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A-Card: Re-engineering Micro-Finance for Smallholder Farmers in Bangladesh

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Abstract

For farmers with limited savings and assets, agriculture technology adoption costs are largely facilitated through two credit models, the micro-finance and bank models. The banking system while enabling access to credit at low interest rates, have failed to reach majority of smallholder farmer who lack necessary collateral. Micro-finance programs while transcending collateral requirement have also proved to be unsatisfactory due to high interest rates, smaller loan sizes and unsuitable tenure. Furthermore, since the bank and micro-finance provided credit is extensively cash-based, there is a tendency for its use in non-farming activities, negatively impacting productivity and profitability. The A-Card, a new model, was thus designed to re-engineer rural agricultural finance in Bangladesh to address these challenges associated with the existing models. A-Card is a debit card specially designed for smallholder farmers (SHFs), which facilitates financial access to credit for digital purchase of farm inputs at low interest rate (10%), no collateral requirement and flexible payback period (6 month tenure). A-Card is based on a four-way collaborative linked between SHFs, input retailers, commercial bank(s) and microfinance institution (acting as agent bank). This paper has presented the blueprint of the A-Card Model and its business mechanisms. A quantitative impact evaluation of the model indicates that for each kg yield per decimal land before A-Card introduction, rice yield increased by 0.92 kg after A-Card introduction. The spent on fertilizers, agro-chemicals and seeds were recorded as 98.03±5.15, 25.49±2.09 and 13.88±1.40 BDT per decimal land with the use of A-Card compared to 82.05±4.43, 21.68±1.70 and 11.24±1.64 BDT per decimal land before the use of A-Card, respectively. Further qualitative assessment of the A-Card also reveals additional benefits and challenges for stakeholders - retailers, micro-finance institutions, banks and SHFs. It is concluded that the A-Card model has promoted financial literacy of the SHFs and their annual farm production business plan. This will potentially contribute to future expansion of digital financing systems in Bangladesh and other countries.

Keywords: A-card, agent banking, digital micro-finance, rural credit in Bangladesh, smallholder farmers (SHF)

Introduction

While agriculture accounts for only 15.3% of Bangladesh's GDP (BBS, 2016), over 53% of its population is directly engaged in agriculture, 91% of who are smallholder farmers (SHFs) (land ownership of less than 1 hectare) (Ganesh-Kumar, 2012; Martin et al., 2016). Hence, in Bangladesh's agricultural sector, particularly SHFs are a key development priority and the linchpin of poverty alleviation strategies. The SHFs have limited savings and assets (Jazairy et al., 1992). In order to sustain the productivity in agricultural sector in Bangladesh, there is a need to financially support SHFs to adopt appropriate technologies, skills and knowledge.

For SHFs, agricultural technology adoption cost is largely facilitated through two credit models, the micro-finance and bank models. The banking system while enabling access to credit at low interest rates of 9-10% average, has failed to reach majority of SHFs; as SHFs lack collateral

and have limited understanding of various procedural complexities (Alauddin and Biswas, 2014). Micro-credit programs due to high interest rates of between 25 and 31%, smaller loan sizes and inflexible and short repayment periods have also failed to address needs of SHFs (Inter-Media, 2014). Furthermore, since both bonk and micro finance institutes (MFIs) provided credit is extensively cash-based, there is a tendency for its use in non-farming activities, negatively impacting productivity and profitability of SHFs (Rahman and Cheng, 2011).

To address these challenges, the 'A-Card', a new model, has been designed to re-engineer micro-finance for SHFs in Bangladesh. This paper presents the blueprint of the A-Card model, describes its business mechanisms and scrutinizes the results of the initial impact assessment together with challenges being faced by beneficiaries and recommendations to overcome those challenges.

The A-Card Model

The A-Card model was designed by Mr. Bidyuth K. Mahalder, Chief of Party (COP) of the Agricultural Extension Support Activity (AESA) Project, funded by the United States Agency for International Development (USAID) and it reserves its Intellectual Property rights. It was piloted in three USAID's Feed the Future districts of Bangladesh by Dhaka Ahsania Mission, Care Bangladesh and mPower.

