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Financial Literacy in Contexts of Vulnerability: Determinants Among Women Horticulturists in Guinea-Bissau

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Abstract

Financial literacy plays a crucial role in promoting social and economic resilience, particularly in vulnerable contexts where access to education and financial services is limited. This study provides the first empirical analysis of the determinants of financial literacy among women horticulturists in Guinea Bissau in West Africa, a group that sustains household income and local markets through informal work. A survey with face-to-face data collection was employed, using a structured questionnaire to assess financial literacy across three dimensions: financial attitude, financial behavior, and financial knowledge. All 978 women horticulturists at the Pessubé Farm were invited to participate in the survey, and 200 valid questionnaires were returned and used as the final sample. Data were analyzed using descriptive statistics and multiple linear regression. Results revealed prudent and consistent financial behaviors, mid to low financial attitudes marked by concern about expenses and short-term planning, and limited conceptual financial knowledge, with frequent uncertainty on basic topics such as inflation, interest, and diversification. Regression analysis showed that financial satisfaction and food sufficiency are positively associated with higher levels of financial literacy, while overdue debts exert a negative effect. These findings highlight that strengthening financial literacy in low income and informal settings requires context sensitive strategies integrating financial education, debt management, and food security initiatives, emphasizing the multidimensional nature of financial literacy and its role in inclusive and sustainable development.

Keywords: financial literacy; determinants; women; vulnerability

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1. Introduction

Financial literacy is a fundamental aspect of individuals' daily lives, particularly in an increasingly complex financial environment. Klapper and Lusardi (2020) emphasize the importance of individuals being financially literate so they can make informed decisions regarding savings, investments, borrowing, and other key financial matters. Conceptually, financial literacy is defined by Nogueira et al. (2025) as a term that encompasses a wide range of evolving skills and knowledge, shaped by the emergence of new investment alternatives and financial products. Complementing this perspective, Gallegos et al. (2025)

argue that financial literacy refers to the ability to understand and apply financial concepts in concrete actions. For these authors, the construct comprises both financial understanding, which is acquired knowledge, and the application of that knowledge, which enables individuals to make sound financial decisions. In this study, our theoretical approach to financial literacy follows the definition proposed by the Organisation for Economic Co-operation and Development (OECD, 2024), which conceptualizes financial literacy as a combination of financial behavior, financial knowledge, and financial attitude.

Given the established importance of financial literacy, the academic literature has devoted particular attention to the factors that influence its level and development. Numerous studies highlight the significant influence of various determinants on financial literacy. Married individuals, for example, generally display higher levels of financial literacy (Dewanty & Isbanah, 2018; Gupta & Negi, 2014; Kadoya & Khan, 2020). The relationship with age is more complex. While some studies suggest that financial literacy tends to decrease with age (Sekti et al., 2023), a substantial body of research indicates an inverted U-shaped relationship, in which financial literacy is lower among younger individuals, peaks in middle age, and declines again among older adults (Kadoya & Khan, 2020; Finke et al., 2017).

With respect to education, it is consistently identified as a factor that positively contributes to financial literacy (Bannier & Schwarz, 2018; Karakurum-Ozdemir et al., 2019; Santini et al., 2019; Zhou et al., 2023). Findings regarding the number of dependents, however, remain inconclusive. A. C. G. Potrich et al. (2015) and Mottola (2013) report higher financial literacy among households with fewer dependents, whereas other studies such as Gonzalvo and Avila (2019) suggest that the number of dependents may not be significantly related to financial literacy. Gender also emerges as a determinant, with women exhibiting lower levels of financial literacy compared to men (A. C. G. Potrich et al., 2013; Böhm et al., 2023).

In addition to these factors, recent studies have also examined determinants related to financial vulnerability and financial well-being. Higher levels of indebtedness are generally associated with lower financial literacy, particularly due to difficulties in understanding credit conditions (Lusardi & Tufano, 2015; Disney & Gathergood, 2013). Access to financial or governmental assistance has likewise been explored, as such support may influence household financial practices in contexts of resource scarcity (Eleoran et al., 2023; Natali et al., 2016). Other studies highlight the role of food security, with evidence that greater household food sufficiency is linked to more stable financial behaviors (Carman & Zamarro, 2016; Millimet et al., 2015; Twumasi et al., 2023). Behavioral elements such as expense control and financial satisfaction also emerge as relevant determinants, as higher perceptions of financial satisfaction may be associated with more positive financial behaviors and outcomes, along with effective budgeting practices (A. C. G. Potrich et al., 2016; Xiao et al., 2013).

This study therefore seeks to answer the following question: what are the determinants of financial literacy among women horticulturists in Guinea-Bissau? To address this question, the study examines these determinants among women horticulturists in Guinea-Bissau, West Africa. Although the literature investigating the relationship between various determinants and financial literacy is extensive, it is largely concentrated in developed and developing countries. As highlighted by Kumar (2025) in a comprehensive literature review, there is a clear absence of studies on financial literacy in least-developed and highly vulnerable countries. Our work underscores this gap by demonstrating that the instruments commonly used to assess financial literacy in most countries are not necessarily effective in contexts of severe vulnerability, such as Guinea-Bissau. A deeper understanding of how these determinants shape financial literacy across diverse geographic and social contexts,

combined with recognition of the lack of studies in this group of countries, particularly in Africa, is essential for the development of appropriate measurement tools and for designing policies aimed at improving financial literacy in such settings.

Accordingly, this study contributes to the discussion by expanding the debate on women's financial literacy, which remains lower than that of men, particularly in an underexplored and fragile context such as Guinea-Bissau (World Bank Group, 2025). Guinea-Bissau ranks among the thirty poorest countries in the world when considering GDP per capita (International Monetary Fund, 2025). Therefore, our study contributes to assessing the impact of the analyzed variables in a country of extreme vulnerability, serving as a basis for examining behavioral patterns in nations with similar conditions, particularly on the African continent. While acknowledging that each country presents its own specificities, this study brings us closer to an example grounded in a reality comparable to that of other vulnerable countries. Moreover, the women who cultivate horticultural crops in these fields are, for the most part, mothers and often the primary earners in their households, frequently serving as the sole source of family income.

In addition, this activity extends beyond household subsistence, supplying local markets and contributing to the national economy. Given this context, investigating the financial literacy of these women offers a meaningful contribution both to society and to the country. Consequently, this research may serve as a valuable reference for policymakers, providing evidence grounded in an unexplored reality and focused on a socially significant yet frequently overlooked group, namely Guinean women horticulturists, based on an unprecedented study assessing their financial literacy.

2. Literature Review

2.1. Fundamental Concepts of Financial Literacy

Broadly speaking, financial literacy involves both the mastery of basic financial concepts and the ability to apply them in concrete situations, enabling more informed decision-making in order to improve the financial well-being of individuals in society (Brito et al., 2024; OECD, 2024). It is not merely a matter of possessing financial concepts, but rather of using this knowledge in personal finance management, future planning, and conduct regarding risks and economic changes.

From this perspective, L. S. Silva et al. (2018) highlight that financial literacy manifests itself when the individual employs financial knowledge to control and manage their finances, taking advantage of market opportunities and increasing efficiency in resource management. Aligning with this view, this study adopts the definition by Potrich et al. (2025), based on the OECD (2024), according to which financial literacy encompasses three articulated dimensions: financial knowledge, attitude, and behavior.

The first dimension, financial knowledge, refers to the conceptual understanding of finance that allows for the interpretation and evaluation of economic situations. Świecka et al. (2019) argue that this knowledge fosters more appropriate decisions in contexts of uncertainty and/or financial problems, while Huston (2010) identifies four essential components: basic knowledge of money, savings and investment, borrowing, and protection mechanisms. The OECD (2011), in turn, determines five fundamental concepts that comprise this dimension, namely: simple interest, compound interest, the time value of money, the effect of inflation on prices, and the effect of inflation on financial returns. In summary, the financial knowledge dimension corresponds to "knowing," that is, the cognitive repertoire that supports the other dimensions.

The second dimension, financial attitude, relates to the values, beliefs, and predispositions that guide how the individual perceives financial decisions (Cardoso, 2018). According to the author, the nature of attitudes, which can be economic or non-economic,

reflects beliefs internalized throughout life. Atkinson and Messy (2012) demonstrate that individuals with negative attitudes regarding the future tend to save less. Similarly, the authors show that those who prioritize short-term desires display less willingness to build emergency financial reserves or adopt long-term financial plans. Thus, financial attitude functions as the "wanting to do," directly influencing the disposition to act in a financially responsible manner.

The third dimension, financial behavior, corresponds to the effective daily practice of financial management, reflected in actions related to money management and the application of knowledge and skills, such as spending control, regular saving, comparing prices, and seeking information before making decisions (Mancone et al., 2024). This dimension translates acquired values, attitudes, and knowledge into practice, constituting the "doing," and is crucial for measuring financial literacy as it encompasses the knowledge and attitudes adopted in the previous dimensions. Furthermore, studies point out that financial behavior is influenced by the family context, where individuals exposed to positive financial management models tend to exhibit more appropriate practices in adulthood (Mancone et al., 2024).

The literature further indicates that financial literacy significantly impacts individual and collective economic well-being. Agarwal et al. (2015) state that understanding financial concepts and mechanisms allows for more conscious decisions, while Świecka et al. (2020) highlight that societies with higher financial literacy present better economic indicators, especially among youth, contributing to sustainable development.

Although the literature recognizes the importance of financial literacy, there is still no consensus on how to measure it. Van Hove and Ahunov (2024) demonstrate that different metrics can yield substantially different conclusions, indicating that basing financial literacy measurement on a single construct is insufficient. In response to this limitation, various authors have proposed their own instruments, combining multiple dimensions.

