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# RESEARCH ARTICLE

## ANALYSIS OF THE SOCIO-ECONOMICS FACTORS DETERMINING ACCESS TO AGRICULTURAL MICROCREDIT IN MAIZE PRODUCTION SOUTH OF THE BORGOU

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## ABSTRACT

Maize is a staple food and an important source of income for many households in Benin. However, national supply is unable to meet demand. With the dual aim of meeting household demand and increasing their incomes, farmers are coming up against a lack of capital and are turning to microfinance institutions. The aim of this research is therefore to analyse the determinants of access to credit in three municipalities in southern Borgou. The data was collected from a sample of 372 farmers determined according to the Yamane formula, with details of the sampling method, the collection tool and the collection method. The data were analysed using R software, using descriptive statistics, hierarchical ascending classification (HAC) and principal component analysis (PCA). The determinants of the different classes were analysed using a multinomial logit model. The results of the analyses reveal three distinct classes of farmers according to the age and farming experience of the head of household, level of financial education, income from maize, overall farming income and membership of a producer organisation. The first class (161 respondents) is made up of farmers with very little access to the credit system, while the second class (57 individuals) is made up of producers with better access to credit. Between the first two classes is class 3, made up of 154 individuals with average access to credit and oriented towards diversification of activities. The level of financial education of the producer, membership of an organisation and the area of maize sown are the main determinants of the level of access to microcredit. Taking these factors into account would enable some farmers in the low and medium access classes to benefit more from credit in order to manage their farms.



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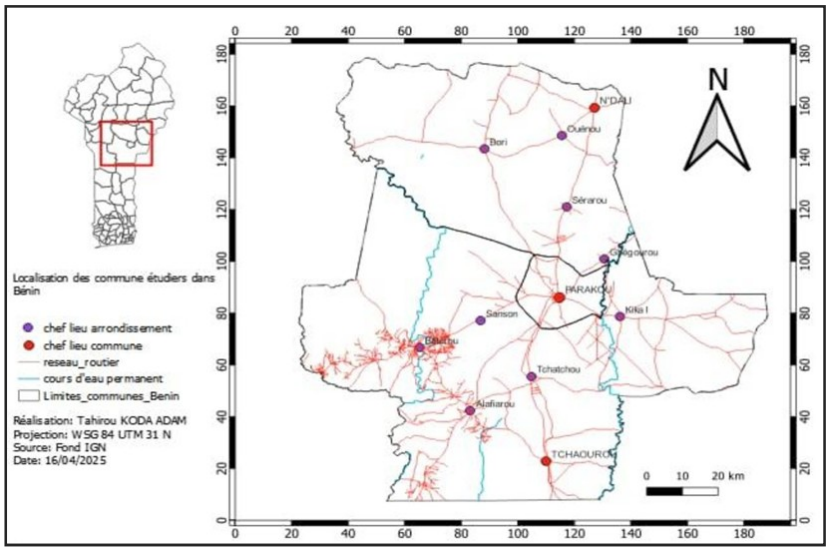
# INTRODUCTION

Access to credit is a decisive factor in the sustainable intensification of agricultural production in developing countries. For Karlan et al. (2014), access to credit allows farmers to overcome financial constraints and invest in sustainable inputs, thus catalyzing agricultural intensification. Faced with the limitations of traditional bank financing encountered by small producers in these countries, agricultural microcredit is an alternative adapted to the realities of smallholder farmers, particularly in developing countries such as Benin (2,3). It makes it somewhat easier to acquire inputs, modernize farms and manage agricultural risks. Obviously, it is essential in the production of maize, the main cereal grown by about 70% of farmers and covering nearly a third of the area sown (INSTAD, 2024). In recent years, the country has experienced growth in terms of the creation of decentralized financial systems with a host of public policies for financial inclusion, effective access to agricultural microcredit remains limited and unequal (5). Despite this proliferation of microfinance institutions, many producers face structural obstacles such as the lack of physical guarantees, the mistrust of institutions towards the agricultural sector considered risky, the low level of financial literacy of beneficiaries, the weak credit culture or the mismatch between the supply of credit and the specific needs related to agricultural production cycles(Assogba et al., 2017; Sonehekpon and Fiamohe, 2022). Added to this is the complexity of administrative procedures and the lack of financial products adapted to smallholders. These factors not only reduce access to credit, but also limit its impact on the productivity and well-being of rural households (8). The literature highlights several determinants of access to agricultural microcredit. Among them, the socio-economic characteristics of the producers play a preponderant role: level of education (6), age, sex (9.10), experience in agriculture, and membership of a farmers' organization (8). On the other hand, institutional and credit market factors also influence the chances of access: interest rate, loan term, timing of disbursement, existence of a guarantor or material guarantee, structure of the credit product (11,12). Studies have also highlighted gender biases and the effects of microfinance programmes specifically targeting women, with positive results on economic empowerment but sometimes increased exposure to the risks of debt distress (13). Despite the richness of this work, some gaps persist in the literature. Research is often limited to small geographical areas or to poorly representative samples, which limits the scope of conclusions (14). Moreover, few studies analyse the economic and social dimensions of agricultural microcredit in an integrated manner. In addition, recent