The theory of change for A-Card model is - if SHFs are able to access non-cash based credit at lowest possible interest rate, and flexible and suitable tenure based on crop cycles, with no collateral requirements, adoption of agricultural technologies will increase, leading to increased agricultural productivity, profitability and enhanced livelihoods for SHFs. The A-Card business model is based on a collaborative digitized four-way linkage between SHFs, commercial banks, micro-finance institution (MFI) (acting as agent bank) and farm input retailers. The business model also creates a system of checks and balances that ensures accountability and transparency for all stakeholders involved. The following sub-sections expand on the A-Card model.

System philosophy of A-Card

Figure 1 presents the financing model for rural agricultural credit in Bangladesh. As illustrated, agricultural technology adoption cost is formally facilitated by micro-finance and bank systems. The banking system enable access to credit at low interest rate (IR), but requires collateral. Micro-finance system, on the other hand, transcends collateral requirement, but offered at high interest rates, small loan amounts and short repayment periods, trapping them into a vicious cycle of debt and overlapping loans as Figure 1 illustrates. This negatively impacts profitability as it impinges on SHFs' income due to larger, recurring debts and pressure to sell produces immediately after harvest at lower market price to meet loan deadlines (Alauddin and Biswas, 2014)). Furthermore, since both the credit is extensively cash-based, there is a tendency for its use in non-farming activities, negatively impacting productivity as shown in Figure 1.

To address the shortcomings of the current rural agricultural financing system, A-Card was developed. A-Card is a debit card specially designed for SHFs, which facilitates financial access to credit for digital purchase of farm inputs at low interest rate (10%), no collateral requirement from SHFs and flexible payback period (6 month tenure). The theory of change for A-Card as presented in the model (Figure 2): if SHFs are able to access non-cash based credit at lowest possible interest rate, and flexible and suitable tenure based on crop cycles, with no collateral requirements, adoption of agricultural technologies by SHFs will increase (in case of A-Card, digital purchase of farm inputs) leading to increased agricultural productivity, profitability and enhanced livelihoods of SHFs.

The A-Card model combines the best features of the bank and microfinance system while doing away with the drawbacks of each as illustrated in Figure 2. The innovative features of the model are: (i) Lowest possible interest rates of 10% which is substantially lower in comparison to the standard rate charged by micro-finance intuitions which averages 25% or more; (ii) No collateral requirements for SHFs; (iii) Flexible tenure based on crop cycles (6 months), which reduces weekly/monthly pressure for repayment, prevalent under existing microfinance system;

(iv) Non-cash based credit reduces the tendency for credit use in non-farming activities prevalent in the micro-finance and bank systems; (v) Digital payment method to reduce leakage and risk of money laundering and to enable cost savings by creating direct linkages; (vi) Improved access to better quality farm inputs and services at lower costs; and (v) Financial inclusion of SHFs into the formal banking system, through agent banking, giving them access to a range of financial services and products.

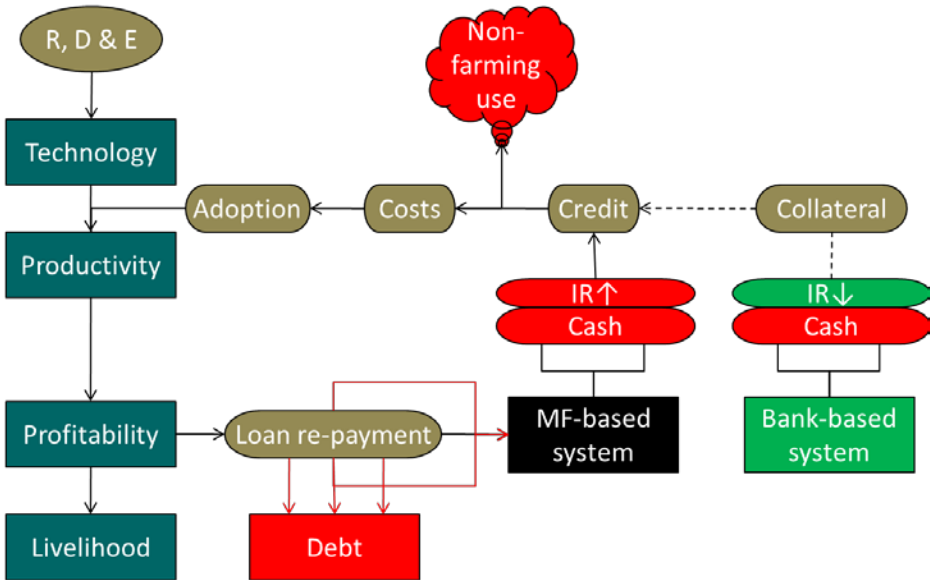

Figure 1: Current rural agricultural financing systems in Bangladesh
(R denotes for research, D for development, E for extension, IR for interest rate, and MF for micro-finance.

