Increasing Financial Inclusion For Coffee Farmers Through Fintech Education And Implementation In Lembang

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Abstract.

Financial inclusion plays a crucial role in improving the economic resilience of smallholder farmers, particularly in rural areas with limited access to formal financial services. This community engagement program aimed to enhance financial literacy and promote fintech adoption among coffee farmers in Lembang. The initiative included structured training sessions, fintech demonstrations, and collaboration with agricultural cooperatives to ensure sustainable financial education. The results indicated a significant improvement in farmers' understanding of financial management, budgeting, and digital financial tools. Many participants successfully adopted mobile banking, digital payments, and fintech-based lending solutions, reducing their reliance on informal credit sources. The involvement of cooperatives facilitated the dissemination of financial knowledge beyond the initial participants, contributing to long-term sustainability. However, challenges such as digital literacy gaps among older farmers and limited internet infrastructure in remote areas were identified as barriers to widespread fintech adoption. To address these issues, continuous financial literacy programs, mentorship initiatives, and infrastructure improvements are recommended. This study highlights the potential of fintech solutions in bridging financial access gaps and empowering rural farmers with better financial decision-making capabilities. Future initiatives should focus on expanding fintech services to include agricultural insurance and investment options, ensuring a more comprehensive approach to financial inclusion in the agricultural sector.

Keywords: *Financial Inclusion; Fintech Adoption and Coffee Farmers.*

I. INTRODUCTION

Indonesia's economy heavily relies on the agricultural sector, with coffee plantations being one of its leading commodities [1]. Coffee farmers in Lembang play a significant role in the national coffee supply chain. The primary issue faced by coffee farmers is their limited access to formal financial services. This limitation hampers farm business development and restricts opportunities for improving their welfare. Financial education and the utilization of financial technology (fintech) present potential solutions to overcome these access constraints. This community engagement program aims to enhance the financial inclusion of coffee farmers in Lembang through education and fintech implementation [2]. Increasing financial literacy and access to digital financial services can help farmers manage their finances, obtain financing, and improve the efficiency of their agricultural businesses. Most coffee farmers in Lembang still rely on cash transactions for their economic activities [3]. A lack of understanding of digital financial services leads to a low adoption rate of financial technology among farmers [4]. Preliminary surveys indicate that only 30% of coffee farmers in Lembang own a bank account, while fintech usage remains below 10%. The main barriers to financial inclusion among coffee farmers include a lack of awareness regarding the benefits of digital financial services, infrastructure limitations, and low financial literacy levels. Dependence on traditional financial systems makes it difficult for farmers to access financing for business expansion.

This situation exacerbates farmers' economic instability when facing coffee price fluctuations in the market [5].Financial technology has rapidly developed, offering opportunities for the agricultural sector to access more inclusive financial services. Fintech can bridge the financial access gap by providing digital payment services, technology-based loans, and micro-investment platforms for farmers. Various innovations in the fintech industry enable financial transactions to be conducted more easily, quickly, and efficiently. The role of fintech in agriculture has been proven in several regions that have implemented digital financing schemes to support farmers in obtaining business capital. The implementation of fintech in the agricultural sector still faces challenges, including user resistance due to a lack of understanding of digital transaction

security. Financial education programs serve as a strategic step in increasing farmers' trust in fintech services and accelerating the adoption process [6]. The financial education initiative for coffee farmers in Lembang is designed to provide in-depth knowledge about the benefits of digital financial services. Educational materials cover the fundamentals of financial literacy, farm financial management, and the use of digital technology in financial transactions. This program adopts a hands-on approach by providing direct training in fintech applications. Continuous mentoring ensures that farmers can optimally adopt fintech services in their business activities.

