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Excellence in Agronomy

Unlocking Financial Inclusion for Cocoa Farmers:

Catalyzing Solar Irrigation Investment in Ghana

Executive Summary

Ghanaian cocoa farmers, who provide livelihoods for over 800,000 households, face significant threats from climate change, including erratic rainfall patterns and droughts lasting up to six months. These conditions jeopardize productivity and income stability. To address this, IWMI conducted research that informed innovative financial models now adopted by Access Bank through the Bridge-In Agric Loan. This loan program leverages IWMI's financing framework to enable smallholder farmers to invest in solar-powered irrigation systems, fostering resilience against climate change, boosting cocoa yields, and improving economic stability. This brief captures the research process, outlines the Bridge-In Agric Loan's impact, and offers actionable recommendations to scale the initiative for nationwide benefits.

Introduction

Cocoa production is a cornerstone of Ghana's economy, supporting over 800,000 households (Attipoe and Adams, 2024). However, the sector faces mounting threats from climate change, leading to yield losses of up to 30% and significant income reductions. For instance, Farmer Akosua, a cocoa producer from the Western Region, saw her yields drop by 20% last year due to drought. With limited access to affordable financing, many farmers struggle to adopt technologies like solar-powered irrigation that could improve resilience. This brief highlights the importance of the Bridge-In Agric Loan in making such technologies accessible. By supporting climate-smart irrigation, the loan can help farmers like Akosua increase yields, stabilize incomes, and contribute to national food security. Urgent action by policymakers and financial institutions is necessary to promote this solution and ensure the long-term sustainability of Ghana's cocoa sector.

Status Quo and Challenges of African Agriculture

African agriculture is beset by numerous challenges, including limited access to financing, high input costs, and inadequate infrastructure (Choruma et al., 2024). Smallholder cocoa farmers in Ghana are particularly vulnerable to these systemic issues. Despite the sector's vital contribution to the economy, farmers struggle to access affordable loans for adopting productivity-enhancing technologies, such as solar-powered irrigation. Climate change further exacerbates the situation, with unpredictable rainfall and extended droughts directly impacting1 cocoa yields and quality, threatening farmers' livelihoods. Gender disparities also play a role; women farmers face additional hurdles such as limited collateral, low financial literacy, and unequal access to technology. Without targeted interventions, the financial exclusion of women, coupled with climate risks, may reduce yields, increase food insecurity, and perpetuate economic hardship.

Methodological Approach

To investigate farmers' preferences for investing in solar irrigation technologies for cocoa, a discrete choice experiment was carried out. The design and implementation of the study involves four stages. **Stage 1:** Initially, we conducted an extensive literature review and background studies to identify and understand the key attributes influencing the adoption of irrigation technologies in cocoa production. This review focused on existing agricultural financing schemes, irrigation supply business models, and drilling providing a comprehensive understanding of the context. Additionally, a cost-benefit analysis was performed to demonstrate the viability of cocoa irrigation technology, thereby informing the selection of relevant attributes for the DCE.

Stage 2: Secondly, a co-design workshop was organized to present the background studies and potential attributes to stakeholders for validation. Stakeholders from financial institutions, irrigation equipment suppliers, borehole drillers, farmers, researchers, and the Ghana Cocoa Board (Industry regulators) were present. This collaborative approach allows us to gather and integrate the insights and expertise of various stakeholders, to ensure that our models accurately reflect real-world scenarios.

Stage 3: The third stage of the experimental design involved constructing choice sets, that were orthogonal, balanced, and efficient, with minimal overlap.

Stage 4: Finally, before administering the experiment, respondents were randomly selected. To ensure respondents were fully informed, an onboarding process was conducted, which included a detailed explanation of the experiment. Any confusion or questions were addressed during this session, to ensure respondents clearly understood the choices before making their selections.

1 Further details about the bridge-in agriculture loan can be found here (https://bridgeinagric.com/).

Cocoa Production and Agronomy: Summary of Key findings

A survey of 550 cocoa households across Ghana's cocoa-producing regions revealed several key insights that influence irrigation adoption. These include loan terms, ownership models, and drilling risks. Farmers overwhelmingly preferred longer-term loans with flexible repayment options, as cocoa has a long yield cycle, providing stability. Group ownership of irrigation systems was also favored, as it reduced the financial burden on individual farmers and made the technology more affordable, particularly for smaller farms and women. Gender-specific preferences highlighted the need for tailored financing options that address both men's and women's unique needs.

