pooling and combining household resources. By doing so, the household behaves as if it has one set of preferences (Haddad & Alderman, 1997). This means that all household members share the same preference function. To put it differently, a single decision-maker (the household head, usually a man) is assumed to act for the welfare of the entire household (Quisumbing & De la Brière, 2000). Such unitary models have been used to analyse household-related phenomena such as household market demand, household production and consumption, labour supply, education, health and so on and so forth (Akram-Lodhi, 1997). However, unitary models have been criticised for their lack of a gender perspective. For example, the models cannot explain how men and women within the household behave or make decisions in terms of the access to and the use of household resources and time allocation (Ellis, 2000). This is because these approaches are constructed under the assumptions of the household consisting of a nuclear family (husband, wife, and children), pooling of household resources, a joint utility function, the possibility of the substitution of household labour and the household as a single entity (Akram-Lodhi, 2005; Moser, 1993). In practice, household members have different tastes and preferences that cannot be represented by one individual. Therefore, they not only play different and changing roles in society but also often have different needs. Moreover, the single household utility obscures the likelihood of conflict and inequality in

household decision-making. As pointed out by Sen (1990), the household mode of interaction involves both cooperation and conflict.

A number of alternative models have been suggested to take intra-household relationships between men and women into consideration. Contrary to the unitary model, the collective models explicitly allow for different decision-makers, diverging preferences and conflict within the household. Household members are conscious of the fact that, through cooperation, their overall well-being might increase, but they not necessarily agree on the division of the gain (Holvoet, N., 2005). These models are termed differently, ranging from the Nash-bargaining model (Manser & Brown, 1980; McElroy & Horney, 1981), to (partly) non-cooperative models (Becker, 1973; Chen & Woolley, 2001), separate sphere bargaining (Lundberg & Pollak, 1993; Lundberg & Pollack, 2003; Lundberg et al, 1997) and the collective model. The Nash-bargaining model considers that household members pursue their own interest given their relative positions within the household. According to Agarwal (1997), the bargaining approach to studying the household provides a useful framework for the analysis of gender relations and of how gender asymmetries are constructed and lead to conflicts. She argues that bargaining models would suggest that policies and resources be directed differently by considering the gender of the target group. The Nash-bargaining model presents the utility function as conflictual and dependent on the fallback position or the threat point of individual household members (i.e. the utility level that is guaranteed if no agreement or bargain is achieved). The threat point for an individual plays a crucial role in determining the allocative outcome. According to this model, the stronger the household member's fallback position, the more power he or she has in decision-making. In the collective model, an individual's power is represented by the 'sharing rule', which allows household members to acquire their own private goods on the market by taking into consideration the household's total expenditure. Once again household members with a big share will increase their utility. The threat point and the sharing rule generally depend on factors such as income, age, education level, socially prescribed gender roles, and other extra-environmental parameters that do not enter the individual preferences. In many societies men are more likely to have control over the intra-household allocation of resources and tasks. Studies have analysed the relationship between income generation, economic empowerment and bargaining position within the household. In particular, income earning is supposed to increase women's bargaining position by increasing their power in household decision-making (Hashemi, Schuler and Riley, 1996; Odebode, 2004).

With regard to microfinance, giving financial support to women's activities may help them to increase their income, strengthen their fallback position, hence their bargaining power and their say in household decision-making. To put it shortly, women's increasing role in the household economy due to MFI will lead to their empowerment. In line with this, Holvoet (2005) found that membership in women's groups shifts overall decision-making patterns from norm-guided behaviour and male decision-making to more joint and female decision-making. Armendáriz and Roome (2008), found that, providing women with MFI loans can result in higher income in the hands of women which might be used in health

improvement and education of women and their households and eventually empowers women. They call it the women empowering effect.

However, studies have also argued that income earning does not always lead to the improvement of women's bargaining power in the household. For example, Gonzales de la Rocha (1994) and Laier (1997) argued that this situation may happen when women do not have control over household resources and their wages for cultural and ideological reasons, i.e. that women are subordinated to their husbands. In her study Odebode (2004) found that some women with high access to capital had low decision-making ability and a weak intra-household position. Likewise, Garikipati (2008) found that lending to women is likely to strengthen the household's ability to cope with vulnerability across income groups but that the women themselves, especially the poorest ones, are not likely to see consistent improvements in their household status. Evidence from Bangladesh suggests that microfinance does not increase women's bargaining power entirely because on average women borrowers surrender nearly 40 percent of their control over the investment decisions they make to their husbands. More alarmingly, over 90 percent of the returns these women realise from their investments are handled by their husbands (Goetz & Gupta, 1996).