Business model of A-Card

The A-Card business model (Figure 3) is based on a collaborative digitized four-way linkage between SHFs, commercial bank, microfinance institution (acting as agent bank) and farm input retailers. Figure 3 shows the win-win collaborative business model of A-Card, outlining the differentiated responsibilities and benefits of the four main stakeholders within the system. The model also creates a system of checks and balances that ensures accountability and transparency for all stakeholders involved.

All stakeholders within this four-way linkage have differentiated responsibilities. The micro-finance institution acting as agent bank goes into a bilateral agreement with the commercial bank on profit sharing, SHF lending, agent banking operations and maintenance of fixed term deposit accounts (collateral for SHF lending).

The responsibilities of agent bank-cum-microfinance institution are: (i) Registering and maintaining SHF's savings accounts; (ii) Maintaining fixed term deposits with bank; (iii) Monitoring loan repayments and monthly savings of SHFs; and (iv) Capacity building of selected SHFs in financial literacy and business planning.

The responsibilities of the commercial bank are: (i) Opening bank accounts for SHFs and providing A-Card; (ii) Establishing agent banking system with microfinance institution-agreeing on credit ceilings on individual loans, profit sharing, processes of credit extension; and (iii) Providing open access to digital money transfer application, and maintaining its upkeep.

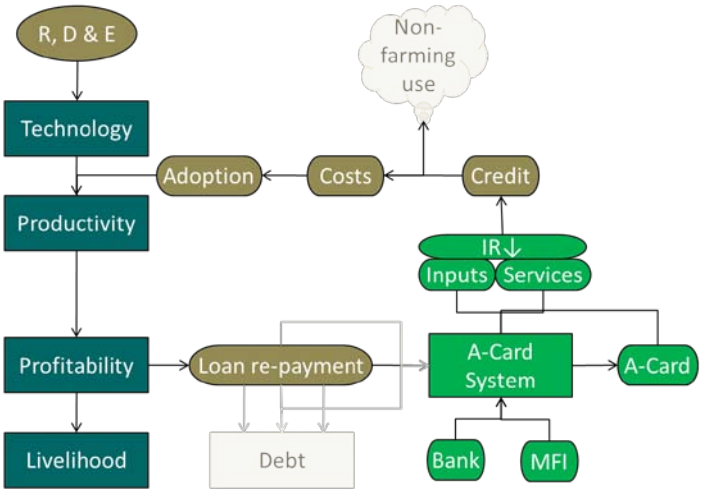

Figure 2: The A-Card system philosophy. R denotes for research, D for development, E for extension, IR for interest rate, and MFI for micro-finance institution.

