



Impact Evaluation of the Mouso Bara digital literacy intervention

Baseline Study Results

Cody Bock, Rosa Castro-Zarzur, Noah Clapacs, and Angela Moturi

American Institutes for Research

Angelika Kessler, Seydou Soro, and Stanislas Touré

CARE Netherlands & CARE Côte d'Ivoire

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Contents

Introduction	1
Background	2
Study Objectives and Scope	5
Study Framework	5
Theory of change	6
Research questions	7
Methodology	7
Quantitative methods	8
Qualitative methods	9
Ethical research approval	9
Study Findings	10
Household characteristics	10
Education, literacy, and numeracy	13
Digital context and skills	18
Social gender norms	21
Service landscape	25
Conclusions	28
Recommendations	31
References	33
Appendix A. Additional Information on Methodology	36
Appendix B. Balance Tables	41

Exhibits

Figure 1. MousoBara Overview	2
Figure 2. MousoBara Literacy Module Overview.....	3
Figure 3. VSLA Summary	4
Figure 4. MousoBara Theory of Change	6
Figure 5. MousoBara Baseline Evaluation Sample Distribution	8
Figure 6. AIR teams conducting literacy tests and focus groups	10
Figure 7. Average Survey Respondent Profile	11
Figure 8. Household Asset Ownership	12
Figure 9. Listening Comprehension Test Scores	15
Figure 10. Reading Familiar and Made-Up Words Test Scores.....	16
Figure 11. Numeracy test scores	17
Figure 12. Digital skill competencies (treatment and comparison average).....	20
Figure 13. Qualitative assessment of women’s digital skills.....	21
Figure 14. Women's Participation in Productive Activities.....	22
Figure 15. Regression Results: Individual Should Spend Savings to Buy Personal Smartphone Women's Perceived Opinions.....	24
Figure 16. Digital Connectivity in Sample Communities	26
Figure 17. MousoBara Livelihood training modules	30
Exhibit A–1. Quantitative Sample.....	36
Exhibit A–2. Sampling locations of qualitative data collection	37
Exhibit A–3. Qualitative sample	37
Exhibit B–1. Background Characteristics	41
Exhibit B–2. Literacy.....	45
Exhibit B–3. Household Asset Ownership	47

Exhibit B–4. Savings Groups Participation and Intended Use of Savings	48
Exhibit B–5. Women's Participation in Productive Activities.....	50

Introduction

Digital skills are “quickly becoming essential” for accessing important financial and livelihood services (UNESCO, 2019, p. 29). In sub-Saharan Africa (SSA), digital tools such as mobile banking have revolutionized informal economies, combated poverty, and supported household resilience to shocks (Innovations for Poverty Action, 2019). Yet digital inclusion is far from equitable. SSA ranks the lowest in the world in broadband coverage (85%) and mobile internet usage (25%; GSMA, 2023).

Within the region, women, rural populations, the poor, and elderly face particularly high economic, cultural, and educational barriers to digital inclusion. Some 71% of women and 84% of men in SSA own a mobile phone; among women who don’t own a phone, the key barriers to their digital inclusion were affordability and lack of literacy, numeracy, and technological skills (GSMA, 2024). SSA is home to 230 million people who own phones but report lacking the skills required to use digital tools (GSMA, 2023). Exacerbating this challenge, adult learning and education (ALE) programs are historically under supported by the public sector, including governments and international development actors (UNESCO, 2022).

To address this need, CARE Côte d’Ivoire developed a novel digital tool for bridging the literacy and digital skills gaps in many rural communities in Côte d’Ivoire. MoussoBara is a smartphone application which provides interactive modules on literacy, numeracy, entrepreneurship, and life skills in an engaging audio-visual format (Figure 1). Developed in 2021, it has been rolled out by CARE in several discrete projects, reaching over 1,400 active users by 2025. The tool shows promise for reaching adult learners where they are—in their homes, fields, and market stalls. However, MoussoBara has yet to undergo rigorous evaluation, and CARE thus lacks evidence that can inform refinement, implementation, and scale-up of the tool.

The AIR Opportunity Fund, a philanthropic initiative of the American Institutes for Research (AIR), has provided support to address this evidence gap through a mixed-methods, experimental impact evaluation of MoussoBara. This baseline study is the first round of the evaluation. This study provides evidence on the contextual relevance of the MoussoBara tool and its implementation model by exploring potential users’ capacities and needs related to digital use. The report also reflects on the existing financial and education service landscape to highlight the gap MoussoBara aims to bridge.

The report first lays out the study’s background, framework, and methodology. We structure the subsequent study findings thematically, covering household characteristics, education and literacy, the digital context, gender and social norms, and finally the service landscape. The

report includes conclusions from this baseline study and makes recommendations for the design and implementation of MousoBara.

Figure 1. MousoBara Overview



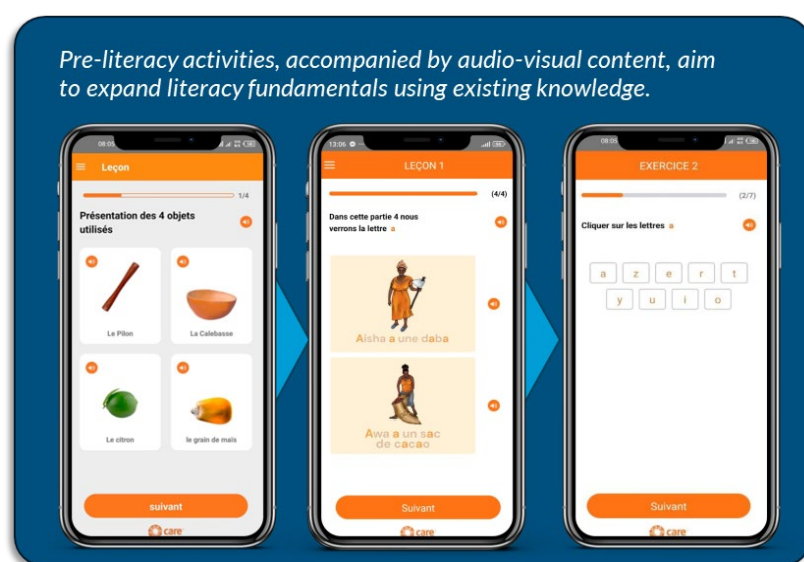
Background

Much like the broader region, literacy rates in Côte d'Ivoire are lower for women (41%) compared with men (54%; UNESCO, 2021). Educational gender disparities contribute to these outcomes: Only 52% of girls enroll in secondary education (compared with 58% of boys), and

55% of enrolled girls finish lower secondary education (compared with 60% of boys; UNESCO, 2024). Educational disparities are exacerbated in rural areas, where girls and women face more restrictive gender norms. In rural Côte d’Ivoire, cultural and social norms emphasize women’s responsibility over domestic rather than income-earning work, limit their participation in household/community decision making, and keep them from owning land and other assets (OECD, 2022). These norms pose substantive barriers to girls’ education and women’s participation in ALE.

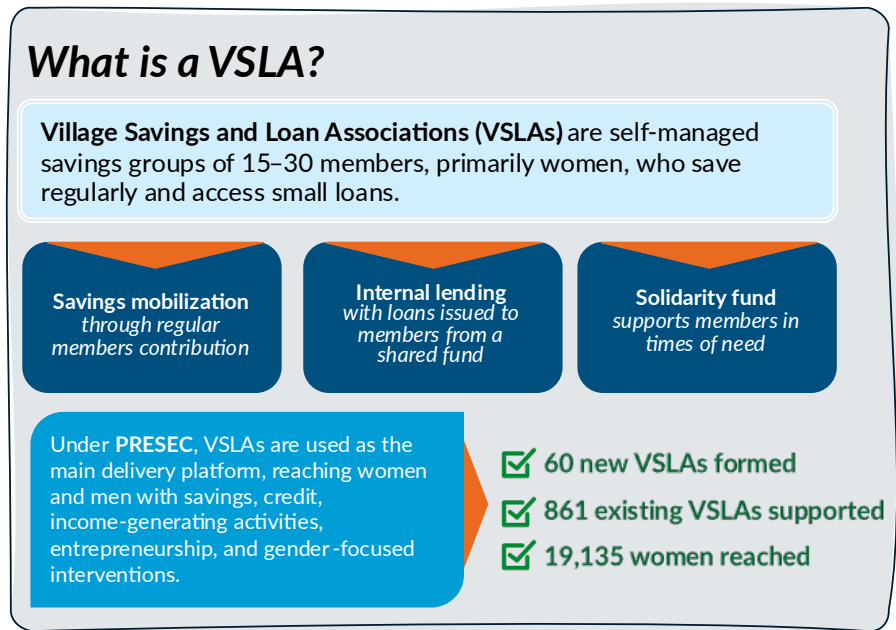
To address the needs of Ivoirians, CARE Côte d’Ivoire developed a digital mobile application called **MousoBara** in 2021 (see Figure 2). Mouso Bara is a smartphone application originally designed by CARE to support entrepreneurship for illiterate and low-literate women and men in rural, cacao-producing regions of Côte d’Ivoire. CARE recognized the need to build literacy and numeracy skills to support economic empowerment training, leading to the development of additional app modules. Altogether, the app comprises interactive audiovisual learning modules on literacy, numeracy, life skills, and entrepreneurship (e.g., writing a business plan). Its literacy and numeracy modules support French language acquisition, the lingua franca and official language of Côte d’Ivoire where there nearly 80 local languages spoken, most of which have no written form. Nonetheless, the app provides audio in several local languages (Dioula, Senoufo, and Baoulé) as well as French to enable illiterate and low-literate women and men to grow their digital and literacy skills. It can also be used offline once downloaded, circumventing the need to have an active data subscription.

Figure 2. MousoBara Literacy Module Overview



MousoBara’s intended users are low-literate male and female farmers who participate in CARE’s Village Savings and Loan Associations (VSLAs). VSLAs are groups of 15 to 30 people, the majority of whom are women (between 70-80%), who meet regularly to pool their savings and loan to one another from this savings fund. CARE also uses VSLAs as a platform for providing financial training (see Figure 3), with the overall goal of giving members access to financial capital; growing their skills in savings, loans, and financial literacy; and fostering their social networks (CARE, n.d.a).

Figure 3. VSLA Summary



Since 2021, CARE has implemented MousoBara by incorporating training on the application into its standard VSLA curriculum, with all group members being invited to register and use the app. CARE introduces MousoBara through in-person orientation training for VSLA members. VSLA group promoters, who are CARE staff, act as trainers and as “teachers” who can help answer questions and troubleshoot issues in person during VSLA gatherings. Although all VSLA members are invited to join the training and use MousoBara, they are not obligated to do so, and some do not. Moreover, VSLA members are not the only ones targeted by MousoBara. CARE invites all community members—men and women—to join the trainings and engage with the application.

In 2025, La Société Africaine de Cacao (SACO) financed the **Socio-Economic Support for Cacao Producing Communities Project (PRESEC)**, an initiative aiming to support community development, women’s economic empowerment, and child protection for families working in cocoa value chains. The project targeted 247 villages in southern Côte d’Ivoire with a suite of

interventions including CARE’s VSLA curriculum, support for community development committees, and training and onboarding for the MoussoBara application. CARE trained PRESEC field agents, who oversee around 20 VSLAs each, in September 2025. The field agents then rolled out the MoussoBara training to VSLA group promoters, who are based in communities and implement the VSLA curriculum at the group-level, in October 2025. The group training on MoussoBara introduced the application and led participants to install the app and register an account. In total, PRESEC trained 71 communities on MoussoBara, touching nearly 1,400 individuals, two-thirds of which were women. Group promoters continue to provide face-to-face support to install and use app functions, while other VSLA members supplement on-the-ground technical support.

As MoussoBara was rolled out to PRESEC communities, AIR designed a complementary study to evaluate the effectiveness of the application and generate evidence on the usefulness of digital tools in Côte d’Ivoire and sub-Saharan Africa more broadly.

Study Objectives and Scope

The core objective of this evaluation is to generate timely and rigorous evidence on the relevance and effectiveness of MoussoBara in the VSLA setting. The study aims not only to inform the refinement and scale-up of MoussoBara in Côte d’Ivoire, but also the appropriateness of digital tools in the broader SSA region, potentially affecting 17.6 million people across 64 countries who are part of CARE-supported VSLAs (CARE, 2023).

Thematic scope. The baseline study assessed contextual factors hypothesized to affect the uptake and effectiveness of MoussoBara. This includes the digital context (e.g., connectivity, skills), educational background, numeracy and literacy skills, livelihood context (e.g., income generating activities), and the digital service landscape.

Geographical scope. The baseline study included 150 communities across 13 regions in southern Cote d’Ivoire where PRESEC is implemented.

Chronological scope. The impact evaluation assesses the effects of MoussoBara over one year, from September 2025 to September 2026. This baseline study presents the results of pre-treatment data collection in July 2025.