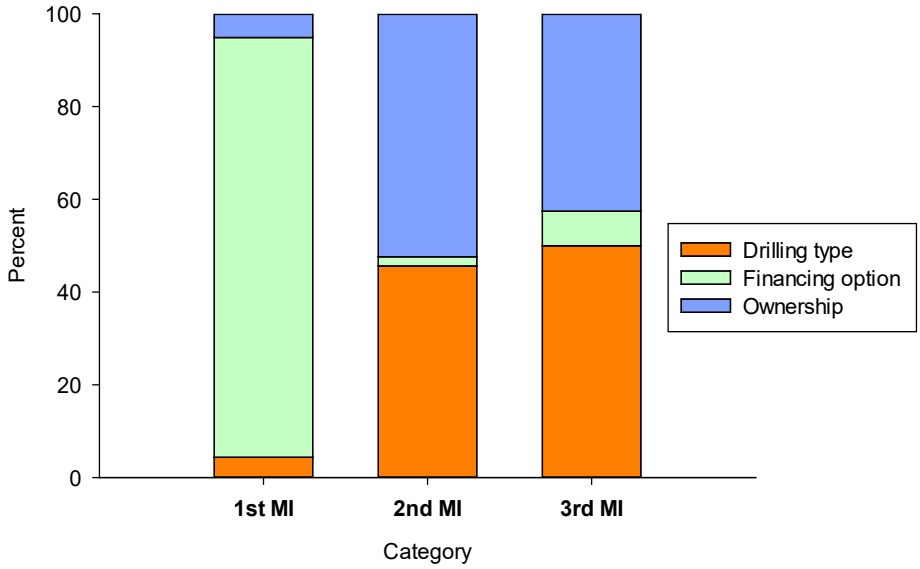

Figure 1.0: Ranking of preference attributes across the population. MI= Most Important