In this study, three dimensions are adopted for measuring financial literacy: financial knowledge, financial attitude, and financial behavior. Vieira et al. (2021) propose evaluating financial attitudes using items on a five-point Likert scale, ranging from "strongly disagree" to "strongly agree." For financial behavior, the authors also propose assessment via seven items on a five-point Likert scale designed to capture the frequency of daily actions, with responses ranging from "never" to "always." Financial knowledge, according to Vieira et al. (2020), is frequently measured with multiple-choice questions organized into increasing levels of difficulty: basic, intermediate, and advanced. Complementary, this study incorporates three multiple-choice questions internationally recognized in the literature as the "Big Three," proposed by Lusardi and Mitchell (2011), which assess key concepts of compound interest, inflation, and risk diversification, widely used in international comparative studies.

Taken together, the dimensions of financial knowledge, attitude, and behavior show that financial literacy is a multidimensional construct, articulating the "knowing," the "wanting to do," and the "doing." Thus, financial knowledge provides the cognitive repertoire to interpret financial situations; attitudes guide preferences, values, and perceptions about the future; and behavior results from the daily practice that translates these elements into concrete actions. This conceptual integration lays the groundwork for the following section, in which the factors associated with financial literacy are discussed, covering socioeconomic and demographic characteristics, as well as behavioral and financial well-being elements.

2.2. Determinants of Financial Literacy

The literature shows that financial literacy is not uniformly distributed across individuals; rather, it is shaped by characteristics that influence both access to financial information and the conditions necessary for transforming knowledge into attitudes and behaviors. Based on the definition adopted in this study, which conceptualizes financial literacy as the combined outcome of financial knowledge, financial attitude, and financial behavior, this section presents a targeted review of the literature related to the variables that will be empirically tested. The aim is to identify the patterns, contradictions, and explanatory mechanisms discussed in previous research.

Existing studies indicate that sociodemographic and economic-financial characteristics influence financial literacy levels, either facilitating or limiting the development of the skills required for its consolidation (Ansong & Gyensare, 2012; Bulian et al., 2022). Guided by these findings, this section examines the specific variables included in the present study and summarizes the main points of consensus and divergence identified in the literature. Accordingly, the following determinants are discussed: gender, age, marital status, number of dependents, indebtedness, receipt of financial or government assistance, food security, expense control, and financial satisfaction.

Among the variables examined, gender is one of the most frequently investigated and presents relatively consistent findings. Most studies show that men tend to exhibit higher levels of financial literacy compared to women (Böhm et al., 2023; Arceo-Gómez & Villagómez, 2017; A. C. G. Potrich et al., 2022; Świecka et al., 2020). According to the authors, part of this disparity may be associated with sociocultural factors, such as differences in financial socialization and unequal exposure to economic information, while another part may result from methodological effects. A. C. G. Potrich et al. (2022) observed that women tend to select the "I don't know" option more frequently, which artificially widens the gap between groups. Thus, gender remains a relevant determinant in the discussion on financial literacy, with potential implications across all three dimensions.

Banerjee and Roy (2020) analyzed disparities in financial literacy between male- and female-headed households, considering the level of exposure to mass media as an endogenous determinant of financial literacy. Their research was conducted in selected villages in rural West Bengal, India, where the authors examined how access to and use of these media influence participants' financial knowledge. The results revealed that male heads of household are significantly more financially literate and rely on mass media more frequently than women who occupy the same role. According to the authors, this difference in exposure and use of informational resources directly affects levels of financial literacy. These findings indicate that greater male exposure to financial information helps strengthen both financial knowledge and financial behavior, demonstrating how sociocultural differences in access to information reinforce the gender inequalities observed in financial literacy.

In the study conducted by Potrich et al. (2024), gender differences in financial literacy were examined both between and within generations, based on a sample of 2888 questionnaires applied across different regions of Brazil. The authors investigated how financial knowledge is distributed among men and women throughout the generational cycle. The results indicated that women exhibit lower levels of financial literacy compared to men, and this difference remains statistically similar across the generations analyzed. Furthermore, Generation Z (ages 18 to 26) demonstrated lower financial literacy levels when compared to Generations Y (ages 27 to 41) and X (ages 42 to 56), reinforcing patterns of inequality related to both gender and age in the Brazilian context. These findings suggest that structural gender inequalities are reproduced across generations, indicating that persistent sociocultural factors may hinder the development of financial literacy among women.

Given this context, although gender is widely examined in the literature and is generally associated with higher financial literacy among men, this study does not aim to test this relationship. This is because the sample is composed exclusively of women, which prevents cross-gender comparisons. Even so, the consistent evidence that women tend to present lower financial literacy levels provides important context for interpreting the results, particularly when assessing the overall level of financial literacy observed in this sample.

Beyond the differences observed across gender and generations, age on its own is another important factor in understanding levels of financial literacy. Several studies point to an inverted U-shaped relationship, in which financial literacy tends to be lower among younger individuals, reaches its peak in middle age, and declines again in older adulthood. Kadoya and Khan (2020) identified this pattern by showing that financial literacy increases with age up to a certain point and then begins to fall. Within this framework, middle-aged individuals demonstrated the highest levels of financial literacy, while older adults, despite the decline, still exhibited higher scores than younger respondents. Supporting this trend, Finke et al. (2017) found that financial literacy scores decrease by approximately one percentage point per year after the age of sixty.

However, other studies suggest different patterns. In a study involving farmers in Indonesia, Sekti et al. (2023) observed a progressive decline in financial literacy as age increased. The authors attributed this result to the difficulties individuals over forty-five face in understanding financial concepts such as calculations, interest rates, inflation, time value of money, and money illusion. These findings reinforce the idea that the effect of age on financial literacy may vary according to cultural, professional, geographical, and informational factors. Overall, the results indicate that the relationship between age and financial literacy reflects both the accumulation of life experience and the gradual decline of cognitive abilities in older age. Additionally, the connection between age and literacy may also be influenced by the information opportunities available in each social context, which helps explain why different patterns emerge across countries and occupational groups.

Marital status presents divergent results in the literature. Some studies suggest that this variable does not exert a significant influence on financial literacy, while others identify that married individuals tend to display higher levels compared to those who are single. Dewanty and Isbanah (2018), for example, analyzed financial literacy among women in Indonesia and found no differences between single and married participants. Similarly, the study by Kadoya and Khan (2020), which examined the determinants of financial literacy in Japan, also reported no association between marital status and financial literacy levels.

In contrast, other studies have identified positive effects of marriage on financial literacy. Gupta and Negi (2014) observed that married individuals exhibit higher levels of financial literacy compared to single individuals. According to the authors, this may occur because married people tend to be more concerned with financial planning and are generally more attentive to both current and future economic needs, while single individuals place less emphasis on these aspects. Comparable findings were reported in a study conducted in Brazil by I. L. M. Silva and Ribeiro (2025), which concluded that financial literacy levels are higher among married individuals or those in stable unions compared to those who are single.

These divergences suggest that the impact of marital status may depend on the social and cultural context analyzed, as well as on the financial responsibilities assigned to each individual within the household. Therefore, the relationship between marital status and financial literacy may not be universal but rather sensitive to the economic and cultural dynamics of each group studied.

Having dependents also presents mixed evidence. Some studies show that families with fewer dependents display higher levels of financial literacy (Mottola, 2013; A. C. G.

Potrich et al., 2015), possibly because they have greater flexibility for financial planning and face less economic pressure. In contrast, Gonzalvo and Avila (2019) found no significant association between the number of dependents and financial literacy. Given the inconclusive nature of the literature, the present study seeks to evaluate the direction of this relationship empirically.

Among the variables selected, education presents the most consistent evidence in the literature. Most studies indicate a positive relationship between educational attainment and financial literacy, with individuals who have higher levels of formal schooling tending to exhibit greater financial literacy. Karakurum-Ozdemir et al. (2019), Santini et al. (2019), and Bannier and Schwarz (2018) found that education exerts a positive and significant effect on financial literacy across different international contexts. Similar results were reported by Agarwal et al. (2015), who observed that the probability of answering all financial literacy questions correctly increases with higher levels of education, particularly among men, although women also benefit from educational gains, albeit to a lesser extent.

More detailed evidence is provided by Zhou et al. (2023) in their study on the relationship between education and financial literacy in China. The authors found that each additional year of schooling increases the financial literacy score by 0.097 point, representing approximately 7.13 percent of the sample mean. This result reinforces the importance of formal education in the development of financial competencies. Complementarily, Ćumurović and Hyll (2019) highlight that maternal education also has strong predictive power for individuals' financial literacy, suggesting a possible intergenerational effect of educational attainment.

Additionally, Santini et al. (2019) conducted a meta-analysis that consolidated this body of evidence, showing that the positive association between education and financial literacy remains robust across different countries and methodological approaches. The literature is therefore largely convergent regarding education, underscoring its fundamental role in shaping financial skills and justifying its inclusion among the variables analyzed in the present study.

Beyond traditional sociodemographic variables, recent literature has expanded its focus to include factors related to economic vulnerability and financial well-being. Within this context, indebtedness emerges as a central element. Numerous studies show that higher levels of debt are associated with lower financial literacy, particularly regarding financial knowledge and financial behavior, since difficulties in interpreting interest rates, repayment terms, and financial costs tend to contribute to unfavorable financial decisions (Lusardi & Tufano, 2015). In their study conducted in the United States, Lusardi and Tufano (2015) found that debt literacy is low, especially among specific groups such as women, the elderly, ethnic minorities, and divorced or separated individuals. The authors also demonstrate that limited understanding of debt is linked to inadequate financial behaviors, including the use of more expensive forms of credit and decisions that increase indebtedness.