From the above, it appeared that income gained by women does not always lead to their empowerment. This result shows that factors other than income may have an influence on women's decision-making power within the household. In line with this, Odebode (2004) suggested that socio-cultural norms, especially in African societies are factors that can affect intra-household relationships between men and women. Divergence in outcomes with respect to women's empowerment may also be explained by the method of evaluation.

The literature overview above shows that within the households, women have some real constraints not only to obtain microfinance credit, but also to productively invest and be able to increase their income and benefit from the money they have borrowed. These constraints related to women's decision-making power are crucial and need to be better investigated. In particular, there is a need to understand how decisions are made within the household and how microfinance can help women to increase their income and thus strengthen their fallback position.

2.3 Overview of the hypotheses

From the analysis above it becomes clear that the MFIs have both positive and negative effects on women borrowers, depending on the type of study, the country, the region and the environment. Weighing the evidence has led to the formulation of a set of hypotheses. All the hypotheses are stated in their alternative form and will be tested against their null hypotheses of no difference or no change.

Hypothesis 1: Women with MFI credit differ from women without MFI credit in the following respects:

- a. they have more income;

b. they have higher productivity

Hypothesis 2: Microfinance credit will have a positive impact on the realisation of women's strategic and practical gender needs: women who have obtained MFI credit have more power in household decision-making than before taking credit.