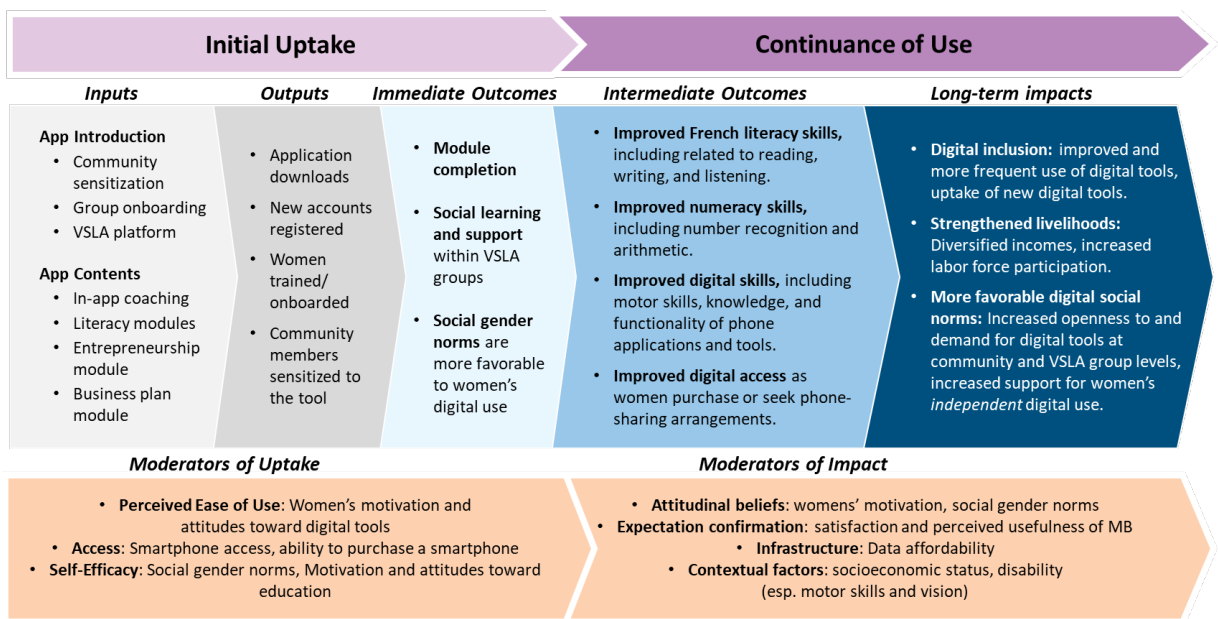
Study Framework

This section describes the theory of change (TOC) for MousoBara and research questions which guide the impact evaluation and this baseline study.

Theory of change

We developed a theory of change (TOC) for the MousoBara intervention to guide the impact evaluation (Figure 4).

Figure 4. MousoBara Theory of Change



The TOC posits that, if CARE introduces the application through VSLA groups and paired with community sensitization, then communities will have more favorable attitudes toward women’s digital use. This community-wide supportive attitudes will result in greater intrahousehold trust in MousoBara, which will in turn lead men *and* women to spend more time on the app (Kaba & Meso, 2022). Furthermore, VSLA group promoters will assist women as they complete the application’s curricular modules, while VSLA groups demonstrate social learning around the application topics (Arnold, 2020). If women complete the app modules, and community and VSLA groups support digital use, then women will develop improved French literacy, numeracy, and digital skills, and digital access will increase as some women seek to buy or share a smartphone (Arnold, 2020). Improved literacy and numeracy will in turn benefit women business through more effective record-keeping, calculation skills, and financial management. Digital skills will amplify this further by enabling online entrepreneurship, mobile banking, and access to digital marketplaces that expand women’s market participation. In the long-term, women will experience greater digital inclusion and strengthened livelihoods (Karakara et al., 2024) while community members will have more favorable attitudes toward

technology and women's digital use. Furthermore, women are also expected to increase their self-efficacy as they gain confidence in their ability to learn new skills and achieve goals, and enhance their empowerment as they become better equipped to participate in decision making on household and community matters (Arnold, 2020; Kaba & Meso, 2022).

The moderators of uptake differ from the moderators of use continuance for digital tools such as MoussoBara (Karakara et al., 2024; Kaba & Meso, 2022). We hypothesize that factors such as the perceived ease of use, access, and self-efficacy can moderate the initial uptake of MoussoBara. We hypothesize that attitudes and personal beliefs, expectation confirmation (i.e., satisfaction with the tool), enabling infrastructure, and contextual factors at household and individual levels can moderate the continued use and effectiveness of MoussoBara (Assielou & Bourgault, 2024).

Research questions

The impact evaluation aims to assess whether the introduction of MoussoBara into CARE's standard VSLA model promotes inclusive economic development by improving literacy and digital skills of adult illiterate rural women. In support of that broader learning goal, we developed a set of core research questions to establish baseline levels for the impact evaluation, provide initial insight on the relevance of the application, and support the refinement of the TOC:

1. What are female VSLA members' competencies related to literacy and numeracy?
2. What are female VSLA members' competencies related to digital access, skills, and digital service utilization?
3. What are potential barriers to and facilitators of the future effectiveness of MoussoBara?
4. How does MoussoBara complement existing services available to female VSLA members?

Through answering these questions, the study can assess if the MoussoBara design, implementation process, and contents are aligned with the needs of VSLA members.

Methodology

This study is the first of two rounds in an experimental, mixed methods impact evaluation of Mousso Bara. Below we detail the study's quantitative and qualitative methodologies and highlight the ethical approval process. Below is an overview of the methods used, while the full methodology can be found in Appendix A.

Quantitative methods

To assess the causal effects of MoussoBara, we implemented a cluster randomized controlled trial (cRCT) in 150 communities, 75 of which were randomly assigned to treatment while the remaining 75 serve as control and will receive the MoussoBara intervention once the evaluation is completed. The evaluation communities are located across 10 regions in southern Cote d'Ivoire (see Figure 5).¹ The baseline survey targeted 1500 women, 10 per community. Women were eligible to participate in the survey if they met all of the following three conditions:

1. Were VSLA members
2. Had a small business (or were planning to form one in the next six months)
3. Had access to a smartphone (or could buy one in the next six months)

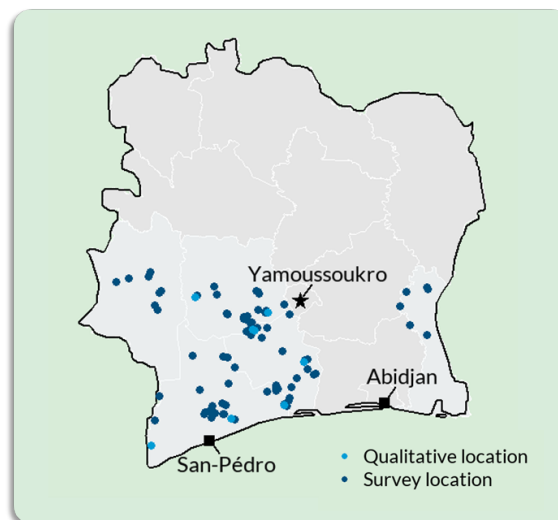
We conducted baseline balance tests to check whether randomization successfully created similar groups before the MB intervention begins. To this end, we compare the treatment and control groups on pre-existing characteristics (like demographics) and outcomes (like literacy and numeracy) to ensure any post-intervention differences in outcomes can be attributed to the intervention rather than to pre-existing differences. If groups are well-balanced at baseline, it provides confidence that randomization worked properly and the study results will be valid.

Specifically, we estimated the following specification to assess baseline balance:

$$Y_{irc} = \alpha_r + \beta_1 \text{Treat}_c + \varepsilon_{irc}$$

where Y_{irc} is an outcome or characteristic of interest for woman i in community c within region r ; α_r is a region fixed effect that accounts for regional stratification in treatment assignment; Treat_c is an indicator variable that takes on the value 1 if community c is assigned to the treatment group and 0 if assigned to the control group. β_1 corresponds to baseline differences between the treatment and the control group. If randomization was successful, β_1 should not be statistically different from zero, indicating there are no differences between the treatment

Figure 5. MoussoBara Baseline Evaluation Sample Distribution



¹ Gbokle, Goh, Guemon, Haut Sassandra, Indenie Djuablin, Loh-Djibouah, Marahoue, Nawa, San Pedro, and Tonkpi.

and control groups. Thus, for each outcome and characteristic of interest, we test whether $\beta_1 = 0$ to assess whether the randomization worked. We use standard errors cluster at the community level to account for within-community correlation induced by the experimental assignment (Abadie et al., 2023).

Qualitative methods

Our qualitative approach aimed to gather anecdotal information about literacy and numeracy, digital skills, gender norms, and the livelihood context to complement the quantitative findings and highlight recommendations for improving and scaling up MousoBara. We collected qualitative in six communities across six regions where PRESEC operates, selected to reflect the range of regions and village sizes targeted by the project (see Figure 5). In each community, we conducted focus group discussions (FGDs) with female VSLA members and their spouses, and we conducted in-depth interviews (IDIs) to explore more sensitive topics and to qualitatively assess digital skills through an observation activity. We also conducted key informant interviews (KIIs) with VSLA leaders, CARE group promoters and field agents, as well as traditional and community leaders. In regional and national capitals, we interviewed representatives of national ministries, CARE, and financial service providers. In total, we conducted 12 FGDs, 31 KIIs, 12 IDIs, and 12 observations.

Ethical research approval

The ethical protocols of the study were independently verified by the AIR Institutional Review Board (IRB), as well as the Côte d'Ivoire Ministry of Women, Family and Children.² The AIR IRB (IRB00000436) is registered with the U.S. Office of Human Research Protection as a research institution (IORG0000260) and conducts research under its own Federal-wide Assurance (FWA00003952). These two bodies approved the research activities and protocols before data collection (Figure 6).

² AIR's data collection partner is Dalberg Research. We would like to acknowledge the great work of Alioune Touré and Serge Bazié in overseeing the ethical approval process and data collection mission.

Figure 6. AIR teams conducting literacy tests and focus groups



Study Findings

This section provides an overview of key household characteristics, literacy and numeracy levels, the digital environment, prevailing social gender norms, and the landscape of available services. Together, these topics offer important context for understanding the living conditions and challenges faced by potential users of MousoBara. Balance tables for these findings are contained in Appendix B.

Household characteristics

The sample includes 1,514 households with an average household size of 9 members. The average age of female respondents was 41 (Figure 7). On average, households include 4.5 adult members (15-64 years), 2.5 children (6-14 years) and 1.6 children under 5 years, with very few older adults (mean of 0.35 members aged 65+). Gender distribution among adults is balanced, with approximately 2.3 women and 2.2 in the 15-64 age group per household. Among young children, boys and girls are evenly represented.

Most households are headed by a male spouse (77%), while 13% are headed by a female. Most respondents are married or cohabiting (87%), with small shares divorced/separated (3%) or widowed (6%). Overall, household composition is similar across treatment and comparison groups, with differences between treatment and comparison being close to zero for all characteristics.

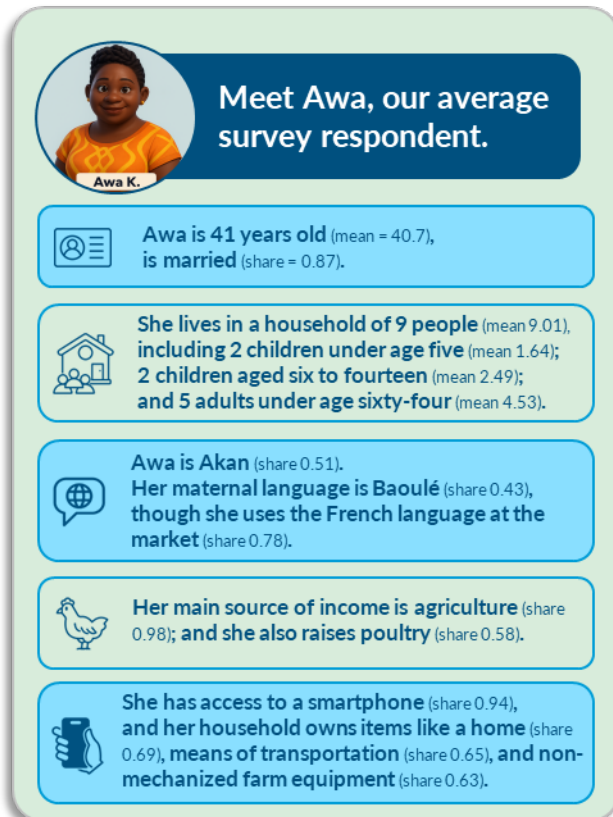
Disability. Severe functional limitations are relatively uncommon in the sample. Nearly half of respondents (46%) report *some* level of difficulty performing functions associated with literacy and digital skills (i.e., hearing, vision, cognitive functions, communication). However, it is important to note that these self-reported concerns do not necessarily indicate formal disability status; they may reflect a wide range of conditions, from mild limitations to more serious impairments. Truly severe impairments are less common, as only 4% of respondents reported severe levels of disability that could impact literacy. Older respondents are significantly more likely to report these difficulties, with each additional year of age associated with about a 1.2 percentage point increase ($p < 0.001$, $r^2 = 0.077$). Overall, treatment and comparison groups are well balanced, with only minor differences such as slightly fewer hearing difficulties in the treatment group (4% T vs. 6% C, $p < 0.1$).

Ethnicity. The sample is ethnically diverse, with Akan being the largest group (51%), followed by Voltaic (Gur) (21%), Mandé (13%), and Krou (11%). Language patterns mirror ethnic identity: Baoulé is the most common first language (43%), followed by Moré (15%). In market settings, French is the primary language (78%), complemented by Baoulé (38%) and Moré (11%). However, only 4% reported speaking French at home. In these regards, treatment and comparison groups are generally balanced, though Moré speakers are more prevalent in the treatment group (19% T vs. 11% C, $p < 0.05$).

Livelihoods. Virtually all households (98%) engage in agricultural production. Cassava (87%), okra (85%), hot peppers (85%) and eggplants (84%) are the most cultivated crops. Other common crops include Plantains (75%) and Yam (74%). Around two thirds of households cultivate cacao. On average, households cultivate about 10 crops, suggesting they mainly cultivate land to meet food needs.

