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FINAL REPORT

USAID/BANGLADESH CSISA-MI PHASE I ACTIVITY FINAL EVALUATION

December 21, 2020

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USAID/BANGLADESH CSISA-MI

PHASE I ACTIVITY FINAL

EVALUATION

December 21, 2020

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LIST OF ACRONYMS

2WT	Two-Wheeled Tractor
ACI	Advanced Chemical Industries
AFP	Axial Flow Pump
AVC	Agriculture Value Chain Project
BADC	Bangladesh Agricultural Development Corporation
BARI	Bangladesh Agricultural Research Institute
BDT	Bangladeshi Taka
BMEL	Bangladesh Monitoring, Evaluation, and Learning Activity
BRRi	Bangladesh Rice Research Institute
CIMMYT	International Maize and Wheat Improvement Center
COVID-19	Coronavirus Disease 2019
CP	Centrifugal Pump (referred to as LLP for surface water and STW for ground water)
CSISA-MI	Cereal Systems Initiative for South Asia Mechanization and Irrigation
DAE	Department of Agricultural Extension
DEC	Development Experience Clearinghouse
DTW	Deep Tube Well
EG	Economic Growth
EQ	Evaluation Question
ET	Evaluation Team
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussion
FSP	Financial Services Program
FTF	Feed the Future
GOB	Government of Bangladesh
ha	Hectare
iDE	International Development Enterprises
IP	Implementing Partner
IPM	Integrated Pest Management
JVA	Joint Venture Agreement
kg	Kilogram
KI	Key Informant
KII	Key Informant Interview
LLP	Low Lift Pump
LSP	Local Service Provider
LSPN	Local Service Provider Network
M&E	Monitoring and Evaluation
MEL	Monitoring, Evaluation, and Learning
MFI	Microfinance Institution
MOU	Memorandum of Understanding
NGO	Non-Governmental Organization
PNGO	Partner Non-Governmental Organization
PSP	Private Sector Partner
PTOS	Power Tiller Operated Seeder
RFL	Rangpur Foundry Limited

SAAO	Sub-Assistant Agriculture Officer
SO	Strategic Objective
SP	Service Provider
SPR	Self-Propelled Reaper
SPS	Spare Parts Shop
STW	Shallow Tube Well
SW	Southwest
SWI	Shallow-Wet Irrigation
SWIRP	Surface Water Irrigation Rehabilitation in the Southern Delta Region Project
T	Ton
TL	Team Leader
TML	The Metal (Pvt) Limited
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
ZOI	Zone of Influence

EXECUTIVE SUMMARY

Since 2013, the Cereal Systems Initiative for South Asia Mechanization and Irrigation (CSISA-MI) Phase I Activity has aimed to transform agriculture in southwest Bangladesh by unlocking potential productivity through irrigation, small-scale agricultural machinery, and agricultural services provision. The premise of the CSISA-MI Activity is grounded in the theory that the introduction of modernized equipment will result in an increase in smallholders' productivity, diversification of crops, and growth in revenue over time. The CSISA-MI Activity focuses on scale-appropriate mechanization to increase and improve tillage, surface water irrigation, and precision planting and harvesting, while responding to escalating rural labor costs and scarcity, to intensify dry season cropping. Over its six years, CSISA-MI implementation has focused on achieving three primary Strategic Objectives (SOs).

SO1: To sustainably intensify and diversify agricultural production in Southern Bangladesh through surface water irrigation to increase household income.

Through the distribution of axial flow pumps (AFPs), and research and development for higher quality and/or locally made AFPs, CSISA-MI aimed to decrease the cost of irrigation and increase the use of surface water for irrigation in order to intensify and diversify agricultural production in the Feed the Future (FTF) Zone of Influence (ZOI) in southern Bangladesh.

SO2: To sustainably transform agriculture in Southern Bangladesh through broad-based access to agricultural mechanization services.

To create a demand for new machines and reach more farmers, CSISA-MI developed a network of local service providers (LSPs) and engaged small microfinance institutions (MFIs) to increase the purchase of power tiller operated multi-crop seeders (PTOSs), AFPs, reapers, and other equipment. The activity also increased LSP access to spare parts shops (SPSs), mechanics and equipment suppliers.

SO3: To develop new models for public and private institutions that support the commercialization of irrigation and agricultural mechanization in Southern Bangladesh.

In partnership with the private and public sectors, the activity researched, tested, developed, produced, introduced, and promoted efficient technologies that enable farmers to more efficiently cultivate grain, horticulture, and other crops.

The purpose of the CSISA-MI evaluation is to determine the degree to which the activity accomplished these objectives with the following evaluation questions (EQs) in mind:

1. To what extent was the CSISA-MI Phase I Activity successful in increasing smallholders' access to surface water irrigation through the LSPs? How effective have the flow pumps been to address the irrigation issues in the FTF ZOI?
 - 1.1 How successful was the activity in terms of developing and expanding farmers' access to the mechanized and related extension services? What were some of the challenges?
 - 1.2 How successful was the activity in increasing the diversification and intensity of farm production and what was the effect on the "pull" factor for the irrigation market?
2. How successful was the activity in leveraging private sector investment and developing public-private partnerships in the agricultural machinery sector? What were some of the challenges in forming partnerships? How effective was the partnership in conducting risk management?
3. How successful and sustainable are the businesses that have been developed by rural entrepreneurs as a result of the activity? What have been the major constraints and opportunities

with respect to sustainability of the LSP business model? What measures should be taken to enhance sustainability?

4. To what extent has CSISA-MI integrated or incorporated gender in the interventions? What have been the challenges and opportunities, if any? What has been the impact of mechanization on women's economic empowerment?
5. How successful was the activity in developing the upstream supply chain (production, imports, distribution), the downstream market, and access to finance and credit for mechanization.

To answer these questions, the evaluation team (ET) conducted a comprehensive desk review, analyzed activity data, facilitated focus group discussions (FGDs) with the CSISA-MI leadership and field staff, and conducted key informant interviews (KIs) with four Government of Bangladesh (GOB) personnel; three manufacturers/importers; seven each of equipment dealers/retails, mechanics, and SPS owners; 33 LSPs; and 36 farmers from seven different districts within the Barisal, Dhaka, and Khulna divisions. Due to the coronavirus disease 2019 (COVID-19) pandemic, all interviews were conducted remotely using Zoom meetings and telephones. Both quantitative and qualitative data were entered into Excel data sheets for analysis. In brief, the findings and recommendations are as follows.

- a. The activity was somewhat successful in increasing farmer access to surface water irrigation, primarily in the Barisal Division, but the AFPs are not reported to be competitive with the centrifugal pump (CP) in terms of durability, cost, convenience and flexibility in use. Addressing the overall irrigation issues in the FTF ZOI was beyond the scope of any one project. Although numerous experimental improvements to the AFP are mentioned in the annual reports and other research documents, these reports do not present clear evidence on which of these improved designs have been adopted by the private sector and sold to farmers and LSPs. CSISA-MI should precisely document how the AFP has been improved and report the level of adoption of the newer versions in the field. In the future, CSISA-MI should identify specific niche upazilas where adoption is likely to be more successful and work with the manufacturers and retailers to reach those areas.
- b. While the activity very successfully increased farmer access to mechanized services, any extension services that may have been provided were informal and based on the knowledge and the initiative of the staff, Department of Agricultural Extension (DAE) and non-governmental organization (NGO) partners, and private sector service providers. Although 90 percent of soil tillage is mechanized, over 95 percent of seeding and harvesting is done manually. The project has made significant headway in increasing the demand for, and availability of, the PTOS and reaper, but there is still an unmet need for these machines to be adapted to specific crops and regions. CSISA-MI needs to have more in-depth discussions on these issues with LSPs and farmers—especially women—to determine the potential market demand.
- c. CSISA-MI was very successful in leveraging private sector investment, over \$8.5 million, almost 30 percent of which was spent by LSPs when procuring equipment. This does not account for the investment by SPSs or dealers in expanding their businesses to meet the need for new spare parts and any additional machines not captured by the activity's monitoring and evaluation (M&E) system. Both the reaper and combines are fairly new to Bangladesh and two out of six GOB and Importer key informants (KIs) believe that the reaper will not be able to compete with the combine. The next phase of the activity should be aware of and prepare for evolving market dynamics, while continuing to address the outstanding limitations and challenges of the reaper, as it does seem to be a more appropriate technology for small holder farmers. CSISA-MI should research and better document the comparative advantages of the reaper, how it can be improved, and what is financially feasible for LSPs and farmers.
- d. The LSP business model is a very sustainable approach to increasing farmer access to machinery, and CSISA-MI was very effective in creating relationships between the 3,474 LSPs, 762 mechanics,

193 equipment dealers, 5-7 importer/manufacturers, and 79 SPS owners. The two greatest challenges for LSPs are obtaining quality spare parts and finding a good mechanic, so there is still room for improvement within the supply chain and related services.

- e. The activity had limited success at incorporating gender within the project interventions. The focus was on establishing female service providers in a sector that is 100 percent male dominated, without attempting to fully understand how women might benefit from mechanization services as customers. In Years 5 and 6, the activity established 75 and 139 female LSPs, respectively, a total of 214 female LSPs out of 3,474.

CSISA-MI was successful in developing the upstream supply chain (production, imports, distribution), and the downstream market for machines, spare parts, and LSPs. CSISA-MI began piloting various interventions to increase access to finance including “zero and half interest loans” to LSPs through partner MFIs in year 3. “In year 5, CSISA-MI drew up Joint Venture Agreements (JVAs) with four MFIs to continue their partnership from the previous year. In Year 6 the JVAs no longer included a provision for interest rate subsidies, and subsidies for Financial Service Program (FSP) staff salaries were also significantly reduced.”¹ According to the final report, by the end of the project only 228 LSPs had accessed finance through MFIs, which indicates a marginal impact in this area. CSISA-MI should commission a more in-depth study on loan repayment rates, return rates on investment for the different machines, and how these return rates were affected by the LSPs’ access to a government subsidy.

¹ CSISA-MI Final Report page 25.