developments in microfinance markets and the rise of new instruments (digital credits, bundled services) call for a change in the determining factors that require a re-update of empirical analyses. This research analyzes the determinants of access to microcredit in maize production in three municipalities of Benin, specifically the Borgou department, by combining microeconomic and institutional approaches. It answers the following question: what are the factors that facilitate or hinder maize producers' access to agricultural microcredit in Benin in a context of high dependence on rain-fed agriculture and rural economic vulnerability? A better understanding of these determinants is essential to improve financial inclusion policies and adapt financing mechanisms to the realities of producers.

# METHODOLOGY

**Study area :** The research was conducted in the south of the Borgou department, in the municipalities of N'Dali, Parakou and Tchaourou. These municipalities are selected to take account of the encounter, in this area, of several crops such as tubers, cereals, industrial crops (cashew, soybean and cotton). These three municipalities, with a strong agricultural vocation, are geographically located as follows: N'dali, almost in the center of the Borgou department, is located between 9°51′ north latitude and 2°43′ east longitude; Parakou, in the southern region of the department, is located between 9°21′ north latitude and 2°37′ east longitude; finally, Tchaourou, in the south of the department, is situated between 8° 53' 11" north latitude and 2° 35' 51" east longitude (figure 1). These municipalities are among those with the largest maize productions. Preparing for the 2050 goals according to the FAO (2016), we chose maize not only because of its first place in the classification of cereals in the country (Yessoufou and Adegnika, 2018), but also to induce an increase in yields in this area where there is potential and this crop has not reached the highest national yield (991.93 in 2023)(17).




**Source : Authors (2025)**

**Figure 1 : Study Area Map**

**Data collection and analysis :**The data were both quantitative and qualitative. Focus groups, participant observations and semi-structured and structured interviews were conducted with farmers. The questionnaire used was designed on Microsoft Word 2016 and implemented on Kobocollect in order to facilitate data collection and processing. The various data are processed using the R software version 4.3. The various data collected relate to the socio-economic and demographic characteristics of producers, microcredit, production and management performance.

The surveys for this study were conducted in the municipalities of N'dali, Parakou and Tchaourou (both in rural and urban areas). The observation units were made up of corn producers (men and women) randomly selected from a three-digit random number table. The list of producers in each municipality was obtained through exchanges with the Head of the Survey and Monitoring-Evaluation Department and the Departmental Union of Borgou/Alibori Producers, then cross-checked by visits to the village chiefs. Once the exhaustive list was established, the sample size was determined using the formula of (Yamane, 1967) as follows:

$$n = \frac{N}{1+N*e^2}$$

**N** is the size of the population of maize producers, here 1741 from the three municipalities; **n** is the minimum sample size required; **e** is the estimated accuracy of the margin of error, in this case 5%; **1** is a natural integer.

This gives a value of n equal to 326 producers. A stratified distribution by municipality was applied to reflect local specificities. The sample was slightly oversized to ensure better robustness and take into account the realities of the municipalities, especially that of Parakou, because of the presence of decentralized financial systems and active producers' cooperatives. In total, 21.4% of the total population of corn producers was sampled instead of 18.7% initially. The number of producers required for the municipality of N'dali is 132, that of the municipality of Parakou is 95 and finally 145 for Tchaourou. These values are summarized in the table below.