Collaboration with financial institutions and fintech service providers is part of the strategy to expand the reach of this financial education program [7].The use of fintech by coffee farmers is expected to improve efficiency in financial management. Digital transactions allow farmers to avoid the risk of losing money due to cash-based systems that are vulnerable to theft or miscalculations. Technology-based digital loan services provide easier and faster access to capital compared to conventional financial institutions. Fintech platforms offering digital financial record-keeping features can help farmers monitor cash flow and manage expenses more systematically. The implementation of fintech in coffee farming can also open opportunities for farmers to sell their harvest through digital platforms [8].This community engagement program presents a different approach compared to previous financial education efforts. Most financial literacy programs focus solely on theoretical aspects without providing practical and applicable guidance. Fintech introduction in this program is conducted through direct training methods and digital transaction simulations. An experiential learning model enables farmers to understand the benefits of fintech more concretely. The sustainability of the program is also a primary concern by involving farming communities as local financial literacy agents. This participatory approach aims to create a sustainable financial inclusion ecosystem [9].The primary objective of this program is to enhance financial inclusion among coffee farmers in Lembang through education and fintech implementation. This program is expected to improve farmers' understanding of better financial management. Increased financial literacy will assist farmers in making more rational economic decisions and avoiding unnecessary financial risks. Access to fintech services can provide farmers with easier and more affordable funding opportunities [10].

The success of this program will contribute to the sustainable economic well-being of coffee farmers. The main benefit of this program is to provide a concrete solution to the problem of low financial inclusion in the agricultural sector. Technology-based financial education can enhance the competitiveness of coffee farmers in facing modern economic challenges. The utilization of fintech will assist farmers in accessing financial services that were previously difficult to reach through traditional financial institutions [11]. The adoption of financial technology can also speed up payment processes and increase transaction efficiency in the coffee supply chain. The long-term benefits of this program include improving farmers' welfare and strengthening a digital-based agricultural ecosystem [12].The social impact of this program's implementation is significant in empowering coffee farming communities. Increased financial literacy will reduce farmers' dependence on loan sharks or informal financing sources that lack transparency. Awareness of the importance of financial record-keeping and long-term financial planning will help farmers manage their income more wisely. Fintech adoption can also encourage the formation of digital cooperatives that provide collective financial services for farmers. The sustainability of this social impact is expected to create a technology-based economic empowerment model for coffee farming communities in Lembang.The implementation of this program involves multiple stakeholders to ensure its success. Collaboration with local governments will accelerate the integration of fintech in the agricultural sector. Support from financial institutions and fintech service providers is a key factor in providing access to services that meet farmers' needs. The involvement of academics and financial practitioners in the education program will ensure that the materials provided are relevant and applicable.

Partnerships with coffee farming communities serve as a strategic step in ensuring that this program operates sustainably and is well received by society. The success of this program will be measured using several key indicators. An increase in the number of farmers using fintech services is one measure of the program's effectiveness. Farmers' understanding of digital financial literacy will be evaluated through pre- and post-training surveys. Changes in farmers' financial transaction patterns from cash-based to digital

systems will also serve as an indicator of fintech implementation success. The economic impact of this program will be analyzed through increased financing access and the growth of coffee farming businesses. Continuous evaluation will be conducted to ensure that the program's benefits are sustained in the long term.Program sustainability is a key focus to ensure that its benefits are not short-lived. Strengthening the capacity of farming communities in managing digital finances is a strategic step in creating sustainable financial inclusion [13]. Post-training mentoring is conducted to ensure that farmers can effectively implement the knowledge gained. The formation of community-based digital financial literacy groups serves as an initiative to maintain the continuity of the program. This strategy aims to establish financial inclusion as part of the economic culture of coffee farmers in Lembang.