1.0 INTRODUCTION

Bangladesh is the most densely-populated country in the world with 1,252 people per square kilometer, over 60 percent of the population, living in rural areas and 80 percent dependent on agriculture for their livelihoods.² Fortunately, the land is fertile, water is readily available, and the climate allows for three cropping seasons within the year. Bangladesh farmers produce a wide variety of crops (rice, wheat, maize, potatoes, numerous legumes, spices, fruits, vegetables, etc.), but farmers plan their production around the two primary rice growing seasons—rain fed *aman* and irrigated *boro*. According to the United States Department of Agriculture (USDA),³ the land area cultivated with *aman* rice has remained the same since 1987—5.5 million hectares (ha), while *boro* rice expanded from 1.7 to 5 million ha between 1987 and 2012, at which point it began to gradually decline. The production of *boro* rice began in the 1970s with the development of deep tube well (DTW) irrigation, which has remained static at a little over 1 million ha, while shallow tube well (STW) irrigation has increased from 1 million ha in 1990 to over 3 million ha in 2006.⁴ Although *boro* rice production led to significantly improved food security, it is no longer more profitable than *aman*; a study by the Bangladesh Rice Research Institute (BRRI) in 2017, indicates an actual negative net return of 9,785 taka/ha. Despite the higher cost for irrigation and other inputs, *boro* yields were only 5,883 kilograms (kg)/ha compared to 4,621 kg/ha for *aman*.

Between 1987 and 2016, the area planted with wheat was fairly static, but with a gradual decrease from 500,000 ha in 1987 to 350,000 ha in 2019, despite the fact that wheat yields increased from less than 2 tons (T)/ha in 2005 to over 3 T/ha in 2017. In contrast, the area of maize production has increased dramatically from virtually zero in 2000 to 445,000 ha in 2019 and maize yields have increased from 1 T/ha in 2000 to almost 8 T/ha in 2017.⁵ The dramatic increase in maize production is in response to the impressive growth in the poultry sector, which has led to increased protein consumption in Bangladesh.

The expansion of irrigation and increased cropping intensity led to the need and demand for other machinery, most notably threshers and two-wheeled tractors (2WTs) for tillage. As documented in a number of studies, including one done by International Development Enterprises (iDE), the relaxation of government policies led to a significant increase in the number of 2WTs in Bangladesh from 500 in 1989 to 500,000 in 2015.⁶ As agriculture labor becomes more scarce and production intensifies the need for a wider variety of machines for improved tillage, planting, and harvesting are needed, which is why the United States Agency for International Development (USAID) invested in the Cereal Systems Initiative for South Asia.

2.0 THE DEVELOPMENT PROBLEM AND THE PROJECT RESPONSE

Rice constitutes almost 80 percent of calories consumed by the majority of the Bangladeshi people, especially the poor, and the Government of Bangladesh (GOB) considers the production of rice as a major priority for food security. The wide scale expansion of STW irrigation enabled the country to increase

² <https://ourworldindata.org/most-densely-populated-countries>

³ Bangladesh Grain and Feed Annual 2019 Approved By: Mark A. Myers, Agricultural Attaché Prepared By: Tanvir Mahmud, Agricultural Specialist.

⁴ The impact of intensive groundwater abstraction on recharge to a shallow regional aquifer system: evidence from Bangladesh Mohammad Shamsudduha, Richard G. Taylor, Kazi M. Ahmed & Anwar Zahid Abstract.

⁵ Bangladesh Grain and Feed Annual 2019 Approved By: Mark A. Myers, Agricultural Attaché Prepared By: Tanvir Mahmud, Agricultural Specialist.

⁶ Study into the Commercialization of Selected Agricultural Machines in Bangladesh, Submitted to International Maize and Wheat Improvement Center (CIMMYT) Bangladesh. By iDE, August, 2012.

rice production over five-fold since the late 1980s, but at a cost. According to the 2014 Food and Agriculture Organization of the United Nations (FAO) profile, “In many areas, environmental hazards have been encountered, and a number of adverse effects have emerged owing to the overexploitation of groundwater, such as lowering of water tables, reduction in dry season flows of rivers and streams, groundwater pollution, intrusion of saline water in coastal areas, ecological imbalance and possible land subsidence.”⁷

Concerned with the long-term sustainability of groundwater use and the need for increasing food production, the GOB began looking to the use of surface water to increase crop production in the southwest coastal belt. There are many studies about water quality and availability in Bangladesh, but few provide detail about the specific localized issues within the coastal belt. One of the more recent in-depth studies was conducted by Tim Krupnick and his colleagues in 2017.⁸ Some of the key contextual issues highlighted in this document include:

- “The viability of increasing dry season boro rice production in southern Bangladesh is questioned given the southern region’s soil and water salinity constraints, problems with coordinated water governance, and concerns over the anticipated long-term effects of climate change.” (Bell et al., 2015; Bernier et al., 2016; Qureshi et al., 2015)
- “Investments to expand shallow-wet irrigation (SWI) are complicated by the region’s crop, soil, and hydrological complexity. Upstream blockages, diversions, siltation and tidal dynamics complicate year-round water availability.” (Krupnik et al., 2017)
- “Temporally dynamic water and soil salinity also pose problems in the coastal fringe, as can late-vacating monsoon season floodwaters that delay timely dry season crop establishment. Rabi crops in the southeast of the study area may be sown as late as January, primarily due to farmers’ preferences for late-maturing *T. aman* rice varieties, which can survive late vacating and deep flood-waters.” (Krupnik et al., 2017)
- “The area above the Sundarbans forest in the **south-west** once experienced southward dry season river flow through the Gorai River, but siltation and the 1976 completion of the Farakka Dam in West Bengal disrupted freshwater flow. This resulted in post-monsoon drying and coastal saltwater intrusion that has now become a serious concern. The **south-central** hydrological zone is conversely characterized by a dense network of active natural canals and rivers, many of which carry relatively fresher water.” (Brammer, 2002)

It is important to keep in mind, the differences between the southwest (Khulna division), the south-central (Barisal), and the districts and upazilas within these divisions. The primary purpose of Krupnick’s study was to assess the opportunity for using SWI to increase cropping intensity. The study came to several conclusions:

- According to the soil and water salinity index, 21 percent of the observed fallows were classified as high and medium potential, with the remainder poorly suited to SWI.
- Conversely, 78 percent of the observed low production intensity acreage addressable by SWI was classified as high and medium potential.
- The largest concentration of fallow land that could be brought under SWI was located in the south-central hydrological zone. Fifty-nine (59) percent was located in Barisal Division, the majority in Patuakhali. The same district however also had the highest amount of low and marginal potential land, a result of increasing salinity towards the coast.

⁷ FAO. 2014. AQUASTAT Country Profile–Bangladesh. Food and Agriculture Organization of the United Nations (FAO). Rome, Italy *Irrigation in Southern and Eastern Asia in figures – AQUASTAT Survey – 2011*.

⁸ Sustainable crop intensification through surface water irrigation in Bangladesh? A geospatial assessment of landscape-scale production potential, Timothy J. Krupnik, Urs Schulthessa, Zia Uddin Ahmeda, Andrew J. McDonald, Land Use Policy 2017.

- As with fallow land, most (73 percent) of the low production intensity cropland that could be converted from rainfed to irrigated conditions was found in the south-central hydrological zone.
- Within this area, Patuakhali district had the greatest land area where soil or water salinity exceeded 4 deciSiemens per meter (dS/m)⁻¹, indicating low or marginal SWI potential.

The study provides a detailed analysis for SWI and increased cropping intensity by district, within the Khulna, Barisal, and Dhaka Divisions. It highlights the fact that there is great variability between districts, but water and salinity are not bound by administrative boundaries, and the differences between upazilas within these districts are not known or documented. There are also many other factors that affect farmer decision-making not covered in this study. Farmers are aware of the rising cost of irrigation, especially as water tables decline toward the end of the dry season. They are dealing with the rising cost and scarcity of agriculture labor for planting, harvesting, and processing. At the same time, they are also now familiar with how other crops such as maize and wheat compare with *boro* rice production and are open to new opportunities.

Cereal Systems Initiative for South Asia Mechanization and Irrigation (CSISA-MI) attempted to address the potential opportunities for increased SWI and production, while also responding to the rising costs of irrigation and manual labor by increasing farmer awareness for improved irrigation machines (axial flow pumps, or AFPs) and tillage, planting, and harvest equipment. Only by increasing the availability of machinery and other support services could farmers assess how those machines might lead to increased productivity and/or profits for their particular farming system. Annex I presents a list of all upazilas where the CSISA-MI activity was implemented from Year 1 to 5. It also indicates that most upazilas in the Jashore, Jhenaidah, Kushtia, Magura, Merherpur, and Narail districts of the Khulna division were unsuitable for SWI and that the AFP was used primarily for *gehr* dewatering in Khulna district.

3.0 EVALUATION PURPOSE

While CSISA maintains a focus on adaptive technology testing, deployment of new crop varieties, direct training work with farmers, and facilitating output markets, CSISA-MI goes beyond this to focus on upstream market interventions involving machinery manufacturers, dealers, spare parts shop (SPS) owners, mechanics, and local service providers (LSPs) to facilitate efficiencies in the value chain to reach farmers at scale. The purpose of this evaluation is to determine the degree to which CSISA-MI has succeeded in achieving the stated objectives and outcomes as per the original logical framework, but with consideration of strategic and operational adjustments that were made between 2013 and 2019.

CSISA-MI is based on market development approaches to strengthen the capacity of stakeholders involved in mechanized agriculture production and their relationships with one another. There are many challenges to improving the quality and availability of machinery and their spare parts, the capacity and availability of mechanics, and the business skills and technical capacity of LSPs. This evaluation will provide an analysis of the number of LSPs, mechanics, SPSs, dealers, manufacturers, and importers that were established or strengthened through CSISA-MI activities; the challenges in establishing new entrepreneurs and developing the capacity of existing entrepreneurs; and the degree to which these efforts are likely to sustain and/or continue to evolve and expand. The evaluation will also provide an analysis of how the activity responded to various challenges, what was learned, and how interventions can be improved in the future.

3.1 AUDIENCE AND INTENDED USE

The primary intended audience for the assessment is USAID/Bangladesh. The intended use of this evaluation report is to provide recommendations to USAID for current projects and activities as well as to inform future designs and interventions in the Agriculture Machinery sector. USAID may also disseminate the report widely to stakeholders, such as implementing partners (IPs), GOB Ministries, departments and agencies, other sector-specific donors, non-governmental organizations (NGOs), and

the Development Experience Clearinghouse (DEC). The assessment's findings and recommendations will inform future designs and implementation of Agriculture and Economic Growth (EG) projects.

4.0 EVALUATION METHODOLOGY

4.1 EVALUATION TEAM COMPOSITION

A three-person evaluation team (ET) comprised of an international team leader, one local mechanization specialist, and one irrigation systems specialist served as the core team for conducting the desk review of all relevant documents, developing the data collection tools, and conducting all focus group discussions (FGDs) and key informant interviews (KIIs).