**Table 1: Sample distribution**

| Municipalities | CVP Maïs | Reference population | Proportion (%) | Sampling Rate (%) | Sample |
|---|---|---|---|---|---|
| **N'dali** | 27 | 639 | 36,7 | 20.7 | 132 |
| **Parakou** | 17 | 384 | 22,0 | 22.0 | 95 |
| **Tchaourou** | 23 | 718 | 41,2 | 20.2 | 145 |
| **Total** | 67 | 1741 | 100 | 21,4 | 372 |

Source : Field survey (2025)

Descriptive statistics have made it possible to identify the general socio-economic characteristics of producers. Given the homogeneity that our sample may present in terms of characteristics, the hierarchical ascending classification (HFC) was used. It made it possible to highlight the variables that characterize the different classes in relation to access to microcredits. This algorithmic methodology consists of grouping the closest farmers in the same class. The closest classes were then grouped using Ward's criteria. The operation is repeated until a significant categorization is obtained. Given the mixed nature of these basic data, the "gower" metric (Gower, 1971) was preferred to the "Euclidean" metric. It looks like this:

$$d_{ij} = d(i,j) = \frac{\sum_{k=1}^{p} w_k \delta_{ij}^{(k)} d_{ij}^{(k)}}{\sum_{k=1}^{p} w_k \delta_{ij}^{(k)}}$$

The distance between two rows (individuals) is the weighted average of the contributions of each variable. Thus, $d_{ij}$ is a weighted average of $d_{ij}^{(k)}$ with weights $w_k \delta_{ij}^{(k)}$ where $w_k = poids[k]$, $\delta_{ij}^{(k)}$ is equal to 0 or 1 and $d_{ij}^{(k)}$ the contribution of the k-th variable to the total distance.

An optimization of the classes was therefore carried out by proceeding step by step. This loss of inertia is also observed using the dendrogram representation. The CAH is very frequently used for descriptive analyses and corresponds perfectly with the evidence of the heterogeneity of farmers initially grouped in a single set (Medvedeva and Ivanova, 2021) and in our case, according to access to microcredit. The analysis is complemented by a principal component analysis (PCA) (22)

In addition, the determinants of access to credit were analyzed using a multinomial logit due to the multinomial nature of the class variable.

$$\begin{cases} 1=\text{Poorly integrated into microcredit schemes} \\ 2=\text{Well integrated and beneficiaries of microcredit} \\ 3=\text{Intermediate or moderately integrated into the microcredit scheme} \end{cases}$$

This variable expresses the level of access to credit of producers, each class corresponding to a level of involvement or access to credit. This involves modelling the behaviour of producers using various alternatives (Nana and Thiombiano, 2017). It allows for a relaxation of the hypothesis of the independence of the alternatives. Each level of access to credit is associated with a given utility. This usefulness is reflected in the following mathematical formula:

$$U_{ij} = \beta_j X_{ij} + \varepsilon_{ij} \quad (1)$$

Uij represents the utility of producer i to belong to a class j, β represents the constant, X= 1, 2, 3.....k are the explanatory variables of the model and εij represents random factors that are not under the control of the producer. To this utility of producer i is associated a probability expressed as follows:

$$P_{ij} = \frac{1}{1+e^{-X_{ij}}} \quad (2)$$

$$(Y_{ij} = 1) = (U_{ij}) \; with \; j \neq n \quad (3)$$

P represents the associated probability and Yij being the explained variable which takes the value 1 if producer i belongs to a class j and 0 if not (24). The multinomial logit establishes disjoint and exhaustive alternatives represented by the explained variable Yij which constitutes the choice of a class (25). Class 1 is chosen here as the reference modality because it constitutes the lowest level of integration into the financial system. The idea is to highlight the factors that can lead producers to opt for a given level of integration into the microcredit system. Several research studies have identified the defining socioeconomic and demographic characteristics. These are mainly property rights, the size of the farm, the mode of access to land, the farm's experience in agricultural production, the age of the head of the household, his sex as well as his level of education, income level (25.26). In this study, only marginal effects were interpreted (24).