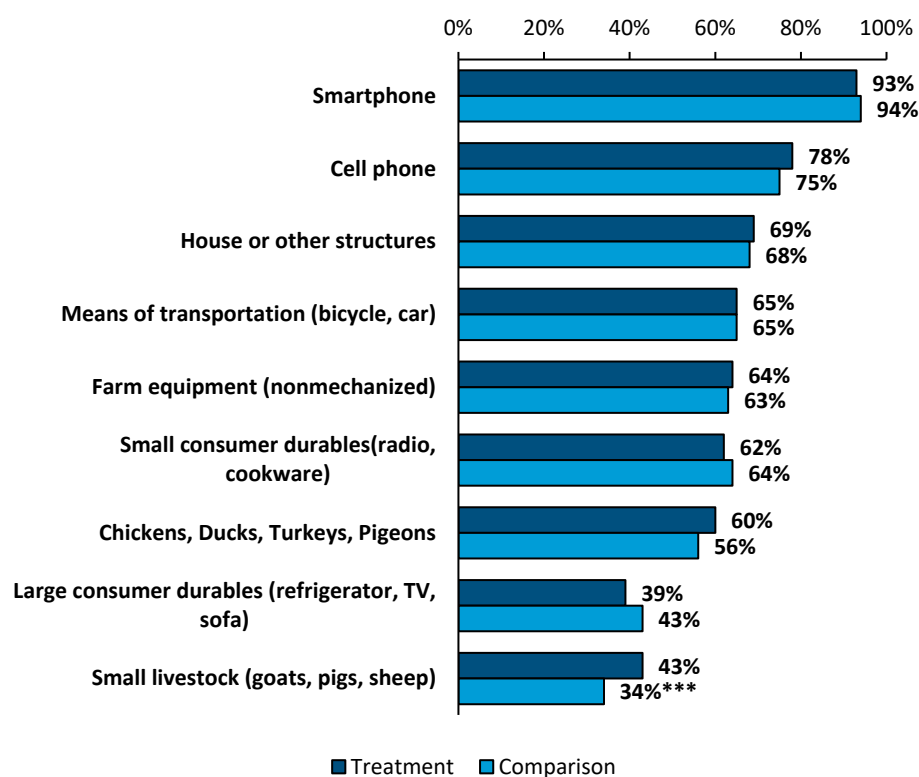
Households in our sample own about 6.4 different categories of assets out of the 17 types measured (Figure 8). Smartphones are owned by 94% of households and cell phones by 76%.

Figure 7. Average Survey Respondent Profile



About 71% of households own both smartphones and cellphones. In terms of women's ownership of smartphones, we see that around 84% of females in our sample currently own a smartphone (either solely or jointly with some else). Beyond technology, the most prevalent assets include houses (69%), means of transportation (65%), small consumer durables (63%), and non-mechanized farm equipment (63%). Poultry ownership stands at 58%, while small livestock like goats, pigs, and sheep are owned by 39% of households. In contrast, large livestock such as oxen and cattle are owned by only 7% of households, mechanized farm equipment by 12%, and nonfarm business equipment by 26%. This pattern suggests households in the sample rely primarily on small-scale agriculture have widespread access to modern communication technology but limited ownership of productive agricultural assets like large livestock or mechanized equipment. Regarding baseline balance, the randomization appears largely successful, with treatment and comparison groups showing nearly identical means across most categories. Only three statistically significant imbalances emerge: the treatment group has higher ownership of large livestock (8% vs 5%) and small livestock (43% vs 34%), while the comparison group owns slightly more non-agricultural land (17% vs 13%), with standardized differences ranging from 0.11 to 0.18.

Figure 8. Household Asset Ownership



Note: N=1,514. Observations are clustered at the community level. Region indicators included as controls in the regressions. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Qualitative data indicate that livelihood challenges affect both agricultural and non-agricultural activities. Farming is impacted by heavy rains, prolonged droughts, and plant diseases (such as swollen shoot disease in cacao), which frequently reduce harvests, create uncertainty, and make it difficult for families to generate a stable income from agriculture. Cacao production is increasingly perceived as unreliable, and respondents indicate that they are seeking other sources of income (e.g., rubber). In non-agricultural activities such as commerce, communities face saturated markets, lack of capital, inadequate infrastructure, and low consumer demand in rural areas, resulting in irregular sales.

Housing conditions. Housing ownership was widespread, with 95% of households owning both their house and lot, and just over half (52%) having electricity access. The dominant household fuel source across households was wood (86%), with a small but notable uptake of solar power in treatment households (3% T vs. 0% C, $p < 0.01$). In terms of construction, roofs were largely built with strong materials (83%), while walls were more commonly made of light materials (53%) and floors of cement (72%).

WASH. Overall, 74% of households reported access to an improved drinking water source, yet 74% did not treat their water, with chlorine use being the most common method among the minority who did (16%). While 65% of households had an improved toilet, the majority (51%) shared these facilities with other households, indicative of concerns about hygiene and privacy. Handwashing infrastructure was limited, with 64% of households lacking a designated handwashing point; among those that did, objects such as buckets, jugs or kettles were most common (35%). Of the observed handwashing facilities, 65% had water available and 63% had bar or liquid soap, indicating gaps in consistent access to both. There were no significant differences in the treatment and comparison arms for most WASH indicators.

Education, literacy, and numeracy

While women's literacy skills in French are limited, they appear to struggle more with reading and reading comprehension as compared to listening comprehension tasks. In addition, most struggle with arithmetic tasks such as addition, multiplication, and division.

Education levels

Educational attainment contributes to modest literacy rates. According to qualitative self-reports, educational attainment levels among adults clustered around early primary grades (CP1–CM2), with fewer cases reaching lower secondary and very few reaching upper secondary. Reported barriers to formal schooling included distance to schools (often 7–8 km), the opportunity costs of agricultural and domestic labor, and direct and indirect schooling costs. Educational infrastructures underline the geographic challenges to accessing formal education:

treatment communities have significantly fewer government primary schools (58% vs 74%, $p < 0.05$) but slightly more government secondary schools (7% vs 1%, $p < 0.1$).

Gendered barriers to education were also recurrent. In interview data, women were more likely than men to report limited schooling and weaker literacy. Participants attributed this to persistent norms that deprioritized girls' education, competing care and work burdens, shame/fear of ridicule, and in some settings spousal opposition to attending classes. These factors collectively narrowed women's perceived opportunities to improve literacy/ and numeracy skills.

Literacy skills

How did we test literacy?

We tested literacy skills in French by administering four modules:

- **Listening comprehension** - Oral language comprehension and vocabulary (the ability to understand spoken language)
- **Reading Familiar Words** - Sight word recognition and whole word reading (recognizing known words automatically)
- **Reading Made-up Words** - Phonological decoding/phonics skills (the ability to sound out unfamiliar words using letter-sound relationships)
- **Reading comprehension** - Reading comprehension and meaning-making from text (integrating decoding with language comprehension to understand written material).

Our literacy assessment is grounded in well-established theoretical frameworks and evidence-based practices from reading research. The assessment structure directly reflects the Simple View of Reading (Gough & Tunmer, 1986), which posits that reading comprehension is the product of two essential components: decoding (word recognition) and language comprehension. The modules systematically measure decoding skills through letter sound knowledge, familiar word reading, and pseudoword decoding, while separately assessing language comprehension through listening comprehension, before evaluating their integration in the reading comprehension module.

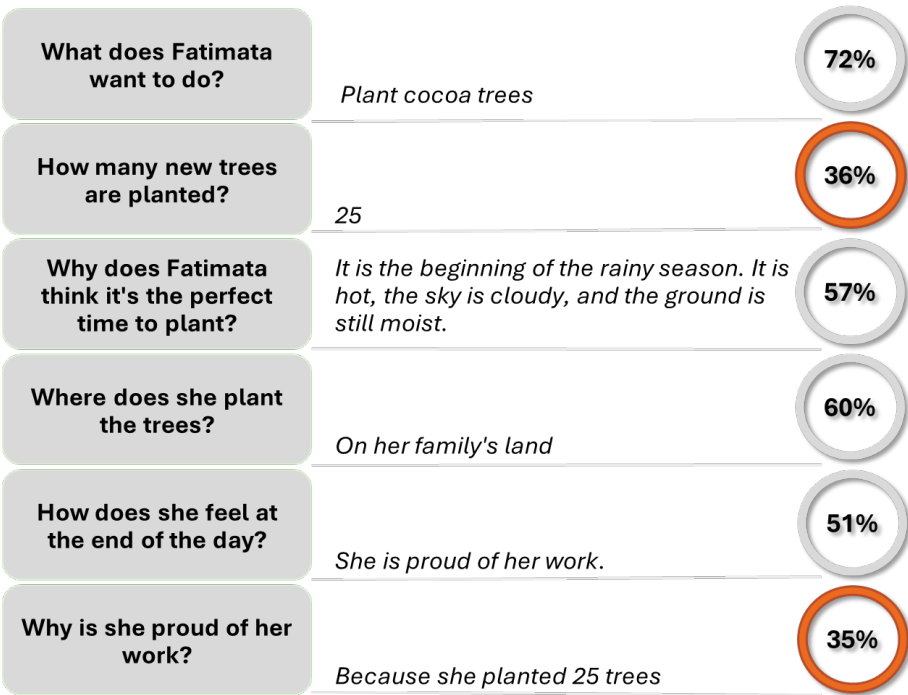
The assessment also aligns closely with the five essential components of reading identified by the National Reading Panel (2000)—phonemic awareness, phonics, fluency, vocabulary, and comprehension—and incorporates Scarborough's Reading Rope model (2001) by measuring both word recognition strands and language comprehension strands.

The specific tasks employed, including oral reading fluency with familiar words, pseudoword decoding, and listening comprehension as a distinct measure, represent internationally recognized assessment methods used in tools like DIBELS (Dynamic Indicators of Basic Early Literacy Skills), EGRA (Early Grade Reading Assessment), and PIRLS (Progress in International Reading Literacy Study), making this a theoretically sound and evidence-based approach to measuring literacy development.

Women demonstrated modest literacy outcomes. On listening comprehension, respondents correctly answered 52% of questions about a story they heard (Figure 9). The lowest performance was observed in questions requiring recall of numeric details, such as identifying how many trees were planted (36%), underscoring challenges in processing and retaining numeric content within a spoken passage. No significant differences were noted in the treatment and comparison group in this task.

Listening Comprehension Passage
"It is the beginning of the rainy season. Fatimata wants to plant some cocoa trees today. The holes are ready for the new trees to be planted. The weather is warm, the sky is cloudy, and the soil is still moist from the rains of last week. Fatimata thinks it is the perfect time for planting. Fatimata spends the day planting the new trees in her family's lot. She plants 25 new trees. At the end of the day, she feels proud of their work"

Figure 9. Listening Comprehension Test Scores

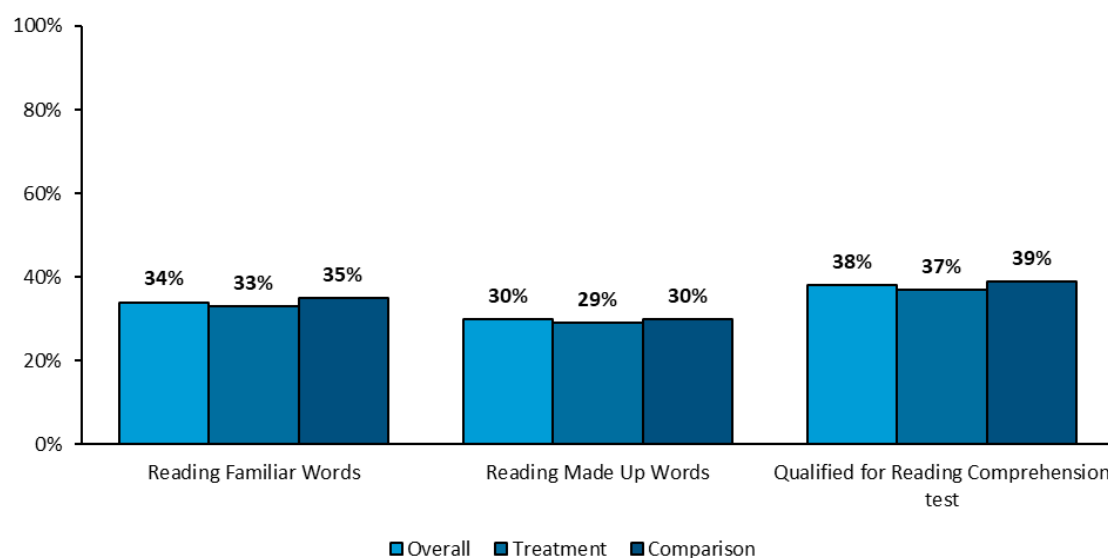


Note: N=1,514. Observations are clustered at the community level. Region indicators included as controls in the regressions. * $p<0.1$; ** $p<0.05$; *** $p<0.01$

On average, women attempted to read 14 to 16 words within 5 minutes, or only about three words per minute. Overall, reading proved particularly challenging, with scores of 34% for reading familiar words and 30% for reading made up words. The low average performance reflects two distinct groups in the data: More than half the sample were unable to read the first

line of familiar words (56%) and made-up words (59%). However, among those who correctly read the first line, performance improved substantially, with average scores of 78% (familiar words) and 73% (made-up words). Only 38% of the sample qualified to attempt the reading comprehension test (by scoring more than five correct in word recognition; Figure 10). Their average score on the comprehension questions was 58%, underscoring both limited progression to higher-level literacy tasks and moderate comprehension ability among those who took the test.