Due to the coronavirus disease 2019 (COVID-19) pandemic, it was decided that the Team Leader (TL) would oversee the evaluation from her home base in Germany. Two days before submission of the work plan it was realized that none of the team members would be able to travel or conduct in-person interviews. At that point, all planned FGD guidelines were revised to be implemented as KIIs, except for those with the CSISA-MI staff. Two research assistants were recruited to translate guidelines, schedule and conduct interviews, perform data entry, and assist with data analysis. The Bangladesh Monitoring, Evaluation, and Learning Activity (BMEL) also provided support for translating KII guidelines into Bengali, conducting interviews when needed, performing quality control of collected data, and assisting with data analysis.

4.2 DOCUMENT REVIEW

The ET began its work with a home-based desk review of the activity proposal and logical framework; annual and semi-annual reports; the Scaling of Agriculture Machinery report; the monitoring and evaluation (M&E) plan; and USAID, GOB and other technical documents. Most documentation was available to the ET at the time of the work plan preparation. All reviewed documents are listed in Annex 18.

4.3 SAMPLING APPROACH

The CSISA-MI activity was implemented in 121 upazilas, within 23 districts in the Dhaka, Khulna, and Barishal divisions. Due to a reduction in funding from USAID the IP phased out 73 upazilas by Year 5. According to the reports and discussions with CSISA-MI staff, the activity ceased operations in areas where the equipment was less in demand by farmers and/or was more expensive to operate due to their remoteness. The TL selected an upazila within each of the seven districts where operations continued after Year 5 and where there were a sufficient number of the activity stakeholders. When not available at the upazila level, dealers were selected from those located in the Sadar district.

Annex 1 shows the years that the activity was operational in each upazila, specific issues for the use of the AFP, and the overlap with the Surface Water Irrigation Rehabilitation in the Southern Delta Region Project (SWIRP), part of the Local Currency Funds Activity. CSISA-MI also provided a list of the total number of LSPs, mechanics, SPSs, and dealers with whom the activity collaborated (Annex 2). The TL used the complete list of all activity stakeholders (farmers, LSPs, mechanics, SPS owners, and dealers), provided by the IP, for respondent selection. Annex 3 provides the planned number of interviews.

4.4 DATA COLLECTION

The availability of technology made a remote evaluation possible, enabling the ET to share documents and discuss any issues, but the quality of the team interaction was sometimes constrained by Internet connectivity. The ET used Zoom to conduct the FGDs with the CSISA-MI leadership core team and three field teams, and three machinery manufacturers/importers. The two specialists interviewed the dealers/retailers, SPS owners, and mechanics by phone—one from each of the seven selected districts. Two additional enumerators were contracted to assist with the LSP and farmer telephonic interviews by phone. Toward the end of the data collection process some LSPs could not be interviewed due to illness

or other issues, so the ET ultimately interviewed 33 LSPs and 36 farmers. The TL reviewed all interview notes, provided feedback, and ensured that all evaluation questions (EQs) were responded to as best as possible.

4.5 DATA ANALYSIS

The BMEL team provided direction for the development of Excel data sheets for data entry and analysis of the farmer, LSP, mechanic, dealer, and SPS owner data. The TL created frameworks for data analysis and all data were entered by the two enumerators. The analysis was facilitated by the ET with support from the BMEL team.

4.6 METHODOLOGICAL STRENGTHS AND LIMITATIONS

The use of various data sources enabled the ET to triangulate information, but there are always methodological limitations, particularly for a remote evaluation. The first limitation was the small sample size for both the number of respondents and upazilas, seven out of the original 121, especially considering the extensive differences in cropping systems, agroecological environments, comparative economic productivity of crops, availability of surface and ground water, and remoteness.

Second, many people do not know or use the precise terms for different machinery. There are over 800,000 “power tillers” or 2WTs in Bangladesh used with an 18-tine attachment. A Power Tiller Operated Seeder (PTOS) is a two-wheeled tractor with a power take off system that is used to operate a 48-tine tillage attachment that comes with a seeder box. Due to the similarities, many people are unlikely to remember a long English name for something that is very similar to a “tractor.” Third, because the ET could not go to the field and meet with random farmers, respondents were selected from the activity data. These farmers were known to be LSP customers, probably more familiar with the terminology, and therefore, not necessarily representative of farmers less involved with the activity. Fourth, it is very difficult to determine if the respondent truly understands the questions or is providing accurate information without being able to observe the situation in the field. Fifth, because the IP worked predominately through the private sector many of those interviewed may not be aware of the actual activity name and its goals. The TL attempted to identify any potential misunderstandings and gaps in information by reviewing all KII notes as they were submitted, seeking clarification as required, and discussing these issues with the team as they arose. One strength of conducting interviews by phone was that it was easier to interview the person at their convenience. In addition, it was easier to follow up with people if additional information was needed.

5.0 FINDINGS AND CONCLUSIONS

The ET had the EQs in mind as they reviewed the CSISA-MI proposal, reports, and other documents. The KII guidelines were developed based on what was learned, and not learned, from these documents. During CSISA-MI FGDs, the ET learned that even though the activity changed direction significantly from the original proposal, that change was not documented in a revised logical framework or within the wording of the annual reports. These issues will be elaborated upon in response to the following respective EQs.

5.1 TO WHAT EXTENT WAS THE CSISA-MI PHASE I ACTIVITY SUCCESSFUL IN INCREASING SMALLHOLDERS’ ACCESS TO SURFACE WATER IRRIGATION THROUGH THE LSPs? HOW EFFECTIVE HAVE THE FLOW PUMPS BEEN TO ADDRESS THE IRRIGATION ISSUES IN THE FEED THE FUTURE (FTF) ZONE OF INFLUENCE (ZOI)?

Agriculture productivity and cropping intensity could be increased in the southwest with the use of surface water for irrigation. The southwest coastal zone includes three divisions with different water issues and a wide variety of land types. The STARS Geospatial mapping tool

(<https://202.53.173.179/cimmyt/mapexplorer.aspx>) indicates the greatest potential for SWI and increasing cropping intensity by district but differences between upazilas are not documented.

Documents and KIs indicate that ground water is available in most of the Dhaka Division and the northern upazilas of the Khulna division but much less so in the Barisal Division. Surface water is delivered through canals and requires proximity, whereas ground water can be easily accessed with a STW. Many southern riverine tributaries and canals have silted up and eroded over the years negatively impacting water flow. For these reasons, farmers are more likely to prefer the convenience of ground water when available.

The ET asked LSPs and farmers about the use of ground and surface water. The primary and secondary sources of irrigation water, as reported by LSPs were analyzed by division (Annex 4). Two upazilas were covered in Barisal: Galachipa and Wazipur. In these upazilas, there is no secondary source of irrigation water; in the other divisions, over 90 percent of irrigation water comes from STWs. As shown in Annex 4, larger canals are more important where surface water is the primary source of irrigation water.

Farmers were asked comparable questions about the source of irrigation water and the results are very similar to the LSPs. Sixty (60) and 80 percent of farmers report the use of surface water in the Dhaka and Khulna divisions, respectively, but the percentage of land covered is 10 percent or less. Although surface water is not an important source of irrigation water in the Dhaka and Khulna Divisions, the majority of farmers do report the use of some surface water. In Barisal, 64 percent of farmers reported the use of AFPs, compared to 10 percent in Dhaka and 40 percent in Khulna (Annex 4.3). Fifty-three (5) percent of respondents in all areas reported the use of low lift pumps (LLPs) only for surface water irrigation.

LSPs procured a total of 1,017 AFPs during the life of the activity, but the numbers dropped significantly after Year 3 (Table 1). According to the CSISA-MI leadership team, the AFPs procured during the first three years (736) were likely out of operation by the end of project (EOP), due to their lack of durability, leaving 281 AFPs likely to be functional in the field. Annex 9 shows the total number of AFPs, PTOSs, and reapers that were procured by LSPs by upazila—25 in Galachipa (Patuakhali District) and 60 in Wazipur (Barisal District). Despite the small sample, it seems that the AFP is highly appreciated in the areas surveyed. With an average of only 1.5 AFPs per village in the two Barisal upazilas, it would be useful to have a more in-depth understanding of how these are being used and their impact on productivity.

One large farmer with over 200 acres of land in Manirampur Upazila (Khulna), reported the use of three AFPs by 300 farmers in his village, primarily to drain *ghers* after shrimp cultivation. This same farmer explained that the AFP can drain the same amount of land in half the time required by the LLP, but he also shared “*the shaft breaks frequently, as the machine runs continuously for days to months, the material quality of the shaft is not appropriate for such heavy-duty work.*”

Farmers appreciated the higher discharge rate which can cut the required time for drainage in half and that there is no need to prime the pump. In addition, AFPs can supposedly bring up water from greater depths than the LLP; in this case they may be referring to the distance of the pump from the canal water. It also seems to be most practical for those who live next to a canal. One farmer mentioned being within the *command area* of the AFP. Based on LSP and farmer interviews, the AFP is still in use and has a strong advantage in certain niche areas where ground water is unavailable.

The AFP delivers more water using less fuel than the centrifugal pump (CP), but it does not have a similarly well-developed supply chain and it can only be used for the delivery of surface water, while the CP can also be used with STWs. In addition, the AFP cannot be left unmanned while in operation, is less durable than the CP, and, due to the length of the pipe, is both difficult to store and transport. The majority of farmers with AFP experience reported the need for a separate engine to run the pump, shaft breakdowns, and corrosion due to saline water as disadvantages of the AFP. In conclusion, the activity was somewhat successful in increasing farmer access to surface water irrigation, primarily in the Barisal Division, but the AFPs are not competitive with the CP in terms of durability, cost, convenience, and flexibility in use. Addressing the overall irrigation issues in the FTF ZOI was beyond the scope of any one project.

Table 1: Sales of Agriculture Technology by Activity Year⁹

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
AFP	134	168	434	152	118	11	1,017
PTOS	72	101	233	410	597	438	1,851
Reaper	28	27	75	218	360	181	889
Total	234	296	742	780	1,075	630	3,757

5.1.1 How successful was CSISA-MI in terms of developing and expanding farmers' access to the mechanized and related extension services? What were some of the challenges?

Based on discussions with the CSISA team, the activity did not support any formal private sector or public extension services. Informally, as a result of Department of Agricultural Extension (DAE) involvement with the machinery demonstrations, relationships between LSPs, farmers, and the DAE were strengthened. One DAE KI mentioned that LSPs come to him when they need technical advice, and he links those LSPs with their local Sub-Assistant Agricultural Officers (SAAOs).