Additionally, Disney and Gathergood (2013) identified a strong inverse relationship between indebtedness and financial literacy. They observed that individuals who rely more frequently on consumer credit tend to exhibit lower levels of financial literacy. Furthermore, according to scarcity theory, proposed by Shah et al. (2015), indebtedness can affect cognitive processes and, as a result, the development of financial competencies. The authors argue that financial scarcity consumes a substantial portion of one's "cognitive bandwidth," the mental capacity available for reasoning, planning, and learning. In this sense, indebtedness intensifies the perception of scarcity by generating constant worry, time pressure, and urgent payment demands, thereby reducing the attention and mental resources needed for learning activities.

For these reasons, this study examines whether having overdue debts negatively influences financial literacy. This relationship may arise because indebted individuals tend to have part of their cognitive capacity compromised, affecting how they process financial information and limiting the acquisition of new knowledge, including that required for financial literacy.

Another variable considered in this study is access to financial and/or government assistance. By incorporating this variable, we seek to examine whether the receipt of additional resources is associated with changes in household financial organization, budgeting practices, and decision-making capacity under economic constraints, all of which relate to the dimensions of financial behavior and financial capability. Among the studies aligned with this perspective is the investigation conducted in the Philippines by Eleoran et al. (2023), which analyzed the relationship between the 4Ps cash transfer program and the financial literacy of its beneficiaries. Although the correlational design does not allow the authors to claim that the assistance directly causes higher financial literacy, they identified a significant association: individuals with higher levels of financial literacy tend to understand the program better, evaluate it more positively, and use the transfers more strategically. Thus, the study suggests that financial literacy shapes how assistance is perceived and managed, and that transfer programs may create opportunities to develop practical financial literacy skills by exposing beneficiaries to more frequent economic decisions.

Complementary evidence emerges in contexts where financial assistance acts primarily as a mechanism for easing liquidity constraints. In the study by Natali et al. (2016) in Zambia, the authors examined the impact of unconditional transfers to rural women and observed substantial changes in financial behavior, especially regarding saving and reinvestment. Beneficiaries significantly increased their financial reserves and expanded their participation in productive activities, suggesting that regular access to assistance can promote more structured economic management practices. The study also shows that these effects were stronger among women who initially had lower decision-making power, indicating that the assistance served as a resource capable of expanding financial autonomy even in settings with limited financial inclusion. Although not focused directly on financial literacy, the study documents changes in behavioral dimensions such as planning and the strategic use of resources. Moreover, the increase in savings was greater among women with lower baseline decision-making power, suggesting that the transfers played a leveling role, enabling those with less autonomy to accumulate capital and engage more actively in economic decisions.

Similar findings were reported by Stoeffler et al. (2019), who examined a program in Niger combining small, regular cash transfers with incentives for participation in rotating savings groups (tontines). The authors documented a sustained increase in savings, strengthened participation in savings groups, and growth in productive assets, particularly livestock, with effects that persisted even after the program ended. The causal mechanism identified involves reducing liquidity constraints and reinforcing regular saving practices, which supported long-term investment decisions. Although the study does not explicitly address financial literacy, the observed behaviors (saving, planning, and investing) are consistent with skills commonly associated with financial literacy.

Differing from these studies focused solely on cash transfers, the present study examines the receipt of support that also includes productive inputs and other non-monetary resources among women horticulturists in Guinea-Bissau. Despite this difference, the reviewed literature provides a relevant framework for interpreting the results, as both types of assistance share a common objective: increasing the resources available to vulnerable families and reshaping their capacity for financial planning and management. Although the specific mechanisms may differ, either through increased liquidity in the case of cash

or greater productive capacity in the case of inputs, the literature suggests that such interventions can influence important financial practices. Based on this, we hypothesize that receiving government assistance, even in the form of productive inputs, is associated with higher levels of financial literacy among women horticulturists, as it reduces barriers to economic planning and encourages more active resource management.

Another central element in this study is food security or food sufficiency, which exhibits a bidirectional relationship with financial literacy. Part of the literature argues that individuals with higher levels of financial literacy tend to experience greater food security, since improved planning and resource management promote stability in access to food. Empirical evidence shows that even among low-income households, higher levels of financial literacy are associated with a lower likelihood of food insecurity (Carman & Zamarro, 2016; Millimet et al., 2015; Twumasi et al., 2023).

Millimet et al. (2015), analyzing clients of food banks in Texas, one of the most vulnerable groups in American society, found that financial literacy exerts a significant causal effect on food security. Households with higher levels of financial literacy, particularly in terms of financial behavior, were more likely to achieve food security. A noteworthy finding of the study is that food insecurity is not necessarily associated with poverty, as many households above the poverty line displayed higher levels of food insecurity than those below it. According to the authors, access to more financial resources alone is insufficient to guarantee food security, which reinforces the central role of financial literacy, especially practices related to budgeting and household financial management.

Similar results were reported by Twumasi et al. (2023) among Ghanaian families, where higher financial literacy was associated with greater capacity to budget, save, and make consistent financial decisions, thereby increasing household food security. Complementing this, Carman and Zamarro (2016), analyzing a national sample of Americans with annual incomes below 50,000 dollars, showed that food insecurity is less related to poverty and more to the lack of basic financial knowledge. The authors also found that cognitive factors such as schooling and reasoning ability influence both financial literacy and food security simultaneously, suggesting that both outcomes may stem from shared individual resources.

Taken together, these studies demonstrate the central role of financial literacy in promoting food stability, particularly among vulnerable populations. In the context of the present study, however, we begin from the opposite direction, since food sufficiency can reduce daily financial pressure and alleviate economic stress. Individuals with greater food security may be better equipped, both materially and psychologically, to develop consistent financial practices. This occurs because, according to Maslow's (1943) hierarchy of needs, when physiological needs are met, individuals can shift attention to higher-order competencies such as financial management. Accordingly, we investigate whether higher levels of food sufficiency are associated with higher levels of financial literacy among the women horticulturists examined in this study.

In addition to the sociodemographic characteristics examined, the literature indicates that behavioral and economic-financial factors also influence financial literacy. These factors relate not only to individuals' material conditions but also to the strategies they employ to manage their resources, organize their budgets, and cope with daily financial pressures. Two variables are particularly relevant to this discussion: expense control and financial satisfaction. Together, they capture both practical and subjective dimensions of economic behavior, expanding the understanding of the mechanisms associated with financial literacy.

Expense control is one of the financial behaviors most frequently addressed in the literature on financial literacy. Studies show that individuals who monitor their spending, record expenses, or follow a budget are more likely to adopt positive financial behaviors.

According to A. C. G. Potrich et al. (2016), adequate financial management, which involves tracking income and expenses, planning the use of resources, and making consistent decisions, represents one of the core objectives of financial literacy and is directly linked to economic well-being. Expense control therefore functions as a practical skill that connects financial knowledge to everyday actions, mediating its relationship with practices such as saving, reducing debt, and planning for the future.

Lusardi and Mitchell (2014) reinforce this perspective by arguing that expense control manifests both in day-to-day financial management and in individuals' capacity to deal with debt. For the authors, failures in expense control help explain negative financial behaviors related to credit use, such as exceeding limits, missing payments, or relying on more expensive forms of borrowing, patterns more prevalent among individuals with lower financial literacy.

Research with vulnerable populations also shows that expense control is associated with greater financial stability and lower food insecurity. Twumasi et al. (2023) demonstrate that systematically monitoring expenses facilitates the prioritization of essential spending and strengthens individuals' ability to budget and save, thereby reducing economic vulnerability. For these authors, practices such as planning and expense control are mechanisms through which financial literacy translates into stronger financial decisions, protecting households from situations of financial stress. Based on this evidence and consistent with the hypothesis to be tested in this study, we expect that individuals who control their expenses will exhibit higher levels of financial literacy.

Beyond observable financial behaviors, the literature also highlights that subjective factors, such as financial satisfaction, influence financial literacy. While expense control reflects concrete practices of managing resources, financial satisfaction captures an individual's perception of their own economic stability, which can affect motivation, engagement, and the capacity to apply financial knowledge. Xiao et al. (2013) define financial satisfaction as a subjective evaluation of an individual's economic conditions, contributing to the explanation of overall life satisfaction. The authors argue that financial satisfaction can be strengthened through the development of financial capability, particularly through positive behaviors such as planning and responsible use of resources, as well as through financial education, which enhances individuals' knowledge. Thus, people who engage in risky or inadequate financial behaviors tend to report lower levels of financial satisfaction, whereas positive behaviors are associated with higher perceived financial satisfaction (Xiao et al., 2013).

Although most of the literature examines the influence of financial literacy on financial satisfaction (Netemeyer et al., 2018; Brüggen et al., 2017), this study, by investigating the determinants of financial literacy, also considers the possibility of an inverse pathway in this relationship, grounded in psychological and behavioral mechanisms. Financially satisfied individuals tend to exhibit better psychological well-being (Owusu, 2023). In contrast, adverse psychological states or higher levels of stress are associated with poorer cognitive performance across multiple domains, including learning (Lindau et al., 2016), a particularly relevant aspect for financial literacy, which requires the assimilation and application of economic and mathematical concepts. Moreover, from the perspective of Bandura's (1977) Social Cognitive Theory, higher levels of financial satisfaction may strengthen perceived self-efficacy, fostering greater engagement, persistence, and openness to learning financial content. For these reasons, we propose testing whether financial satisfaction exerts an influence on financial literacy.