Figure 10. Reading Familiar and Made-Up Words Test Scores



Note: N=1,514. Observations are clustered at the community level. Region indicators included as controls in the regressions. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Respondents are aware of their literacy challenges, rating their skills in reading and writing in French as low to moderate in interviews and focus groups. They broadly found their oral comprehension to be stronger than their expressive ability. Signing one's name was common, but composing words and sentences was often described as effortful, error-prone, or limited to first letters.

Women widely associated literacy and numeracy skills with personal autonomy and upward social mobility, even among those who self-reported low literacy levels. Adults expressed sustained interest in functional literacy (reading, writing, basic math), with some seeking spoken French and phone-based skills to manage transfers and communication.

Mobile phones emerged as another prominent motivator for improving literacy skills. Many qualitative respondents identified value in phones for mobile money and messaging, but written interfaces in French led many to rely on relatives or service points for banking

operations and written communication. These attitudes suggest high potential for interest in short, proximate sessions that normalize error and embed instruction in everyday routines (markets, AVEC tasks).

Numeracy skills

How did we test numeracy?

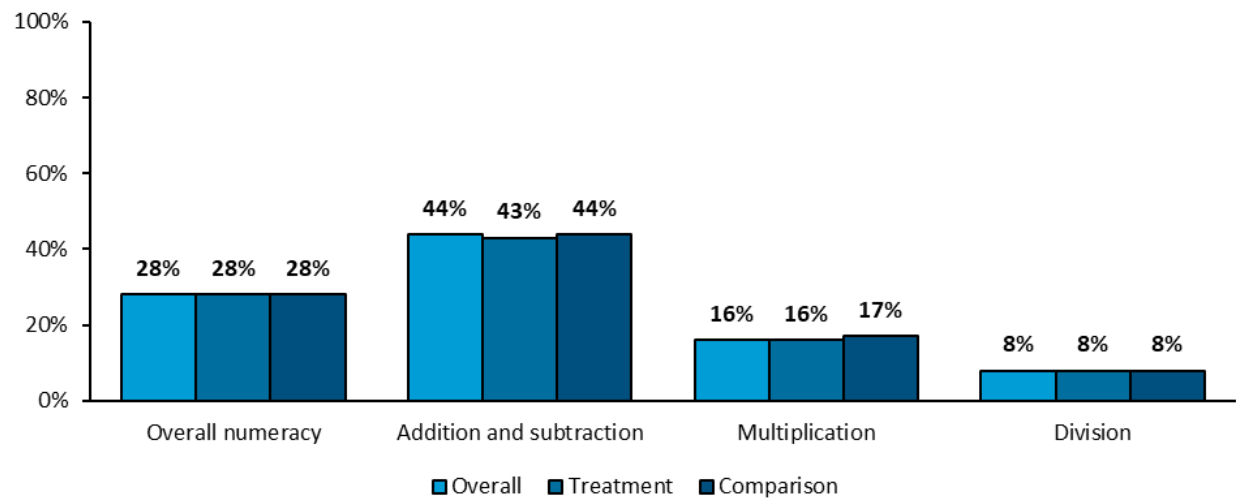
The numeracy module assesses basic mathematical competency through a hierarchical set of 16 arithmetic problems of increasing difficulty. Respondents solve problems involving the four basic operations—addition, subtraction, multiplication, and division—starting with single-digit calculations (e.g., 7+2, 8-3) and progressing to more complex multi-digit operations (e.g., 408+157, 514-286, 124×13, 375÷15).

Respondents can use their fingers, paper and pencil, or mental math to solve the problems.

This progressive difficulty structure allows the assessment to capture a wide range of numeracy skills, from basic number sense and arithmetic fluency to more advanced computational proficiency with larger numbers and operations.

Overall, women scored 28% in the numeracy section (Figure 11). Respondents performed better on addition and subtraction tasks (44%) compared to multiplication (16%) and division (8%).

Figure 11. Numeracy test scores



Note: N=1,514. Observations are clustered at the locality level. Region indicators included as controls in the regressions. * $p<0.1$; ** $p<0.05$; *** $p<0.01$

Qualitative participants frequently discussed numeracy as a practical necessity in market contexts, using arithmetic skills for exercising key business management skills, such as selling

and purchasing, record keeping, financial management, and accessing mobile money and banking services. While participants commonly reported using addition and subtraction in market transactions, multiplication/division and doing calculations in French posed challenges. Several informants emphasized that recognizing numbers and computing felt easier in local languages; some also reported selective use of calculators/phone calculators to bridge gaps.

Digital context and skills

A majority of women have access to smartphones and use them for communication and social media purposes. They report lacking digital skills, however, and face barriers to using phones as productive assets.

Smartphone ownership

Little over 84% of women in our sample currently own a smartphone. Sixty percent of women own a smartphone by themselves, while an additional 24% own a smartphone jointly with someone else (i.e., shared ownership). Around 16% of women do not currently own a smartphone but can borrow one from a relative/friend or are interested in acquiring one within the next six months.

There are differences between owning and sharing a phone, according to focus group participants. Those who share a phone with a family member noted they have limited access to the phone, only a few times per month or in the evenings after finishing domestic chores. Building digital skills, they noted, is more difficult when sharing a phone.

Focus groups highlighted that most women who have smartphones acquired them within the past five years. Many women noted that their smartphone was gifted by a male relative (e.g., son, husband, brother), while those who purchased their own smartphones noted that they paid in installments, saving money for the phone over time.

*“They told me the price of the phone, but I didn’t have all of the money to buy it. So I chatted with the seller and I asked him: **Can I pay for this little by little?** He told me there was no problem with this, so every time I sold my goods, from my profits I might take out 5,000 CFA and give it to him. I come back, I sell, I count my money, and I bring him my profits....That’s how I paid for my phone and finally purchased it.” -VSLA member, Obié*

While most expressed an interest in owning a smartphone, the lack of literacy and digital skills, limited connectivity, and fear of losing or breaking their smartphone (i.e., investment risk) lessened respondents’ motivation to acquire one. Nonetheless, focus group respondents cited

affordability as the principal barrier to smartphone ownership, with smartphone prices ranging between 50,000 FCFA (90 USD) and 100,000 FCFA (180 USD). To a lesser extent, some women—especially older women—reported that they were happy with their basic phones and did not aspire to own a smartphone.

Smartphone utilization

Overall, 79% of women reported using a smartphone in the past month (77% treatment vs. 80% comparison), averaging 24 days of daily usage. TikTok (51%), WhatsApp (49%), and games (48%) were the most popular apps used by women.

Qualitative sessions confirmed that most adults use smartphones frequently (e.g., daily), primarily through audio-visual interfaces. In addition to apps like TikTok and Whatsapp, voice calls were another primary use of smartphones as well as using the phone’s built-in flashlight. A smaller subset reported using the camera and calculator and occasionally conducting Google searches for school or agriculture-related questions.

“Those who did not go to school mainly use TikTok and WhatsApp—even if they cannot read, they send voice notes, especially to exchange audio messages and watch videos.”

-Regional service provider, Haut Sassandra

Half of the women surveyed had made a financial transaction via phone in the prior 3 months (47% T vs. 52% C). Common mobile money platforms used included Orange Money (27%) and MTN Money (21%), while fewer than 8% used alternatives like MOOV Money, Djamo Money, or online banking. While many can understand SMS messages signaling an incoming transfer, far fewer send money on their own. In these cases, respondents reported relying on children, spouses, or mobile money agents at “cabines” or “points.” The extent to which these supports are accessible varies across communities, with 60% of localities surveyed having no access to mobile money agents (see *Service landscape*). Qualitatively, adult women and older adults more frequently reported relying on community supports to execute mobile money transactions. In many cases, these respondents associated this vulnerability with fears of security risks (e.g., short-changing at cash points or stealing PIN information), which results in a preference to maintain savings in cash and a hesitancy to keep balances.

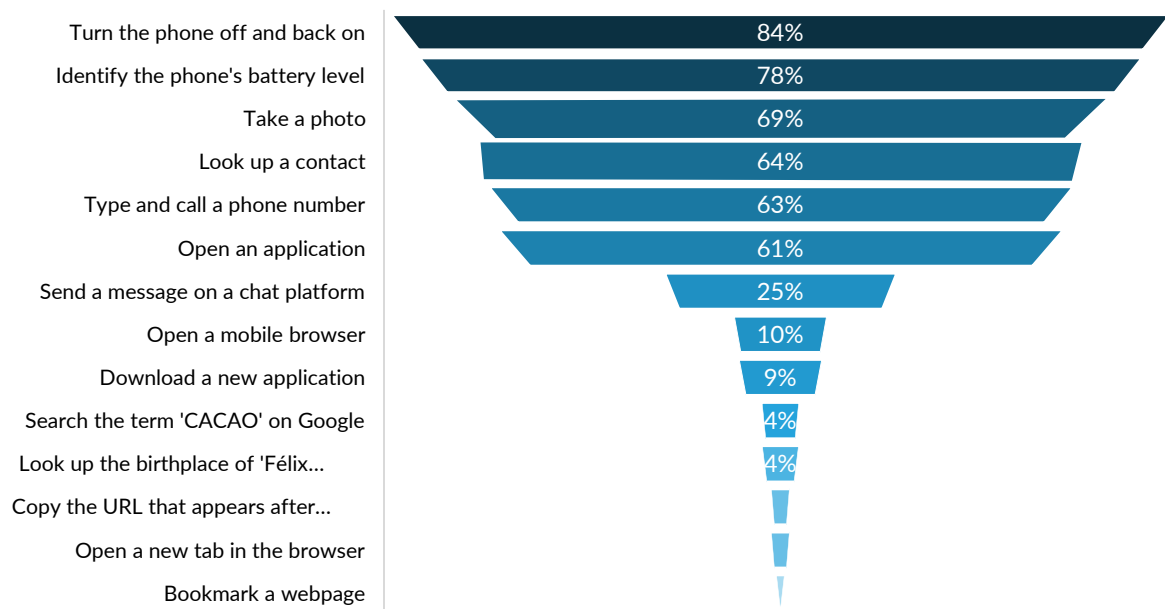
Non- or low-literate users are generally limited to calls, flashlight, voice notes, and agent- or family-assisted money tasks, whereas more literate or confident users are likelier to manage transfers themselves, search for information, coordinate groups, and handle small payments.

Several younger men reported having engaged in sports betting via smartphone apps, which they also framed as an opportunity for extra income. AVEC leaders and promoters show somewhat higher functional use (e.g., calculators, group coordination) yet still commonly prefer in-person cash points.

Digital skills

Smartphone proficiency was lower in the treatment arm, particularly for tasks such as identifying battery level (74% T vs. 81% C , $p<0.01$), typing and calling a number (60% T vs. 66% C , $p<0.05$), opening an application (58% T vs. 64% C , $p<0.05$), and sending a chat message (23% T vs. 27% C , $p<0.1$). Notably, only 10% of the sample could open a web browser, highlighting very low internet use proficiency (Figure 12).

Figure 12. Digital skill competencies (treatment and comparison average)



In qualitative data, about half of respondents reported feeling unsatisfied with their digital skills and expressed a desire for additional skills. In addition to quantitatively testing digital competencies, we also assessed skills qualitatively through an observation exercise, finding that participants began to feel overwhelmed with more complex tasks involving several menus, pages, or navigation skills (Figure 13). Women and men remain motivated, however, and expressed interest in doing tasks such as making phone calls, reading messages, managing mobile credit and mobile money, e-commerce, and searching for information online.

Figure 13. Qualitative assessment of women’s digital skills



Social gender norms

Gender norms around mobility, time use, and livelihoods indicate the usefulness of a tool like MoussoBara which meets women in their work and home spaces with literacy and livelihood trainings. Gender norms related to women’s digital use, however, may limit digital access and affect the uptake of the application.

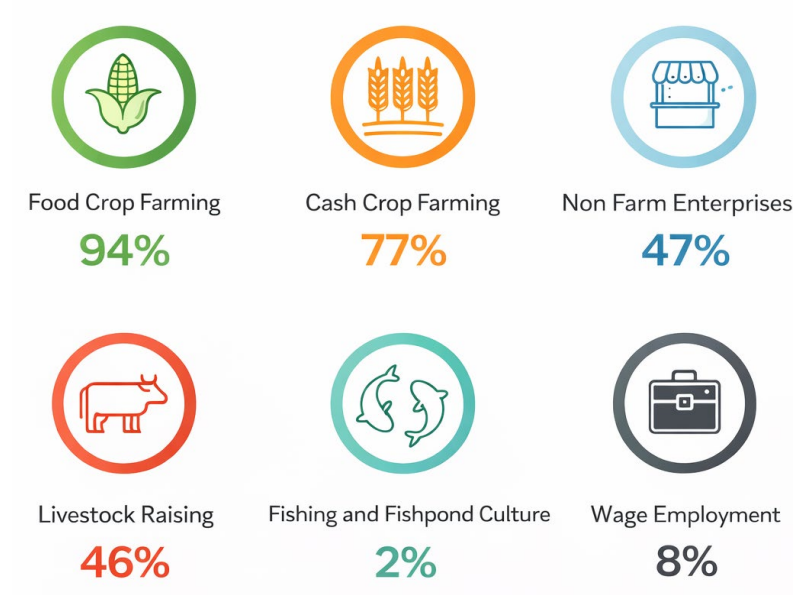
Mobility and time use. Gender roles typically limit mobility for women, who spend most of their time in and around the home managing household duties and raising children. Other locations where it was acceptable and common for women to go were the market and fields. Respondents noted that men have more freedom to move around the village and between towns for their work and leisure.