Twenty-five (25) percent of LSPs reported learning new agriculture practices, primarily line sowing of wheat and other crops. According to Table 1, the PTOS was procured by the largest number of LSPs, most likely because it is similar to the existing common tillage equipment, and because it takes only one pass in the field to create a fine soil, compared to five with the standard attachment. The PTOS was intended to facilitate improved tillage and seeding, but various stakeholders estimated that less than 10 percent of the LSPs use the seeding attachment. To increase farmer demand for mechanized seeding, LSPs promoted line sowing, which some farmers began to adopt. All farmers found significant value in the PTOS for land preparation for onions, jute, mung bean, and other crops.

According to DataBD,¹⁰ 90 percent of land in Bangladesh is cultivated with 35,000 tractors and 700,000 2WTs, as well as over 1.5 million STWs, 170,000 LLPs, and 35,000 DTWs for irrigation. So, the amount of equipment procured as a result of the activity is a drop in the bucket. Although the activity was focused on scaling, it was more about bringing new technologies that would increase farmer productivity.

In contrast to tillage equipment, data indicate that there were only 500 reapers and 200 combines used for cultivation in 2019. Harvesting of rice, wheat, maize, and other grain crops is extremely labor intensive and has to be done when the grain is mature and before any untimely rainfall. As tillage and planting become more mechanized there will be a growing need for more mechanized harvest equipment.

Presently, the use of a reaper is new to over 99 percent of farmers in Bangladesh and the technology is still not perfectly adapted to farmers' needs. For example, it did not perform well in moist soils, with crops vulnerable to lodging, and it is difficult to turn in small fields, leaving some of the crop uncut. CSISA-MI made numerous modifications to the reaper to address these issues. One hundred (100) percent of farmers that reported using reapers will continue to do so because labor is scarce, and the reaper is cheaper than manual labor. Mechanized harvest equipment will allow farmers to harvest quickly and to get ready for the following season, giving them greater choice of crops and varieties to plant.

CSISA-MI began demonstrating the K-BOS medium multi-crop combine harvester in Year 5, and in 2017 one key informant (KI) imported 12 combines increasing to 174 in 2019. Combines are very expensive, and one GOB KI mentioned that it may only be practical where farmers are willing to plant the same variety at the same time so that the combine can be used on larger fields. Another GOB KI shared how the DAE has provided combines to some groups with a 100 percent subsidy.

Annex 5 indicates a very ambitious plan with regard to subsidies for combine harvesters over the next five years. Advanced Chemical Industries (ACI), Alim Industries Ltd, The Metal (Pvt.) Ltd. (TML), and

⁹ CSISA-MI Final Report, 2019

¹⁰ <https://databd.co/stories/envisioning-mechanization-innovation-in-bangladesh-agriculture-10536>

Chittagong Builders Ltd.—have imported combines, a process which requires government approval and a memorandum of understanding (MOU) with the DAE. Before any further promotion or development research with combines, CSISA-MI should look closely at the financial feasibility of combines owned by individual LSPs without the 100 percent subsidy. In conclusion, while CSISA-MI very successfully increased farmer access to mechanized services, any extension services that may have been provided were informal and based on the knowledge and the initiative of the staff, DAE and NGO partners, and private sector service providers.

5.1.2 How successful was the activity in increasing the diversification and intensity of farm production and what was the effect on the “pull” factor for the irrigation market?

Despite what is stated in the activity proposal and implied in the annual reports, CSISA-MI did not focus on increasing crop diversification as a pull factor for the irrigation market. As farmers became aware of the PTOS, reaper, and AFP they assessed how these machines could best be used for the most profitable crops—onions, watermelon, jute, etc. As discussed under EQ 1 the irrigation “market” is less influenced by increasing cropping intensity than by the availability of surface and ground water and the efficiencies of the available technologies. In conclusion, CSISA-MI did not focus on increasing cropping diversity, and there was no additional pull factor for the AFP; but the increased availability of surface water in some upazilas of the Barisal division did lead to increased cropping intensity.

5.2 HOW SUCCESSFUL WAS THE ACTIVITY IN LEVERAGING PRIVATE SECTOR INVESTMENT AND DEVELOPING PUBLIC-PRIVATE PARTNERSHIPS IN THE AGRICULTURAL MACHINERY SECTOR? WHAT WERE SOME OF THE CHALLENGES IN FORMING PARTNERSHIPS? HOW EFFECTIVE WAS THE PARTNERSHIP IN CONDUCTING RISK MANAGEMENT?

According to both manufacturer and GOB KIs, CSISA-MI worked very well with the private sector to increase the demand for and availability of the PTOS, reaper, and AFP. Table 2 shows the annual level of investment by the private sector partners (PSPs) and the LSPs, a total of \$8.5 million, 26.6 percent of which is from LSPs. The PSPs appreciated the IP’s help in expanding and strengthening their knowledge of and relationships with government institutions, especially BARI. PSPs reported that BARI has been very involved in the testing and approval of equipment, in addition to the DAE subsidies which helped to create demand for machinery. The private sector also greatly appreciated the way CSISA-MI helped to increase the farmer demand for machinery, expand their market areas, and, in some cases, to improve their production of equipment.

Table 2: Private Sector Investment in the FTF ZOI

Company	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
Alim	\$ -	\$ -	\$100,938	\$111,275	\$580,000	\$45,079	\$837,292
Janata	\$ -	\$ -	\$102,563	\$185,063	\$310,976	\$45,938	\$644,539
TML	\$ -	\$ -	\$195,862	\$303,075	\$951,122	\$239,929	\$1,689,988
ACI	\$ -	\$ -	\$242,162	\$105,250	\$1,795,122	\$308,571	\$2,451,105
Rangpur Foundry Limited (RFL)	\$26,567	\$264,377	\$159,226	\$52,601	\$53,091		\$555,862
LSPs	\$129,657	\$123,992	\$444,593	\$472,813	\$618,000	\$580,000	\$2,369,054
Total	\$156,224	\$388,368	\$1,245,343	\$1,230,076	\$4,308,311	\$1,219,517	\$8,547,839

KIs reveal that people in the higher echelons of DAE were aware of CSISA-MI and the machines promoted by the activity but they were not significantly involved. On the other hand, based on KIs with dealers, mechanics, LSPs, and farmers, many or most of them became aware of the activity through DAE at the upazila level. In fact, DAE also facilitated their access to subsidized machines and training by CSISA-MI

personnel. The three GOB KIIs indicated that collaboration with the IP was somewhat less than a full partnership. One KI indicated that the IP was inclined to take their interventions to government agencies for their support, rather than developing interventions together from the beginning. The KI believed if the latter approach had been taken, the capacity and motivation within the government agencies might have become more sustainable.

In conclusion, the activity was very successful in leveraging private sector investment, but somewhat less so in developing full public-private partnerships. The primary challenge to forming public-private partnerships is that government partners tend to be very busy with a multitude of ongoing projects and are primarily accountable to their supervisors, while private sector partners are driven by the bottom line.

5.3 HOW SUCCESSFUL AND SUSTAINABLE ARE THE BUSINESSES THAT HAVE BEEN DEVELOPED BY RURAL ENTREPRENEURS AS A RESULT OF THE ACTIVITY? WHAT HAVE BEEN THE MAJOR CONSTRAINTS AND OPPORTUNITIES WITH RESPECT TO SUSTAINABILITY OF THE LSP BUSINESS MODEL? WHAT MEASURES SHOULD BE TAKEN TO ENHANCE SUSTAINABILITY?

The final report referred to 2,107 active LSPs out of the original 3,475 LSPs and CSISA-MI provided a list of 1,200 active LSPs to use as a selection frame. It turned out that these were “active” based on a particular seasonal survey so the TL requested the full list of 3,475 LSPs to use as a selection frame.

Only one out of 33 interviewed LSPs was no longer active. Based on farmer and LSP KIIs, the number of LSPs is growing. Based on the LSP KIIs, over 90 percent of LSPs already owned equipment (2WVs and CPs) and worked for other farmers when they became involved with CSISA-MI. The LSP business model is likely more sustainable because CSISA-MI began with existing entrepreneurs and developed their capacity to acquire additional machines, more effectively operate and maintain their machines, increase their access to spare parts and mechanics, expand their business, and increase their profitability. CSISA-MI met the need for technical training and feedback mechanisms between LSPs, dealers, and equipment manufacturers.

The majority of LSPs and farmers stated that the number of service providers (SPs), mechanics, and SPSs are increasing dramatically in their areas leading to improved and more timely service; but there is still a need for other kinds of equipment, higher quality equipment, and spare parts. Activity documents refer to having reached the tipping point in many of the upazilas, but the documents do not specify in which upazilas that tipping point has been reached or for which equipment.

Farmers and LSPs are very clear about the advantages of the PTOS; the 48-tine attachment provides excellent soil tilth with one run, compared to the 18-tine attachment which takes 4-5 runs for the same quality of soil. According to reports and KIIs, less than 10 percent of LSPs use the seeding attachment on the PTOS, predominantly for wheat and mung bean. The activity should investigate more closely those areas where the seeding attachment is used and how best to promote the technology. In conclusion, the LSP business model is very sustainable due to increasing farmer demand for mechanization services. The primary challenge for LSPs, mechanics, and SPS owners is the quality and reliability of the machines and spare parts. With the increase in SPs the market is becoming more competitive and consumers more discerning. There is an opportunity for machine and SPS owners to respond to the demand for quality and reliability.

5.4 TO WHAT EXTENT HAS CSISA-MI INTEGRATED OR INCORPORATED GENDER IN THE INTERVENTIONS? WHAT HAVE BEEN THE CHALLENGES AND OPPORTUNITIES, IF ANY? WHAT HAS BEEN THE IMPACT OF MECHANIZATION ON WOMEN'S ECONOMIC EMPOWERMENT?

CSISA-MI supported an in-depth study on Gender and Mechanization in 2017 but it did not look at

women's interests in specific crops and potential mechanization needs.¹¹ In summary, the study concluded that women were reluctant to purchase machines on their own; it is socially unacceptable for women to drive machines; both men and women struggle with operating machines; and women overall benefit from mechanized harvesting of wheat and rice, primarily by not having to feed and manage laborers in the field. Yet, the primary approach to incorporating gender into the interventions was to identify and train 75 female LSPs in Year 5 and another 139 in Year 6 (total 214 female LSPs). Based on the document review and KIs, most of the machines owned by these women are operated by their husbands or other family members. The ET interviewed three female LSPs and one of these reported that she operated her own PTOS which had an electric starter. CSISA-MI worked with the private sector to make the electric starter available, specifically for women.