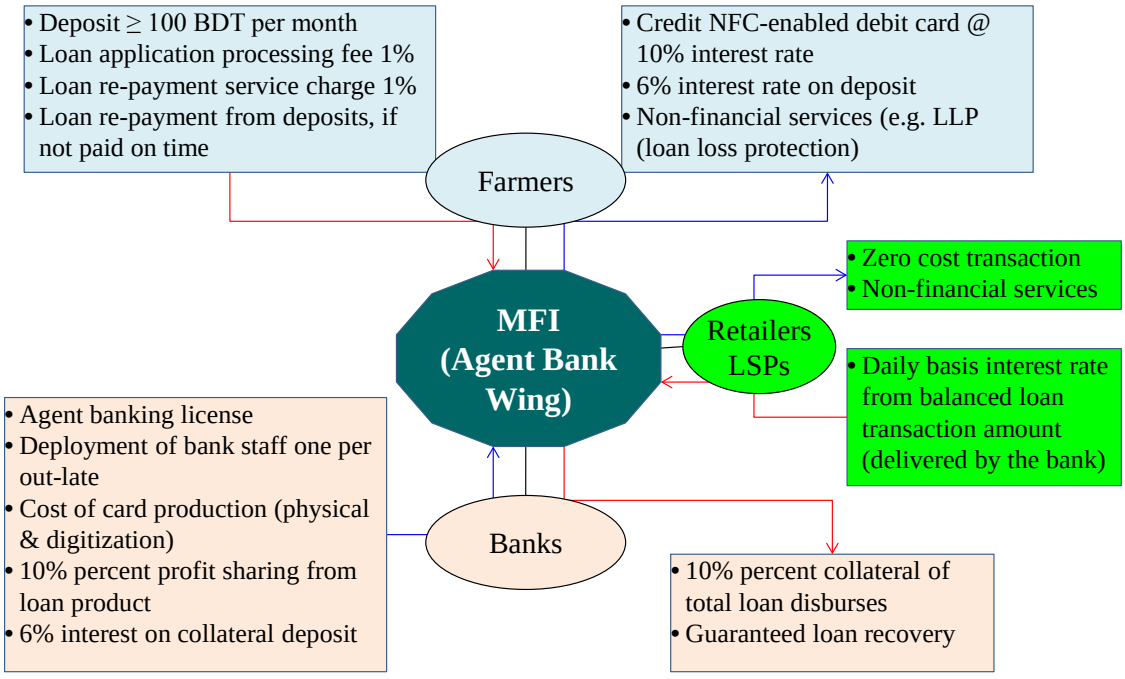

Figure 3: The A-Card business model. LSP denotes for local service providers, MFI for micro-finance institution, and NFC for near-field communication.

Methodology for Impact Assessment

As per the system philosophy of the A-Card, adoption of agricultural technology (production inputs) will lead to higher productivity (yield) and eventually higher profitability for SHFs Thus, the impact of A-Card on productivity and profitability change was evaluated. For this, 53 rice farmers in Faridpur district who received the first batch of the A-Cards in 2016-17 cropping seasons were purposely selected. The study evaluated the impact comparing two phases: Phase 1 - before A-Card introduction and Phase 2 - after A-Card introduction. A pre-tested semi-structured questionnaire was used to collect data.

The impact was evaluated through changes in yield (kg per decimal land), production inputs (fertilizers, agro-chemicals, seeds, irrigation, tillage and labour) cost (BDT per decimal land), grain sale price (BDT per kg) and profitability (BDT per decimal land). Data were analysed statistically and the mean differences of the variables were compared through t-test at 95% probability level using SPSS statistical software (IBM, 2015). Regression analysis was done between production inputs cost and the yield across the two phases, and yield between Phase 1 and Phase 2.

In addition to evaluating A-Card's impact on productivity and profitability, the benefits and challenges of the model for SHFs, micro-finance institution, bank and retailers were assessed through one-to-one interviews with the 56 SHFs respondents, 5 input retailers and 1 micro-finance agent.

Findings and Discussion

Productivity: As per the hypothesis of the A-Card model, adoption of agricultural technology (production inputs) will lead to higher productivity (yield) for SHFs. The evaluation thus tested this hypothesis. The relationship between production inputs costs and yield of rice (productivity) was positive and statistically significant ($Y = 17.89 + 0.05*X$; $N = 106$, $R^2 = 0.35$, $P < 0.001$). The regression analysis shows that for spending BDT 1 per decimal land, rice yield increased by 0.05 kg. This validates the hypothesis and indicates that in the Faridpur district, increasing use of production inputs can lead to increased yield of ('Boro') rice (Figure 4).

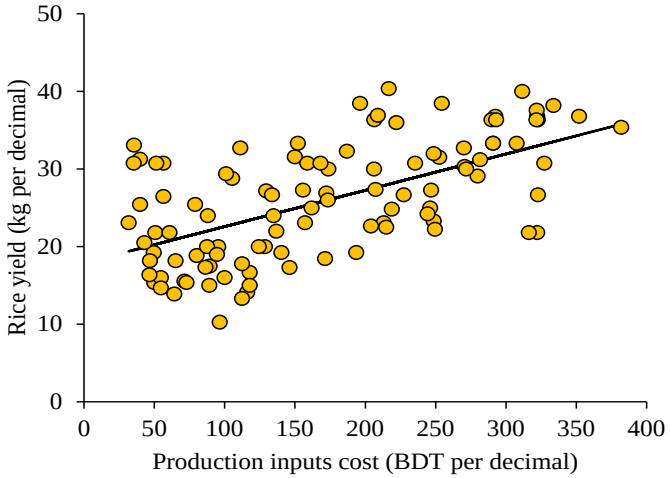

Figure 4: Relationship between production inputs costs and yield of rice across Phase 1 (before A-Card introduction) and Phase 2 (after A-Card introduction)