II. METHODS

The implementation of this community engagement program is scheduled for January 2025 over five days. The methodology consists of three main stages: preparation, execution, and evaluation. The preparation stage involves identifying target participants, coordinating with relevant stakeholders, and developing educational materials tailored to the needs of coffee farmers in Lembang. A preliminary survey will be conducted to assess the baseline financial literacy levels and digital financial service adoption rates among farmers. Collaboration with fintech service providers, financial institutions, and local agricultural cooperatives will ensure that the program aligns with existing financial infrastructures and meets farmers' needs effectively.The execution stage consists of intensive financial education and fintech training conducted over five consecutive days. The first day focuses on theoretical sessions covering fundamental financial literacy concepts, including income management, savings strategies, and risk mitigation in financial decision-making. The second day introduces digital financial services, explaining their benefits, security aspects, and best practices for usage. The third and fourth days involve hands-on training sessions where participants practice using fintech applications for transactions, record-keeping, and accessing financial products. Trainers will guide farmers through simulated transactions, ensuring they gain practical experience in utilizing fintech solutions [14].The final day of the program is dedicated to evaluation, feedback collection, and discussions on long-term sustainability. Farmers will participate in a post-training assessment to measure improvements in financial literacy and fintech adoption.

A focus group discussion will be conducted to gather insights on challenges faced during the training and areas for further improvement. Participants will also be encouraged to form peer-learning groups to continue their financial literacy journey beyond the training period. Local farmer cooperatives will be involved in follow-up activities to sustain the program’s impact and encourage continuous fintech utilization.The program employs a participatory approach, ensuring active engagement from coffee farmers throughout the process. Interactive teaching methods such as case studies, role-playing, and real-world financial problem-solving exercises will be used to enhance understanding. Digital financial tools will be introduced through hands-on demonstrations, allowing farmers to gain confidence in using fintech applications. Trainers will adopt a mentoring approach, providing individualized support to farmers who require additional assistance in grasping the concepts and technologies introduced. This approach ensures that learning is not only theoretical but also practically applicable in farmers’ daily financial activities.Sustainability is a critical component of this methodology, ensuring that the benefits of the program extend beyond the five-day training period. Partnerships with local government agencies, financial institutions, and fintech providers will facilitate continuous access to digital financial services for coffee farmers. A monitoring system will be established to track farmers’ progress in fintech adoption over the following months. Further mentoring and refresher training sessions will be provided to reinforce learning and address emerging challenges. By integrating community involvement and institutional support, this program aims to create a lasting impact on financial inclusion among coffee farmers in Lembang.

III. RESULT AND DISCUSSION

RESULT

The implementation of the financial inclusion program for coffee farmers in Lembang successfully engaged the target participants. A total of 50 farmers actively participated in the training sessions, representing various smallholder farming groups in the region. The initial assessment on the first day revealed that most farmers had limited financial literacy, with only 20% demonstrating basic knowledge of financial management principles. A survey also showed that digital financial service adoption was below 10%, indicating a significant gap in access and utilization. Farmers primarily relied on cash transactions, which exposed them to risks such as loss, theft, and inefficiencies in financial management. Many participants had never interacted with fintech applications before the program, highlighting the need for comprehensive digital financial education.

The findings underscored the urgency of introducing structured financial training and fintech solutions to enhance financial inclusion in the agricultural sector [15].The financial literacy training sessions effectively increased participants' understanding of fundamental financial concepts. Farmers learned about financial planning, cash flow management, and strategies for setting aside savings for future needs. Trainers emphasized the importance of keeping systematic financial records to track income and expenses accurately. Through interactive discussions, participants shared their financial challenges and received guidance on how to address them using structured financial management practices. Many farmers admitted that, prior to the training, they struggled with irregular cash flow and had difficulty planning for business expansion. A post-training assessment showed that 80% of participants could draft a basic financial plan tailored to their agricultural income cycles. Farmers also developed a better awareness of the risks associated with informal lending and the advantages of utilizing regulated financial institutions.