The CSISA-MI Activity did minimal initial research on male or female farmer interest in agriculture machinery. As staff became aware of important regional crops, they could have done more informal research to learn about women's interests in mechanization. For example, mung bean and other pulses are important crops for women and the production of these have declined dramatically with the increase in *boro* production. However, where *boro* is not grown due to a lack of irrigation, i.e., Patuakhali, farmers (male and female) continue to grow pulses in what is considered "fallow" land.

Sixty (60) percent of LSPs reported having an average of 15 female customers. When asked about women's interest in other forms of mechanization, 33 percent reported reapers, followed by 25 percent for AFPs, and 17 percent for PTOSs. A few also mentioned mung bean "transplanters;" since mung beans are normally broadcast, the team assumes they meant seeding equipment. CSISA-MI should investigate more closely the PTOS potential for mung bean planting in specific areas and involve women in that discussion. Many studies, including the IFPRI study,¹² indicate that when women contribute to their family's livelihoods, it leads to recognition and status within the household and community, but CSISA-MI should conduct a more in-depth study on how women are benefiting from their investment as well as their overall interests in mechanization. In conclusion, the CSISA-MI had limited success at incorporating gender within the activity interventions. The focus was on establishing female SPs in a sector that is 100 percent male dominated, without attempting to fully understand how women might benefit from mechanization services as customers.

5.5 HOW SUCCESSFUL WAS THE ACTIVITY IN DEVELOPING THE UPSTREAM SUPPLY CHAIN (PRODUCTION, IMPORTS, DISTRIBUTION), THE DOWNSTREAM MARKET, AND ACCESS TO FINANCE AND CREDIT FOR MECHANIZATION?

The activity was very successful in developing the downstream market for agriculture machinery and spare parts which stimulated the upstream supply chain. The activity had some success in increasing access to finance and government subsidies. The following is a detailed analysis for each of the supply chain actors.

5.5.1 Manufacturers/Importers

CSISA-MI partnered with five different machinery importers that already had fairly well-developed supply chains based on the use of their own regional dealers, retailers, and commission agents. Table 3 shows the year that CSISA-MI began working with these companies and the products with which they were most involved. The ET interviewed three of these companies. One company reported importing PTOSs from 2013; their sales increased by over 260 percent in 2016 and by 280 percent in 2017, as a result of working with CSISA-MI. Their annual production of seeding attachments also increased 600 percent between 2013 and 2019. The three importers reported selling a total of over 1,700 reapers between 2015 and 2019,

¹¹ International Food Policy Research Institute (IFPRI) Discussion Paper 01837 May 2019. Gender and Agricultural Mechanization: A mixed-methods exploration of the impacts of multi-crop reaper-harvester service provision in Bangladesh by Sophie Theis, Timothy J. Krupnik, Nasrin Sultana, et. al.

¹² *Ibid.*

compared to the 889 reported by CSISA-MI. Activity documents were very clear in pointing out that most of these companies were able to sell more equipment in the northwest.

Table 3: Primary PSPs and Their Machinery Priorities

	RFL	ACI	Alim	Janata	TML
AFP	2013	NA	2015	NA	2015
PTOs	2014	2016	2015	2015	2016
Reaper and Attachment	NA	2013	2015	2015	2015

While only one KI mentioned receiving direct financial support to procure a piece of equipment, all KIs appreciated the cost sharing agreement for the promotion of the different machines. In addition, they highly valued the introductions to BARI, BRRI, Bangladesh Agricultural University (BAU), and their technical support; financial and business management training; capacity development for dealers; and training of LSPs. When asked what CSISA-MI could have done better, responses included increasing farmer/LSP access to finance, capacity building for local spare parts production, facilities to improve material quality, more quality control of machines, more field tests, and “supply chain development so that all products are available everywhere”—this latter suggestion is beyond the scope of any one project and is more the responsibility of the private sector.

Production and revenue for all companies increased significantly (5 to 20 percent) due to their involvement with CSISA-MI. When asked about their biggest ongoing challenges, KIs mentioned import duties on raw materials, lack of skilled manpower, and maintaining production quality. Challenges for specific machines included the following: “The CP is more durable and cheaper than the AFP, which is not easy to transport and needs to be manned while in operation;” and “Reaper sales may decline without the government subsidy and may not compete well with the combine.”

5.5.2 Machinery Dealers/Retailers

Machinery dealers and retailers serve as the next segment of the supply chain between the importers/manufacturers and the farmers. Annex 1 includes a complete list of upazilas where the CSISA-MI activity was implemented. CSISA-MI worked with 762 mechanics, 193 dealers, and 79 SPSs. Annex 2 shows the number of each of these for each upazila; the numbers vary dramatically between upazilas. The primary criteria for upazila selection by the ET was the number of operational years and the availability of active LSPs and SPS owners since they had the lowest representation among the stakeholders. When there were no dealers available in the selected upazila, e.g., in Nagarakanda, the ET selected dealers from the nearest Sadar upazila. Annex 6 shows the total number of stakeholders with whom the CSISA-MI worked in the selected upazilas. The last column is the estimated number of SPSs in the upazila where the SPS KII was interviewed, which are surprisingly high.

A sample size of seven for each stakeholder is not significant, but the data gathered provide some interesting insights. First, according to Table 4, while most of the mechanics established their businesses prior to 2011, 57.1 and 42.9 percent of dealers and SPS owners, respectively, started their businesses within the last decade. In fact, two of the dealers and SPS owners started their businesses after 2015.

Table 4: Decades During Which Dealers, Mechanics, and SPS Owners Established their Businesses

	Percentage of Businesses Interviewed Established Within These Time Periods			
	Between 2011 and 2020	Between 2001 and 2010	Between 1991 and 2000	Between 1980 and 1990
Dealers	57.1 (4)	14.3 (1)	14.3 (1)	28.6 (2)
Mechanics	14.3 (1)	28.6 (2)	42.9 (3)	14.3 (1)
SPSs	42.9 (3)	28.6 (2)	14.3 (1)	14.3 (1)

It should be noted that dealers are in fact machinery retailers, some of whom may sell on behalf of one company only, but most do not. Five of the seven persons interviewed were the business owners while two were employees. Four of the respondents reported first learning about the activity from CSISA-MI or iDE personnel, two from DAE, and one from machinery importers. Six respondents were invited to machinery demonstrations and other events, five were invited to receive training, three of these received training on machinery operation and maintenance, and two on business expansion. Six of the respondents were introduced to farmers and LSPs.

Five of the respondents were introduced to importers/manufacturers that were previously unknown to them, including RFL, TML, Alim Industries, Janata Engineering, and Chittagong Builders, and 100 percent of these dealers began procuring machines from those companies. One of the respondents who was not introduced to other companies was a dealer for Alim Industries. Four dealers began procuring threshers (mostly from Alim), one bought the PTOS, and one bought AFPs. Due to Alim's presence as a major supplier of threshers, still in high demand, retailers may have been more inclined to purchase other machinery from them.

When asked if there was a demand for machinery they could not supply, five respondents said they could not meet the demand for reapers as they lacked capital, it was too expensive, and there was a lack of quality machine service and spare parts. Another mentioned that there is a demand for maize shellers but those that are available (locally made) are of poor quality. It seems there is a "demand" for something that does not meet specific criteria. For example, reapers are available but not at a price people are willing or able to pay. There is also a high demand for straw choppers, threshers, and combines. One respondent mentioned that young men come in looking for equipment that they saw on the Internet.

Three of the respondents use an average of five commissioning agents and five use an average of six sub-dealers to increase sales. One respondent reported using 600 commissioning agents. To better understand the expansion of the machinery sales in these areas, the ET asked about which equipment they sold between 2015 and 2019, and the number of machines sold (Annex 7).

Between 2015 and 2019, the number of dealers selling 2WTs increased from 28.6 to 100 percent, with a similar increase for PTOS. By 2017, four of the respondents were selling reapers, reaper attachments, and threshers. The total number of self-propelled reapers (SPRs) sold annually was fairly flat with an average of two per dealer, compared to the reaper attachment which appears to be slowly increasing in sales. Surprisingly, the number of combines sold outpaced the SPR in 2019 by 50 percent. In contrast to the 2WT and the PTOS, the majority of respondents perceive a future decline in demand for both the reaper and the attachment due to *"lack of quality spare parts"* and *"farmers do not like cutting only."*

AFP sales are very small and declining compared to the CP which is used for both ground (STW) and surface water (LLP) irrigation. Over 400 of the CPs sold annually were by one dealer in Jessore upazila. Four dealers said they no longer sell the AFP and one no longer sells the reaper, all due to a lack of demand. The AFP is considered too expensive and difficult to operate compared to the LLP. Except for the AFP, the vast majority of dealers also sell spare parts for the various machines.

5.5.3 Spare Parts Shop Owners

While machinery retailers serve as the last mile for the machinery supply chain, the availability of quality spare parts is critical to sustaining the demand for machinery services. If an LSP cannot keep his/her machine operational, they lose money and the trust of their customers, especially for machinery that is new to them and replaces traditional manual practices. Annex 6 shows the estimated number of SPSs by the respondents from these upazilas; although these figures do seem high, they are regardless much greater than the number of SPSs targeted by CSISA-MI. Similar to the dealers, the majority of respondents became aware of CSISA-MI through activity staff, although two learned about the activity from mechanics and one from a dealer. Five respondents were invited to training, but only three attended trainings on the reaper and PTOS, and two attended training for the AFP. Four interviewees stated they were provided

with training on how to provide technical advice to LSPs. Six of the respondents were introduced to an average of 64 LSPs and all reported that those introductions helped to expand their businesses. As one SPS owner shared, *“known LSPs told others about me and encouraged them to buy parts from my shop.”*

Four respondents stated they were introduced to machinery importers and three of these began procuring spare parts from these companies. Six of the interviewees reported selling parts for the PTOS, two for the reaper, and one for the AFP. It was reported that RFL, Chittagong Builders, Janata Engineering, and China Royal Company supply parts for PTOS; ACI, Chittagong Builders, and Green Machinery supply parts for reapers; and RFL, TML, and R.K. Metal supply parts for AFPs. Three KIs reported noticing an increase in demand for spare parts for the PTOS and 2WT, and two reported an increase in demand for reaper and AFP parts. All seven respondents said they had no difficulty getting the parts needed.