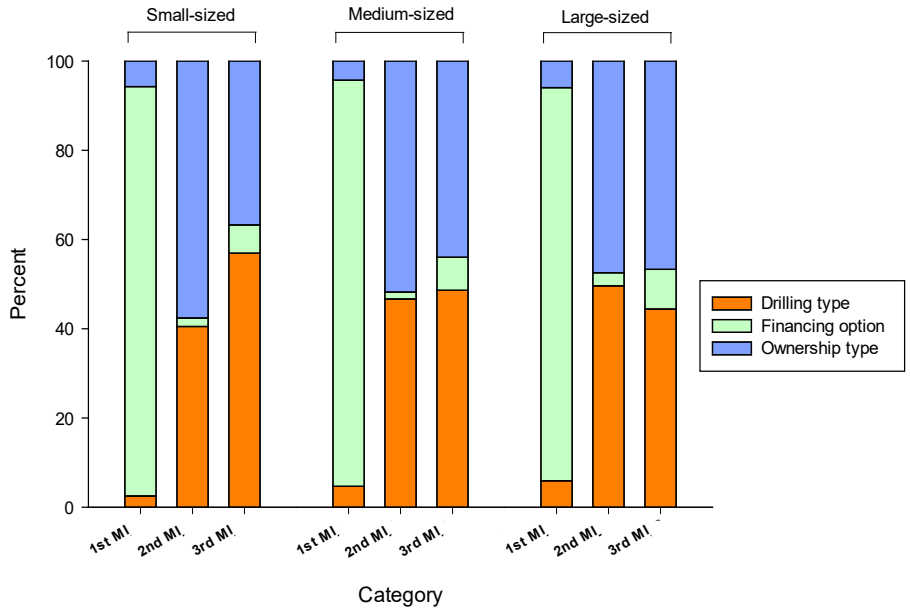

Figure 2.0: Ranking attributes based on resource level. MI= Most Important

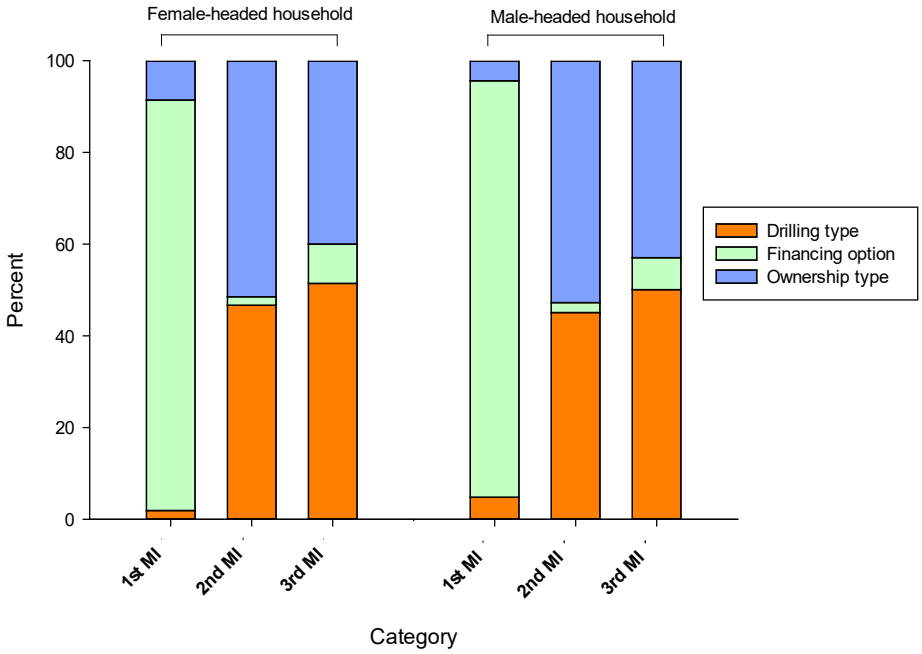

Figure 3.0: Ranking attributes based on gender. MI= Most Important

1. **Irrigation System Components**: Financing covered a comprehensive irrigation package, including solar-based pumps, drip kits, and, where required, well drilling.
2. **Drilling Preferences**:

    a. Farmers preferred **professional drilling**, which is less risky but more expensive, over local/manual methods due to challenges with groundwater availability across regions.

3. **Loan Preferences**:

    a. Longer-term loans were most preferred, as cocoa farming's stable income allows for flexible repayment options aligned with yield cycles (Figure 1).

4. **Group vs. Individual Ownership**:

    a. Farmers, particularly small and medium-sized producers, and women favored **group ownership** of irrigation systems to share costs and liability (Figure 2).
    b. However, larger groups posed challenges in management and decision-making (Figure 2).

5. **Gender and Resource Factors**:

    a. Female-headed households preferred long-term loans and larger group ownership models.
    b. Male-headed households leaned towards individual or small-group ownership arrangements (Figure 3).

These findings reinforce the need for inclusive, flexible, and scalable financing solutions for cocoa farmers in Ghana.