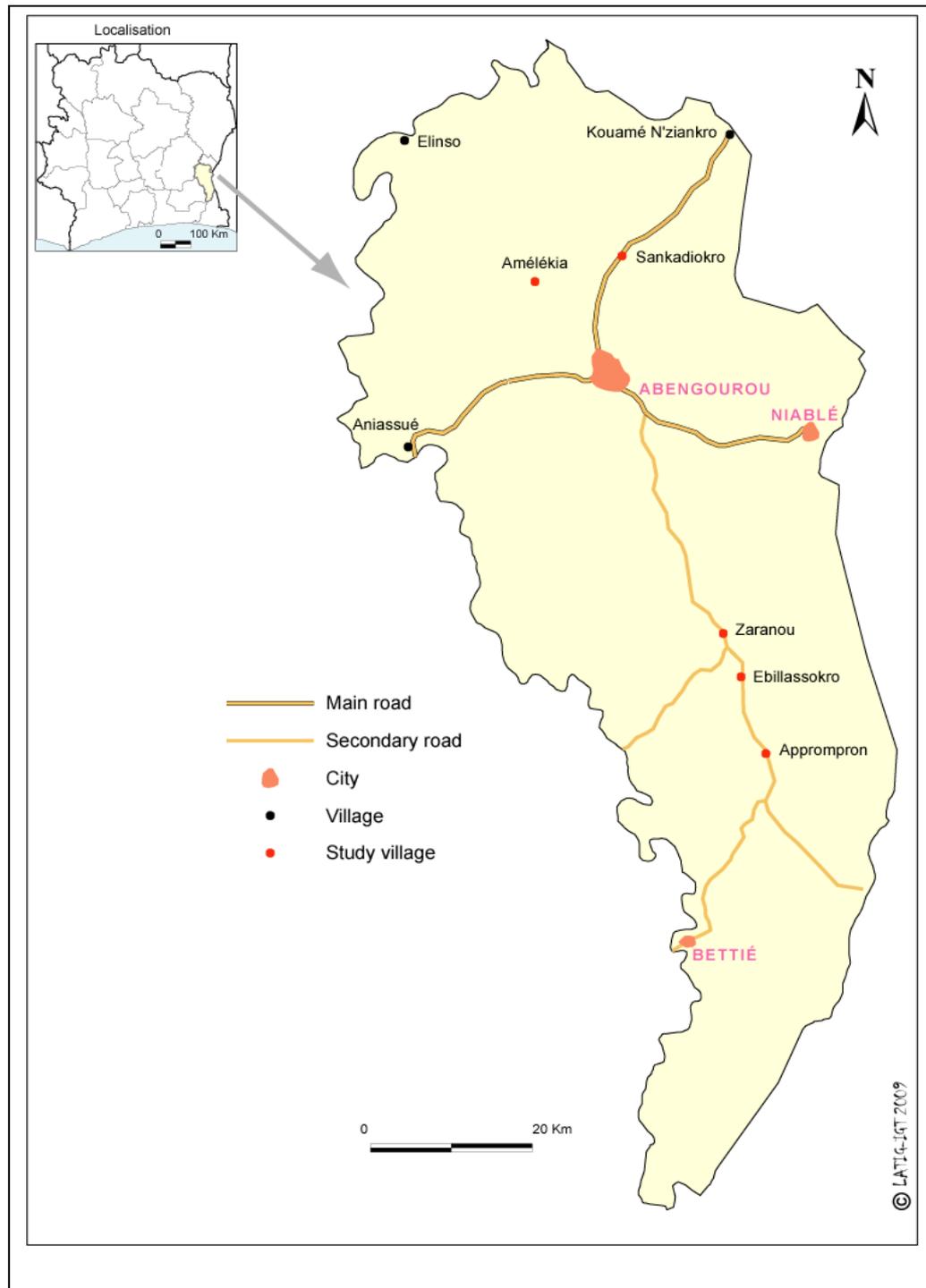


Figure 4.1 Map of the study area

III. Research methodology

3.1 Study area

This study was conducted in Abengourou located in the Central Eastern region of Côte d'Ivoire; Abengourou region occupies a surface area of 5,200 km² with about 288,200 inhabitants. This population consists of 53 percent of male and 47 percent of female. Economically, during the eighties, the Abengourou region was the leading producer of coffee and cocoa, which are the main export products of the country. The region is still one of the main agricultural production regions, with coffee, cocoa and staple crops as the core products. Women are the main producers of staple crops (cassava, maize, plantain, peanut) and horticultural crops (peanut, eggplant, hot pepper, okra, tomato, etc.), while men are engaged in cash crops production (coffee and cocoa in general). In addition, women are engaged in trade of agricultural products and non-agricultural goods.

Microfinance institutions (MFIs) are present and contribute to the development of the region especially the National Union of Credit and Saving Cooperatives of Côte d'Ivoire (UNACOOPEC-CI or simply COOPEC), and the Mutual Savings and Credit Network (RCMEC or CMEC). These two MFIs have been selected for inclusion in this study because they are the most important microfinance institutions in the country and are the sole microfinance institutions in the study region. COOPEC has set up a special credit programme for women, called Women Access to Financial Services (AFISEF), which gives technical and managerial support to female borrowers. In contrast to the COOPEC, the services provided by CMEC for women are limited to credit. However, CMEC provides group lending, in addition to individual loans.

3.2 Research design and Data collection methods

This paper aims at assessing the effectiveness and the capability of microfinance institutions to financially support women in rural areas. It seeks to assess whether MFIs can provide adequate loans to women in order to enable them to carry out income-generating activities and achieve more power within the household. To achieve this objective, a cross-sectional survey among women has been conducted. In addition to the survey, qualitative research has been conducted to understand some sociological or cultural issues, especially women's decision-making power,

The basic research units in this study were women who borrowed money from microfinance institutions. To assess the effects of MFIs' loans on women's livelihoods, the study also included female non-borrowers. These women are considered as control group. Finally, microfinance institutions (COOPEC and CMEC) formed a different type of research unit, studied in order to understand their functioning and the extent to which they have achieved the poverty alleviation goal.

Primary quantitative and qualitative data have been collected to answer the research questions. A combination of quantitative and qualitative data collection methods can give a more comprehensive understanding of the studied topic.

A written questionnaire was used to collect empirical data through face-to-face interviews. Multi-stage sampling was used to select the study sample. The first step was the village sampling and the second step was the study unit sampling within the villages. Three villages (Appronpron, Sankadiokro and Amélékia) from a list of twelve, where CMEC MFIs work were selected. For COOPEC, two out of four villages were selected (Zaranou and Ebilassokro). The reason for selecting only three villages out of twelve where CMEC is present is primarily that before the fieldwork period some CMEC institutions were not functioning well due to increased non-repayment of the previous loans. At COOPEC two out of the four MFIs were newly set up in these villages, so the period of loan provision was too short to conduct the survey.