5.5.4 Mechanics

Other than LSPs, CSISA-MI worked with more mechanics (762) than any other stakeholder. Three out of the seven respondents started their business between 1991 and 2000, perhaps due to the dramatic increase in the number of 2WTs and CPs. Three of the mechanics had their own workshops and three said they could neither read nor write. Four respondents first became aware of CSISA-MI in 2019, followed by two in 2016, and one in 2015. The majority of mechanics appreciated how CSISA-MI encouraged farmers to use reapers, PTOSs and other machines, and provided training to the mechanics on these machines. KIs noted CSISA-MI also demonstrated the use of these machines and invited the mechanics to participate in these demonstrations.

Four of the respondents reported that they were introduced to LSPs, other mechanics, and SPS owners, and provided with training on the PTOS and the reaper. Two received training on the AFP. Five stated that their businesses have expanded since their involvement with CSISA-MI. When asked about the number of mechanics in their upazila, one respondent said he did not know, but that he met nine mechanics in the training conducted by the activity. The Baliakandi respondent said he knew about 15 mechanics in his upazila but did not know the total number. Two of the respondents had no idea of the number. The largest number of mechanics were reported in the Khulna division with 50 and 120 in Jessore and Meherpur Districts, respectively.

Annex 8 includes two tables on the machines maintained by mechanics and the most common repair issues. The majority of mechanics worked mostly on CPs (LLPs/STWs), 2WTs, and PTOS. The range for the number of machines that the mechanics worked on is quite broad which is not surprising as most of them are free-lance mechanics with small shops. Close to 100 percent of the respondents reported that work on all of the machines is increasing except for the PTOS. The seven mechanics interviewed mentioned a variety of challenges including having to leave their shop to work on machines, lack of capital to procure parts, lack of appropriate hand tools, and poor-quality spare parts. One mechanic reported that the LSPs and farmers do not want to pay him as much because he has to repeatedly repair the same machine. Another mechanic mentioned that he uses other workshops to repair some parts and it is difficult to get them back on time. Another mechanic stated that his only challenge was the need for more work. Interestingly five out of the seven mechanics interviewed said they want to expand their businesses by investing in old machinery to repair and resell, but they lack the capital. *“I purchase old agricultural machines and after repairing [them] I sell them, so I need financial support to purchase more machines and expand my business.”*

When asked if they needed more support for their business, the responses were diverse. Three specified the need for training on specific machines; two responded that they need capital in order to purchase older machines; two mentioned the need for appropriate hand tools and instruments for their work, i.e., liner pullers; one stated the need for more durable spare parts; and one expressed the need for a training center for new mechanics.

5.5.5 Local Service Providers

CSISA-MI worked with 3,491 LSPs in 103 different upazilas. The number of LSPs in each upazila varies dramatically from zero in several upazilas to 209 in Baliakandi (Annex 2). Annex 9 shows the number of LSPs interviewed in each upazila, district, and division, the equipment they owned at the time of the interview, those who received subsidies, and the percentage who are still active. The TL and the scheduler used the full LSP list in order to keep track of responses to requests for interviews and select appropriate back-up interviewees. Unfortunately, in the process of managing the list, the rows for the Manirampur upazila LSPs were hidden and the TL was not informed until all of the interviews were completed. As there were four people conducting interviews at the same and a number of respondents backed out or became unavailable after numerous attempts, only 33 LSPs were interviewed and without the divisional representation that was hoped for (10 LSPs in Barisal and Dhaka Divisions and 15 in Khulna division).

Fortunately, the ET was able to interview 36 farmers, instead of the planned 30, and in all selected upazilas. The farmer respondents were randomly selected from a list of 13,000 farmers that the CSISA-MI activity used for their last seasonal survey. Unfortunately, the ET had completed most of the interviews when it was realized that nine of the selected farmers were also LSPs, so the TL increased the number of interviews to somewhat make up for the anomaly. Regardless of the small sample size and the imbalance in geographical representation, the ET was able to develop an overall impression of the evolving demand for machinery services in the CSISA-MI operational areas.

First, it should be noted that 91 percent of the LSPs interviewed are active LSPs. In addition to owning either a PTOS, AFP, or reaper, the majority of respondents also own either a 2WT or CP, referred to as a STW when used for ground water and LLP when used for surface water. LSPs with AFPs were found only in the Barisal division, but four of these seven LSPs also owned PTOSs (2) and reapers (2). Among the 12 Khulna LSPs, 10 owned PTOSs and one had a reaper. Similarly, 13 of the 14 Dhaka LSPs had a PTOS and three had reapers. Among all of the 33 LSPs, eight had LLPs, 19 had STWs, and 16 more had 2WTs.

One of the most surprising learnings is that 42.4 percent of these randomly selected LSPs received subsidies when purchasing machines. This might be due to the fact that unlike other stakeholders, the majority (51.5 percent) became aware of CSISA-MI through DAE contacts, compared to 24 and 9 percent through iDE and International Maize and Wheat Improvement Center (CIMMYT) staff and the private sector, respectively. In Mujib Nagor, 85 percent received subsidies for their PTOS purchase. With regard to finance, 70 percent of LSPs reported getting funds from their family, 27 percent from microfinance institutions (MFIs), and 9 percent from banks. Three of the LSPs (9 percent) stated they were supported by CSISA-MI to access finance.

To assess the impact of CSISA-MI on LSP machinery ownership the ET asked about the equipment owned when they first became aware of the activity (Table 5). Almost 80 percent of the LSPs owned equipment and had an average of 62 clients before becoming involved with CSISA-MI. This is not surprising as field staff looked for working LSPs to become involved in the activity. Not only did the LSPs acquire PTOSs, reapers, and AFPs for the first time, but they also increased their ownership of CPs and 2WTs.

Table 5: Equipment Ownership Before Becoming Involved with CSISA and After

	%	Count	Equipment Ownership at Time of Interview
# of LSP interviewed	100.0	33	
# of LSPs who already owned equipment	78.8	26	
# that owned 2WTs	36.4	12	16
# that owned LLPs	12.1	4	8 (plus 19 STWs)
# that owned PTOS	9.1	3	25
# that owned Reapers	0	0	6

	%	Count	Equipment Ownership at Time of Interview
# that owned AFPs	0	0	4
# that owned other equipment*	54.6	18	
# of LSPs that worked for other farmers	78.8	26	
Average number of clients		62.4	

* All equipment other than PTOS, CP and 2WT are counted as other equipment.

Table 6 shows the busiest seasons as reported by the LSPs by division and their average number of customers, which increased from 62.4 to 100 for all divisions. Most LSPs are able to serve 2.5 to 3.2 villages within one to two unions.

Table 6: Busiest Season as Reported by Percentage of LSPs

# of LSPs by Division**	Boro	Rabi	Aman	Aus/ Other	Average Number of Customers	Average # of Villages Served	Average # of Unions Served
Barisal	3 (42.9)	1 (14.3)	3 (42.9)	0 (0.0)	142	3.1	1.9
Dhaka	3 (21.4)	9 (64.3)	2 (14.3)	0 (0.0)	71	3.2	1.4
Khulna	2 (16.7)	8 (66.7)	1 (8.3)	1 (8.3)	91	2.4	1.1

** The numbers of LSPs by Division are Barisal - 7, Dhaka - 14, and Khulna - 12.

Despite the fact that SPS owners stated that they had no problems meeting the need for spare parts, the greatest challenge reported by LSPs is getting quality spare parts. This was ranked number one by 15 LSPs, and number 2 and 3 by 10 more LSPs (Table 7). Other challenges included: finding a good mechanic, knowledge on machine maintenance, and finding qualified employees to run machinery. Thirteen (13) LSPs reported having no employees; 14 have an average of 1.4 seasonal employees; and six have an average of two full time employees. Table 8 shows how LSPs ranked their most important business challenges, primarily getting people to pay on time and the fact that everyone needs their service at the same time.

Table 7: Greatest Equipment Challenges for LSP KIs—Number and Percentage

	Ranked # 1	Ranked # 2	Ranked #3
Getting spare parts	15 (45.5)	5 (15.2)	5 (15.2)
Finding a good mechanic	10 (30.3)	9 (27.3)	2 (6.1)
Transporting equipment to more distant farmers	2 (6.1)	3 (9.1)	6 (18.2)
Knowledge on regular maintenance	0 (0.0)	1 (3.0)	8 (24.2)
Finding qualified employees to run machinery	1 (3.0)	7 (21.2)	3 (9.1)
Other	2 (6.1)	1 (3.0)	1 (3.0)

Note: Values in parenthesis indicate percentage.

Table 8: Top Three Business Challenges as Reported by LSP KIs

	Ranked #1	Ranked #2	Ranked #3
Getting people to pay on time	21 (63.6)	8 (24.2)	2 (6.1)
Everyone needs you at the same time	9 (27.3)	21 (63.6)	1 (3.0)
Keeping track of your customers	0 (0.0)	1 (3.0)	6 (18.2)
Other	2 (6.1)	1 (3.0)	6 (18.2)

Note: Values in parenthesis indicate percentage.

When asked if they felt they had enough customers 79 percent responded “Yes” and 67 percent said they referred farmers to other LSPs if they were too busy. Sixty-one (61) percent reported that new LSPs are coming into the business, while 39 percent stated they are not—due to a lack of capital and too much competition. Twenty (20) of the 33 LSPs interviewed reported having an average of 14 female clients. When asked if female clients were looking for machinery services not available in their area, 12 LSPs reported that women were looking for reapers (4), AFPs (3), PTOS (2), combines (1), and other (2).

Training and Capacity Building

Twenty-two (22) of the LSPs reported being invited to training but three of these declined the offer. The LSPs reported receiving training on machine operation (19), machine maintenance (12), business management (6), and how to increase their customer base (11). Table 9 provides a breakdown of the LSPs who reported an increase in the demand for their services and the average increase by machine type. Over 80 percent of those with reapers had an average increase in demand of 268 percent. Only eight out of 33 LSPs were aware of any media efforts to increase the demand for machinery services, most of which seemed to be commercials for particular machines.

Table 9: Changes in Demand for LSP Service

	Percentage of LSPs With an Increase in Demand for Services	Average Percentage Increase in Demand
LSPs with AFP	2 (50.0)	180
LSPs with PTOS	15 (65.2)	133
LSPs with Reaper	5 (83.3)	268

Note: Values in parenthesis indicate percentage.

Only eight out of 33 LSPs reported learning any new agriculture practices, primarily line sowing of wheat and other crops. When asked if they promoted this practice, they all responded positively and that farmers were adopting the practice. Fifteen (15) of the LSPs were involved with farmer groups but only six of these were connected to groups by CSISA-MI. Similarly, 10 of the interviewed farmers reported belonging to MFIs, farmers, Integrated Pest Management (IPM), or other groups, and six of these groups were invited to CSISA-MI or DAE-organized trainings. In this way, it is likely that CSISA-MI reached almost 500 women and 850 men in just five villages.