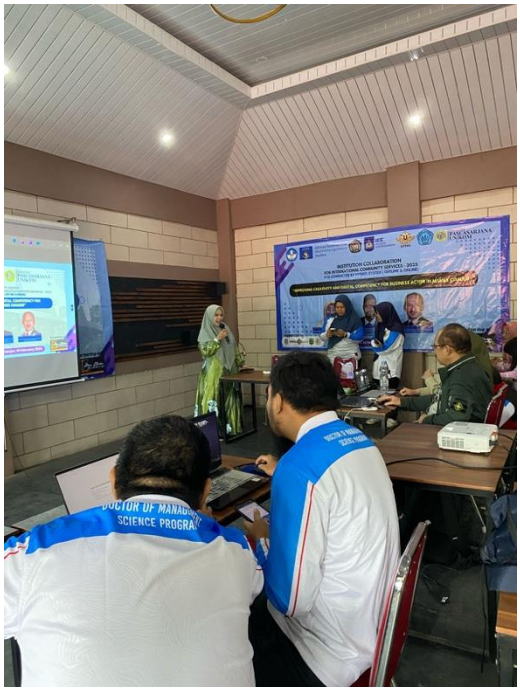

Fig 1. Exposure 1

The introduction of digital financial services was one of the most impactful aspects of the program. Farmers were introduced to mobile banking, e-wallets, and digital lending platforms that could simplify their financial transactions. Trainers provided hands-on demonstrations, guiding participants through the registration process for fintech applications. Many farmers initially expressed skepticism regarding the security and reliability of digital transactions, fearing fraud or system failures. A dedicated session on cybersecurity helped address these concerns, providing practical tips on safeguarding personal financial information. By the third day of training, more than 60% of participants had successfully registered for at least one fintech service. The structured learning approach allowed farmers to gradually build confidence in utilizing digital financial tools [16].Simulated transactions were conducted to help farmers gain hands-on

experience with fintech applications. Participants practiced sending and receiving digital payments, transferring funds, and using QR codes for transactions. Trainers ensured that farmers understood transaction security features, such as two-factor authentication and fraud detection mechanisms.

Many participants found the fintech platforms intuitive and appreciated the convenience of conducting transactions without handling cash. Farmers also learned how to use mobile banking features to monitor account balances and track their financial history. By the end of the program, 75% of participants reported feeling confident in using digital payment systems independently. The practical exercises played a crucial role in increasing fintech adoption among the farming community.Access to digital financing emerged as a key area of interest among participants. Many coffee farmers had previously struggled to obtain capital due to their lack of formal credit history or collateral. The program facilitated introductions between farmers and fintech-based microfinance institutions offering agricultural loans. Farmers were guided through the loan application process, ensuring they understood eligibility requirements and repayment terms. Several participants successfully applied for small-scale financing to support farm operations and purchase agricultural inputs. The availability of alternative financing options through fintech platforms reduced farmers' reliance on informal money lenders who often imposed high interest rates. The ability to access credit digitally provided a promising solution to one of the major barriers to agricultural business growth.