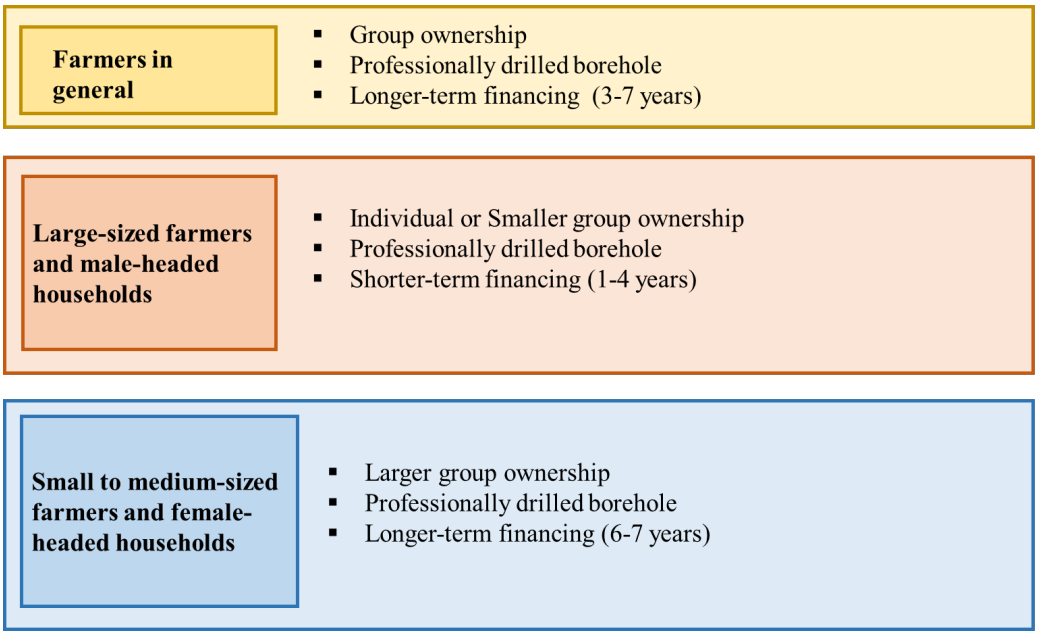

Figure 4.0: Different financing modalities depending on farmer and farm typology.

Recommendations: High-Impact Leverage Points:

1. **Longer-term, flexible loans:** Provide loans that align with cocoa's yield cycles, offering extended repayment periods to ease financial stress.
2. **Cost-sharing models:** Promote group ownership models for irrigation systems to reduce costs, making solar irrigation more accessible to smallholder farmers, especially women and those with limited resources.
3. **Reduce risks in drilling:** Incentivize professional drilling services to minimize risks associated with irrigation technology investments and boost adoption.
4. **Expand renewable energy incentives:** Provide tax breaks or subsidies for solar-powered irrigation equipment to make it more affordable, facilitating broader adoption of climate-smart technologies.
5. **Capacity-building programs:** Offer targeted training for farmers—particularly women and youth—on how to operate irrigation systems and manage financing options.

Stakeholders' call to action:

To accelerate the adoption of solar-powered irrigation in Ghana's cocoa sector, stakeholders have agreed on the following roles and commitments during a validation workshop organized by IWMI on the theme "Scaling Solarized Irrigation in Ghana's Cocoa Sector: Partnerships for Sustainability".

Financial Institutions: In the next year, develop and offer loan products tailored to smallholder farmers, with flexible terms and group ownership models for irrigation systems.

- Government and Policymakers: Introduce tax incentives for renewable energy equipment and invest in infrastructure such as improved roads to enhance farmers' access to technology. The Ghana Cocoa Board to provide agronomic training to farmers.
- Private Sector/irrigation equipment providers: Provide bundled solutions that include solar irrigation technology, financing, and technical support, tailored to smallholder farmers' needs.
- Development Organizations/IWMI: Support capacity-building programs with a focus on women and youth, enabling more farmers to adopt irrigation technologies.

Success/Outcome

Local bank, Access Bank (Ghana) Plc, in partnership with organizations like the Mastercard Foundation, have committed to offering low-interest loans for solar-powered irrigation equipment. These loans come with extended repayment terms, a crucial consideration for farmers whose income fluctuates with agricultural cycles. The introduction of this financing option marks a turning point for Ghana's cocoa sector, enabling farmers to invest in solar irrigation, improve their productivity, and withstand climate-related challenges. "At Access Bank Plc, we deeply value the pivotal role cocoa farmers hold in Ghana's economy and are mindful of the climate challenges that impact their work. In collaboration with the International Water Management Institute (IWMI) and with support from the MasterCard Foundation, we are committed to providing innovative, tailored financial solutions that meet these farmers' needs. Through flexible, low-interest loans for solar irrigation equipment, we aim to boost productivity, strengthen resilience, and uplift livelihoods. This initiative underscores our dedication to sustainable progress and our commitment to empowering the communities we serve," Pearl Nkrumah – Executive Director. A particularly innovative aspect is the promotion of group ownership models. By pooling resources, farmers can form small groups of three or larger collectives of five to share the costs of irrigation equipment.

Conclusion:

As Ghana's cocoa sector faces increasing climate risks, bridging the financing gap for solar-powered irrigation is crucial for sustainability. The Bridge-In Agric Loan presents a practical solution, offering both financial relief and climate resilience to cocoa farmers. Scaling this initiative will not only boost productivity but also foster long-term economic stability, social[2] inclusion, and environmental sustainability. By prioritizing flexible financing, renewable energy incentives, and inclusive capacity-building programs, stakeholders can ensure a resilient and prosperous future for Ghana's cocoa farmers, contributing to rural economic growth and food security.

2 Find out more about Access Bank (Ghana) Plc on their website (https://www.ghana.accessbankplc.com/).

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