It was further observed that the rice yield in Phase 2 (after A-Card introduction) increased linearly with respect to the yields in Phase 1 (before A-Card introduction). The regression equation ($Y = 5.91 + 0.92*X$; $N = 53$, $R^2 = 0.70$, $P < 0.001$) between the two was statistically significant and explained 70% variability in the data. This indicates that for each kg yield per decimal land before A-Card introduction, rice yield increased by 0.92 kg after A-Card introduction (Figure 5).

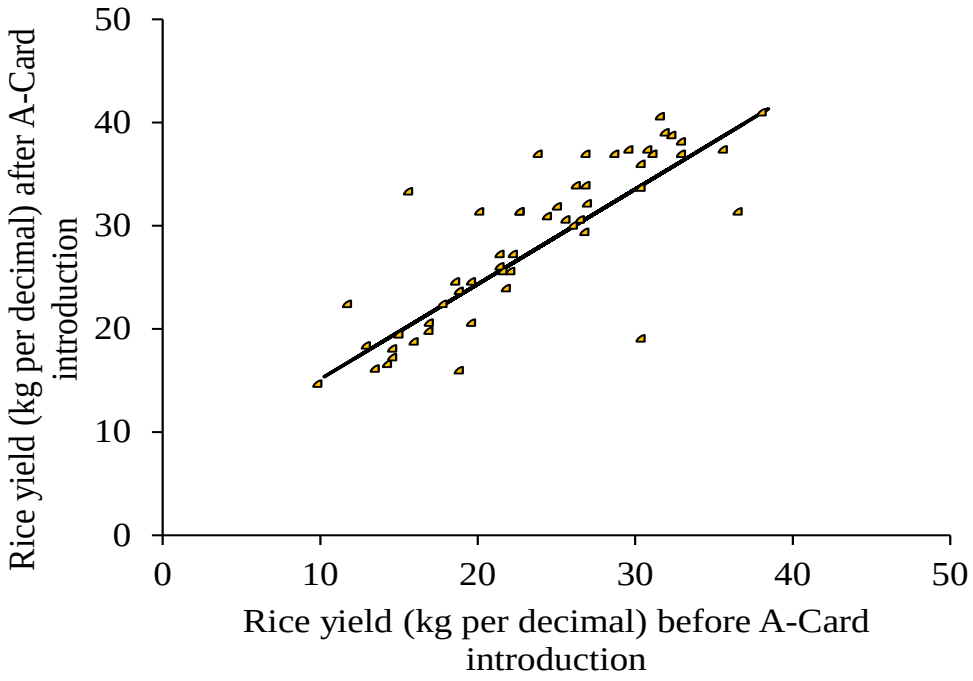

Figure 5: Relationship between the yields of rice Phase 1 (before A-Card introduction) and Phase 2 (after A-Card introduction)

As the hypothesis has been statistically proven, the increase in yield from 23.99±0.96 kg per decimal land before A-Card introduction to 27.99±1.05 kg per decimal land after (difference was statistically significant $p<0.05$) (Table 1), could be accounted for by increase in production input use. In fact, a significant positive increase in the major production inputs use after the A-Card introduction was observed in this study (Table 1). For example, spent on fertilizers, agro-chemicals and seeds were recorded as 98.03±5.15, 25.49±2.09 and 13.88±1.40 BDT per decimal land with the use of A-Card compared to 82.05±4.43, 21.68±1.70 and 11.24±1.64 BDT per decimal land before the use of A-Card, respectively.

In addition to the increased use of production inputs, there were other qualitative factors related to the use of A-Card that contributed to the increase in yield or productivity. For example, the farm productivity with the use of A-Card was enhanced through timely purchase of farm inputs. About 95% of all SHFs interviewed stated that timely purchase of farm inputs as related to seeds, fertilizer, and agro-chemicals as a key factor for increase in yield. Previously (Phase 1), inability to invest accordingly as per the requirements of the seasonal cropping cycle,

resulted in poor quality and lower quantity outputs. However, with the use of A-Card where credit was disbursed based on the amount requested as per planned production costs and cropping cycle, SHFs had financial independence to invest in their production needs as they planned out.