Focus group discussions (FGD) were conducted with two groups of women involved in this study: those who had obtained credit (FGD1), those without credit (FGD2). FGD is a method used to collect qualitative data from a small group of people. It was used in this study to get insightful information about women's perceptions of: a) credit (both individual and group lending) in terms of its utility and effectiveness; b) household labour allocation, women's decision-making power with respect to their needs; c) importance of MFIs; d) use of loans and income.

The study sample comprised a total number of 185 adult women who had borrowed money from COOPEC and CMEC (95 women taking credit from COOPEC and 90 women from CMEC) in rural areas and who undertook agricultural or non-agricultural activities selected as explained above. There were 209 adult women without MFI credit, but who undertook agricultural or non-agricultural activities (control group).

IV. Analysis of the effects of MFIs in rural areas

4.1 MFI credit and Women empowerment

Among borrowers' characteristics, women's empowerment is a critical factor which can play an important role in generating and making profit from their investment. It may also give them better opportunities to get financial support from MFIs which in turn may reinforce their power through, for example, the increase in their income.

Within a household, woman's decision-making power to manage her livelihood is associated with her being able to choose the type of activity she wants to carry out, to freely decide whether to borrow money or not and, in particular, to have control over the money she borrows. For MFIs, such women are more reliable in terms of using the money for investment purposes without any interference from a husband

or relatives. On the one hand, empowered women can therefore make more profit from MFI credit and contribute to the sustainability of the credit institution. On the other hand, women's income can be increased by MFIs through supporting their livelihood activities and thereby reinforcing their fallback position, thus enhancing their say in household decision-making.

To assess this effect of MFIs on women's empowerment, we first use factor analysis to select the factors representing women's decision-making power. The degree of influence in household decision-making was measured by ten survey items. For each item, the information was collected on the basis of women's subjective response referring to both the situation before credit-taking and the situation after credit-taking. Specifically, data on empowerment before taking credit was collected by asking retrospective questions. To reduce the number of items, factor analysis was used taking into account the two situations (before and after women obtained MFI credit).

To analyse the effect of MFI on women's decision-making power, we ran a t-test for related samples by comparing women's empowerment before and after taking MFI credit. Decision-making power here refers to the reverse causality and is used as an endogenous variable. Doing so will identify individual and institutional factors that may affect the outcomes and the efficacy of credit participation.

From the results of factor analysis, two factors were found, explaining 43 percent and 21 percent of the item variance respectively. In the same order, these percentages were 44 and 21 in the situation after MFI credit. The items which were highly loaded on the first factor concerned women's participation in decision-making in terms of the use of household consumption goods and household income, household expenditure on equipment, schooling of children, and the participation of women in community ceremonies (shaded in Table 1). This factor was interpreted as a practical gender needs factor. The second factor encompassed women's decision-making in terms of borrowing money, trading goods, and the use of women's income and credit (shaded in Table 1). This factor was associated with women's own business activities reflecting women's strategic gender needs.

Table 1 Factor loadings from principal component analysis on women's decision-making power before taking MFI credit.

	Factor 1 (Practical Gender needs)	Factor 2 (Strategic Gender Needs)
Who makes decisions to borrow money	0.092	0.760
Who makes decisions about the trade of goods	0.082	0.778
Who makes decisions to use household consumption goods	0.803	0.132
Who makes decisions to use woman's income	0.168	0.792
Who makes decisions to use household income	0.808	0.120
Who makes decisions for schooling of boys	0.860	0.054
Who makes decisions for schooling of girls	0.848	0.055
Who makes decisions about household equipment expenses	0.771	0.185
Who makes decisions for woman's participation in community ceremonies	0.721	0.159

* KMO: 0.80¹; Explained variance: 64.70%

Rotation Method: Varimax² with Kaiser Normalisation.

Table 2 Factor loadings from principal component analysis on women's decision-making power, after taking MFI credit.