In sum, the reviewed literature shows that financial literacy is shaped by a broad and heterogeneous set of factors. Variables such as gender, age, marital status, number of dependents, education, indebtedness, and food security exert effects that vary according to social,

economic, and cultural contexts. This variation reveals both relatively consistent patterns, such as the positive influence of education, and results that are highly sensitive to the specificities of each group analyzed. Complementing these structural characteristics, behavioral and subjective elements such as expense control and financial satisfaction also emerge as relevant determinants, as they involve both the everyday practice of managing resources and the individual's perception of economic stability and security. These factors interact and reinforce one another, helping to explain how financial knowledge is internalized, applied, and translated into attitudes and behaviors aligned with financial well-being.

Considering this body of evidence, financial literacy appears to result from the combination of structural conditions, practical experience, and subjective perceptions that shape how individuals organize, plan, and manage their resources. Accordingly, we expect factors traditionally associated with access to information and economic stability, such as education, lower indebtedness, and higher food security, to be positively associated with financial literacy. Likewise, individuals who exercise greater control over their expenses and who perceive themselves as more financially satisfied are expected to exhibit higher levels of financial literacy. Finally, drawing on the literature on institutional support programs, we also hypothesize that receiving government assistance, even in the form of productive inputs, may be associated with higher levels of financial literacy, by easing material constraints and encouraging more active planning and economic management. These relationships will be tested empirically, as summarized in Table 1, which presents the variables considered and the expected direction of their effects.

Table 1. Summary of the study's hypotheses.

Explanatory Variable	Hypothesis	Rationale	Supporting References
Age	H1. Age negatively influences financial literacy.	Experience accumulates knowledge, but cognitive decline may reduce financial literacy as age increases.	Finke et al. (2017); Sekti et al. (2023)
Marital status	H2. Being married positively influences financial literacy.	Married individuals tend to show greater concern with financial planning and are usually more attentive to present and future economic needs.	Gupta and Negi (2014); I. L. M. Silva and Ribeiro (2025)
Dependents	H3. Having dependents negatively influences financial literacy.	Families with fewer dependents typically have greater room for planning and face less financial pressure.	Mottola (2013); A. C. G. Potrich et al. (2015)
Education	H4. Higher levels of education positively influence financial literacy.	Education increases knowledge and the ability to deal with financial information.	Karakurum-Ozdemir et al. (2019); Santini et al. (2019); Bannier and Schwarz (2018); Agarwal et al. (2015); Zhou et al. (2023); Ćumurović and Hyll (2019)
Debt	H5. Indebtedness negatively influences financial literacy.	Debt generates a sense of scarcity and mental overload. The reduction in "cognitive bandwidth" hinders information processing and limits the ability to learn new concepts.	Lusardi and Tufano (2015); Disney and Gathergood (2013)

Table 1. *Cont.*

Explanatory Variable	Hypothesis	Rationale	Supporting References
Government/ financial assistance	H6. Receiving assistance positively influences financial literacy.	Government programs may reduce material barriers to financial planning, promoting more positive financial behaviors.	Eleoran et al. (2023); Natali et al. (2016); Stoeffler et al. (2019)
Food security/food sufficiency	H7. Higher levels of food security positively influence financial literacy.	Food security may reduce daily financial pressure and relieve economic stress, enabling better conditions—material and psychological—for the development of more positive financial practices.	Carman and Zamarro (2016); Millimet et al. (2015); Twumasi et al. (2023)
Expense control	H8. Expense control positively influences financial literacy.	Individuals who monitor expenses, record spending, or follow a budget are more likely to adopt positive financial behaviors.	A. C. G. Potrich et al. (2016); Lusardi and Mitchell (2014); Twumasi et al. (2023)
Financial satisfaction	H9. Higher levels of financial satisfaction positively influence financial literacy.	Financially satisfied individuals tend to demonstrate greater self-efficacy, better planning, and more consistent financial practices—factors directly associated with financial literacy.	Owusu (2023); Lindau et al. (2016); Bandura (1977)

Based on the theoretical relationships and hypotheses presented in Table 1, Figure 1 provides a conceptual framework summarizing the expected effects of each determinant on financial literacy. The model integrates sociodemographic, economic, and behavioral variables and illustrates their hypothesized direction of influence on financial literacy, understood here as the combined construct of financial knowledge, attitude, and behavior. This visual representation supports the transition to the empirical analysis presented in the following section.

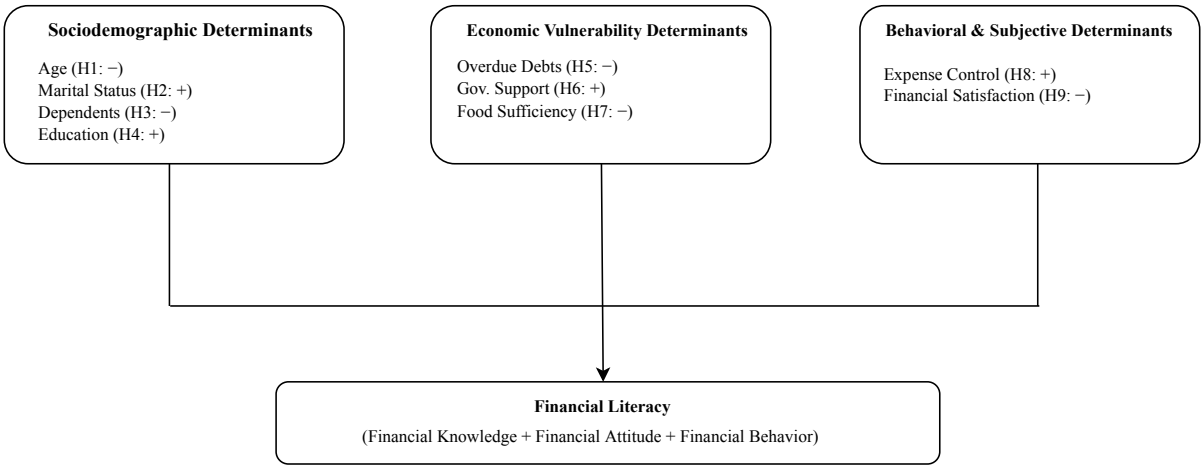


Figure 1. Conceptual framework of the determinants of financial literacy. Signs indicate the hypothesized direction of the effect: (+) positive association; (−) negative association.

3. Methods

This research is a descriptive study that employs a survey strategy using a structured questionnaire to systematically collect data on individuals, their preferences, and their behaviors. The study was submitted to the Brazilian National System of Information

on Ethics in Research Involving Human Subjects (SISNEP) to ensure the protection of participants' rights and compliance with ethical and legal standards. The project was approved under protocol number 84114124.2.0000.0121.

The study population comprises 978 women horticulturists from the Pessubé Farm in Guinea-Bissau, West Africa. This site was selected because it is the area with the highest concentration of women horticulturists in the country. The farm is organized into eight horticultural production groups, formed according to the number of women involved in the activity. This structure facilitates the logistical distribution of inputs and support initiatives provided by governmental or partner organizations. Among the resources supplied to the women are seeds, farming tools, and technical training. Additionally, the organization into groups allows for the designation of representatives responsible for sharing information and coordinating the distribution of materials, according to the specific needs and size of each production unit.

The decision to conduct this research with this population stemmed from the scarcity of studies on financial literacy within informal work contexts. In the case of Guinea-Bissau, this is the first study focusing specifically on women horticulturists. These women play a crucial role in sustaining their families and simultaneously contribute to the local economy by supplying the market with the products they cultivate.

Given the limited internet access in Guinea-Bissau and the restricted familiarity with digital tools among women horticulturists and much of the general population, the researchers conducted an in-person field study, assisting the women in completing the questionnaires. To ensure access to participants, the researchers approached the production groups during their regular work gatherings, and data collection took place during January and February 2025. All horticulturists were invited to participate, and after providing informed consent, the questionnaire was administered, and the researcher read each question aloud while participants filled out the printed forms. This procedure ensured inclusion regardless of literacy levels. At the end of the data collection period, 200 valid questionnaires were obtained, a number that exceeds the minimum required to ensure a 95% confidence level and a sampling error below 7%.

The questionnaire was divided into two sections, comprising a total of thirty-eight questions: one section assessing the financial profile and the socioeconomic and demographic characteristics of the participants, and another section measuring financial literacy. The first section included sixteen questions designed to capture the realities of women horticulturists in Guinea-Bissau. The financial literacy component comprised twenty-two questions covering three dimensions: financial attitude, financial behavior, and financial knowledge.

To measure financial attitude, we used a nine-item, five-point Likert scale adapted from Vieira et al. (2021), ranging from "1—strongly agree" to "5—strongly disagree." This scale identifies how individuals evaluate statements related to financial matters, with higher mean scores indicating more positive financial attitudes. To measure financial behavior, we applied nine questions related to saving, debt, consumption, and financial habits, also adapted from Vieira et al. (2021). These questions followed a five-point Likert scale ("1—never," "2—rarely," "3—sometimes," "4—often," and "5—always"), where higher frequencies represent better financial behavior. Regarding financial knowledge, we included four multiple-choice questions based on Vieira et al. (2020) and Lusardi and Mitchell (2011). In this scale, respondents received one point for each correct answer and zero for incorrect answers. Thus, the financial knowledge scores ranged from 0 (all questions answered incorrectly) to 4 (all answered correctly).

To analyze the data, we used descriptive statistics and multivariate analysis techniques with the support of SPSS software version 20.0. Initially, descriptive statistics were applied

to the variables in order to characterize the sample and describe the behavior of individuals in relation to the variables and constructs under investigation. Subsequently, we calculated the simple mean of the questions comprising the financial attitude and financial behavior constructs. For financial knowledge, we summed the four questions, and based on these results we formed the financial literacy measure. Next, all constructs were standardized on a 0-to-1 scale to facilitate the interpretation of results.