Table 1: Means of major productions inputs, yield, profitability and price of rice in Phase 1 (before A-Card introduction) and Phase 2 (after A-Card Introduction), and the significance of their respective statistical differences (± denotes standard error)

Variable	Mean		Probability (P)
	Phase 1 (before A-Card introduction)	Phase 2 (after A-Card introduction)	
Fertilizer (BDT per decimal)	82.05±4.43	98.03±5.15	0.000
Pesticide (BDT per decimal)	21.68±1.70	25.49±2.09	0.003
Seed /(BDT per decimal)	11.24±1.64	13.88±1.40	0.003
Yield (kg per decimal)	23.98±0.96	27.99±1.05	0.000
Profitability (BDT per decimal)	272.38±16.36	434.29±24.25	0.000
Price (BDT per kg)	716.04±10.50	867.93±16.11	0.000

A second qualitative factor was better availability of good quality inputs at fairer prices. Ninety two percent of surveyed SHFs stated their satisfaction with the quality and price of farm inputs being provided by the retailers. Two factors made this possible. One was that, retailers were selected from Agro Inputs Retailers Network (AIRN) to be part of the A-Card value chain based on certain quality criteria, and the retailers received regular capacity building training on how to provide better products and services to SHFs. Note that the AIRN was established during 2013-14 by another USAID funded Agro Input Project (AIP). Secondly, while before the use of A-Card, 80% of SHFs had made credit purchases from retailers, after use of A-Card only 1% had made credit purchases. As SHFs were making full payments and had improved purchasing power with A-Card use, retailers felt encouraged to sell them good quality products, which they may not had considered selling to them before. A separate study shows 81% of SHFs had received discounted products due to their increased ability to purchase in bulk after use of A-Card (Akhter et al. 2017).

Profitability*:* As per Table 1, profitability in rice also increased after A-Card use from BDT 272.038±16.36 to BDT 434.29±24.25 per decimal land ($p<0.05$, difference in mean is statistically significant), which could be directly related to increased yield. This improved profitability could also be accounted for sale at better market value of product after A-Card introduction (Table 1). As the loan tenure in A-Card is based on crop seasons (maximum of 6 months), SHFs had less pressure to sale their harvest to make weekly or monthly payments. About 95% of SHFs interviewed stated that they had the flexibility to retain their harvest until the crop fetched a higher price in the market, to be able to make better profits on their harvest.