	Factor 1 (Practical Gender needs)	Factor 2 (Strategic Gender Needs)
Who makes decisions to borrow money	-0.049	0.696
Who makes decisions about the use of woman's credit	0.226	0.837
Who makes decisions about the trade of goods	0.037	0.721
Who makes decisions to use household consumption goods	0.860	0.139
Who makes decisions to use woman's income	0.291	0.564
Who makes decisions to use household income	0.839	0.101
Who makes decisions for schooling of boys	0.888	0.165
Who makes decisions for schooling of girls	0.898	0.115
Who makes decisions about household equipment expenses	0.864	0.049
Who makes decisions for woman's participation in community ceremonies	0.723	0.131

* KMO: 0.82; Explained variance: 65.61%

Rotation Method: Varimax with Kaiser Normalisation.

¹ KMO (Kaiser-Meyer-Olkin) measures the sampling adequacy which should be greater than 0.6 for a satisfactory factor analysis to proceed. With KMO=0.80, we can say that factor analysis in this study was appropriate.

² The Varimax rotation method assumes the independence between the factors. However, we first conducted factor analysis with oblimin rotation to check whether factors were related. We found a correlation coefficient $r=0.387$ which seemed a bit high. However, in order to proceed with uncorrelated factors in subsequent analyses we used the uncorrelated factor solution (Varimax).

The results of the t-test (Table 3) indicates significant differences between the two situations with respect to the power in decision-making related both to women’s practical needs ($t= 3.11$; $p<.005$) and strategic gender needs (3.36 ; $p<.005$). The results suggest that MFI credit has given more power to female borrowers. Indeed with the increase in the income they earned from their activities, women borrowers were able to reinforce their fallback position. This led to the improvement in women’s ability to be financially more involved in the management of household resources. Accordingly, it gave them the opportunity to reinforce their power in household decision-making. Credit taking has also increased women’s power in decision-making regarding strategic gender needs, meaning that women are more likely to make their own decision about what types of goods to produce and sell, and, more importantly, they could decide how to use their loans and their incomes. Achieving power in strategic gender needs is a very important issue for women as it may affect the profit a woman can make from MFI services provided for them and, consequently, the effectiveness and the capability of the credit institutions to financially support women in general and rural women in particular. It is noteworthy that women’s responses to retrospective questions used to assess the empowerment of women before and after obtaining MFIs credit are subject to recall bias, namely hindsight bias³. Hindsight bias should normally work against our hypothesis, meaning that the difference between the power before obtaining MFI credit should be less and may not be significant. However, our result showed a significant difference between the two situations.

Table 3 Women’s decision-making power before and after obtaining credit

	Before obtaining MFI credit		After obtaining MFI credit		t-value
	Mean	Std.D	Mean	Std.D	
Practical gender needs	2.452	0.465	2.506	0.450	3.108**
Strategic gender needs	2.840	0.332	2.903	0.233	3.357**

****significant at 1%; ** significant at 5%;*

Source: Research results based on the household survey, 2006

4.2 Effects of MFI credit on food production and income

We aim to analyse whether obtaining MFI credit leads to change with respect to outcomes such as income and farm productivity which are important factors to ensure food security within the household.

³ Hindsight bias refers to the tendency people have to view events as more predictable than they really are. People often recall their predictions before the event as much stronger than they actually were. With hindsight people consistently exaggerate what could have been anticipated with foresight (Fischhoff, 1980)

Different research methods have been used to assess the impact of microfinance credit on the borrowers. One of the simple and widely used methods in the microfinance literature is to compare programme participants (the treated group) to non-participants (control group) on key outcomes that are expected to be affected by participation. Using the mean difference to measure the impact of credit between two groups that may be different with respect to some characteristics may lead to overestimation or underestimation of the impact. Thus, this method was criticised for ignoring the selection problem. Another method is propensity score matching (PSM). This technique which is performed to reduce the selection bias is used in our study to assess the effects of MFI credit on women with respect to some outcomes of interest. This method is described below.

4. 2.1. The propensity score matching method (PSM)

PSM is a method recently used in impact assessment. It is defined as the conditional probability of receiving treatment given pre-treatment or exogenous individual characteristics (Rosenbaum and Rubin, 1983). In our case we can define PSM as the conditional probability of a woman obtaining credit from MFIs (COOPEC and/or CMEC) given certain characteristics such as age, education level, marital status of women, and so on. The PSM method helps to adjust for initial differences between the treated and control group by matching those treated and controls with similar propensity scores based on observable characteristics. The idea of the PSM method is to construct the outcomes (Y_1) of programme participants (borrowers) with the outcomes (Y_0) of comparable non-participants (non-borrowers). Therefore, any difference in the outcomes between the two groups is attributed to the programme or treatment.