Finally, to identify the impact of socioeconomic and demographic determinants on financial literacy, we estimated a multiple linear regression model. Financial literacy (the standardized scale ranging from 0 to 1) was included as the dependent variable. The independent variables considered were: age (quantitative variable); marital status dummy (1 = married/in a stable union, 0 = other); financial dependents dummy (1 = has dependents, 0 = does not have); education dummy (1 = has some level of education, 0 = no formal education); overdue debts dummy (1 = has overdue debts, 0 = does not have); government assistance dummy (1 = receives government assistance, 0 = does not receive); expense control dummy (1 = tracks expenses, 0 = does not track); food sufficiency dummy (1 = food is always sufficient, 0 = food is sometimes or often insufficient); and financial satisfaction (quantitative scale from 0 to 10).

In addition, to verify the validity of the assumptions related to normality, autocorrelation, multicollinearity, and homoscedasticity of the regression models, we conducted the Kolmogorov–Smirnov (KS), Durbin–Watson (DW), Variance Inflation Factor (VIF), and Pesaran–Pesaran tests, respectively. The Kolmogorov–Smirnov test was selected given that the sample size exceeded 30 observations, following the recommendation of Hair et al. (2010, p. 84): "The researcher must always remember that significance tests are less useful in small samples (fewer than 30) and extremely sensitive in large samples (exceeding 1000 observations)." To assess the normality of the residuals, the KS test was implemented under the premise that the distribution of the examined series follows a normal distribution. The presence of autocorrelation was evaluated using the DW test. To examine multicollinearity, the Variance Inflation Factor test was applied, where a value of 1 indicates the absence of multicollinearity (Hair et al., 2010). Finally, to test for homoscedasticity, the Pesaran–Pesaran test was employed to determine whether the variance of the residuals remains stable, accepting the null hypothesis of homoscedasticity when the significance level exceeds 0.05.

4. Results and Discussion

The results of this study present data on a population of female horticulturists from the Pessubé Farm in Guinea-Bissau, West Africa, based on a sample of 200 participants. The data were collected in person during January and February 2025. The findings show that the average age of the horticulturists is 50 years, ranging from 25 to 74, indicating a group with practical experience in resource management and a stage marked by heightened family responsibility. Regarding family structure, most respondents (95.3%) have financial dependents, with an average of six per woman and up to fourteen. The high proportion of widows (34.5%) and the prevalence of dependents highlight the central role and significant financial pressure these women face as the primary providers for their households. Moreover, each household includes, on average, four adults (ranging from 1 to 11), two adolescents (1 to 7), and two children (1 to 6), which further intensifies logistical and financial challenges in a context of vulnerability. The complete profile of the sample is presented in Table 2.

Table 2. Profile of respondents.

Variable	Alternatives	Frequency	Percentage
Marital Status	Single	50	25.40%
	Married/In a stable union	61	31.00%
	Separated/Divorced	18	9.10%
	Widowed	68	34.50%
Financial Dependents	No	9	4.70%
	Yes	182	95.30%
Education Level	No schooling	50	26.20%
	Primary education	86	45.00%
	Secondary education	49	25.70%
	Technical/vocational training	1	0.50%
	Higher education (undergraduate, licensure, or bachelor's degree)	5	2.60%

Regarding education, most participants completed primary education (45.0%), followed by secondary education (25.7%), technical or vocational training (0.5%), and higher education (2.6%). However, a substantial share of the women reported having no formal schooling (26.2%). With respect to their main occupation, 98% of the respondents work predominantly as horticulturists, while only 2% engage in other activities. Concerning horticulture as the primary source of household income, 82.7% stated that this activity constitutes the main basis of their family's livelihood. In terms of the proportion of income derived from horticulture, 71.7% reported that 100% of their income comes exclusively from this activity, although values range from 10% to 100%. Additionally, most respondents (75.8%) declared that they are fully responsible (100%) for the household income, emphasizing the central role they play in supporting their families.

Regarding the length of time that horticulture has served as a source of income, we observed a range from six months to forty-eight years, with an average of eighteen years working in this activity as a means of livelihood. Concerning the participation of families in horticultural work, a large share of the women (44.3%) indicated that their children contribute to the activities. However, 45.4% stated that they do not receive assistance from any family members in tasks related to horticulture. After establishing the respondents' profile, Table 3 presents the profile of these women based on their financial situation.

Regarding the receipt of government assistance, 54.4% of the respondents reported receiving some type of support from the government. Among these types of assistance, the distribution of seeds and farming materials stands out, mentioned by 44% of beneficiaries as the main types of support received.

Concerning the statements related to expense monitoring, 56.3% of participants indicated that they maintain a basic level of control over their spending, while only 6.5% reported using written records to exercise more detailed control. According to Lukas and Howard (2023) suggest that establishing formal budgets tends to reduce consumption even when the budget is not followed rigorously, as individuals tend to minimize deviations from the established target. In the context of the Pessubé Farm, the prevalence of basic monitoring (56.3%) and the low rate of formal recordkeeping (6.5%) reflect the informal nature of the activity and the practical, practical non-documented management of resources.

Table 3. Household financial situation: government assistance, spending control, debts, and food consumption.

Variable	Alternative	Frequency	Percentage
Do you receive any government assistance?	Yes	88	45.60%
	No	105	54.40%
Which of the following statements BEST describes how you monitor your regular expenses?	I usually do not control my expenses.	40	20.10%
	I keep a small control over my expenses	112	56.30%
	I do not keep written records, but I monitor my expenses.	34	17.10%
	I use written records to keep better control of expenses.	13	6.50%
Do you have overdue debts?	Yes	64	34.0%
	No	122	65.60%
Thinking about the amount of food consumed by your family, would you say that:	It is often not enough for everyone to eat well.	18	9.20%
	It is sometimes not enough for everyone to eat well.	137	70.30%
	It is always enough for everyone to eat well.	40	20.50%

With respect to indebtedness, most respondents (65.6%) stated that they do not have overdue debts. Finally, regarding the food consumed by the families, the majority of women (70.3%) reported that, at times, the available food is not sufficient for all household members to eat adequately, while only 20.5% stated that food is always sufficient for everyone. This high rate of food insecurity is a critical indicator that contextualizes the economic vulnerability of the sample.

Continuing the analysis, Table 4 presents the level of financial satisfaction reported by the respondents, based on a scale ranging from 0 (not included at all/not satisfied at all) to 10 (fully included/satisfied).

Table 4. Self-assessment of personal financial satisfaction in Guinea-Bissau.

Variable	Mean	Minimum	Maximum
On a scale from zero (not satisfied at all) to ten (completely satisfied), how satisfied are you with your financial situation, considering your income, assets, debts, and savings?	7.04	0	10

Subsequently, we examined the participants' financial satisfaction, considering income, debts, and savings. The average satisfaction score was 7.04 on a scale from 0 to 10, with most respondents assigning a score of 7 (38.2%). When comparing this result with studies involving women in other developing countries, the average score of 7.04 appears relatively high. For instance, Ayob (2023) analyzed the level of financial satisfaction among female entrepreneurs in Asia using the same ten-point scale. When compared to the countries examined in that study, the average obtained in the present research exceeds those reported for Malaysia, Thailand, Indonesia, the Philippines, and Myanmar, and is slightly lower only than the score found in Vietnam, which reported an average of 7.19. These findings suggest that, even in contexts of limited income, the women horticulturists evaluated perceive their financial situation relatively positively when compared with their international counterparts. This positive perception, despite economic vulnerability, may reflect the high level of responsibility these women assume as the primary providers for their households (75.8%),

as well as a sense of personal accomplishment in ensuring family subsistence within an environment marked by scarcity and informality.

Next, in Table 5 we proceed with the analysis of the descriptive statistics of financial attitude. The complete distribution of frequencies for all categories of the Likert scale is detailed in Table A1 (Appendix A).

Table 5. Valid descriptive statistics on the Financial Attitude Scale.

Variable	Descriptive Statistics		
	Mean	Median	Standard Deviation
29. I feel more satisfied when spending money than when saving it for the future.	3.5	4	1.2
30. My financial situation limits my ability to do things that are important to me.	1.7	2	0.9
31. I am satisfied with my current financial situation. *	3.8	4	1.1
32. I tend to worry about paying my regular expenses.	1.5	1	0.7
33. I tend to live for today without thinking about tomorrow.	4.2	5	1.1
34. I am just getting by financially.	1.6	2	0.7
35. Because of my financial situation, I feel that I will never have the things I want in life.	3.8	4	1.3
36. I am worried that my money will not last.	1.6	1	0.8
37. Money is meant to be spent.	2.8	3	1.4

The asterisk (*) indicates that the item had its score reversed.

The financial attitude scale used in this study was a five-point Likert scale, with responses ranging from "strongly agree" to "strongly disagree," where a score of 1 represents the poorest financial attitudes and a score of 5 represents the most positive ones. For analytical purposes, we reversed the scoring of item 31 to maintain consistency in the direction of responses.

Based on the results, the item with the lowest average score for financial attitude was number 32, titled "I tend to worry about paying my normal expenses," with a mean of 1.5 points. This result indicates that the women are highly concerned about paying their regular expenses, reflecting a more negative financial attitude toward managing day-to-day costs. Item 36, "I am worried that my money will not last," showed the second-lowest average score for financial attitude (1.6 points), reinforcing the pattern of financial worry and insecurity among participants. This result suggests that the respondents exhibit a high level of anxiety regarding the sustainability of their income over time, reflecting a constant fear that available resources will not be sufficient to cover future expenses. This perception tends to intensify due to the lack of significant financial reserves and the income instability frequently experienced by these women, representing a direct reflection of the structural vulnerability of their context.