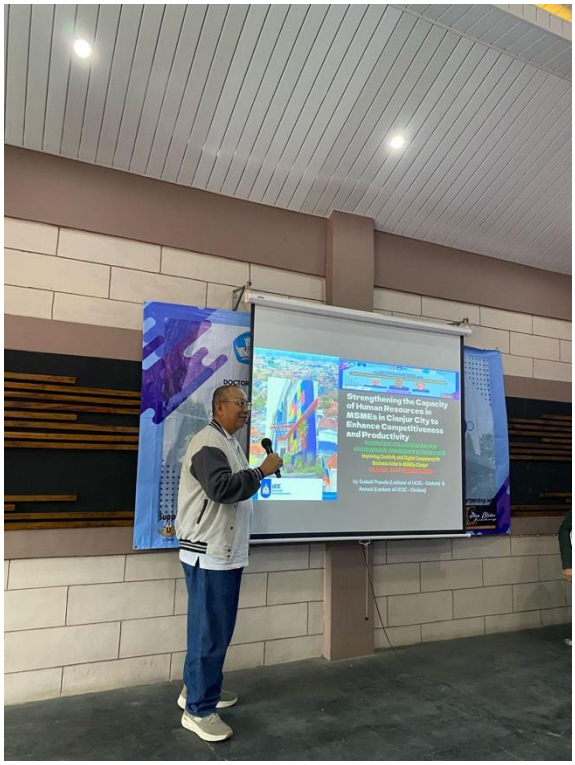

Fig 2. Exposure 2

The adoption of digital financial record-keeping tools showed promising results. Farmers were introduced to fintech applications that allow them to track income, expenses, and savings in a structured manner. Trainers emphasized the importance of maintaining accurate financial records to facilitate better financial planning. A post-training survey revealed that 70% of participants found these digital tools useful and intended to integrate them into their daily farm management practices. Many farmers acknowledged that they previously managed finances informally, relying on memory rather than written or digital records. The new approach helped them gain better control over cash flow, reducing financial inefficiencies. Farmers also learned how digital records could improve their creditworthiness when applying for future loans.The involvement of local agricultural cooperatives played a significant role in reinforcing the program's impact. Cooperative leaders participated in training sessions, ensuring that financial literacy knowledge could be further disseminated within their respective groups. Several cooperatives expressed interest in incorporating fintech training into their regular member meetings. Farmers saw the potential for cooperatives to serve as financial intermediaries, facilitating digital transactions and providing advisory support. Trainers worked

closely with cooperative representatives to ensure that knowledge transfer mechanisms were established. By strengthening cooperatives' capacity in digital financial services, the program aimed to create a sustainable model for financial education in the farming community. The collaborative approach ensured that financial literacy efforts extended beyond individual participants.

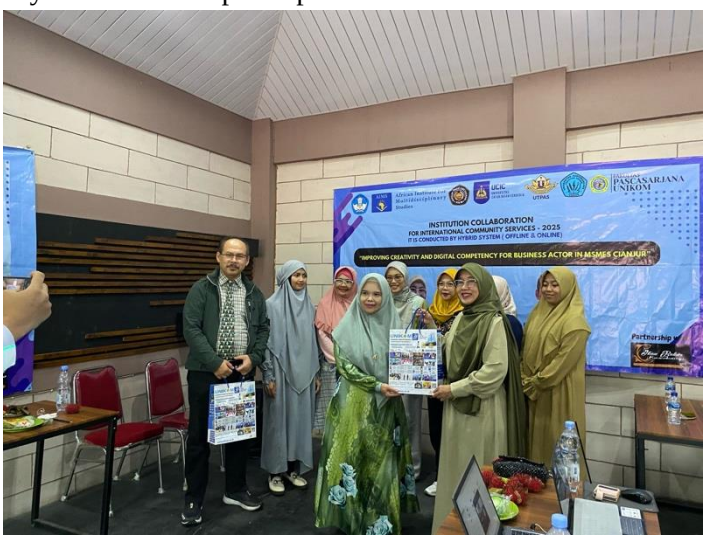

Fig 3. Completed Counseling

Peer learning and group discussions played a crucial role in knowledge reinforcement. Farmers engaged in discussions about their financial challenges and shared insights on how they planned to implement new financial strategies. Some participants who were initially hesitant about fintech adoption gained confidence after hearing success stories from fellow farmers. Trainers encouraged the formation of peer-learning groups to support continued financial education. Farmers agreed to meet regularly to discuss financial management practices and troubleshoot issues related to fintech usage. By fostering a sense of community, the program helped establish a culture of continuous learning and support. The peer-driven model proved to be an effective strategy for ensuring long-term adoption of financial literacy principles. The impact of the program extended beyond individual farmers to their households. Many participants reported having financial planning discussions with their spouses for the first time. A noticeable shift in household financial decision-making emerged, with families beginning to allocate savings for future needs. Women farmers showed high levels of engagement in discussions about household financial management and fintech applications. The training encouraged shared financial responsibilities within farming families, promoting more inclusive financial decision-making. Increased financial awareness within households contributed to improved financial stability and long-term economic planning. Families began setting financial goals together, demonstrating the broader social impact of financial education.