Based on the literature, the potential variables determining access to microcredit include socio-economic and demographic characteristics (Ayedegue *et al.*, 2020; Katé *et al.*, 2014). These are:

- **Age :** Older individuals tend to have more experience and established social networks, which can strengthen their credibility with microfinance institutions and thus increase their likelihood of accessing credit (27). However, some research suggests that young farmers, who are often more open to financial innovations, may also be more likely to use microfinance services. The effect of age can therefore be ambivalent.
- **The level of financial education:** is increasingly emerging in the literature as a major determinant of access to and effective use of financial services. A better understanding of budget management mechanisms, savings, interest rates and debt risks allows households to make more informed financial decisions and gain credibility with lenders. According to Xu and Zia (2012), financial education improves households' ability to compare and select suitable financial products, which increases their likelihood of accessing credit. Similarly, Grohmann and Menkhoff (2020) show that individuals with higher levels of financial education are more likely to use formal financial services. The positive sign is hoped.
- **Belonging to a group:** Membership in a farmers' organization or cooperative helps build trust between lenders and borrowers, reducing information asymmetry and the risk of default. In addition, the pools facilitate access to information, inputs and collective guarantees, which significantly increases the likelihood of accessing credit (27). The expected effect is therefore positive.
- **Household size :** also influences the demand for and access to credit. A larger household may have an abundant labour force, which can increase agricultural productivity and, consequently, the solvency of the farm (30,31). However, large size can also mean a higher dependency ratio, reducing savings capacity and increasing financial vulnerability. The expected effect could therefore be positive or negative, depending on the structure of the household.

- **Maize area :** indicators of productive capacity and income potential. The larger the area, the greater the likelihood of using credit, particularly to finance inputs, seeds and equipment (31). A positive sign is expected.
- **Agricultural income and income from maize**: Latif et al. (2017) shows that higher incomes improve producers' credibility and creditworthiness with lenders. As maize is a staple crop in many regions, its income is a specific indicator of financial stability. These variables should therefore have a positive effect on access to microcredit if they evolve in the same direction.

Coefficients indicate the directional effect of explanatory variables on the probability of belonging to a given class relative to the reference class, while marginal effects (dxdy) measure the average effect on the probability of belonging to a given class. The likelihood statistic (LR $chi^2$ = 244.92; $p < 0.001$) confirms the overall significance of the model, indicating that the included variables explain the membership of the different classes.

**Table 2. Description of the variables determining access to credit**

| VARIABLES | Description | Coding | Signe |
|---|---|---|---|
| **AGE** | Age of the maize farmer | Continuous variable | ± |
| **FINEDUC** | Level of financial education | Binary variable (0-No, 1-Yes) | + |
| **APPARTOPA** | Membership of a group/association | Binary variable (0-No, 1-Yes) | + |
| **TAILLMENAGE** | Household size | Continuous variable | ± |
| **SUPMAIS** | Maize acreage | Continuous variable | + |
| **RMAIS** | Maize income | Continuous variable | + |
| **RAGRICOLE** | Farm income | Continuous variable | + |

Source: Authors (2025)

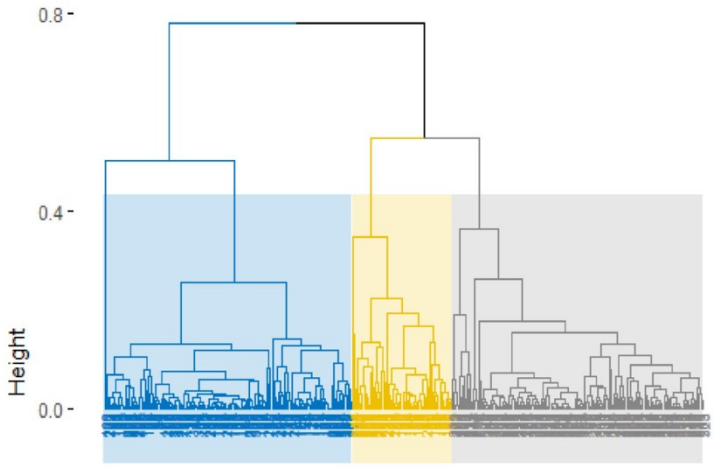
# RESULTS

**Socio-economic and demographic characteristics :** Table 3 presents the profile of respondents in the three survey municipalities according to 10 variables.