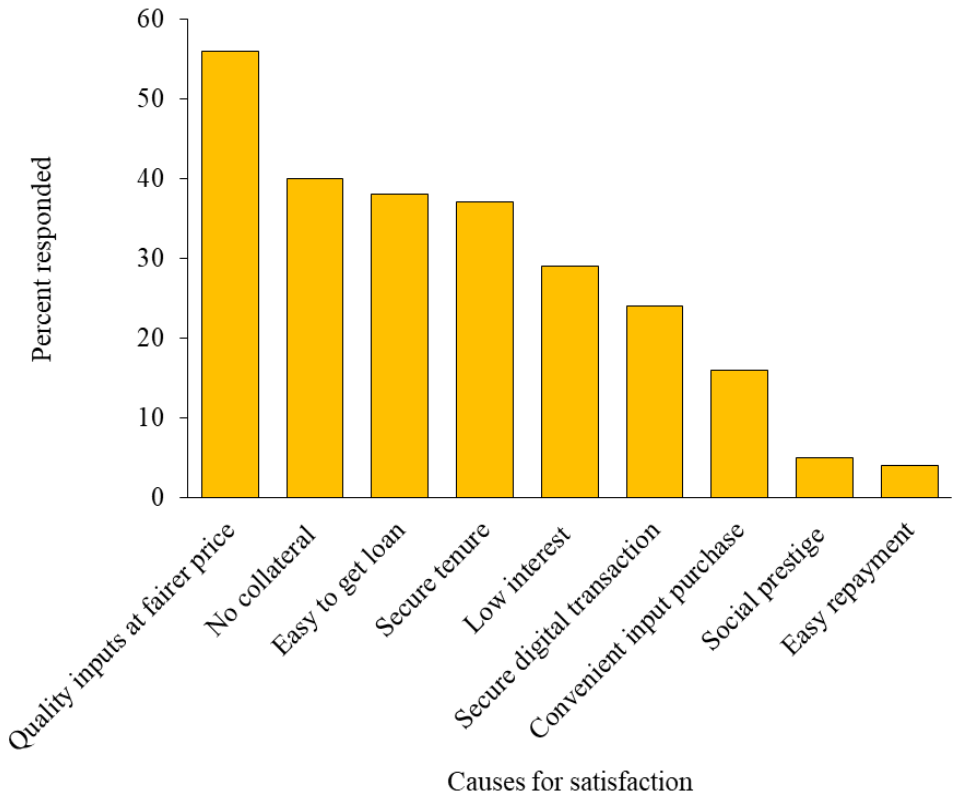

Figure 6 Respondents' opinion on the causes of satisfaction on the use of A-Card

Benefits and Challenges for SHFs: The survey of SHFs on their satisfaction level after A-Card use showed that 47% were highly satisfied, 48.4% were satisfied and 3.9% were unsatisfied. The reasons for their satisfaction as prioritized were as (Figure 6): quality inputs at fairer price (58%), no collateral requirement (39%), easy access to loans (37%), secure tenure (36%), low interest rate (29%), secure digital transactions (25%), ability to purchase inputs when needed (18%), social prestige with car ownership (6%) and easy repayment process (5%). A-Card facilitated increased access to other formal financial services including access to savings. For example, 45% of the A-Card borrowers started (after A-Card introduction) maintaining different types of accounts with banks and almost one third had been making regular savings as shown in the Table 2.

Table 2: Types of new savings amongst A-Card beneficiaries in Faridpur district of Bangladesh

Account type	Percentage
Saving account	33
Current Account	5
Fixed Deposit Account	2
Loan Account	11

Furthermore, due to a 91% reduction in credit purchases from input retailers, the issues of debt and interest on credit between SHFs and retailers were eliminated resulting in improved social capital between SHFs and retailers. This resulted in more frequent consultations of SHFs with

retailers on agricultural production. A separate study shows that 96% of the SHFs they surveyed found digital payments through A-Card more secure as there was less risk of theft if they got cash credit and minimized the risk of counterfeit notes. In addition, due to the two-layered security process of A-Card, consisting of a Personal Identification Number (PIN), password or fingerprint verification, meant that no one could access their credit even if the card was lost or stolen.

There were some challenges were noted: (i) About 53% respondents faced difficulties in using NFC–enabled smart phones for A-Card operation due to weak internet network and/or inadequate technology knowledge of the retailers; (ii) About 15% SHFs were also not happy with the time the bank took in processing their loan application; (iii) A-Card only facilitated production costs for seeds, fertilizer, agro-chemical and in some locations irrigation fuel through non-cash based digitalized credit from selected input retailers; consequently, about 90% of sampled SHFs had to invest cash based capital in addition to A-Card credit for labor, tillage and irrigation purposes; (iv) SHFs had to use other sources of finances in addition to A-Card credit to purchase seeds, fertilizers, agro-chemicals indicating that A-Card credit limit was not sufficient (Fig. 7).

Benefits and Challenges for Retailers As indicated, the benefits included: (i) Improved customer base and sales margin by approximately 20% to 25%; (ii) 95% reduction in credit sales, reducing the time and travel hassle of following up on credits and debts, and improving social capital with SHFs; (iii) Financial inclusion into the formal banking system: all retailers had savings accounts with commercial bank and agent bank. (iv) Collateral in the form of financial history: All retailers shared their expectation that since their transaction histories were saved due to digital transactions, it could bring more opportunities in the future for them to access low-interest rate loans for business capital; and (v) Safe and easy digitalized transactions.