As others have written about the Cote d’Ivoire context (Dioffo & Ouattara, 2020; Hugues, 2020), focus group participants highlighted that women typically face extensive time constraints. In addition to taking care of the household and children, they are traditionally expected to work the family’s land (e.g., cacao plantation) as well as work their personal income streams (e.g., commerce).

Livelihood and Economic Gender Norms. Nearly all women in the sample engage in at least one productive activity (Figure 14). The most prevalent is food crop farming, practiced by 94% of women, followed by cash crop farming at 77%. Just under half of women participate in non-farm economic activities like small-scale commerce, while fewer than 10% engage in wage employment. These patterns reveal that women's economic contributions are multifaceted: while growing food crops for household consumption is nearly universal, women also play a

substantial role in generating income through both cash crop production and non-farm enterprises.

Figure 14. Women's Participation in Productive Activities



Most qualitative respondents believed that women and men have the same livelihood capabilities but that women are limited by the lack of savings and access to credit to take advantage of livelihood opportunities. Indeed, women were highly respected for being entrepreneurial and for acting quickly on business opportunities, but female respondents confirmed that they lacked the time, savings, and income to create substantial businesses.

Men generally farm cash crops such as cacao, corn, rubber, palm, and cashew while women primarily cultivate crops meant for local markets (e.g., eggplant, cassava, peppers), engage in small commerce, and operate restaurants (e.g., attiéké). This gendered division of activities is reinforced by access to land and time constraints which men and women experience differently. In most cultures in Cote d'Ivoire, land is passed down patrilineally.

“Men have a source of income. A small cacao or rubber plantation can enable him to easily buy a phone. Women have to manage on their own. If a man doesn’t give her a phone, she can’t get one.”

-Group Promoter, Tehiri

Because of the industries in which women work and their time constraints, respondents note that women's businesses are usually less profitable than those of men. This leads women to have limited income and limited prospects for repaying credit should they take a loan.

Digital Gender Norms. There is a disconnect between women's personal judgments and their perceptions of social norms regarding female autonomy in smartphone purchases. Women demonstrate gender bias in their own opinions, showing significantly less approval (7.8 percentage points) when a woman seeks to buy a smartphone compared to a man, regardless of the utilization scenario (Figure 15). However, this bias disappears entirely when women infer what their husbands or communities would think—they perceive no gender discrimination from these external sources. This suggests that women may internalize restrictive norms about female spending autonomy more strongly than they believe others actually hold them, potentially leading to self-censorship.

How did we test digital gender norms?

We explored gender norms and attitudes around smartphone utilization and purchase through vignettes. We randomly divided the sample into three hypothetical scenarios where an *individual* was deciding whether to spend their savings in buying a smartphone as it can:

- Scenario 1: Help with *mobile banking* by allowing money transfers.
- Scenario 2: Allow *social media* utilization and chat with friends.
- Scenario 3: Can be used to learn to *read and write*.

Within each scenario, we further randomly divided the sample into two halves: one where the *individual* was a woman and another where the *individual* was a man. There is a total of 6 combinations of the vignette, two per scenario. We then elicited our respondent's opinion on whether the individual should buy or not the smartphone, as well as what she thought would be the opinion of her spouse and her community.

The purpose of smartphone use is a critical legitimizing factor, particularly for perceived social approval. When the smartphone is framed as a tool for learning to read and write rather than for social media, women believe both husbands (8.6 percentage points more supportive) and communities (11.1 percentage points more approving) would view the purchase more favorably. Mobile banking also increases perceived husband support, though it doesn't significantly shift perceived community opinion. Importantly, these "productive" justifications benefit men and women equally—there are no significant interaction effects, indicating that educational or financial uses legitimize smartphone ownership regardless of the buyer's gender.

Figure 15. Regression Results: Individual Should Spend Savings to Buy Personal Smartphone Women's Perceived Opinions

	(1)	(2)	(3)
VARIABLES	Hers	Husband's	Community's
Female	-0.078*	-0.005	-0.030
	(0.040)	(0.043)	(0.043)
Read/Write	0.041	0.086**	0.111***
	(0.041)	(0.044)	(0.041)
Mobile Banking	0.046	0.079*	0.059
	(0.041)	(0.046)	(0.042)
Read/Write*Female	0.025	-0.015	-0.050
	(0.053)	(0.055)	(0.058)
Mobile Banking*Female	0.016	-0.041	0.016
	(0.062)	(0.066)	(0.062)
Constant	0.617***	0.504***	0.497***
	(0.029)	(0.030)	(0.030)
Observations	1,514	1,514	1,514
R-squared	0.125	0.072	0.101

Cluster-robust standard errors in parentheses. Region fixed-effects.

*** p<0.01, ** p<0.05, * p<0.1

There are notable differences in the qualitative data between how men and women are perceived to use smartphones. Phones are perceived by most as a tool for business and for accessing entertainment. However, the perception of smartphone use for entertainment is more strongly attributed to women's use of the phone, especially as it pertains to internet-enabled phones.

"[Women] don't use their phones productively. They mostly prefer to download songs and watch videos. Most of them don't yet see the usefulness of a phone beyond music or videos." -VSLA Group Leader, Yedeke

In fact, quantitative data showed that there is some substance to perceptions of greater social media use by women: In our sample, women were found to use their phones most often to

access TikTok, WhatsApp, and games (see *Smartphone utilization*). Qualitative accounts indicate that TikTok and Facebook, in particular, are likely to be seen as a distraction, waste of time, and an unproductive use of the phone. Some female respondents noted that the phone is one of few sources of leisure available to them; however, negative attitudes toward women's leisure extend to the smartphone, with both men and women reporting that women who consistently use their phones for entertainment are neglecting their household management, child rearing, and economic activities.

Due to their social media use, women's use of smartphones is sometimes treated with suspicion and distrust by their family members (e.g., husband, in-laws) who suspect them of forming extramarital romantic relationships online. Rumors about couples who divorced over smartphone- and social media- related allegations circulated widely, with some women—especially older women—citing this as a reason they are hesitant to upgrade to an internet-enabled phone. As one husband of a VSLA member in Tehiri expressed, *“What I can't stand is when boys start sending them messages. I don't like that at all.”*

Poor digital skills among family members may contribute to the distrust, as accusations of hiding away or deleting photos and chats (things that can likely be verified by another user) were common in the stories of smartphone-induced conflicts. In this way, supporting the digital literacy of families and communities can be an important step in enabling women's smartphone use—albeit one that could facilitate the surveillance of women's online activity.

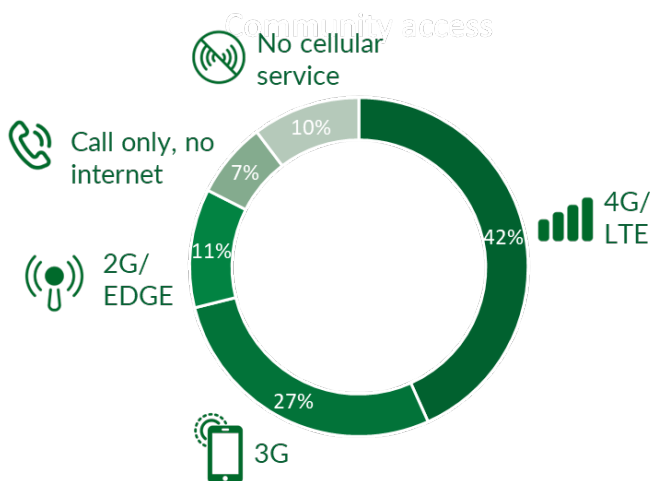
Women's lower literacy and digital skills are an important factor in perceptions of their digital use. Many respondents recognized that women were less capable of using their phones 'productively' (i.e., to support their economic activities) due to their relatively lower skills in literacy, numeracy, and using digital tools. They rather use audiovisual applications such as TikTok. The lack of literacy and digital skills led some women report little interest in upgrading their basic phone to a smartphone, saying they wouldn't be able to use the latter even if they had it.

Service landscape

Though basic digital connectivity exists in the majority of PRESEC communities, there are limited others supports and services in the areas of financial services, business registration, and literacy.

Community infrastructure. The communities present a mixed landscape of infrastructure and services. Most (80%) report having at least 2G cellular internet, but 3G connectivity was more common in comparison areas (19% vs 35%, $p < 0.05$; Figure 16).

Figure 16. Digital Connectivity in Sample Communities



Note: N=1,514. Observations are clustered at the locality level.
 Region indicators included as controls in the regressions. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. *2% of respondent's didn't know the available cell service in the community

Electricity through the public grid reaches 43% of communities, connecting about 74% of households. Fifty-nine percent of communities are accessible by motor vehicles year-round, though most roads (77%) are made of earth, reflecting infrastructural challenges.

Financial and Livelihood Services. Despite there being a number of microfinance institutions (MFIs) in southern Cote d'Ivoire, respondents cited CARE's VSLAs as the primary external support available in their communities. Only 40% of communities overall reported having access to mobile money agents, while banks (1%) are nearly absent. Microfinance services from providers like COOPEC, Baobab, MICROFEBE, and ADVANS are located only in larger villages and towns and are less accessible to rural populations like those sampled.

MFIs like ADVANS have increasingly offered digital services to address this need, but respondents did not appear aware of digital banking/MFI services. This is perhaps because other barriers keep them from feeling that banks/MFIs are accessible. For instance, respondents cited feeling that MFIs and banks are only useful at a certain income level. As one woman stated, *"After selling cocoa and from my business, we save a little, but it's not much, so we can't put it in a bank or microfinance account."* By contrast, VSLAs encourage savings in small increments, a format more accessible for many respondents.

Aside from distance and means, attitudes toward financial services constitute another key barrier. "[Rural populations] are often afraid of banks," according to a representative of

ADVANS, who highlighted that his institution recognizes the need for sensitization and financial education to improve the uptake of microfinance in rural areas.

VSLAs on the other hand, constituted a key form of support in communities. Nearly all women in the sample (99%) were active members of a credit, microfinance, or savings group,³ contributing on average once per cycle. Most women (62%) contributed between 1,000–2,500 CFA francs each time and the majority (77%) had accumulated individual savings of over 50,000 CFA francs. The primary motivations for participation include saving collectively (87%), gaining access to credit (66%), and fostering social support and cohesion (54%). Upon share-out, the majority intend to use their savings to start or invest in non-agricultural businesses (59%), followed by agricultural ventures (24%) and supporting children’s education (23%).

Business registration. Few communities have access to business registration services (3%). Further, women have limited understanding of the business registration process and benefits: In focus groups, many women had never heard of business registration, while those who knew of it often had incorrect information about it. For instance, some believed the government would provide financial support to registered businesses.

An ADVANS representative confirmed that business registration can be done online or in person, it requires an ID card, and it does provide certain benefits to entrepreneurs:

“Being legally recognized boosts the entrepreneur's credibility. They will be able to take advantage of certain opportunities, such as public or private contracts. For me, it's really essential for an entrepreneur to register their business.”

While it seems unlikely that women would spontaneously seek out business registration, the MousoBara intervention could support digital skill building which, if paired with targeted training, could support women’s formalization of their businesses.

Adult literacy services. At present, literacy services are provided by both the Ministry of Education, Literacy, and Technical Training as well as the Ministry of Women, Family, and Children (MFFE) who operate training centers throughout the country, including in the regions of data collection. We observed that time scarcity, small fees (e.g., per-session payments), fear of embarrassment, limited proximity to centers, and shortage of instructors were the primary barriers to seeking remedial literacy instruction.

³ Being a member of a VSLA was an inclusion criterion for the household survey.

Women and men expressed a desire for literacy training insofar as it would help support their economic livelihoods. A departmental MFFE respondent echoed this sentiment, saying,

“We need to take into account the fact that adults are already very busy. They cannot follow a traditional program like the one offered in formal schools... It's about implementing functional literacy, directly linked to their daily activities, so that it's really useful.”

The respondent recommended sector-specific literacy training, for instance, supporting the unique needs of smallholder farmers, merchants, and restaurateurs.

Conclusions

We compare treatment and control groups at baseline to assess whether randomization achieved balance across outcomes and background characteristics. The randomization appears successful: only a few indicators show statistically significant differences between groups, and these differences are not substantively meaningful (< 0.2 SMD). Additionally, given the large number of statistical tests conducted, we expect some significant results to emerge by chance alone.

Below, we revisit the research questions to indicate conclusions emerging from the study findings.

What are female VSLA members' competencies related to literacy and numeracy?

While UNESCO (2021) found 41% of women and 54% of men to be literate in Cote d'Ivoire, this study points to the extent of the challenges faced by adults in rural cacao-producing communities. Over half of women cannot read the first five-item line of familiar (56%) and made-up words (59%), leading to overall test scores of 34% for reading familiar words and 30% for reading made up words. Women with relatively stronger reading skills (who attempted at least five words during each test) demonstrated stronger word recognition skills, but they read at a slow speed at 3 words per minute, placing them still well below CP1 (Grade 1) reading level according to the Côte d'Ivoire curriculum.

In terms of numeracy, women have stronger addition and subtraction skills, but those scores remain low at 44%. Test scores in multiplication (16%) and division (8%) suggest even more room for improvement.