The socio-economic characteristics of corn producers show differences between locations. Parakou producers are older (45.3 years) and more experienced (15.3 years), with a strong membership in organizations (61%). These producers have more to apply for and obtain loans with collective guarantees. Their experience in maize production is also a factor of credibility in the agricultural DFS. In addition, in the municipality of N'Dali, agricultural incomes are much higher (2,444,545 CFA francs), making them solvent candidates for lenders, despite a low rate of membership in organizations (18%). Tchaourou stands out for its majority access to land by inheritance (93%), which is an asset for guarantees, but with relatively low agricultural incomes (718,298 CFA francs). Education is dominated on average by the secondary level overall and 88% of respondents have married marital status, strengthening the ability of producers to take out credit, while religious disparities and modes of access to land (inheritance, borrowing) could influence the preferences of financial institutions. These factors combined show that in terms of access to credit, each of the municipalities has specific interesting features. The addition of other variables with even more in-depth analyses allows us to better understand the determinants of access to credit in Borgou.

**Principal Component Classification and Analysis**

- **Hierarchical ascending classification:** The classification made it possible to group the observations according to their similarity on a set of variables. These include socio-economic characteristics, agricultural practices, access to finance, and the life cycle of households.




**Source : Authors (2025)**

**Figure 2: Classification Dendrogram**

The dendrogram brings out three classes represented by the three colored areas on the graph. It can be seen that the groups are clearly distinct from each other. This shows a heterogeneity in the socioeconomic characteristics of the households studied.

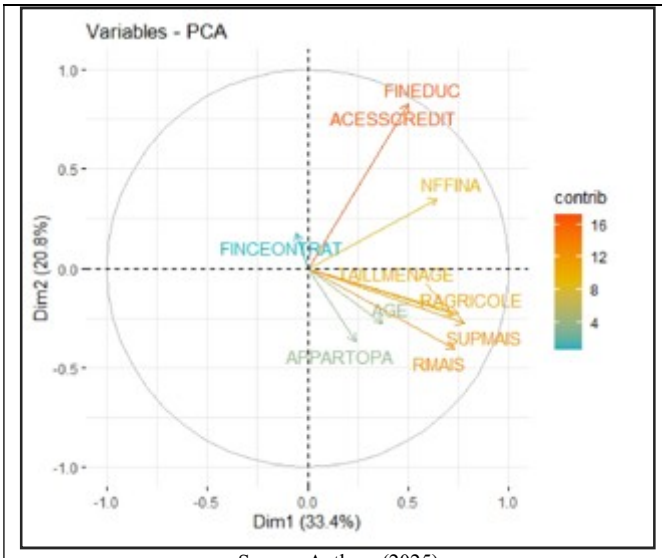
- **Circle of contribution of variables to classification :** The circle of variables from Principal Component Analysis (PCA) shows the contribution of the different variables contributing to the construction of the first two factor axes (Dim1 and Dim2). These two axes summarize more than half of the information contained in all the variables studied (about 54% of the total inertia). Each variable is represented by an arrow in the circle, and the position and length of this arrow indicate its importance in explaining the differences between

producers. It appears that the variables Access to credit (ACESSCREDIT), maize area (SUPMAIS) and maize income (RMAIS) stand out for their strong contribution, indicating that they play a central role in farm differentiation.