According to documents and KIs, CSISA-MI worked with only eight formal LSP networks (Annex 10), so it is surprising that four of the LSPs reported membership in a formal network with an average membership of 21 LSPs. Another five LSPs mentioned being involved with informal networks with an average of six members. CSISA-MI should look for and learn more about existing LSP networks.

Awareness and Availability of New Machines

The ET asked LSPs and farmers about equipment types new to their areas since 2016 and the increase in their availability. In Barisal, the AFP was mentioned by three out of seven LSPs as being new to the area and four said that it has increased in availability. The PTOS was reported to have increased in availability by 43, 93, and 67 percent of the LSPs interviewed in Barisal, Dhaka, and Khulna Divisions, respectively (Annex 11).

LSPs were also asked about farmer demand for machinery not presently available in their areas as shown in Table 10. The machines in greatest demand include rice transplanters, reapers, combines, PTOSs, and other equipment, indicating there is an important unmet demand for a variety of machines in Bangladesh. Although the ET is not aware of the existence of mung bean transplanter machines, the ET decided to report it because the machine type was mentioned by an LSP and farmers.

Table 10: Machines in Demand as Reported by Number and Percentage of LSPs by Division

Division	Rice Transplanter	Mung Bean Transplanter	Combine Harvester	Self-Propelled Reapers	PTOS	Other Equipment	Other Transplanter
Barisal	5 (71.4)	1 (14.3)	0 (0.0)	0 (0.0)	1 (14.3)	1 (14.3)	1 (14.3)
Dhaka	1 (7.1)	0 (0.0)	3 (21.4)	7 (50.0)	5 (35.7)	3 (21.4)	2 (14.3)
Khulna	4 (33.3)	0 (0.0)	4 (33.3)	2 (16.7)	0 (0.0)	6 (50.0)	2 (16.7)

Note: Values in parenthesis indicate percentages in each division.

5.5.6 Farmers

The ET interviewed 36 farmers, including two women in the seven selected upazilas (Annex 12). The table in Annex 12 also shows where the team inadvertently interviewed LSPs who were included in CSISA-MI's list of 13,000 farmers. The ET asked farmers about their awareness of new machines, their own machines, their use of LSPs, and the number of seasons they have used various machines (Table 11). The issue of awareness was queried in a separate question, so there is some discrepancy in the total numbers. Awareness of the AFP was covered in a different set of questions, and one question did not distinguish between the reaper and the reaper attachment. While 20 out of 36 farmers learned about the PTOS and reaper since 2016, 11 have not heard of or ever seen the PTOS, 20 have either not heard of or seen the reaper, and another 28 are not familiar with the reaper attachment.

The relatively high number of farmers who own the PTOS and/or the AFP is likely due to the LSPs that were included in the respondent group, especially for the AFP as four of the Barisal Division farmers were LSPs. Those who reported using an LSP with a particular machine did not own that machine. One hundred (100) percent of farmers who are aware of the PTOS either own one or use one provided by an LSP, and six out of seven farmers who are familiar with the reaper, use one provided by an LSP. In addition, those who have used an LSP with an AFP, PTOS, or reaper have done so for several seasons. While CSISA-MI has made significant progress in creating awareness and demand for these machines there is still much to be done. The data indicate that 90 percent of people who are aware of and have access to the reapers and PTOSs are using them. It is interesting to note that farmers have become newly aware of other machines that are ubiquitous in most areas, i.e., the 2WT and CP, while a greater number of farmers own these machines themselves rather than using an LSP. In a separate question, farmers were asked if they had noticed an increase in machinery. While approximately 30 percent have noticed an increase in the number of PTOSs, reapers, and AFPs, over 50 percent noticed an increase in the number of CPs and almost 70 percent in the number of 2WTs (Table 12).

Table 11: Farmer Awareness, Ownership, and Use of LSPs for Machinery Service

Machine	# Who Have Never Heard of This Machine	Have Heard of This Machine But Never Saw It	# of Farmers Who Report Learning About This Machine Over Last 4 Years	# of Farmers Who Reported Owning This Machine	# and % of Farmers Who Had an LSP Use This Machine on Their Land	Average Number of Seasons Farmers Have Used This Machine
AFP				6	1 (2,8%)	2.5
PTOS	4	7	13	5	8 (22,2%)	3.9
Reaper	9	11	7	0	6 (16,7%)	2.3
Reaper Attachment	21	7				
2WT			6	8	5 (13,9%)	4.3
CP			5	19	3 (8,3%)	5.2
Others			12	17	10 (27,8%)	2.9
Total			45		33	-

Table 12: Farmer Respondents that Report an Increase in the Presence of Machines

Number and % of Farmers That Report an Increase in These Machines				
PTOSs	Reapers	AFPs	2WTs	LLPs
12/36 (33.3 %)	10/36 (27.8 %)	10/36 (27.8 %)	25/36 (69.4 %)	19/36 (52.8 %)

The ET asked farmers who use LSPs for particular machines about their perceptions of whether or not the demand for those machines is increasing (Table 13). Due to the small sample size, especially when

broken down by division, the results should only be taken as suggestive. Regardless, except for one farmer in the Dhaka division, 100 percent of all farmers perceive an increasing demand for all machines mentioned.

Table 13: Farmer Perception of Specific Machinery Demand

Number and % of Farmers That Pay for This Machine Service and Their Perception of Demand			
	Barisal	Dhaka	Khulna
Farmers that use LSPs for PTOS service	-	7/8 (78.5%)	5/13 (38.5%)
% that perceive increasing demand	-	7/7 (100%)	5/5 (100%)
Farmers that pay LSPs for reaper service	3/10 (30%)	1/8 (12.5%)	3/13 (23.1%)
% that perceive increasing demand	3/3 (100%)	1/1 (100%)	3/3 (100%)
Farmers that pay LSPs for AFP service	3/10 (30%)	-	1/13 (7.7%)
% that perceive increasing demand	3/3 (100%)	-	1/1 (100%)
Farmers that pay LSPs for CP service	3/10 (30%)	4/8 (50%)	1/13 (7.7%)
% that perceive increasing demand	3/3 (100%)	4/4 (100%)	1/1 (100%)
Farmers that use LSPs for 2VWs/Power tillers	7/10 (70%)	2/8 (25%)	7/13 (53.8%)
% that perceive increasing demand	7/7 (100%)	1/2 (50%)	7/7 (100%)

Farmers were also asked about their interest in machinery that is not presently available to them. Out of 36 farmers, 28 are interested in more types of equipment. Of these, eight would like access to reapers and 10 are looking for rice transplanters. When asked about their three most important sources of information about machinery, responses included LSPs (67 percent), machinery dealers (56 percent), extension personnel (56 percent), mechanics (31 percent), media (22 percent), and agriculture fairs (6 percent). This indicates the importance of personal relationships more so than media, commercials, or large agriculture fairs.

The ET asked farmers if they have met new SPs; 35 out of 36 farmers interviewed have met new SPs, mostly LSPs (34) and mechanics (25), but dealers (2) as well. Farmers were also asked if they have noticed an increase in the number of SPs; many responded with specific details about the increase in number of SPs. The ET calculated the estimated percentage change for each category (Table 14). Over 65 percent of farmers reported dramatic increases in the number of mechanics and SPSs—737 and 465 percent respectively. One hundred (100) percent of the farmers also reported an improvement in the quality of services. *“Because there are more LSPs and mechanics, they are more available and timelier in providing service, they also provide better service.”* While it is likely that macroeconomic factors created a healthy enabling environment that allowed for the increase in SPs, the activity played a large part in stimulating the supply of machines and SPs.

Table 14: Number and Percentage of Farmers that Report an Increase in Number of Machine Mechanics, SPSs, Dealers/Retailers/Commission Agents, or LSPs and their Observed Percentage Increase

Total For All SPs	Farmers That Report an Increase in Mechanics	Average Percentage Increase	Farmers That Report an Increase in SPSs	Average Percentage Increase	Farmers That Report an Increase in the Number of LSPs	Average Percentage Increase
35/36 (97.2 %)	23/35 (65.7%)	737%	24/35 (68.6%)	464%	18/35 (51.4%)	633%

6.0 RECOMMENDATIONS

6.1 MORE FOCUSED INFORMATION AND LEARNING MANAGEMENT

CSISA-MI has a very complex M&E system which leads to a great deal of data collection, but this is a value chain, research, and development activity, which requires a more focused approaches to information and learning management. The activity has worked with numerous types of machines and initiated a multitude of improvements and innovations, but from the annual reports and other documents it is not clear to what degree these innovations have been successful or adopted by farmers and in which contexts they are most appreciated by farmers.

CSISA-MI documents acknowledge that some products are more popular in some areas than others, especially for the AFP, which overall does not compete well with the CP. Based on LSP and farmer interviews, the AFP is still in use and has a strong advantage in certain niche areas where ground water is unavailable, where surface water is available, and where the AFP does not have to be extensively relocated. There is a sense that CSISA-MI has “given up” on this machine, but it is unclear exactly which technical or market challenges could not be overcome in areas where the AFP is most relevant. CSISA-MI should look more closely at these potential niche markets for the AFP.

Similarly, the PTOS tillage attachment is highly appreciated but the seeder less so; the seeder has great potential, but CSISA-MI needs to follow through on how to make it work for the crops where it would provide the most benefit. CSISA-MI should investigate more closely its potential for mung bean planting in specific areas, involve women in those discussions, and continue to research and resolve issues related to the use of the PTOS for seeding. The reaper has been adopted to a lesser degree, but it too has great potential; CSISA-MI needs to be clearer about what needs to be done to make it more successful with the most important crops. The activity should develop a system for documenting its research and development process to better understand what has been tried, what failed, what succeeded, and next steps.

The data in Annex 5, provided by a GOB KI, indicate a very ambitious plan with regard to machinery subsidies, especially for combines. Most CSISA-MI partners—ACI, Alim Industries Ltd, TML, and Chittagong Builders Ltd.—have imported combines, a process which requires government approval and a MOU with DAE. Before any further promotion or development research with combines, CSISA-MI should look closely at the financial feasibility of combines owned by individual LSPs without the 100 percent subsidy.