Qualitative data highlights how limited opportunities to access formal education contributed to low literacy outcomes, but it suggests that women and men are highly motivated to acquire literacy skills which will support their business activities and digital use.

What are female VSLA members' competencies related to digital access, skills, and digital service utilization?

Smartphones are prevalent, with 84% of women either owning or sharing a smartphone and 79% saying they had used one within the past 30 days. They commonly use smartphones to access social media (e.g., TikTok), communicate, play games, use the phone's hardware (e.g., flashlight), and transact through mobile money. The most used mobile money vendors were Orange Money (27%) and MTN Money (21%), and many women reported relying on pay point agents or family members to help them conduct transfers.

While most respondents reported they could identify the battery level (78%) and type and call a phone number (63%), they lacked skills in sending a chat message (23%) and opening a web browser (1%). Digital skill development can support the uptake more advanced uses of the phone, enabling women to employ the phone as a productive tool in addition to a source of entertainment.

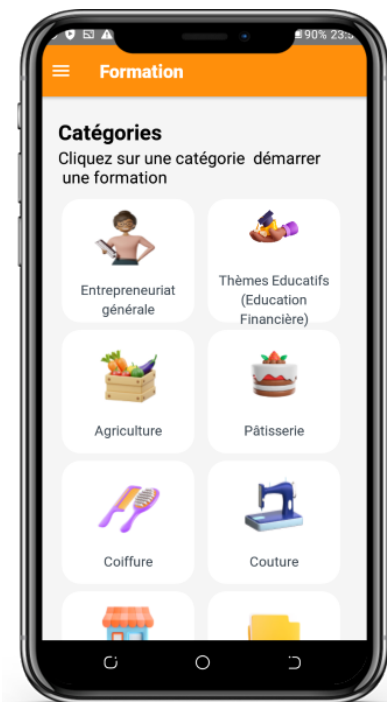
What are potential barriers to and facilitators of the future effectiveness of MoussoBara?

The primary barrier to MoussoBara uncovered in this study are the extensive skills gaps related to literacy, numeracy, and to a lesser extent, digital skills. The modest scores in reading, listening, and calculation indicate that MoussoBara would need to support a broad range of skills to achieve its outcomes in these domains. While challenging, the application is well designed to support letter recognition, word-sound association, vocabulary expansion, and calculation— all while engaging users in developing their digital skills. Indeed, a basic level of digital skill is required for using MoussoBara (e.g., opening the app, navigating through the modules), but it is clear from the study findings that informal helpers are often nearby to support learners in the early stages of using MoussoBara.

A more difficult barrier to surmount is that of digital network infrastructures; though 80% of communities had at least 2G connectivity, this leaves nearly 20% unconnected. While the application can operate offline once downloaded, it is unclear if women’s interest changes for the offline or online versions.

Key facilitators of MoussoBara stem from its design as a learning tool for gaining practical skills. Women view smartphone purchases as more acceptable when the phone is framed as a tool for learning to read and write or a tool for mobile banking. In addition, women and men appear especially motivated to access literacy training tools when they are tailored to supporting their livelihood activities. MoussoBara features some sector-specific entrepreneurship module (Figure 17)—though not all sectors have been developed—alongside its literacy and numeracy modules, maximizing its likelihood of being perceived as a positive use of time and allowing it to be leveraged as a justification for purchasing a smartphone.

Figure 17. MoussoBara Livelihood training modules



How does MoussoBara complement existing services available to female VSLA members?

VSLAs provide crucial livelihood support in PRESEC communities, where there are few other NGOs or government organizations providing services directly. Rather, accessing services like business registration, banking, and remedial education require travel to larger towns or cities, often on earth roads. Paired with women’s limited mobility and time for learning, geographic

isolation factors further underline the usefulness of mobile learning opportunities like MoussoBara.

AIR will conduct an endline evaluation in 2026 to assess the impact of MoussoBara and learn more about preferences and experiences with the application, providing more information on some of the topics raised in this report.

Recommendations

While MoussoBara is aligned to many of the needs of its potential users, the following recommendations emerged from the baseline findings and may support the future uptake and effectiveness of the tool. We structure them according to recommendations for the rollout of MoussoBara, for the application design, and for the broader implementation process.

Recommendations for MoussoBara Rollout:

- For users residing in communities with no internet services (17%), highlight the ability to use the app offline and encourage download of content. Consider providing mobile routers during VSLA meetings to overcome internet cost barriers and facilitate downloading of content.
- Consider rolling out MoussoBara over several sessions, to cover topics such as smartphone manipulation, dealing with error (e.g., how to navigate on the smartphone when one is stuck), and digital safety (Herlitz & Harden, 2021). For instance, onboarding should build basic skills like opening an app and finding a contact, while also promoting PIN hygiene, never-share-codes norms, and balance verification after mobile transactions (Mazer et al. 2025).
- Pair MoussoBara rollout with training on specific digital tools such as business registration and mobile banking to support the practical application of digital and literacy skills for livelihoods.

Recommendations for Application Design:

- Pair reading comprehension tasks in the app with math problems (e.g., read a short passage, then answer a math question based on it) to provide dual benefits and increase proficiency in numeracy.
- Develop in-app content on digital skills and services to support users in mastering digital environments and connecting with practical digital services. Additional modules should

include content on digital safety, or the ability to identify and assess risks connected with online activity (Herlitz & Harden, 2021).

- Populate all sector-specific entrepreneurship modules with interactive and tailored livelihood content.

Recommendations for Broader Implementation:

- Encourage the involvement of MFIs in rolling out MoussoBara to increase app uptake, for instance by drawing on microfinance agents to conduct trainings and to refer new users to the application.
- Facilitate social events to motivate MoussoBara uptake and module completion. These could include community-level graduation ceremonies for those completing all literacy modules, all entrepreneurship modules, or submitting a viable business plan.⁴
- Provide VSLA group promoters and CARE field agents with regular updates on MoussoBara monitoring⁵ (e.g., completion of literacy, numeracy, and entrepreneurship modules) so they can provide on-ground support and follow-up.
- Conduct usability tests so that targeted users can provide direct feedback on bugs in the app and suggest interface changes which can support accessibility.

⁴ At present, the application provides users with a digital certificate of completion for literacy and business plan modules.

⁵ CARE operates a real-time database on application use.

References

- Abadie, A., Athey, S., Imbens, G. W., Wooldridge, J. W. (2023). When Should You Adjust Standard Errors for Clustering?. *The Quarterly Journal of Economics*, 138(1), pp. 1–35. <https://doi.org/10.1093/qje/qjac038>
- Ali, A., Raza, A. A., & Qazi, I. A. (2023). Validated digital literacy measures for populations with low levels of internet experiences. *Development Engineering*, 8. <https://doi.org/10.1016/j.deveng.2023.100107>
- Arnold, J. (2020). *Digitizing Savings Groups: Evidence from Tanzania*. Washington, DC: The International Center for Research on Women.
- Assielou, N. G., & Bourgault, M. (2024). Critical factors inhibiting information and communication technology (ICT) adoption in Côte d'Ivoire: a study of small and medium enterprises (SMEs) in metropolitan Abidjan. *International Journal of Technology, Policy and Management*, 24(1), pp. 19-49. DOI: 10.1504/IJTPM.2024.10055762
- CARE. (n.d.a). *The importance of Village Savings and Loans Associations*. CARE International. <https://www.care-international.org/what-we-do/womens-economic-justice/village-savings-and-loans-associations>
- CARE. (2023). Beyond the Box: Village Savings and Loan Association, Annual Report 2023. CARE. <https://www.care.org/news-and-stories/resources/beyond-the-box-fy23-global-vsla-annual-report/>
- Dioffo, B. S., & Ouattara, M. (2020). *Analyse genre dans les régions cacaoyères de Côte d'Ivoire : Revue documentaire pour le projet IRGECC*. CARE International.
- Gough, P. B., & Tunmer, W. E. (1986). Decoding, reading, and reading disability. *Remedial and Special Education*, 7(1), 6-10. <https://doi.org/10.1177/074193258600700104>
- GSMA. (2017, April). *Connected women: Mapping the mobile money gender gap: Insights from Côte d'Ivoire and Mali*. GSMA. <https://www.gsma.com/solutions-and-impact/connectivity-for-good/mobile-for-development/wp-content/uploads/2017/04/Mapping-the-mobile-money-gender-gap-Insights-from-Cote-d%E2%80%99Ivoire-and-Mali.pdf>

- GSMA. (2023). *The state of mobile internet connectivity 2023*. GSMA. <https://www.gsma.com/r/somic/>
- GSMA. (2024). *The mobile gender gap report 2024*. GSMA. <https://www.gsma.com/r/gender-gap/>
- Herlitz, L., & Harden, A. (2021). *Can the use of technology help to reduce social isolation and loneliness? An in-depth study of digital inclusion projects for older people before and during the COVID-19 pandemic*. Institute for Connected Communities, University of East London; City, University of London.
- Hugues, K. K. (2020). Sustainability in the Cocoa Production Chain in Côte d'Ivoire: Schooling, Women Empowerment and Household Living Condition. *Open Journal of Social Sciences*, 8, 191-208. <https://doi.org/10.4236/jss.2020.88017>
- Innovations for Poverty Action (IPA). (2019). *Building resilience through financial inclusion: A review of existing evidence and knowledge gaps*. IPA. Financial Inclusion Program. <https://poverty-action.org/sites/default/files/publications/Building-Resilience-through-Financial-Inclusion-English.pdf>
- Kaba, B. & Meso, P. (2022). Socioeconomic status and digital inequality: lessons from Cote D'Ivoire. *Information Technology for Development*, 28(2), pp. 397-419. <https://doi.org/10.1080/02681102.2021.1962234>
- Karakara, A. A.-W., Daudu, A. K., & Koomson, I. (2024). Digital Literacy and Financial Inclusion Among Smallholder Farmers: Exploring Gender Dichotomy in Cote d'Ivoire and Nigeria. In I. Koomson and R. A. Villano (eds.), *Financial Inclusion and Sustainable Rural Development*, Sustainable Development Goals Series. https://doi.org/10.1007/978-981-97-6132-6_9
- Mazer, R., Bird, M., Kamwesigye, A., & Massie, J. (2025, March 28). How interactive storytelling is protecting Ugandans from mobile money fraud. Innovation for Poverty Action. <https://poverty-action.org/how-interactive-storytelling-protecting-ugandans-mobile-money-fraud>
- National Reading Panel. (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. National Institute of Child Health and Human Development. <https://www.nichd.nih.gov/publications/pubs/nrp/smallbook>

Organisation for Economic Co-operation and Development (OECD). (2022). *Institutions sociales et égalité femmes-hommes en Côte d'Ivoire: Rapport pays SIGI*. OECD.
<https://doi.org/10.1787/169fd5da-fr>

Scarborough, H. S. (2001). Connecting early language and literacy to later reading (dis)abilities: Evidence, theory, and practice. In S. B. Neuman & D. K. Dickinson (Eds.), *Handbook of early literacy research* (Vol. 1, pp. 97-110). Guilford Press.

UNESCO. (2019). *I'd blush if I could: Closing gender divides in digital skills through education*. UNESCO and EQUALS Skills Coalition.
<https://unesdoc.unesco.org/ark:/48223/pf0000367416>

UNESCO. (2021). *Global Alliance for Literacy country profiles: Côte d'Ivoire*. UNESCO Institute for Lifelong Learning.
<https://www.uil.unesco.org/sites/default/files/medias/files/2022/03/GAL%20Country%20profile%20-%20Co%CC%82te%20d%27Ivoire.pdf>

UNESCO. (2022). *Citizenship education: Empowering adults for change* [Fifth global report on adult education and learning]. UNESCO Institute for Lifelong Learning.
<https://www.uil.unesco.org/en/grale5>

UNESCO. (2024). *Cote d'Ivoire: Education country brief*. UNESCO International Institute for Capacity Building in Africa. <https://www.iicba.unesco.org/en/node/78>

Appendix A. Additional Information on Methodology

Quantitative methods

Our quantitative approach assesses the causal impacts of MousoBara through a cluster Randomized Controlled Trial. The evaluation sample is composed of 150 communities located across 10 regions in southern Cote d'Ivoire. Half of the communities were randomized into treatment, and the remaining half were assigned to control. The randomization is stratified by region, to ensure that communities of similar characteristics are evenly distributed across treatment arms. At baseline, we interviewed a total of 1,514 women, or about 10 women per community (See Exhibit A-1).

Exhibit A–1. Quantitative Sample

Region	Number of Treatment Communities	Number of Control Communities	Number of Treatment Women	Number of Control Women
Gbokle	11	11	110	113
Goh	10	10	101	100
Guemon	4	4	40	40
Haut Sassandra	5	5	50	50
Indenie Djuablin	5	5	54	52
Loh-Djibouah	9	9	90	90
Marahoue	7	7	71	70
Nawa	6	8	60	80
San Pedro	13	13	130	131
Tonkpi	4	4	42	40
TOTAL	74	76	748	766

Women responded to a multi-topic survey covering individual and household demographics, agricultural production, productive capital, access to credit, and business and entrepreneurship,

among other. We also explored gender norms around smartphone utilization using vignettes. Furthermore, during the survey administration, we tested women’s digital, French literacy, and numeracy skills. Details of these testing modules can be found in the Study Findings section.

Qualitative methods

Our qualitative approach complemented the quantitative data by examining the social, cultural, and implementation-related factors which may affect the uptake and effectiveness of MousoBara. Qualitative data collection covered six communities spread across the cacao-producing regions where PRESEC is implemented (see Exhibit A-2). We employ focus group discussions (FGDs), in-depth interviews (IDIs), observations, and key informant interviews (KIIs) as core qualitative methods. In total, we conducted 12 FGDs, 31 KIIs, 12 IDIs, and 12 observations, as depicted in Exhibit A-3.