Two main assumptions underlie the PSM method. The first assumption is the conditional independence assumption (CIA) according to which the selection is only based on observable characteristics, and potential outcomes in the untreated state are independent of treatment or programme participation. It is noteworthy that this assumption is strong as unobservable characteristics may also cause bias but are ignored in the process. The CIA condition requires that selected exogenous variables are those which simultaneously affect the participation and the outcomes. However, these variables should not be influenced by participation in the treatment. The second condition is the common support (CS) requirement which ensures that individuals from the treatment and control groups are comparable before the treatment. According to Heckman et al. (1999) cited in Tesfay, (2009), common support ensures that individuals with the same observable characteristics have a positive probability of being in both treatment and control groups. Thus estimation can be performed on individuals that have common support. The average treatment effect on the treated group (ATT) is the difference between the mean outcomes for matched treated and untreated individuals that have common support conditional on the propensity score. The model is written as follows:

$$p(X_i) \equiv \Pr\{T_i = 1|X_i\} = E\{T_i|X_i\} \quad (1)$$

Where $p(X_i)$ is the propensity score; It represents the probability of a woman i of obtaining MFI credit; $T_i = \{0,1\}$ is the indicator of exposure to treatment, $T_i=1$ if treated (having MFI credit) and $T_i=0$, otherwise. X_i is the vector of pre-treatment characteristics. In our case X_i is represented by age, household size, education level, marital status, ethnicity, and decision-making power (PGN and SGN).

If outcomes are assumed to be independent of programme participation after controlling for propensity score, and equation (1) holds, the average treatment effect (ATT) is represented by:

$$ATT = E\{E(Y_i|T_i = 1, p(X_i)) - E(Y_i|T_i = 0, p(X_i))\}T_i = 1 \quad (2)$$

The estimation of the average treatment effect using the PSM method is done in three steps. The first step is to construct a predicted propensity score that estimates the probability of being treated given a set of exogenous characteristics for each group by using a probit regression model (equation 1). In the second stage, individuals are matched on the basis of their predicted probabilities of participation. But an estimate of the propensity score is not enough to estimate the average treatment effect because the probability of observing two units with exactly the same value of the propensity score is in principle zero. To overcome this problem, different methods are used by which weights are given for matching precision. Among these methods, four are the most widely used (nearest neighbour matching, radius matching, stratification matching and Kernel Matching (KM)). The latter is used in this study. With KM, all control cases are matched to each treated case but weighted so that those closest to the treatment case are given the largest weight. According to Tesfay (2009), KM has the advantage of ensuring low variance because it uses the weighted average of all individuals in the control group to construct the counterfactual outcome. Whatever the methods used, the quality of the matches may be improved by imposing a good common support restriction.

To ensure comparability once propensity scores are estimated and cases are matched, the next step is to test the balancing property using a t-test which assumes that pre-treatment observable covariates did not differ statistically between control and treated groups. From the balancing test a balanced distribution of the covariate is obtained meaning that there is no difference between the two groups. It also gives the percentage reduction in bias. So, any difference in the outcome between the treated and the control is due to the treatment (obtaining MFI credit in our case).

Definition of exogenous variables and outcomes

To construct a propensity score that estimates the probability of obtaining MFI credit, the control variables representing women's characteristics were: the average age of women, household size, education level of women, marital status, gender of household head, decision-making power of women within household, type of

activity, wealth, and ethnicity. The control variables are expected to simultaneously influence the probability of a woman obtaining a loan and the outcomes.

The outcomes of interest to be measured are women's net income, women's and household assets and the productivity are included as well. Below we present a description of each outcome of interest.

Income: One of the most important outcomes of the provision of loans by MFIs to the poor is to enable them to earn and increase their income. By lending money to the poor, they can set up income-generating activities or extend and improve existing activities. The net income in this study represents the total amount of money earned per month by women from agricultural and/or trade activities. We made this choice to have the same basis of comparison as traders who make money everyday, while farmers get money once a year by selling crops after the harvest.