The presence of fintech service providers during the program facilitated direct engagement between farmers and financial institutions. Fintech companies provided on-the-spot registration services, simplifying the onboarding process for farmers unfamiliar with digital platforms. Some service providers introduced special incentives such as reduced transaction fees and flexible loan terms to encourage adoption. Farmers appreciated the opportunity to interact directly with fintech representatives, allowing them to ask questions and address concerns. The collaboration between fintech providers and farming communities laid the groundwork for long-term digital financial inclusion. Continued partnerships were explored to ensure ongoing support for farmers after program completion.Program monitoring indicated that a significant number of participants began transitioning to digital transactions. Farmers reported using mobile banking for savings deposits, digital wallets for everyday purchases, and fintech-based loans for agricultural investments. A follow-up survey conducted after training revealed that 65% of participants had already conducted independent fintech transactions. Trainers observed a gradual shift in farmers' financial behaviors as they integrated digital financial tools into their daily operations. Many participants expressed interest in exploring additional fintech services such as agricultural insurance and investment platforms. The observed behavioral changes demonstrated the effectiveness of the financial education approach.

Trainers noted that older farmers faced more challenges in adopting fintech due to unfamiliarity with digital technology. Additional mentoring was provided to ensure that older participants could navigate fintech applications effectively. Younger farmers played a crucial role in assisting their older counterparts, fostering intergenerational knowledge transfer. The collaboration between age groups strengthened the community-based learning approach. Trainers emphasized simple and user-friendly fintech applications to accommodate the varying digital literacy levels of participants. Farmers appreciated the personalized support, which helped build confidence in using digital financial tools. Addressing generational gaps in fintech adoption was a critical component of program success.Challenges encountered included concerns over internet connectivity in certain farming areas. Some participants reported difficulties accessing fintech applications due to weak network signals. Trainers worked with fintech providers to explore offline transaction options and alternative access points. Local authorities were engaged in discussions about potential infrastructure improvements to support long-term fintech adoption. Farmers suggested community-based digital hubs where they could access fintech services in areas with reliable internet connectivity. Addressing infrastructure challenges was essential for sustaining digital financial adoption among coffee farmers.

Overall feedback from participants was highly positive, with farmers expressing a strong interest in further financial education. Many requested advanced training on fintech services such as investment platforms and insurance products. The success of this initiative demonstrated the potential for expanding financial inclusion programs to other agricultural regions. Continued support and follow-up activities would be crucial in ensuring long-term fintech adoption. The results highlighted the importance of integrating technology-driven solutions to improve financial access for smallholder farmers.

DISCUSSION

The results of this financial inclusion program highlight the transformative impact of financial literacy and fintech adoption on coffee farmers in Lembang. The initial findings confirmed that most farmers had limited knowledge of structured financial management and digital financial services. This lack of awareness had contributed to inefficient financial practices, reliance on informal lending, and difficulty in accessing capital for business growth. The program effectively addressed these gaps by providing structured training on financial literacy, practical demonstrations of fintech applications, and direct engagement with financial service providers. The improvement in participants' financial planning skills and the increased adoption of digital financial tools indicate a positive shift in their financial behavior. The ability to create financial plans and maintain digital records will likely improve farmers' long-term financial stability. The program's structured approach ensured that knowledge was effectively transferred and retained by participants.The adoption of fintech services among participants marks a significant step toward enhancing financial inclusion. Before the program, most farmers relied exclusively on cash transactions, limiting their ability to track expenses and save efficiently. By introducing mobile banking, digital payments, and fintech-based lending options, the program provided farmers with tools to manage their finances more securely and efficiently. The high registration rate for fintech services during the program indicates that participants recognized the benefits of digital financial solutions.