Exhibit A–2. Sampling locations of qualitative data collection

Region	Community
Gbokle	Dahiri
Goh	Tehiri
Haut Sassandra	Belleville
Loh-Djibouah	Obié
Marahoue	Gbalibonou
San Pedro	Yedeke

Exhibit A–3. Qualitative sample

Participant	Method	Number
Communities		
VSLA members	FGD	6 (1 per community)
Family of VSLA members	FGD	6 (1 per community)
VSLA members (allogènes and autochtones)	IDI + Observation	12 (2 per community)
Stakeholders		
Female VSLA leaders	KII	6 (1 per community)
Group promoters	KII	6 (1 per community)
CARE field agents	KII	3 (1 per region)
Traditional authorities or local leaders	KII	6 (1 per community)

Departmental-level administrators – IFEF ou DAAJE	EIC	3
National-level administrators - MFFE (2), DAAJE (1)	EIC	3
CARE	EIC	3
Financial service representatives (e.g., Advans, Ecobank)	EIC	1
Total: 12 DGs, 31 EICs, 12 EPs, and 12 Observations		

FGDs are a gathering of six to eight participants who share their perspectives in a semistructured, discussion-style format. This setting is ideal for capturing congruence and dissent of perspectives among a group of peers from a community. We conducted 12 FGDs at both baseline and endline, six with female VSLA members, and six with members of their families (e.g., husbands, mothers-in-law). In this baseline study, FGDs explored participants' strengths and needs as they relate to literacy, digital inclusion, and livelihoods, as well as social norms related to gender, digital use, and adult learning. At endline, we will use FGDs to explore those same topics, as well as women's implementation experiences and any perceived impacts connected with MoussoBara. During FGDs with family members, our methodology particularly explored their understanding of MoussoBara and inquire whether the intervention has introduced any change into household, family, and community dynamics. Further, we will probe about access to and sharing of mobile phones in the household, as CARE has indicated that many women borrow a family member's phone to use MoussoBara. This approach was informed by anecdotal evidence from Côte d'Ivoire which indicated that phone sharing can create tensions between spouses, so as women have a higher demand for phone usage, we determined that it was important to understand if this has led to an increase spousal conflict (GSMA, 2017).

In addition to FGDs, we conducted 12 IDIs with VSLA members who use MoussoBara to ask about their individual experiences with the tool. These IDIs collected detailed information at an individual level, and they were an ideal format for exploring sensitive topics and/or highly descriptive information about a participant's unique experience with a program. While FGDs with VSLA members included a mixture of allogène and autochtone women, in line with the makeup of the VSLA itself, we purposively sampled six allogène women and six autochtone women in each community for IDIs. These IDIs covered topics including participant's strengths and needs in areas of literacy, digital inclusion, and livelihoods, and social norms related to gender, digital use, and adult learning. We further probed to understand how migratory status intersects with these outcomes, and at endline, we will ask if these dynamics have changed over time, as women have developed literacy, numeracy, and financial skills through MoussoBara. For instance, it is possible that, if allogène women see their incomes grow with

the help of MousoBara and VSLAs, these changes may increase competition for resources (e.g., land) in the community and exacerbate allogène–autochtone tensions.

IDIs included an observational component, in which we observed each user’s interaction with their phone and MousoBara application (Ali et al., 2023). These observations allowed us to better understand the strengths of participants regarding digital use and to triangulate our observations with participants’ self-reports. Observations involved a checklist of tasks (e.g., type a phone number, open the MousoBara application, purchase phone credit) that participants were asked to complete in front of interviewers, followed by a few questions about the participant’s level of comfort and confidence with these tasks. Interviewers also recorded their qualitative observations from this activity, for instance, related to the length of time or anything said by the participant during the tasks.

Lastly, we conducted KIIs with key stakeholders who oversee MousoBara implementation, including VSLA group promoters, supervisors, and group leaders; community-level authorities; government staff at key ministries; CARE staff; and financial service providers. KIIs targeted individuals with privileged knowledge about program implementation, the community context, or other relevant topics, and these interviews are used to explore perceptions of an intervention from a particular vantage point. At baseline, we used KIIs to understand community-level perceptions and norms regarding literacy and e-literacy, and we examined how and to what extent MousoBara accounted for these in the program design and implementation. At endline, KIIs will explore the efficiency and effectiveness of implementation, as well as perceived impacts of MousoBara and plans for sustaining and scaling up the program.

To analyze the data from FGDs, IDIs, observations, and KIIs, we coded qualitative transcripts and notes in NVivo according to key concepts in the ToC, as well as emergent themes from the data. We characterized the prevalence of responses to identify key trends related to the research questions. At both baseline and endline, we triangulate qualitative findings with quantitative results and will validate these findings in consultation with our Côte d’Ivoire–based team members and the advisory group to ensure contextualization.

Fieldwork details

Fieldwork for the Mouso Bara Baseline Evaluation was conducted between 23 June and 10 July 2025. Quantitative data collection took place over this full period across ten regions, while qualitative data collection was conducted between 23 June and 2 July 2025 in six selected regions. All data collection activities followed established protocols and ethical guidelines, as described in the Ethical Research Approval section.

The fieldwork was implemented by a mixed-methods team comprising both quantitative and qualitative data collection staff. The quantitative team consisted of 27 enumerators, organized into teams led by designated team leaders, while the qualitative team included 5 moderators divided into two teams. Field activities were carried out under the supervision of staff from AIR and CARE Côte d'Ivoire, with oversight provided by the project management and field coordination team. Team leaders were responsible for ensuring adherence to data collection protocols, ethical standards, and real-time quality control throughout the fieldwork period.

Enumerator training was conducted over four days, from 16 to 19 June 2025, in in-person sessions held in Abidjan. All quantitative enumerators and qualitative moderators participated in a joint introductory session, followed by separate, specialized training streams. Training covered study objectives, research ethics, informed consent procedures, detailed review of data collection instruments, and practical role-play exercises. Enumerators were also trained in the use of digital data collection tools and participated in a supervised pilot exercise to reinforce learning and ensure readiness for field deployment.

Appendix B. Balance Tables

Below, we provide balance tables for the study, finding overall that the randomization was successful: only a few indicators show statistically significant differences between groups, and these differences are not substantively meaningful (< 0.2 SMD).

Exhibit B–1. Background Characteristics

	Mean (SMD)	SM Diff	N		
	All	Treat	Comparison		
Female head of household	0.13	0.14	0.12	0.03	1,514
	(0.34)	(0.34)	(0.33)	[0.05]	
Spouse head of household	0.77	0.75	0.79	-0.08	1,514
	(0.42)	(0.43)	(0.41)	[0.05]	
Total number of household members	9.01	9.00	9.03	-0.01	1,514
	(4.85)	(4.88)	(4.83)	[0.07]	
Total number of household members age 6+	7.37	7.34	7.40	-0.02	1,514
	(3.92)	(3.96)	(3.88)	[0.06]	
Number of household members 5 years or under	1.64	1.66	1.62	0.01	1,514
	(1.68)	(1.71)	(1.65)	[0.07]	
Number of household members 6 to 14 years	2.49	2.43	2.56	-0.07	1,514
	(1.85)	(1.76)	(1.94)	[0.06]	
Number of household members 15 to 64 years	4.53	4.57	4.49	0.03	1,514
	(2.64)	(2.77)	(2.50)	[0.06]	
Number of household members 65 years or older	0.35	0.35	0.35	-0.01	1,514
	(0.67)	(0.68)	(0.66)	[0.06]	
Number of household members 15 to 64 years: Men	2.21	2.29	2.14	0.09	1,514
	(1.59)	(1.71)	(1.47)	[0.06]	

Number of household members 15 to 64 years: Women	2.32	2.28	2.35	-0.05	1,514
	(1.51)	(1.49)	(1.52)	[0.06]	
Household members 5 years or under: Boys	0.53	0.53	0.53	0.00	1,514
	(0.50)	(0.50)	(0.50)	[0.06]	
Household members 5 years or under: Girls	0.53	0.52	0.54	-0.04	1,514
	(0.50)	(0.50)	(0.50)	[0.05]	
Household members 6 to 14 years: Boys	0.70	0.69	0.72	-0.07	1,514
	(0.46)	(0.46)	(0.45)	[0.05]	
Household members 6 to 14 years: Girls	0.70	0.71	0.69	0.04	1,514
	(0.46)	(0.46)	(0.46)	[0.05]	
Household members 15 to 64 years: Men	0.95	0.94	0.95	-0.05	1,514
	(0.23)	(0.24)	(0.21)	[0.06]	
Respondent age	40.70	40.69	40.71	-0.00	1,514
	(11.24)	(11.42)	(11.08)	[0.07]	
Respondent age 18-24	0.06	0.07	0.05	0.07	1,514
	(0.24)	(0.25)	(0.22)	[0.05]	
Respondent age 25-34	0.25	0.24	0.25	-0.02	1,514
	(0.43)	(0.43)	(0.44)	[0.06]	
Respondent age 35-44	0.34	0.33	0.35	-0.04	1,514
	(0.47)	(0.47)	(0.48)	[0.05]	
Respondent age 45-54	0.23	0.23	0.23	0.01	1,514
	(0.42)	(0.42)	(0.42)	[0.06]	
Respondent age 55-64	0.10	0.10	0.10	0.00	1,514
	(0.30)	(0.30)	(0.30)	[0.05]	
Respondent age 65+	0.02	0.03	0.02	0.03	1,514
	(0.15)	(0.16)	(0.15)	[0.05]	
Person 2 female	0.04	0.04	0.03	0.08	1,318
	(0.19)	(0.20)	(0.17)	[0.06]	
Person 2 age	50.67	51.02	50.33	0.06	1,318

	(12.24)	(12.19)	(12.29)	[0.06]	
Person 2 age 18-24	0.00	0.00	0.00	0.08	1,318
	(0.04)	(0.06)	(0.00)	[0.06]	
Person 2 age 25-34	0.07	0.06	0.08	-0.07	1,318
	(0.25)	(0.24)	(0.27)	[0.05]	
Person 2 age 35-44	0.27	0.26	0.28	-0.04	1,318
	(0.44)	(0.44)	(0.45)	[0.06]	
Person 2 age 45-54	0.30	0.31	0.28	0.07	1,318
	(0.46)	(0.46)	(0.45)	[0.06]	
Person 2 age 55-64	0.21	0.20	0.22	-0.04	1,318
	(0.41)	(0.40)	(0.41)	[0.06]	
Person 2 age 65+	0.16	0.17	0.15	0.05	1,318
	(0.37)	(0.37)	(0.36)	[0.06]	
Person 2 has attended school	0.52	0.50	0.53	-0.07	1,318
	(0.50)	(0.50)	(0.50)	[0.07]	
Person 2 attended some elementary school	0.39	0.40	0.39	0.02	679
	(0.49)	(0.49)	(0.49)	[0.08]	
Person 2 completed elementary school	0.15	0.14	0.16	-0.07	679
	(0.36)	(0.35)	(0.37)	[0.07]	
Person 2 attended some high school	0.30	0.32	0.29	0.07	679
	(0.46)	(0.47)	(0.46)	[0.08]	
Person 2 completed high school or further	0.11	0.08	0.13	-0.13*	679
	(0.31)	(0.28)	(0.33)	[0.07]	
Ethnicity: Akan	0.51	0.53	0.49	0.10	1,514
	(0.50)	(0.50)	(0.50)	[0.12]	
Ethnicity: Mandé	0.13	0.11	0.16	-0.16*	1,514
	(0.34)	(0.31)	(0.36)	[0.08]	
Ethnicity: Voltaic (Gur)	0.21	0.23	0.19	0.11	1,514
	(0.41)	(0.42)	(0.39)	[0.10]	
Ethnicity: Krou	0.11	0.08	0.13	-0.16	1,514
	(0.31)	(0.27)	(0.33)	[0.12]	

Married or Cohabiting	0.87	0.87	0.87	0.00	1,514
	(0.33)	(0.33)	(0.33)	[0.05]	
Divorced/Separated	0.03	0.02	0.03	-0.05	1,514
	(0.16)	(0.15)	(0.17)	[0.05]	
Widowed	0.06	0.05	0.06	-0.04	1,514
	(0.23)	(0.22)	(0.24)	[0.05]	
First language: French	0.04	0.04	0.05	-0.08	1,514
	(0.20)	(0.19)	(0.22)	[0.06]	
First language: Baoulé	0.43	0.45	0.42	0.08	1,514
	(0.50)	(0.50)	(0.49)	[0.11]	
First language: Moré	0.15	0.19	0.11	0.21**	1,514
	(0.36)	(0.39)	(0.31)	[0.10]	
Language spoken at home: French	0.04	0.04	0.05	-0.08	1,514
	(0.20)	(0.19)	(0.22)	[0.06]	
Language spoken at home: Baoulé	0.45	0.47	0.43	0.09	1,514
	(0.50)	(0.50)	(0.50)	[0.12]	
Language spoken at home: Moré	0.15	0.19	0.11	0.21**	1,514
	(0.36)	(0.39)	(0.31)	[0.10]	
Language spoken at market: French	0.78	0.78	0.78	-0.01	1,514
	(0.41)	(0.42)	(0.41)	[0.06]	
Language spoken at market: Baoulé	0.38	0.40	0.36	0.11	1,514
	(0.49)	(0.49)	(0.48)	[0.10]	
Language spoken at market: Moré	0.11	0.14	0.07	0.23**	1,514
	(0.31)	(0.35)	(0.26)	[0.09]	
Difficulty that impedes literacy (composite of vision, hearing, remembering/concentrating, communicating)	0.46	0.47	0.46	0.02	1,514
	(0.50)	(0.50)	(0.50)	[0.06]	
Severe difficulty that impedes literacy	0.04	0.04	0.03	0.03	1,514
	(0.19)	(0.19)	(0.18)	[0.06]	
Difficulty: Vision	0.29	0.29	0.28	0.02	1,513
	(0.45)	(0.45)	(0.45)	[0.06]	
Severe difficulty: Vision	0.00	0.00	0.00	0.05	1,513