Farm productivity is an important variable in rural areas where agriculture is the main activity. In general, it is commonly thought that rural households and women in particular face difficulties in generating income due to their low level of productivity. The provision of credit in the agricultural context is supported by the argument that giving credit to farmers may help them to acquire farm inputs such as seeds and fertilizer that will add value to farm production and therefore make their farms more productive. In the study area, female farmers had borrowed money from either COOPEC or CMEC to produce crops, mainly cassava, yam, plantain cash crops and horticultural crops. Productivity is defined as the ability of women to produce profitable crops using their scarce resources, including inputs and hired labour. Farm productivity was estimated in value of crops per hectare and is given as follows:

$$VQ_i = \sum_j \left(\frac{P_j Q_{ij}}{A_j} \right)$$

where VQ_i is farm productivity (value per hectare obtained by a woman i), P_j is the price of crop j produced by woman I ; Q_{ij} represents the quantity of crop j produced by woman I and A_j is the area cultivated in crop j (in hectare).

Assets: Assets are the basic factors of production, consumption and investments that are controlled and accessed by the household. Assets are represented by the sum of monetary value (in francs CFA, local currency) of livestock, equipment, electrical appliances and consumer goods that belong to the household (see Appendix 1). Several studies have found that the provision of loans for women may enable them to build up and improve the value of their assets (Rahman, 2004; Mayoux, 1999; ADB, 2000; Van Maanen, 2004).

4.2.2 Results

Characteristics of female respondents

The results from Table 4 indicate the socio-demographic characteristics of women who have obtained MFI credit and women without MFI credit. It presents unmatched and matched average sample coefficients. From the unmatched sample, we can conclude that women who obtained MFI credit are adult Agni female household heads with few household members. They have more power in decision-making within the household. In the matched sample there is no significant difference between the two groups of women with respect to the variables in the table. This means that the bias between women with and without credit was reduced and therefore the treatment and the control groups are now comparable on the basis of their pre-treatment characteristics.

Table 4 Socio-demographic characteristics of women with and without MFI credit

	Unmatched samples			Matched samples			Percentage reduction in bias
	Women with credit N=185	Women without credit N=209	t-test	Women with credit N=137	Women without credit N=179	t-test p-value	
Age in years	42.21	39.46	2.31**	41.2	41.3	0.10	94.8
Household size	5.47	6.15	2.67**	5.41	5.62	0.69	69.2
Female household head	0.43	0.27	3.36**	0.41	0.40	0.25	90.3
Married woman (dummy)	0.61	0.64	0.73	0.64	0.64	0.05	91.5
Primary education (dummy)	0.44	0.45	0.33	0.44	0.50	0.95	-253.3
Decision-making power (SGN)	0.13	-0.21	3.32**	-0.01	-0.04	0.25	92.2
Decision-making power (PGN)	-0.08	0.16	2.32**	-0.05	-0.04	0.11	94.4
Ethnicity: Agni	0.91	0.66	6.23***	0.90	0.92	0.66	90.6

Source: Research results based on the household survey, 2006

Table 5 presents the probit regression model for propensity scores. It indicates that Agni women who have more power in decision-making are more likely to obtain credit from MFIs (COOPEC or CMEC). Agni is the principal ethnic group in the study area, and this fact may give Agni women more of chance to be well informed about the services offered by MFI, as most of the MFI agents in the region belongs to this group. There may be a positive discrimination in favour of Agni women in

the process of the provision of credit as reported during the focus group discussion. Decision-making power in terms of SGN is positively linked to obtaining MFI credit. Women with more power in decision-making, have more chance to obtain MFI credit. As explained above, when a woman has power within the household, she can efficiently invest her money and make a profit. MFIs will therefore prefer such a woman in whom they will have more confidence. As predicted, women with a large household size are less likely to obtain MFI credit. The same holds true for married women and female household heads. Contrary to what we expected, neither the level of education nor age was significant. This means that in our study, these two variables did not affect or explain MFI credit taking.