The third-lowest financial attitude score was observed for item 34, "I am just getting by financially," which had a mean of 1.6 points, indicating a widespread perception of financial hardship and limited resources among respondents. This finding is even more concerning when compared with the results of Fulton et al. (2023), who found that 34% of African American respondents stated that the phrase "I am just getting by financially" described them completely or very well. The high prevalence observed in Guinea-Bissau indicates that a large share of the horticulturists perceive themselves to be in a state of financial survival, a characteristic of a structurally fragile context with low economic stability, where

the focus is placed primarily on basic and immediate expenses, with little or no margin for long-term planning.

The items with the highest average scores for financial attitude were item 33, "I tend to live for today without thinking about tomorrow," with an average of 4.2 points (where disagreement reflects a positive attitude), followed by item 35, "Because of my financial situation, I feel that I will never have the things I want in life," with an average of 3.8 points. These results indicate a relatively positive perception regarding current satisfaction and the possibility of achieving future financial goals. Despite the concerns and insecurities revealed in other financial attitude items, the women demonstrated a certain degree of satisfaction with their current financial situation, possibly related to a sense of personal accomplishment in the face of adversity.

For item 33, most participants disagreed with the statement, indicating a more positive attitude oriented toward long-term financial planning. Finally, the relatively high average for item 35, which assesses perceptions of material deprivation, suggests that some respondents still maintain hope of acquiring goods or achieving financial goals in the future, without expressing complete hopelessness. This combination of high concern about the present and optimism about the future emerges as a central characteristic of the sample, suggesting that their role as primary providers fosters both caution and resilient hope, even in contexts of scarcity.

Next, Table 6 presents the analysis of the financial behavior scale, which constitutes another dimension of financial literacy. The complete distribution of frequencies of responses for this scale is detailed in Table A2 (Appendix A).

Table 6. Valid descriptive statistics on the Financial Behavior Scale.

Variable	Descriptive Statistics		
	Mean	Median	Standard Deviation
20. I closely monitor my finances.	3.7	4	1.3
21. I have a lot of debts. *	3.6	4	1
22. I set long-term financial goals and strive to achieve them.	3.3	3	1.1
23. I have money left at the end of the month.	3.6	3	1.2
24. My finances control my life. *	2.4	3	1
25. I pay my bills on time.	3.8	4	0.9
26. Before buying something, I carefully consider whether I can afford it.	4.4	5	0.9
27. I tend to save more when I earn more.	4.2	5	1.1
28. I set aside part of the money I receive each month to meet future needs.	4.2	5	1

The asterisk (*) indicates that the item had its score reversed.

We analyzed the financial behavior of the female horticulturists using a five-point Likert scale (never, rarely, sometimes, often, and always). Prior to the analysis, we reversed the scoring of two items (items 21 and 24) so that higher scores, closer to 5, would indicate better financial behaviors among participants.

The highest financial behavior score was observed for item 26, "Before buying something, I carefully consider whether I can afford it." The high mean for this item suggests a cautious approach to purchases, reflecting conscious and planned financial behavior. This prudence indicates that, even under economic constraints, the women seek to avoid indebtedness and financial mismanagement, thereby contributing to household budget stability.

This result becomes particularly relevant when compared with the findings of López-Rodríguez and López-Ordoñez (2022). Those authors identified that individuals with professional or technological education tend to fully agree with this statement, those with technical-level education often disagree, and those with only basic primary education generally adopt a neutral position. In contrast, the women horticulturists in this study displayed even greater financial caution than less-educated individuals in previous research. This suggests that, in this group, factors beyond formal schooling, such as practical experience managing scarce resources and the responsibility of supporting a household in an informal context, may strengthen conscious financial behaviors.

The second-highest average was found for item 27, "I save more when I earn more," indicating that the women adjust their saving strategies according to available resources. The third-highest score was observed for item 28, "I set aside part of the money I receive monthly for future needs," reflecting a consistent practice of building financial reserves and establishing a personal financial safety net.

Table 7 presents the distribution of frequencies for correct and incorrect responses related to financial knowledge, along with the percentage of correct answers. The complete distribution is also provided in Table A3 (Appendix A).

Table 7. Valid percentage of correct and incorrect answers on the Financial Knowledge Scale.

Variable	Correct Answers	Incorrect Answers
47. Suppose you deposit FCFA 10,000 into a savings account earning 2% interest per year. You make no additional deposits or withdrawals. How much would you have at the end of the first year, including interest?	5.5	94.5
48. Imagine that the interest rate on your savings account is 6% per year and the inflation rate is 10% per year. After one year, how much could you buy with the money in this account? Assume you made no deposits or withdrawals.	24	76
49. Buying shares of a single company generally provides a safer return than a fund composed of multiple shares. This statement is:	19.5	20.5
50. Imagine that five friends receive a donation of FCFA 100,000 and must divide the money equally among them. How much will each person receive?	69.5	30.5

The analysis of the data presented in Table A3 allows for a detailed understanding of the results for each item on the financial knowledge assessment scale, which ranged from 0 to 4 points, with the maximum score indicating correct answers to all four questions.

Regarding item 47 "Suppose you deposit FCFA 10,000 into a savings account earning 2% interest per year. You make no additional deposits or withdrawals. How much would you have at the end of the first year, including interest?", we found that 30.3% of the women reported not knowing the answer, and only 5.5% answered correctly (Table A3, Appendix A). This result suggests that the concept of savings remains unfamiliar to many participants.

As for item 48 "Imagine that your savings account earns 6% interest per year and inflation is 10% per year. After one year, how much would you be able to buy with the money in this account? Assume there were no deposits or withdrawals," the results were even more concerning. Despite the high inflation rate in the country, which reached 7.1% in March 2025, the highest since July 2023 (Trading Economics, 2025), 51.3% of respondents stated that they did not know the answer, and only 24% answered correctly (Table A3, Appendix A). Although many of the women experience a loss of purchasing power in their daily lives, they were unable to link this experience to the concept of inflation. Nevertheless,

all participants recognized that prices had increased considerably, demonstrating a practical awareness of the phenomenon even without the corresponding conceptual understanding.

Regarding item 49 "Buying shares of a single company generally provides a safer return than a fund composed of multiple shares," we found that 41.7% of the women did not know the answer, and only 19.5% answered correctly (Table A3, Appendix A). Some correct responses may reflect guessing, as this topic is distant from the participants' lived realities.

Item 50 "Imagine that five friends receive a donation of FCFA 100,000 and must divide the money equally among them. How much will each person receive?" required only a simple calculation and showed a higher rate of correct answers: 69.5% of participants answered correctly, including those without formal education (Table A3, Appendix A). This finding reinforces the idea that, even in the absence of formal schooling, many individuals develop basic mathematical abilities through daily interactions with money, an essential skill for survival in informal economic contexts. The contrast between the high accuracy in practical mathematics (Item 50) and the high frequency of "I don't know" responses in the conceptual questions (Items 47, 48, and 49) provides strong evidence that practical financial skills outweigh formal financial knowledge within the sample.

The first three items, which are widely used internationally to measure financial knowledge, reveal certain limitations when applied to the Guinean context, particularly among the women in this study. The high frequency of "I don't know" responses highlights the gap between the proposed questions and the participants' daily realities. In contrast, Xu et al. (2022), using data from the China Household Finance Survey (CHFS), which covered more than 40,000 urban and rural households across China, found that 57.26% of respondents did not select "I don't know" for any of the three financial literacy questions. This result suggests a substantially higher level of familiarity with basic financial concepts among Chinese households compared to the women horticulturists in Guinea-Bissau. Such differences can be attributed to disparities in educational opportunities, financial inclusion, and exposure to formal financial systems, factors shaped largely by the extreme vulnerability of the Guinean context.

Overall, the average score on the financial knowledge questions was 29.5%, equivalent to 1.18 points on a 0-to-4 scale. According to the criteria established by Chen and Volpe (1998), a score below 2.4 points (i.e., less than 60% correct) represents a low level of financial knowledge. Therefore, it can be concluded that the level of financial knowledge among the women assessed is low, consistent with findings from other studies (Da Silva et al., 2018; Marciano & Medeiros, 2022; A. C. G. Potrich et al., 2016).

After identifying the items corresponding to each variable analyzed, standardized indicators were constructed for each dimension on a 0-to-1 scale, allowing for comparison between results. On this scale, values closer to 1 indicate higher levels of financial attitude, knowledge, behavior, and literacy. Table 8 presents the descriptive statistics for each of these dimensions.

Table 8. Descriptive statistics of the Financial Attitude, Financial Behavior, Financial Knowledge, and Financial Literacy Scales.

Scales	Mean	Median	Standard Deviation
Financial attitude	0.44	0.44	0.09
Financial behavior	0.68	0.69	0.13
Financial knowledge	0.29	0.25	0.21
Financial literacy	0.48	0.47	0.09

Financial behavior (mean = 0.68) shows the highest average score among participants. This result indicates that the women more frequently adopt practices such as expense control, planning, and timely bill payment, likely influenced by their daily experience managing limited resources, even without formal technical knowledge. In contrast, financial attitude (mean = 0.44) presents a lower average score, showing that although adequate behaviors are present, beliefs, perceptions, and motivations, such as the importance attributed to planning, discipline, self-control, and confidence, are not yet fully developed. According to the OECD (2023), weak financial attitudes can hinder the maintenance of such behaviors over time, especially in the face of financial pressures or adverse contexts, highlighting the need to strengthen attitudinal aspects to sustain consistent financial practices.