**Table 3. Descriptive profile of farmers**

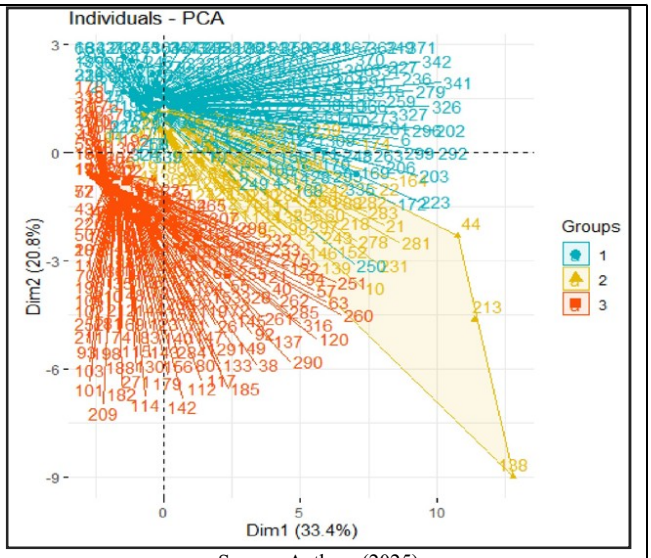
| Variables | Tchaourou | | Parakou | | N'Dali | | Together | |
|---|---|---|---|---|---|---|---|---|
| | Moy | Std | Moy | Std | Moy | Std | Moy | Std |
| Age # | 35,93 | 9,68 | 45,26 | 11,29 | 34,78 | 7,67 | 37,9 | 10,41 |
| Household Size # | 5,9 | 2,15 | 7,04 | 4,62 | 5,98 | 3,69 | 6,22 | 3,49 |
| Experience # | 13,08 | 7,73 | 15,28 | 10,04 | 13,1 | 7,2 | 13,65 | 8,24 |
| Farm Income # | 718299 | 580887,3 | 1245474 | 258874,6 | 2444546 | 419511,6 | 1463463 | 293159,7 |
| Religion: Catholic | 0,32 | 0,47 | 0,42 | 0,49 | 0,07 | 0,26 | 0,26 | 0,44 |
| Religion: Muslim | 0,66 | 0,47 | 0,56 | 0,49 | 0,92 | 0,26 | 0,73 | 0,44 |
| Marital status: Married | 0,8 | 0,4 | 0,96 | 0,17 | 0,9 | 0,28 | 0,88 | 0,32 |
| Educational Level: None | 0,01 | 0,11 | 0,01 | 0,1 | 0,06 | 0,23 | 0,02 | 0,16 |
| Educational Level: Elementary | 0,08 | 0,28 | 0,1 | 0,3 | 0,23 | 0,42 | 0,14 | 0,35 |
| Level of education: Secondary | 0,76 | 0,42 | 0,72 | 0,44 | 0,6 | 0,49 | 0,69 | 0,45 |
| Level of education: University | 0,13 | 0,33 | 0,15 | 0,36 | 0,12 | 0,32 | 0,12 | 0,32 |
| Organization Membership | 0,21 | 0,41 | 0,61 | 0,49 | 0,18 | 0,38 | 0,3 | 0,46 |
| Main activity: trade | 0,02 | 0,14 | 0,00 | 0,00 | 0,01 | 0,12 | 0,01 | 0,11 |
| Main activity: Livestock farming | 0,06 | 0,24 | 0,02 | 0,14 | 0,00 | 0,08 | 0,03 | 0,17 |
| Main activity: agricultural production | 0,81 | 0,38 | 0,96 | 0,17 | 0,96 | 0,19 | 0,9 | 0,29 |
| Access to Land: Legacy | 0,93 | 0,25 | 0,28 | 0,45 | 0,81 | 0,39 | 0,72 | 0,44 |
| Access to land: Borrowing | 0,48 | 0,5 | 0,66 | 0,47 | 0,18 | 0,39 | 0,42 | 0,49 |
| Access to Land: Purchase | 0,06 | 0,24 | 0,1 | 0,3 | 0,06 | 0,25 | 0,07 | 0,26 |

# Quantitative variables **Source**: Field survey (2025)




Source: Authors (2025)

**Figure 3. Contribution of variables to classification**




Source: Authors (2025)

**Figure 4. Representation of respondent classes**

**Class 1: Young farmers with low levels of microcredit :** The first class (made up of 161 individuals) is distinguished by a relatively young age (35 years on average) and 10.5 years' experience in agriculture, which reflects a certain professional youth. Their level of education is modest, on average lower than in other classes, and the rate of membership of a professional agricultural organization in this class is very low. This institutional marginality significantly limits their access to resources and opportunities, particularly in terms of financing. Indeed, this class has a very low rate of access to credit, and the amounts requested are also the lowest since they are not used to obtaining credit. Agricultural incomes, both from maize and from all agricultural activities, remain low. It is therefore a socially and economically vulnerable group. These are farmers who are poorly informed about access to credit from microfinance institutions.