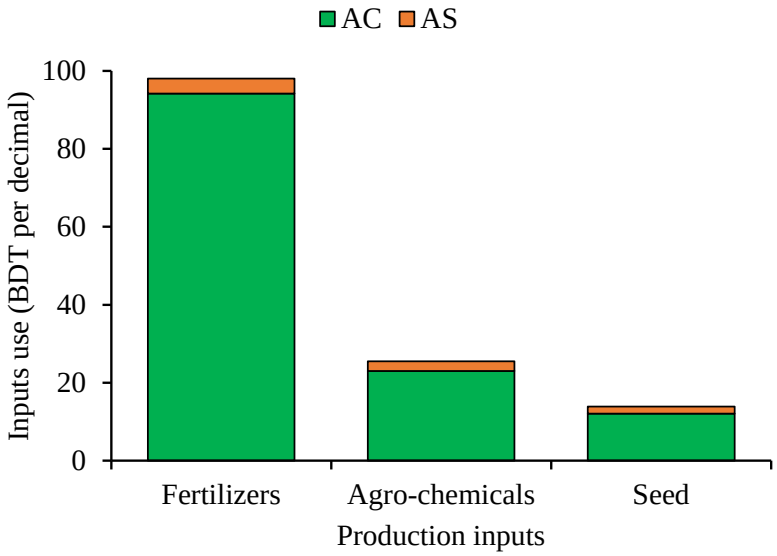

Figure 7: Partitioning of the use of three major production inputs from A-Card (AC) and additional sources (AS).

A major challenge noted was the initial inadequate knowledge in operating customized software installed smart phone and additional internet operation cost for internet-based transactions for A-Card.

Benefits and Challenges for Micro-Finance Institutions and Commercial Banks

On launching a diversified agricultural lending product for a different segment of customers, the micro-finance institutions and the commercial bank experienced both benefits and challenges. On the benefit side, A-Card was rated economically viable for both as they experienced returns on investment from the first year. They further confirmed the effectiveness of A-Card in capturing the untapped informal and marginalized agricultural sector. Under A-Card two parties i.e. bank and MFI are sharing credit risks. This model has been lowering transaction and operations costs for both the partners. In addition, the MFI is accumulating capital fund from SFHs' monthly savings schemes, which is further reducing the credit risks. As the retailers are under the system, a new segment of customers are contributing through inclusion of digital banking channel.

The challenges, however, were manifold. (i) Micro-finance institution's buy into A-Card model as agent banking service providers was difficult due to their need to adopt to a new financing model; the new system demanded change in work-culture in terms of collection and follow up of loan repayment, and collaborating with input retailers; (ii) Negotiating between two partners proved challenging due to lack of proper structures, bureaucracy and frequent change of officials; (iii) Staff timings of micro-finance institution with regards to A-Card service provision were not always maintained due to ineffective monitoring by the management of micro-finance institutions.

Conclusion and Recommendations

From the preliminary quantitative evaluations, it appears that the A-Card has served its purpose of ensuring borrowers (SHFs) spend money on agricultural inputs, which has translated into productivity and profitability. The qualitative assessments also indicate the additional socio-economic benefits received by its different stakeholder groups i.e., the farmers, retailers, partner micro-finance institution and the bank and opportunities for it to perform better. The A-Card Model has promoted financial literacy of the SHFs and their annual farm production business plan. This will potentially contribute to future expansion of digital financing systems in Bangladesh and other countries.

The evaluation recommends the following:

- Increasing the credit ceilings: A considerable number of SHFs used their personal credit in addition to A-Card credit to purchase fertilizers, agro-chemicals and seeds. Thus, the credit ceilings may need to be increased.
- All SHFs invested extra capital in addition to A-Card credit for other production costs in addition to fertilizers, agro-chemicals and seeds. The A-Card model may consider to extend credit to include other essential production costs.
- Centrally controlled loan processing system sometime delayed in receiving loan by SHFs affecting inputs use on time. Therefore, it may require to address kinks in the system.
- Take up of the A-Card model by micro-finance institutions as a new financial product is a cultural shock to the staff. Therefore there needs to adopt a better change management by the micro-finance institutions.

Acknowledgement

We would like to sincerely thank all the A-Card Implementing partners who believed in this new concept of A-Card without any hesitation, had joined this pilot initiative and have systematically

maintained their process data which we have used in this study. Our appreciation also goes to all the USAID-AESA project staff, who apart from their regular routine duties, have spent their very valuable and precious time to collect the real time pre-/baseline and post- assessment data from the A-Card beneficiary farmers and retailers. We also acknowledge and pay gratitude to the farmers and all others who have spent their valuable time and provided the data.

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