Furthermore, this difference between attitude and behavior may be explained by several factors, particularly by the fact that most of these women, being the main providers for their families, may have developed responsible financial habits as a practical response to resource scarcity. However, this does not necessarily prevent them from perceiving their financial situation negatively.

Financial knowledge (mean = 0.29) shows the lowest score among the analyzed dimensions, suggesting limited mastery of technical concepts such as interest, inflation, risk, and differentiation between financial products. This result is a direct consequence of structural and educational factors. The sample profile shows that 26.2% of participants have no formal schooling and 45.0% completed only primary education, characteristics that, according to the literature, are consistently associated with lower levels of financial knowledge.

This structural disadvantage is further compounded by the context of Guinea-Bissau, one of the world's poorest and most vulnerable countries, where limited access to formal education and to more complex financial systems hinders the development of the conceptual knowledge required by standardized assessment instruments. Many of these topics are not part of the daily reality of horticulturist women, who primarily deal with immediate and informal financial practices.

This limitation is particularly relevant because it indicates that the observed behaviors do not necessarily originate from a structured theoretical framework but rather from accumulated day-to-day experience. This pattern is recurrent among populations with limited access to formal and financial education (Women's World Banking, 2024). Nevertheless, life experience may play an important role in developing cautious, self-controlled, and saving-oriented behaviors, even in the absence of technical knowledge. This dynamic is evident in the data from the present study, which show that 75.8% of participants reported being entirely responsible for their household income. This condition suggests the absence of external financial support, which reinforces practical management strategies, albeit with limited conceptual grounding.

When combining the three dimensions (financial knowledge, attitude, and behavior) it was observed that financial literacy reached an average of 0.48, corresponding to an intermediate level. This result reflects a balance between relatively consolidated behavioral practices, developing attitudes, and still-limited technical knowledge. This scenario is consistent with the findings of Karakurum-Ozdemir et al. (2019), who identified lower levels of financial literacy among women across all countries analyzed in their study.

The authors also reported lower financial literacy scores among individuals without a high school diploma. These characteristics, being women, having low levels of formal education, and living in a context of vulnerability, describe the profile of the sample in this study, composed exclusively of women and marked by a high proportion of participants without a formal diploma, 45.0% of whom completed only basic education, while 26.2% reported having no formal education at all.

Finally, in alignment with the main objective of this study, we proceed to the analysis of the multiple linear regression model in order to investigate the determinants of financial literacy among women horticulturists in Guinea-Bissau. For this purpose, we estimated a model in which financial literacy (measured on a standardized 0–1 scale) serves as the dependent variable. The nine independent variables (including age, marital status, education, overdue debt, government assistance, expense control, food sufficiency, and financial satisfaction) were defined and detailed in Section 3 (Methods) and summarized in Table 1 (Summary of Hypotheses). Table 9 presents the results.

Table 9. Determinants of Financial Literacy.

Variables	Standard Coefficient	*p*-Value	95.0% Confidence Interval	
			Lower Bound	Upper Bound
Age	−0.084	0.305	−0.002	0.001
Marital status (dummy)	0.127	0.110	−0.005	0.053
Financial dependents (dummy)	0.004	0.957	−0.061	0.058
Education (dummy)	0.121	0.135	−0.008	0.057
Overdue debts (dummy)	−0.243	0.002	−0.072	−0.017
Government assistance (dummy)	0.079	0.324	−0.014	0.041
Expense control (dummy)	0.035	0.642	−0.025	0.040
Food (dummy)	0.152	0.047	0.000	0.064
Financial satisfaction	0.205	0.009	0.003	0.023
Adjusted R^2		0.117		
F-test		3.393		
p-value		0.001		

We estimated a model to analyze the determinants of financial literacy among female horticulturists and found it to be statistically significant (p = 0.001; F = 3.393), explaining 11.7% of the variation in financial literacy (adjusted R^2 = 0.117). Next, we evaluated the model assumptions following the criteria proposed by Hair et al. (2010). The normality of the residuals was confirmed by the Kolmogorov–Smirnov test (sig. = 0.200), indicating adherence to a normal distribution. The Durbin–Watson statistic (DW = 2.018) showed no autocorrelation, confirming the independence of errors.

Regarding homoscedasticity, the regression analysis of residuals was not significant (p = 0.163), supporting the null hypothesis of constant error variance. Finally, the Variance Inflation Factors (VIF) were close to 1, indicating the absence of multicollinearity among the explanatory variables. Taken together, these diagnostics confirm that the model meets the necessary assumptions for valid interpretation of the results.

In the present model, the variables age, marital status, financial dependents, education, government assistance, and expense control did not exhibit statistically significant effects on the dependent variable. This is supported by the analysis of the 95% confidence intervals, which include zero for all these variables, indicating that the true population relationship cannot be distinguished from zero. Consequently, hypotheses H1, H2, H3, H4, H6, and H8 are rejected.

These findings are consistent with previous studies that have not reached a consensus regarding the influence or direction of these determinants, suggesting that their effects may be context-specific or non-linear. Age, for example, is frequently associated in the literature

with an inverted U-shaped relationship (Kadoya & Khan, 2020), a pattern that is not captured by linear regression models, which may explain its lack of statistical significance.

Among the predictors analyzed, financial satisfaction (Coefficient = 0.205; p-value = 0.009) had the strongest positive impact on financial literacy. The significance and positive direction of this determinant are further supported by its 95% confidence interval, which is strictly positive and does not include zero. Accordingly, Hypothesis H9 is confirmed.

These results indicate that the level of financial satisfaction reported by participants significantly influences their degree of financial literacy. Individuals who are satisfied with their finances tend to feel more capable of managing them, making them more receptive to learning and applying financial concepts. This finding aligns with Bandura's (1977) concept of self-efficacy, in which satisfaction reinforces beliefs of competence that enhance financial literacy.

In the specific context of female horticulturists, this is a group frequently exposed to income instability resulting from production seasonality, the informality of labor relations, and fluctuations in agricultural prices, in addition to bearing household and caregiving responsibilities. These conditions intensify financial stress and may reduce available cognitive resources. Consequently, higher levels of financial satisfaction may alleviate mental overload and foster engagement with financial topics.

Moreover, the daily experiences of these women with rapid decision-making, negotiation, and resource management may generate a practical sense of control, reinforcing self-efficacy beliefs and, consequently, expanding their financial literacy, even outside formal educational structures.

A similar logic helps explain why the variable overdue debts (Coefficient = −0.243; p-value = 0.002) had a negative effect in the regression model. The confidence interval (−0.072, −0.017) reinforces the robustness of this negative effect, as it lies entirely below zero. Thus, Hypothesis H5 is not rejected.

We observed that the presence of overdue debts significantly reduces financial literacy levels among participants, likely because indebtedness generates stress and excessive focus on immediate demands, thereby reducing the mental and cognitive resources necessary for learning and planning. Chakraborty et al. (2025) emphasize that financial constraints can overload cognitive capacity through fatigue and stress, impairing the assimilation of new knowledge.

Female horticulturists with lower financial satisfaction and overdue debts may adopt avoidance mechanisms, postpone decisions, or maintain inefficient financial habits, which limit the development of formal financial competencies. This dynamic can create a cycle in which dissatisfaction and debt generate stress, reduce educational engagement, and perpetuate knowledge gaps. Conversely, individuals who are satisfied with their financial situation and have their accounts in order may enter a virtuous cycle of greater engagement and confidence, fostering learning and improvement of financial management skills.

Finally, the determinant food sufficiency (Coefficient = 0.152; p-value = 0.047), which measures food security, also emerged as a significant and positive determinant, thus not rejecting Hypothesis H7.

The validity of its positive effect is confirmed by the confidence interval, which lies entirely above zero. This result suggests that higher levels of food security positively affect financial literacy. In light of Maslow's hierarchy of needs (1943), once physiological needs are met, individuals can direct attention toward higher-order competencies, such as financial management. Among female horticulturists, this effect may be even more pronounced, given their simultaneous responsibility for food production and household administration. Adequate levels of food security may therefore create a cognitive and emotional environment conducive to the advancement of financial literacy.

5. Conclusions

The study examined the determinants of financial literacy among female horticulturists in Guinea-Bissau, West Africa. As the first empirical analysis of this topic in this group, the study's primary contribution lies in presenting evidence for an underexplored population. This context is particularly critical when considering that these women are frequently the main providers of their households through horticulture, while also belonging to a social group that is frequently neglected in one of the world's poorest and most vulnerable countries. By documenting how the analyzed determinants relate to financial literacy levels, the study offers insights that may support public policymakers in addressing the specific needs of this population.

Regarding the research findings, although 65.6% of participants reported not having overdue debts, a high level of food insecurity was observed: 70.3% stated that food is, on some occasions, insufficient to ensure adequate nutrition for all family members. Even so, self-perceived financial satisfaction was moderate to good, an average of 7.04 on a 0-to-10 scale.

In analyzing the three dimensions of financial literacy, we found a fundamental discrepancy that constitutes a key analytical contribution: financial attitude presented a moderate-to-low average score (0.44 out of 1), and financial knowledge showed a low score (0.29 out of 1), while financial behavior displayed comparatively higher levels (0.68 out of 1).

This difference indicates that, in the context of vulnerability and resource scarcity, the practical experience of managing finances and family responsibility act as adaptation mechanisms, reinforcing prudent habits even in the absence of formal technical knowledge. More specifically, financial knowledge did not meet the 60 percent criterion established in the literature, with this issue further aggravated by the high incidence of "I don't know" responses on internationally standardized questions (the Big Three). This suggests that standardized instruments may underestimate actual financial skills, despite 69.5% of women correctly answering a simple division calculation, reinforcing the presence of basic everyday math skills.