**Class 2: Experienced, well-integrated farmers and microcredit beneficiaries:** The second class includes 57 individuals who are the oldest (42.9 years old on average) and most experienced (16.4 years old) farmers. This group also has the highest level of financial education among the three classes. These are farmers who are highly integrated into the support schemes because their membership of the OPAs is strong (0.88). This institutional inclusion is reflected in their almost universal access to microcredit (0.99), as well as in the relatively large amounts they request. They also enjoy the highest agricultural incomes, and have better access to land, both through purchase and inheritance. This class seems to be full of the "ideal" beneficiaries of microcredit schemes: experienced producers, collectively organized, and able to leverage financial services to improve their economic performance.

**Class 3: Intermediate farmers oriented towards diversification:** The class is composed of 154 individuals. It is also made up of young farmers (35.6 years), with an intermediate level of education and agricultural experience (13.8 years). These producers are distinguished by a very low membership of takeover bids (0.01). Like those in class 1, there was institutional isolation. Most do not have agriculture as their main activity, which could indicate diversification or a move away from traditional agriculture. They are oriented towards either trade or breeding. Access to microcredit remains limited (0.34), although higher than the level of class 1. Similarly, the income and the amounts of credit requested are of an intermediate level. This group could represent a strategic target for microfinance institutions wishing to expand their reach: young, dynamic farmers, but still under-integrated and under-funded, with potential for progress if adequate support is offered to them.

**Determinants of access to microcredit:** The determinants of access were identified according to the different classes obtained from the CAH. The results of the multinomial logit model are reported in Table 4.

**Table 4. Determinants of the adoption of access to microcredit: Result of the Logit multinomial model**

| Variable | Description | Classe 2 | | Classe 3 | |
|---|---|---|---|---|---|
| | | Coef | dxdy | Coef | dxdy |
| AGE | Age of the maize farmer | 0.02 | - 0.00 | 0.00 | 0.001 |
| FINEDUC | Level of financial education | 1.58*** | 0.17 | - 2.36*** | - 0.63 |
| APPARTOPA | Membership of a group/association | 3.39*** | 0.20 | 1.03*** | 0.14 |
| TAILLMENAGE | Household size | - 0.02 | -0.001 | 0.01 | - 0.00 |
| SUPMAIS | Maize acreage | - 0.01 | 0.002 | -0.15** | - 0.03 |
| RMAIS | Maize income | 0.00 | -4.70e-09 | 0.00 | 5.32e-08 |
| RAGRICOLE | Farm income | - 0.00 | -8.26e-09 | 0.00 | 1.91e-08 |
| _cons | Constant | -3.956 | | 0.903 | |
| Log likelihood = -255.953; LR chi2(16) = 244.92; Prob > chi2= 0.000, **, ***: significance level at 5 %, 10 % and respectively. Coef : Coefficient ; dydx : Marginal effect; class 1 : Modality of reference | | | | | |

Source: Field survey (2025)

It appears that the model is globally significant at the 1% threshold (Prob > chi2 = 0.000), which shows that all the explanatory variables make a significant contribution to explaining the level of access to microcredit. The variable level of financial education has a very significant influence on both classes 2 and 3. For class 2, the marginal effect is 0.17, which means that improved financial education increases the probability of ending up in class 2. Conversely, for class 3, the marginal effect is negative (dxdy = -0.63). Thus, a high level of financial education greatly reduces the probability of belonging to class 3. In addition, membership in a farmers' organization reveals positive and significant coefficients in the two classes respectively. This indicates that membership in a take-over bid significantly increases the likelihood of being a member of Class 2 or Class 3 rather than the reference class. For corn acreage, the effect is not significant for Class 2 (p>0.1). On the other hand, for class 3, the coefficient is negative and significant at the 5% threshold (dxdy = -0.03). This means that the more corn area is grown, the less likely the producer is to belong to Class 3 compared to the reference class. These results show that financial education and membership in a peasant organization are major determinants in class differentiation. The result on financial education reflects the fact that human capital influences the choices of access to microcredit. Membership in a takeover bid favours membership in classes 2 and 3 because one of the roles of farmers' organisations is to disseminate information and strengthen the bargaining power of members, which would have made it possible to join the credit. Maize acreage is a distinguishing factor, reducing the likelihood of being in Class 3, suggesting that producers with larger acreages tend to have an intermediate level in access to credit.