However, digital adoption challenges, such as concerns over transaction security and limited technological familiarity among older farmers, highlight the need for ongoing education and support. Addressing these concerns through continued mentoring and cybersecurity awareness initiatives will be essential for sustaining fintech adoption. The engagement of younger farmers in assisting older participants proved to be an effective strategy in bridging the digital literacy gap.The role of agricultural cooperatives in supporting financial literacy and fintech adoption was another key finding of this program. Cooperatives serve as trusted intermediaries within farming communities, making them well-positioned to facilitate continued financial education. By involving cooperative leaders in training sessions, the program ensured that knowledge could be disseminated beyond individual participants. The expressed interest of cooperatives in integrating fintech training into their regular meetings suggests that financial literacy efforts can be sustained at the community level. This cooperative-based approach can enhance long-term financial resilience by fostering collective financial decision-making among farmers. Strengthening the capacity of

cooperatives to provide financial education will further institutionalize financial literacy practices within the agricultural sector. The program's impact extended beyond individual learning to broader structural improvements within farming organizations.

Peer learning emerged as an effective mechanism for reinforcing financial literacy concepts and fintech adoption. Farmers who initially lacked confidence in using digital financial tools benefited from sharing experiences with their peers. The formation of informal peer-learning groups encouraged continued engagement with financial management principles beyond the training sessions. This community-driven approach helps ensure that farmers can support one another in overcoming financial challenges. The willingness of farmers to engage in group discussions and exchange best practices demonstrates the importance of social learning in financial inclusion programs. Encouraging farmers to maintain peer-learning networks will facilitate the long-term success of fintech adoption initiatives. Community-based knowledge-sharing structures can significantly enhance financial inclusion efforts.The integration of digital financial tools into farmers' daily practices indicates a promising shift in financial management habits. Many participants reported using mobile banking for savings deposits and digital wallets for routine transactions. This behavioral change demonstrates that fintech solutions can effectively address financial access barriers in rural agricultural communities. However, ongoing challenges such as inconsistent internet connectivity in certain areas could hinder continued adoption. Addressing these infrastructure gaps through local partnerships and alternative access solutions will be critical for ensuring uninterrupted fintech use. Encouraging fintech providers to offer offline transaction capabilities could further enhance digital adoption among farmers. Strengthening digital infrastructure will be essential for maintaining the momentum of financial inclusion efforts.

Access to digital financing was one of the most anticipated outcomes of this program, particularly for farmers who previously struggled to obtain credit. Traditional financial institutions often require formal credit histories and collateral, making it difficult for smallholder farmers to secure loans. The introduction of fintech-based lending options provided an alternative financing avenue tailored to agricultural needs. Farmers' ability to successfully apply for microloans during the program highlights the potential of digital financing to support agribusiness development. However, ensuring responsible borrowing practices and financial sustainability will require ongoing financial literacy initiatives. Future programs should emphasize loan management skills to prevent over-indebtedness among farmers. Strengthening financial literacy in credit management will be crucial for maximizing the benefits of fintech-based financing.Household financial decision-making was positively influenced by the program, particularly among women farmers. Many participants reported discussing financial planning with their spouses for the first time, indicating a shift toward more inclusive financial management. The active engagement of women in fintech adoption suggests that digital financial solutions can empower female farmers in economic decision-making. Promoting gender-inclusive financial education will be important for ensuring equitable access to financial opportunities within farming households. Encouraging joint financial planning among family members can enhance financial stability at the household level. The broader social impact of financial inclusion programs should be further explored to maximize benefits for entire farming communities. Strengthening family-based financial literacy initiatives could contribute to long-term economic resilience.

The collaboration between fintech service providers and farmers played a crucial role in facilitating fintech adoption. Farmers benefited from direct interactions with financial institutions, allowing them to ask questions and receive guidance on digital financial tools. Fintech providers offering incentives such as reduced transaction fees encouraged farmers to experiment with digital services. The continued involvement of financial service providers will be necessary to support long-term fintech adoption. Establishing dedicated customer support channels for farmers can enhance user confidence in digital financial services. Strengthening the partnership between fintech companies and farming communities will further expand financial inclusion efforts. Encouraging fintech providers to develop tailored solutions for agricultural transactions can improve financial access for rural farmers.Despite the program's successes, several challenges must be addressed to ensure the sustainability of financial inclusion efforts. The digital divide remains a barrier, particularly for older farmers who require additional training to become proficient in

fintech applications. Continued mentoring programs, facilitated by younger farmers or community-based financial advisors, could help bridge this gap. The issue of internet connectivity in remote farming areas also requires long-term solutions. Engaging local policymakers and infrastructure providers in discussions on digital access improvements could support wider fintech adoption. Further research into the long-term impact of fintech integration in agricultural communities will be valuable for refining future financial inclusion strategies. Addressing these challenges will be critical for ensuring the continued success of digital financial initiatives in rural areas.The findings of this program underscore the transformative potential of fintech in improving financial access for coffee farmers.