Table 5 Probit model of the propensity score to estimate MFI credit effects

	Probability of obtaining MFI credit	
	Coefficient	Z-value
Age	0.034	0.87
Age squared	-0.0003	0.69
Household size	-0.073	2.25**
Female household head	0.388	1.83*
Power of decision-making (SGN)	0.314	3.47**
Power of decision-making (PGN)	0.038	0.35
Primary education (dummy)	-0.201	1.24
Married woman (dummy)	0.377	1.86*
Ethnicity: Agni (dummy)	1.058	5.09***
Constant term	-1.683	1.96*

Source: Research results based on the household survey, 2006

The effects of MFI credit, after controlling for potential bias, is presented in Table 6. These effects are the differences in outcomes between the groups of women with and without MFI credit, respectively, and are indicated by the average treatment effect ATT. A positive ATT for a particular outcome means that participation in MFI credit has led to a positive change in that particular outcome. And this change can be attributed to participation in MFI credit. The results indicate that the matched difference in income between women who received MFI credit and women without MFI credit is positive ($t=2.76$; $p < .05$). This means that female borrowers earned on average more income than non-borrowers. Thus, we can say that MFI credit has helped women to improve the level of their income. Furthermore, the table shows that after propensity matching, the value of women's assets was not significantly different between the two groups. However, a positive difference in the value of household assets was found. This interesting result is the proof of women's contribution to household expenditure. Female borrowers may use their income to contribute to household expenditure rather than to buy goods for themselves. The participation in MFI credit resulted in the increase of the value of household assets. This result is not surprising as during the focus group discussion some women reported that their main objective for taking credit was to contribute to household livelihood and consumption and to be able to take care of

the household members and children in particular. The participation of women in household livelihood is a way for them to increase their fallback position, and an opportunity to gain more power within their household.

Table 6 suggests that the value of production was significantly different between the treated and the control groups. The average treatment effect is positive, meaning that female borrowers who invested their loan in farming have achieved a higher value of production per hectare than women without MFI credit. This difference is reflected in the yield of crops such as cassava, yam and plantain. Female borrowers produced on average 8,650 kilograms per hectare of cassava⁴, whereas the yield in the control group was only 4,841 kilograms on average. The factors explaining these differences may be linked to the use of inputs such as hired labour and modern seeds. Indeed, female borrowers in the study area spent much money on cassava, yam and plantain. Even more money was used to hire labour because labour was a real constraint for women in farm production. Some tasks such as ploughing and felling trees are rarely performed by women as this is men's work.

Table 6 Average effects of obtaining MFI credit on a set of outcomes

	Mean		Unmatched difference	T-value	Matched	
	With credit	Without credit			Matched ATT	T-value
Income in FCFA/month	50,179	29,331	20,847	4.53	17,722	3.17**
Women's assets (FCFA)	39,807	21,879	17,927	1.49	15,073	1.11
Household assets (FCFA)	552,312	312,721	239,590	2.15	217,247	2.99**
Value of production/ha (FCFA)	597,138	447,464	149,673	2.94	209,913	2.00**

Source: Research results based on the household survey, 2006

⁴ Like coffee and cocoa, cassava and plantain and yam can be considered cash crops in the region, though this depends on the context and the objectives that one wants to reach. For example, when a woman borrows money and grows one of these crops, it is more likely that the crop will be produced mainly for the market rather than for household consumption. Then the crop becomes a cash crop. In the study region, cassava is nowadays generally produced as a cash crop.

V. Conclusions

The objective of this paper was to analyse the effectiveness and capability of MFIs in enhancing women's livelihood activities and empowerment, and ensuring food security.

MFIs are found to be effective in enhancing women's income. The improvement of the value of farm production is a main development goal in most African countries whose economies are based on the agricultural sector. Studies have suggested that the progress in this sector is associated with the use of modern inputs to increase the level of production. The findings of this study show that MFI credit has improved the value of farm production through positive productivity.

Although this study established the positive relationship between MFI credit and women's income, it suggested that female borrowers were more likely to use their earned income not to build up their own assets, but to contribute to the improvement of the household standard of living. Doing so enables these women to enhance their fallback position and to achieve more power in decision-making within the household. To corroborate this statement, our findings on the effects of MFI credit on women's empowerment showed that women's access to credit has significantly increased their power in fulfilling their practical and strategic gender needs. This means that with MFI credit, women gained more power with respect to individual (women themselves) and household issues.

With the increase of farm production and income, women can provide food for their household and therefore ensure food security in rural areas. This result was confirmed by focus group discussion where some women explained that the increase of food production enabled them to provide food for the household. With the income gained from their activities, women were able to buy food that they did not or can not produce.

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