# DISCUSSION

The results of this study show three distinct profiles of farmers according to socio-demographic and economic characteristics and access to services. These are respectively young farmers who are poorly integrated into microcredit schemes, experienced farmers, well integrated and beneficiaries of microcredit, and intermediate farmers oriented towards diversification. These classes emerge from the differentiated dynamics of integration of agricultural households into financing mechanisms and mainly in access to credit. These are poorly integrated producers with little access to credit. Their profile reflects increased vulnerability, often reported in the literature on rural youth in West Africa, who face land tenure insecurity and financial exclusion (Yeboah and Jayne, 2020). The class of established and financially connected producers, better integrated into formal networks and benefiting from better access to credit, refers to the results of Dossou et al. (2020), which highlight the central role of seniority and social networks in access to rural credit and productive resources. These farmers also have a large household size and a larger agricultural area, illustrating their relatively dominant position in local production chains. Regarding smallholders with a gradual transition in class 3, characterized by intermediate access to support schemes and a certain dynamism in terms of diversification, the observations of Bationo et al. (2017) insist on the rise of a segment of farmers in transition, potentially drivers of generational renewal in rural areas, but still held back by structural barriers. The main determinants of access to microcredit include financial education, membership in a farmers' organization and the area of maize planted. (35) have shown that financial education is systematically associated with better access to credit. It has significantly increased farmers' access to subsidized credit programs. A moderate level of financial literacy is the key to credit affordability (36). In addition, financial literacy significantly improves farmers' ability to stay in credit systems, as indicated by studies by Daemane and Muroyiwa (2022). Similarly, membership in farmers' organizations improves the capacity for collective bargaining, resource sharing and stronger social networks. Research in Benin indicates that membership in a cooperative can increase access to credit by up to 31% (6.38). However, persistent barriers such as high interest rates and a lack of collateral still limit the effectiveness of these benefits. Membership in a producer organization facilitates access to credit, as these groups often offer collective bargaining power and resources although they are not always able to provide quality services (Oyedele and Akintola, 2012). In addition, large producers specializing in a given crop have the facility to acquire microcredit. A study of young tomato farmers in the Ruzizi plain (Democratic Republic of Congo) showed that farm size is positively associated with access to credit, with land serving as a credible collateral for financial institutions (40). Similarly, (41) it appears that farmers with access to credit have much larger areas on average, but they emphasize the question of land ownership much more. Thus, comprehensive policies to strengthen financial management, cooperative structures, access to land and reforms in the credit system can make microcredit more inclusive and accessible. The need to introduce financial education programmes to improve access to credit is highlighted. In addition, farmers outside the designated areas for credit programs often face exclusion, which limits their access to the necessary financial resources. Urago and Bozoğlu (2022), in examining the impact of access to credit for agriculture, highlight factors that are favourable to access to credit, but highlight that the government needs to support microfinance institutions in order to provide credit to farmers.

# CONCLUSION

This research made it possible to identify, from a multivariate approach combining principal component analysis (PCA) and hierarchical ascending classification (HAC), the typology of respondents in relation to the determinants of access to microcredit. Three distinct profiles emerged. The first class is that of poorly integrated producers with little access to credit, the second group includes established and financially connected producers, and then the Smallholders with a gradual transition in the third class. The key variables that contributed to this

classification were: financial literacy, maize acreage, and farm income. Taking this diversity into account as well as the determinants would be an asset for adapting policies to support family farming.

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