	(0.03)	(0.04)	(0.00)	[0.05]	
Difficulty: Hearing	0.05	0.04	0.06	-0.08*	1,514
	(0.23)	(0.21)	(0.24)	[0.05]	
Severe difficulty: Hearing	0.00	0.00	0.00	0.05	1,514
	(0.03)	(0.04)	(0.00)	[0.05]	
Difficulty: Walking/Climbing Stairs	0.32	0.32	0.32	-0.00	1,514
	(0.47)	(0.47)	(0.47)	[0.06]	
Severe difficulty: Walking/Climbing Stairs	0.04	0.04	0.03	0.03	1,514
	(0.19)	(0.19)	(0.18)	[0.05]	
Difficulty: Remembering/Concentrating	0.26	0.27	0.26	0.03	1,514
	(0.44)	(0.44)	(0.44)	[0.06]	
Severe difficulty: Remembering/Concentrating	0.03	0.04	0.03	0.03	1,514
	(0.18)	(0.19)	(0.17)	[0.06]	
Difficulty: Dressing/Washing	0.04	0.05	0.04	0.07	1,514
	(0.20)	(0.21)	(0.19)	[0.06]	
Severe difficulty: Dressing/Washing	0.01	0.01	0.00	0.11**	1,514
	(0.08)	(0.11)	(0.05)	[0.05]	
Difficulty: Communicating	0.03	0.02	0.03	-0.06	1,514
	(0.16)	(0.14)	(0.17)	[0.05]	
Severe difficulty: Communicating	0.00	0.00	0.00	-0.09*	1,514
	(0.04)	(0.00)	(0.06)	[0.04]	

Notes: SMD estimated using linear regressions. Standard deviations for means are in parentheses; standard errors of SMD presented in square brackets. Observations are clustered at the community level. Region indicators included as controls in the regressions. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Exhibit B–2. Literacy

	Mean (SD)			SM Diff	N
	All	Treat	Comparison		
Listening Comprehension (%) Out of 6	0.52	0.52	0.52	-0.00	1,514
	(0.32)	(0.32)	(0.32)	[0.07]	
Reading Familiar Words -First line incorrect	0.56	0.57	0.55	0.04	1,514
	(0.50)	(0.50)	(0.50)	[0.07]	

Average number of words attempted (Out of 55)	16.38	16.13	16.63	-0.03	1,514
	(16.65)	(16.55)	(16.76)	[0.07]	
Reading Familiar Words (Correct/Attempts) [Sample that correctly read first line of words]	0.78	0.77	0.78	-0.03	667
	(0.27)	(0.26)	(0.27)	[0.09]	
Reading Familiar Words (Correct/Attempts) [Full sample]	0.34	0.33	0.35	-0.04	1,514
	(0.42)	(0.42)	(0.43)	[0.06]	
Reading Made Up Words- First line incorrect	0.59	0.60	0.58	0.04	1,514
	(0.49)	(0.49)	(0.49)	[0.07]	
Average number of words attempted (Out of 50)	13.88	13.70	14.05	-0.03	1,514
	(13.41)	(13.35)	(13.47)	[0.07]	
Reading Made Up Words Score (Correct/Attempts) [Sample that correctly read first line of words]	0.73	0.74	0.73	0.02	614
	(0.27)	(0.26)	(0.27)	[0.09]	
Reading Made Up Words Score (Correct/Attempts) [Full sample]	0.30	0.29	0.30	-0.03	1,514
	(0.40)	(0.40)	(0.40)	[0.06]	
Attempted Reading Comprehension test	0.38	0.37	0.39	-0.04	1,514
	(0.49)	(0.48)	(0.49)	[0.06]	
Reading Comprehension Score % Out of 7 [Sample that qualified after reading words and non-words]	0.58	0.59	0.58	0.02	574
	(0.31)	(0.32)	(0.31)	[0.08]	
Numeracy (%) Out of 16	0.28	0.28	0.28	-0.02	1,514
	(0.20)	(0.19)	(0.20)	[0.06]	
Addition and subtraction Score (%) Out of 8	0.44	0.43	0.44	-0.01	1,514
	(0.26)	(0.25)	(0.26)	[0.06]	
Multiplication Score (%) Out of 4	0.16	0.16	0.17	-0.05	1,514
	(0.23)	(0.23)	(0.24)	[0.06]	
Division Score (%) Out of 4	0.08	0.08	0.08	-0.00	1,514
	(0.17)	(0.16)	(0.17)	[0.05]	

Notes: SMD estimated using linear regressions. Standard deviations for means are in parentheses; standard errors of SMD presented in square brackets. Observations are clustered at the community level. Region indicators included as controls in the regressions. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Exhibit B–3. Household Asset Ownership

	Mean (SD)			SM Diff	N
	All	Treat	Comparison		
Categories of Assets Owned by HH	6.36	6.37	6.34	-0.00	1,514
	(2.28)	(2.28)	(2.28)	[0.06]	
Categories of Assets Owned by Women	4.91	4.94	4.88	0.02	1,514
	(1.97)	(1.99)	(1.95)	[0.06]	
Large livestock (oxen, cattle)	0.07	0.08	0.05	0.12**	1,514
	(0.25)	(0.27)	(0.22)	[0.06]	
Small livestock (goats, pigs, sheep)	0.39	0.43	0.34	0.18***	1,514
	(0.49)	(0.50)	(0.48)	[0.06]	
Chickens, Ducks, Turkeys, Pigeons	0.58	0.60	0.56	0.07	1,514
	(0.49)	(0.49)	(0.50)	[0.07]	
Fishpond or fishing equipment	0.02	0.01	0.02	-0.08	1,514
	(0.14)	(0.12)	(0.16)	[0.07]	
Farm equipment (nonmechanized)	0.63	0.64	0.63	0.01	1,514
	(0.48)	(0.48)	(0.48)	[0.05]	
Farm equipment (mechanized)	0.12	0.12	0.12	-0.02	1,514
	(0.33)	(0.32)	(0.33)	[0.06]	
Nonfarm business equipment	0.26	0.23	0.28	-0.12	1,514
	(0.44)	(0.42)	(0.45)	[0.08]	
House or other structures	0.69	0.69	0.68	-0.00	1,514
	(0.46)	(0.46)	(0.47)	[0.05]	
Equipment for urban gardening	0.06	0.06	0.07	-0.05	1,514
	(0.24)	(0.23)	(0.25)	[0.06]	
Equipment for dairy production	0.00	0.01	0.00	0.07	1,514
	(0.06)	(0.07)	(0.04)	[0.05]	
Large consumer durables	0.41	0.39	0.43	-0.09	1,514

	Mean (SD)			SM Diff	N
	All	Treat	Comparison		
	(0.49)	(0.49)	(0.50)	[0.07]	
Small consumer durables	0.63	0.62	0.64	-0.05	1,514
	(0.48)	(0.49)	(0.48)	[0.06]	
Cell phone	0.76	0.78	0.75	0.07	1,514
	(0.42)	(0.42)	(0.43)	[0.05]	
Smartphone	0.94	0.93	0.94	-0.04	1,514
	(0.24)	(0.25)	(0.23)	[0.05]	
Other land not used for agricultural purposes	0.15	0.13	0.17	-0.11**	1,514
	(0.36)	(0.34)	(0.38)	[0.05]	
Means of transportation (bicycle, car)	0.65	0.65	0.65	-0.00	1,514
	(0.48)	(0.48)	(0.48)	[0.06]	

Notes: SMD estimated using linear regressions. Standard deviations for means are in parentheses; standard errors of SMD presented in square brackets. Observations are clustered at the community level. Region indicators included as controls in the regressions. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Exhibit B–4. Savings Groups Participation and Intended Use of Savings

	Mean (SD)			SM Diff	N
	All	Treat	Comparison		
Purpose of participating in Savings (AVEC) Groups:					
To obtain access to credit	0.66	0.67	0.65	0.05	1,458
	(0.47)	(0.47)	(0.48)	[0.07]	
To save in a group	0.87	0.87	0.86	0.00	1,458
	(0.34)	(0.34)	(0.34)	[0.06]	
To participate in trainings	0.10	0.12	0.09	0.08	1,458
	(0.30)	(0.32)	(0.29)	[0.06]	
To meet with friends	0.08	0.07	0.08	-0.03	1,458
	(0.27)	(0.26)	(0.27)	[0.05]	

To meet new friends	0.06	0.06	0.06	-0.01	1,458
	(0.23)	(0.23)	(0.23)	[0.06]	
To obtain social support/social cohesion	0.54	0.52	0.56	-0.06	1,458
	(0.50)	(0.50)	(0.50)	[0.07]	
To access information	0.08	0.09	0.08	0.03	1,458
	(0.28)	(0.28)	(0.27)	[0.05]	
Other (specify)	0.01	0.01	0.01	0.05	1,514
	(0.11)	(0.12)	(0.10)	[0.05]	
Intended use of Savings:					
Health expenses	0.06	0.07	0.06	0.04	1,371
	(0.24)	(0.25)	(0.23)	[0.05]	
Invest in livestock	0.03	0.02	0.03	-0.05	1,371
	(0.16)	(0.15)	(0.17)	[0.05]	
Invest in other assets (household or productive assets)	0.15	0.17	0.14	0.06	1,371
	(0.36)	(0.37)	(0.35)	[0.07]	
Start or invest in agricultural business	0.24	0.26	0.23	0.08	1,371
	(0.43)	(0.44)	(0.42)	[0.06]	
Start or invest in non-agricultural business	0.59	0.57	0.61	-0.07	1,371
	(0.49)	(0.50)	(0.49)	[0.06]	
Fund own marriage or dowry	0.00	0.00	0.00	-0.10*	1,371
	(0.05)	(0.00)	(0.07)	[0.05]	
Fund marriage or dowry of family member	0.00	0.00	0.00	-0.00	1,371
	(0.04)	(0.04)	(0.04)	[0.05]	
Fund funeral of family member	0.01	0.01	0.01	-0.05	1,371
	(0.09)	(0.08)	(0.10)	[0.05]	
Fund other shock	0.14	0.15	0.12	0.08	1,371
	(0.34)	(0.36)	(0.33)	[0.06]	
Food purchases	0.08	0.09	0.07	0.05	1,371

	(0.27)	(0.28)	(0.25)	[0.06]	
Education of children	0.23	0.25	0.21	0.09	1,371
	(0.42)	(0.43)	(0.41)	[0.07]	
Make home repairs/improvements	0.04	0.04	0.03	0.04	1,371
	(0.19)	(0.20)	(0.18)	[0.05]	
Pay for a loan/debt	0.01	0.01	0.00	0.04	1,371
	(0.08)	(0.08)	(0.07)	[0.05]	
For security in case of future emergencies	0.04	0.04	0.03	0.05	1,371
	(0.19)	(0.20)	(0.17)	[0.05]	
Other (specify)	0.04	0.05	0.04	0.04	1,371
	(0.20)	(0.21)	(0.19)	[0.05]	
Refused to answer	0.01	0.01	0.01	-0.02	1,371
	(0.08)	(0.08)	(0.09)	[0.05]	

Notes: SMD estimated using linear regressions. Standard deviations for means are in parentheses; standard errors of SMD presented in square brackets. Observations are clustered at the community level. Region indicators included as controls in the regressions. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

Exhibit B–5. Women's Participation in Productive Activities

	Mean (SD)			SM Diff	N
	All	Treat	Comparison		
Food Crop Farming	0.94	0.95	0.93	0.05	1,514
	(0.24)	(0.23)	(0.25)	[0.06]	
Cash Crop Farming	0.77	0.76	0.78	-0.04	1,514
	(0.42)	(0.43)	(0.42)	[0.06]	
Livestock Raising	0.46	0.49	0.43	0.12*	1,514
	(0.50)	(0.50)	(0.50)	[0.06]	
Non-farm Economic Activities	0.47	0.46	0.49	-0.05	1,514
	(0.50)	(0.50)	(0.50)	[0.06]	
Wage Employment	0.08	0.09	0.07	0.09	1,514
	(0.27)	(0.29)	(0.25)	[0.06]	
Fishing and Fishpond Culture	0.02	0.01	0.03	-0.09	1,514

	(0.14)	(0.12)	(0.16)	[0.08]	
Woman Participates in at Least One Activity	0.99	1.00	0.99	0.04	1,514
	(0.08)	(0.06)	(0.09)	[0.05]	

Notes: SMD estimated using linear regressions. Standard deviations for means are in parentheses; standard errors of SMD presented in square brackets. Observations are clustered at the community level. Region indicators included as controls in the regressions. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$

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AIR® Headquarters

1400 Crystal Drive, 10th Floor
Arlington, VA 22202-3289
+1.202.403.5000 | [AIR.ORG](https://www.air.org)

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