The multiple linear regression model, which examined the determinants of financial literacy, proved to be statistically significant (p = 0.001; F = 3.393), but showed limited explanatory power, with an Adjusted R^2 of 0.117. This low explained variance suggests that many relevant factors remain outside the scope of the model.

It is essential to recognize that financial literacy is a multifactorial and complex concept, encompassing an evolving set of skills, knowledge, and attitudes. Given that the investigation did not include all contextual and socioeconomic factors known to influence this competence, the low R^2 is an expected characteristic, and not an indicator of model failure, reinforcing that the results represent only punctual determinants within a broader system. Thus, the results must be interpreted cautiously, considering their specificity to the investigated context.

Accordingly, three predictors were identified as statistically significant: financial satisfaction, which had the strongest positive impact (Coef. 0.205; p-value: 0.009), suggesting that the perception of financial satisfaction acts as a facilitator for learning and applying financial knowledge; food sufficiency, which also showed a positive impact (Coef. 0.152; p-value: 0.047), indicating that the fulfillment of physiological needs creates the cognitive and emotional environment required for the advancement of financial competence.

Overdue debts exhibited the strongest negative effect in the model (Coef. −0.243; p-value: 0.002), a negative effect associated with cognitive overload, whereby financial stress consumes mental resources and undermines the ability to assimilate and apply new financial knowledge. Thus, Hypotheses H9, H7, and H5 are not rejected. In this context,

the results corroborate that greater food security and higher perceived financial satisfaction increase financial literacy, while difficulties in paying debts tend to reduce it.

The findings of this study carry both social and public policy implications, particularly as they provide unprecedented evidence for this population in Guinea-Bissau by confirming the influence of food sufficiency and the absence of debt on financial literacy. Financial literacy plays a crucial role in ensuring the economic sustainability of individuals and families and in promoting active participation in society. Considering that food sufficiency is associated with higher levels of financial literacy, ensuring secure access to food may create more favorable conditions for people to learn and apply financial knowledge. Accordingly, these results highlight important implications for social policies and educational programs that integrate food security and financial education initiatives. In contexts of vulnerability, where food insecurity is high (70.3%), such combined initiatives may prove particularly effective.

This could be operationalized through the implementation of a medium-term training course with the women from the Pessubé farm and other farms in the region, focusing on agroecology, financial literacy, and sound money management. The course would be offered when they enroll in the seed distribution program, with the aim of enhancing their knowledge about cultivation and horticultural activities, as well as strengthening their control over finances so that these women are better prepared in case the harvest is impaired, sales are lower than expected, and similar adverse situations occur. Furthermore, supporting the organization of resources into local cooperatives is fundamental to ensuring greater income stability and better supply management.

Moreover, the negative impact of overdue debts on financial literacy indicates that concrete financial difficulties generate cognitive overload and stress, which hinder individuals' ability to apply or absorb financial knowledge. In practical terms, this suggests that financial education programs should incorporate components focused on debt management, renegotiation, and payment planning, offering support to help individuals reduce delinquency before progressing to more advanced financial concepts. The implementation of a public policy could also be considered, such as improving access to credit for financing horticultural activities, with credit being granted only to those women who provide proof of completion of the financial literacy and responsible money management course. This would substantiate the outcomes of the knowledge acquired and would practically demonstrate the benefits that proper resource management can bring.

The positive impact of financial satisfaction on financial literacy suggests that the perception of satisfaction is not merely a consequence of financial decisions, but also acts as a facilitator for learning and applying financial knowledge. This finding aligns with the concept of self-efficacy. In this sense, financial education programs should promote experiences that enable small financial achievements, such as budgeting, building savings, or paying off debts, to strengthen individuals' confidence and increase their engagement with learning.

Moreover, the government could also establish an institution staffed with finance professionals to support these women by clarifying doubts regarding resource management, the responsible use of credit, and by assessing each worker's current financial situation. By providing guidance and practical training in day-to-day financial practices, this initiative would demystify and increasingly concretize the correct and efficient management of resources. In doing so, it is possible to create a virtuous learning cycle in which financial satisfaction fosters knowledge acquisition, while financial literacy in turn contributes to an increased sense of financial well-being.

Because we conducted a descriptive study using a survey strategy and a cross-sectional design (with data collected at a single point in time, between January and February 2025)

in a single location (Pessubé Farm), this work has limitations. First, we highlight the presence of self-selection bias, since the sample in this study consisted exclusively of women who were willing to participate in the research. Furthermore, the reliance on self-reported measures may introduce social desirability bias, where participants might provide responses they perceive as favorable. Additionally, since participation was voluntary rather than random, and the study was restricted to a single location, the findings may not be fully representative or generalizable to female horticulturists in other regions of Guinea-Bissau or West Africa.

Another relevant limitation concerns the measurement of financial knowledge, since the internationally validated "Big Three" questions proved to be poorly suited to the local reality. Originally developed in Western contexts with populations familiar with formal financial concepts, these questions, though internationally recognized for their validity and simplicity, face significant challenges when applied in vastly different socioeconomic and cultural settings, as evidenced by the high number of "I don't know" responses. Furthermore, these items primarily assess formal financial knowledge, whereas many female horticulturists employ practical financial strategies in their daily lives without relying on technical terminology or academic concepts. This highlights a gap between applied and measured knowledge, suggesting that standardized instruments may underestimate actual financial skills in contexts characterized by low financial formalization.

The findings underscore the importance of rethinking financial literacy assessment tools, particularly those measuring financial knowledge, in non-Western contexts or among populations with limited formal education, so as to achieve more accurate and context-sensitive evaluations. Additionally, future research should explore the effectiveness of context-based educational interventions, considering that many female horticulturists manage money in practical ways without relying on formal financial concepts. It is crucial for future research to adapt content to women's everyday experiences, such as managing small profits, saving for seeds and inputs, or organizing resources within local cooperatives. Finally, we encourage longitudinal or experimental studies that track the evolution of financial literacy and establish causal relationships across different vulnerability groups, thereby strengthening the transferability of the findings beyond Pessubé Farm.

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Appendix A

Table A1. Valid percentage statistics on the Financial Attitude Scale.

Variable	Percentage of Responses				
	1	2	3	4	5
29. I feel more satisfied when spending money than when saving it for the future.	6.7	19.6	12.9	34.5	26.3
30. My financial situation limits my ability to do things that are important to me.	45.2	40.6	5.6	7.1	1.5
31. I am satisfied with my current financial situation. *	4.6	11.3	11.3	41.5	31.3
32. I tend to worry about paying my regular expenses.	60.7	30.1	6.6	2	0.5
33. I tend to live for today without thinking about tomorrow.	2.6	10.3	8.2	22.1	56.9
34. I am just getting by financially.	44	47.1	6.8	1	1
35. Because of my financial situation, I feel that I will never have the things I want in life.	8.6	13.7	6.1	24.9	46.7
36. I am worried that my money will not last.	53.4	35.2	5.2	4.7	1.6
37. Money is meant to be spent.	20.9	26	14.3	22.4	16.3

Caption: 1. Totally agree, 2. Agree, 3. Neutral, 4. Disagree, 5. Totally disagree. The asterisk (*) indicates that the item had its score reversed.

Table A2. Valid percentages on the Financial Behavior Scale.

Variable	Percentage of Responses				
	1	2	3	4	5
20. I closely monitor my finances.	6.1	13.3	27	6.6	46.9
21. I have a lot of debts. *	6.6	2.5	30.8	36.9	23.2
22. I set long-term financial goals and strive to achieve them.	3.5	12.6	50.5	7.6	25.8
23. I have money left at the end of the month.	7.6	9.1	36	8.6	38.6
24. My finances control my life. *	22.8	24.9	41.6	7.6	3
25. I pay my bills on time.		3.6	36.2	27.6	32.7
26. Before buying something, I carefully consider whether I can afford it.	1	3.1	15.4	8.7	70
27. I tend to save more when I earn more.	1.5	11.6	9.1	16.2	61.6
28. I set aside part of the money I receive each month to meet future needs.	1	11.6	5.5	25.6	56.3

Caption: 1. Never, 2. Almost never, 3. Sometimes, 4. Almost always, 5. Always. The asterisk (*) indicates that the item had its score reversed.

Table A3. Distribution of Response Percentages for Each Item of the Financial Knowledge Scale.

Variable	Percentage of Responses				
	1	2	3	4	5
47. Suppose you deposit FCFA 10,000 into a savings account earning 2% interest per year. You make no additional deposits or withdrawals. How much would you have at the end of the first year, including interest?	0.5	3	5.6	60.6	30.3
48. Imagine that the interest rate on your savings account is 6% per year and the inflation rate is 10% per year. After one year, how much could you buy with the money in this account? Assume you made no deposits or withdrawals.	17.6	7	24.1	51.3	
49. Buying shares of a single company generally provides a safer return than a fund composed of multiple shares. This statement is:	38.7	19.6	41.7		
50 Imagine that five friends receive a donation of FCFA 100,000 and must divide the money equally among them. How much will each person receive?	3	69.8		1	26.1

Caption: Question 47—1. FCFA 9800, 2. FCFA 10,000, 3. FCFA 10,200, 4. FCFA 12,000, 5. Don't know. Question 48—1. More than today; 2. Exactly the same, 3. Less than today, 4. Don't know. Question 49—1. True, 2. False, 3. Don't know. Question 50—1. FCFA 10,000, 2. FCFA 20,000, 3. FCFA 100,000, 4. FCFA 500,000, 5. Don't know.

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