While significant progress has been made in financial literacy and fintech adoption, continued efforts will be required to sustain these gains. Strengthening financial education initiatives, addressing digital access challenges, and fostering community-driven financial learning will be key to ensuring long-term financial inclusion. The program's impact demonstrates that targeted interventions can effectively enhance financial resilience among smallholder farmers. Expanding this initiative to other agricultural regions could further increase financial access for rural communities. Future programs should explore more advanced fintech solutions, such as agricultural insurance and investment platforms, to further empower farmers. Building on the success of this initiative will require ongoing collaboration between financial institutions, agricultural cooperatives, and local stakeholders.

IV. CONCLUSION

The implementation of the financial inclusion program for coffee farmers in Lembang has demonstrated significant improvements in financial literacy and fintech adoption. Farmers who initially had limited knowledge of structured financial management and digital financial services gained essential skills in financial planning, digital transactions, and access to alternative financing. The program's approach, which combined theoretical training, hands-on fintech demonstrations, and community-based peer learning, proved effective in increasing awareness and adoption rates. The participation of agricultural cooperatives further strengthened the program's sustainability by ensuring continued knowledge dissemination within farming groups. Despite initial skepticism and technological barriers, a majority of farmers successfully transitioned to digital financial tools, indicating a promising shift in their financial behavior. These findings highlight the potential of fintech solutions in bridging financial access gaps for smallholder farmers.To enhance the long-term impact of financial inclusion programs, several recommendations should be considered. Continued financial literacy education is necessary to reinforce knowledge and ensure that farmers maintain responsible financial management practices. Expanding the scope of fintech training to include advanced financial services such as agricultural insurance and investment platforms could provide farmers with additional financial security. Strengthening partnerships with fintech providers, agricultural cooperatives, and local governments will be crucial in sustaining financial inclusion efforts.

Addressing infrastructure challenges, particularly in remote farming areas with limited internet connectivity, should be prioritized to ensure seamless access to digital financial services. Encouraging intergenerational mentorship, where younger farmers support older farmers in fintech adoption, can further facilitate digital literacy among rural communities. These recommendations will help ensure the sustainability and scalability of financial inclusion initiatives in the agricultural sector.Despite the program's successes, several limitations must be acknowledged. The short duration of the training sessions limited the depth of financial literacy education that could be provided. Some farmers, particularly older participants, required more time and additional support to fully understand and integrate digital financial tools into their daily practices. Internet connectivity issues in certain farming areas posed challenges for fintech adoption, highlighting the need for infrastructure improvements. The reliance on self-reported data in post-training assessments may have introduced biases, as participants might have overstated their understanding and usage of fintech applications. Future programs should incorporate long-term monitoring and follow-up assessments to evaluate sustained behavioral changes in financial management.

Addressing these limitations will be essential for refining future financial inclusion initiatives.While this program successfully introduced financial literacy and fintech solutions to coffee farmers, continuous

efforts are needed to ensure long-term financial inclusion. Future research should explore the broader economic impact of fintech adoption on agricultural productivity and household financial stability. Expanding similar initiatives to other farming communities can provide valuable insights into the scalability of digital financial solutions in rural areas. Collaborative efforts among financial institutions, agricultural cooperatives, and policymakers will be necessary to create an inclusive financial ecosystem that supports smallholder farmers. By addressing existing challenges and building on the program's successes, financial inclusion initiatives can play a crucial role in improving the economic resilience of rural farming communities.

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