Although difficult to discuss remotely and with only one member at a time, it would have been interesting to have learned more about the role of the LSP networks, formal and informal, in strengthening their businesses. CSISA-MI should look for and learn more about existing LSP networks. It was mentioned by a member of the leadership team that the next phase of CSISA-MI will focus on the production of machines instead of imports. During this same conversation, it was acknowledged that CIMMYT and other CGIAR institutions have a history of creating great products that never reach the market or go to scale. As a result of their partnership with iDE, CIMMYT has learned a great deal about how to work with the private sector and market dynamics, but there is more to learn, and they should be careful to not regress into old habits. Any new machines need to lead to increased profits for everyone along the value chain and CSISA-MI needs to keep this in mind. One of the GOB KIs mentioned the importance of importing parts and materials which cannot be produced effectively or economically within Bangladesh and producing only that which can be done well within the country. In some cases, local production may just require the appropriate machine and skilled manpower. Numerous KIs mentioned the need for skilled employees. Although CSISA-MI provided a great deal of technical training along the value chain, it was not possible to determine the quality or relevance of the training remotely.

Instead of implementing massive seasonal farmer surveys, more qualitative information should be collected

on the impact of technical training. Training impact evaluations tend to use vague and subjective questions like “do you know how to repair a piston?” Instead, they should be more like an exam where a specific question is asked about repairing a piston. It should not be a full exam, but should have enough questions to serve as proxy indicators for the preciseness of the training material. The assessment should also be implemented as a pre-test which helps prepare people for learning and improves their retention. Similarly, although CSISA-MI performs a multitude of small thematic studies, some of the most potentially interesting studies had only very brief summaries, for what looked like significant pieces of research, including the LSP Panel Survey done in Years 4 and 5; the ADI Market Study; and the Reaper Deep Dive.

6.2 MORE FOCUSED REGIONAL TARGETING

Despite the desire to reach large numbers of farmers, 62 upazilas (not to mention 103 in Year 4) is too many for a market development project. It is unclear why CSISA-MI worked in so many different upazilas or why they added or left upazilas in the different years. The number of stakeholders that CSISA-MI targeted in each upazila also varies dramatically, leaving the activity with an unclear understanding of the supply chain, needs, and opportunities in those areas. Some areas like Bhola, could have great potential and need but are logistically challenging and expensive; the latter is not a good reason to abandon an area with significant potential for adoption and possibly greater needs than other more convenient locations. CSISA-MI should be both more creative and focused in deciding on operational areas. If they are going to think like the private sector, CSISA-MI may need to establish less bureaucratic structures where staff can act more independently as market facilitators in remote areas like Bhola and Galachipa.

6.3 IMPROVED GOB COLLABORATION AND SYNERGIES

While the machinery manufacturers and importers highly appreciated their increased collaboration with BARI and other institutions, all GOB KIs gave the impression that “collaboration” was somewhat superficial. Very often NGOs attempt to get governments on board with their programs, but are less familiar with government programs. DAE KIs appreciated CSISA-MI because it provided them with an opportunity to increase farmer familiarity with new machines and encourage those farmers to apply for subsidies; however, the KIs interviewed were actually not deeply familiar with the three priority machines promoted by CSISA-MI. The development of the 2020-2025 GOB Plan for Subsidized Farmer Machinery (Annex 5) began with a nation-wide assessment of farmer interests by the DAE. After deciding on the number and type of machines to be subsidized, a set of pre-qualified importers and manufacturers were invited to display their machines. A national technical expert team was then formed to assess the quality of the machines and the proposed prices for the specific models. The approved prices were finalized through negotiations between the DAE and private sector. According to KIs, machine types and their approved prices have not yet been decided upon for the present five-year plan. One weakness with this process is that farmers are asking for machines with little knowledge of the potential return on investment for the LSPs or the ultimate service fee that they will be charged. As subsidies can distort the market, CSISA-MI can play a critical role in helping farmers and LSPs to make informed decisions about which machines will work best for them in their area and serve as a feedback mechanism between LSPs, farmers, and the DAE. At the same time, if CSISA-MI is going to focus on production, they need to be fully aware of the imported and subsidized products with which they will be competing.

Similarly, other than channeling some funds to the SWIRP project, there seemed to be little real collaboration with BADC with regard to the excavation of canals for surface water irrigation. A much larger and similar channel excavation program is being implemented in the greater Faridpur district, but with no interest in the AFP or collaboration with CSISA-MI. The KI who noted this, did not seem to have a good understanding of the potential benefits of the AFP in surface irrigation “command areas.” The one GOB KI who had the best understanding of the activity and machines only had this because he had been embedded within the program.

6.4 IDENTIFY CRITICAL AGRONOMIC OPPORTUNITIES FOR INCREASED PRODUCTIVITY AND GENDER EMPOWERMENT

One of CIMMYT Bangladesh's institutional strengths is its knowledge on constraints to increasing productivity for maize, wheat, and legumes in Bangladesh—including the use of improved varieties, quality seed, disease management, inputs, etc. Although the original CSISA-MI document stated that the activity would use the promotion of improved management practices to create a pull factor for irrigation and other machinery, it was decided to not apply this approach and to instead respond to farmer demand for machinery for the crops in which they had the most interest, i.e., onions, jute, etc.—a valid approach. There may, however, be particular opportunities where a focused approach to increasing productivity for certain crops in certain areas, could not only increase yields but also provide feedback on the kind of machinery needed for those crops, and be of more interest to women.

According to documents, CSISA-MI collaborated with a wide range of projects, especially with regard to gender engagement and empowerment, but other than identifying potential LSPs, the impact of this collaboration is not clear. Interestingly, there was no apparent collaboration with the USAID-funded Agriculture Value Chain Project (AVC) which trained 40,000 farmers on pulse production in the southern delta. It was possibly a missed opportunity to learn more about machinery needs for mung bean production, an important crop to women, and to take advantage of AVC's efforts to improve the mung bean value chain.

7.0 LESSONS LEARNED

Agriculture production in Bangladesh is intensive and diverse with a wide variety of cropping patterns. Generally, farmers are responsive to market demands but they are also aware of the risks. CIMMYT has a long history of researching and promoting improved varieties and production practices, as well as machinery development required for the implementation of new practices. As a result, they are aware of the challenges getting farmers to adopt new practices and getting technology to market, even in areas where farmers have easy access to irrigation and other infrastructure. The context and issues are even more challenging in the southwest coastal zone, so it was fortuitous that the original CSISA-MI Chief of Party (COP), Tim Krupnick, and his colleagues had done extensive research on the potential for increased surface water irrigation and cropping intensity in these areas. However, it is not clear how this knowledge was applied in selecting operational areas, or how actual project experience served as a reality check against this research.

Similarly, iDE has a long history of working with the private sector to improve the quality of products and services provided to smallholder farmers. They are aware of the importance of profitability for everyone along the value chain. They too were well prepared to work in the agriculture machinery subsector after conducting their Study into the Commercialization of Selected Agricultural Machines in Bangladesh (2012). Based on activity documents and FGDs, the CIMMYT and iDE staff have learned how to work together more effectively over the years and to adapt along the way.

In the beginning CSISA-MI worked with a wide variety of technologies, as they put it, like “*throwing spaghetti on the wall to see what would stick*.” After consulting with Dr. Richard Kohl, author of the Scaling Up of Agriculture Machinery in Bangladesh study for USAID in 2016, CSISA-MI began focusing on the machines in greatest demand: the AFP, PTOS and reaper, and those of most interest to their PSPs. Then CSISA-MI learned about the need for numerous modifications to these machines and again learned more from each of these research and development efforts. Although the annual reports mention these issues, they do not fully describe what was learned and how they used these learnings to move forward. It is hoped that they will have applied these learnings to the most recent phase of CSISA-MI. A private sector research and development team would analyze and carefully document what was done and learned in the process. Very likely, the CIMMYT engineering staff have much of this information in their heads but staff come and go

and the people who replace them have varying degrees of technical knowledge and experience. The project teams should improve on their analysis and documentation of learnings, and better apply them for adaptive management of the program.

It is very difficult to assess the effectiveness and efficiency of the CIMMYT/iDE partnership, not to mention the local partner non-governmental organizations (PNGOs), remotely during a global pandemic, but there seems to be a need for a less bureaucratic structure moving forward. There seemed to be many different kinds of NGO staff (CIMMYT, iDE, and PNGO) in each field office even though CSISA-MI was working predominately through the private sector, using a market facilitation approach. There should be greater clarity in the role of these various staff, their value added and impact in increasing access to machinery service. What could be done more sustainably if done through the private sector and which activities are not leading to increased use of agriculture machinery? CSISA-MI leadership should consider these issues.

Based on their extensive research and experience, the CSISA-MI team believed they had a good understanding of how best to help farmers and of the machines farmers needed to increase agriculture productivity. The CSISA-MI leadership team learned two things. First, private companies have their own experiences, comparative advantages, challenges, and priorities. Which is why PSPs were slow to take on additional marketing and other efforts in some areas that CSISA-MI believed were important. In the next phase, CSISA-MI will not push products they believe are important with the private sector but will instead provide the private sector with opportunities to come to them with their ideas and need for support. Second, similar to larger business, farmers also have their own interests, priorities, and opportunities, and will only adopt a new technology if it can compete with the existing available technologies and traditional practices.

CSISA-MI had to reduce its operational areas in Year 5 due to a reduction in funding from USAID, but it is not clear why they moved into new areas in Years 3 and 4. Documents mentioned that CSISA-MI had reached a tipping point in many upazilas, but they did not specify where or for which machines. There is always the temptation to focus on targets and impact to meet donor requirements, but the CSISA-MI team needs to be clearer and more intentional about how they will move forward in applying market development approaches and technologies relevant to farmers and the private sector.

ANNEXES

ANNEX I: CSISA-MI OPERATIONAL UPAZILAS BY YEAR AND WATER SUITABILITY

District	District	Upazila	Y1	Y2	Y3	Y4	Y5	Unsuitable Surface Water Area for LLPs or AFPs	AFP Use Mainly for Limited Aquaculture Production & SWIRP Areas
Barishal	Barguna	Amtali	Yes	Yes	Yes	Yes	Yes		
Barishal	Barguna	Barguna Sadar		Yes	Yes	Yes			
Barishal	Barguna	Betagi				Yes			
Barishal	Barguna	Patharghata				Yes	Yes		
Barishal	Barguna	Taltali		Yes	Yes				
Barishal	Barishal	Agailjhara	Yes	Yes	Yes	Yes	Yes		SIRWP
Barishal	Barishal	Babuganj	Yes	Yes	Yes	Yes	Yes		SIRWP
Barishal	Barishal	Bakerganj			Yes	Yes			SIRWP
Barishal	Barishal	Banari Para	Yes	Yes	Yes	Yes			SIRWP
Barishal	Barishal	Barishal Sadar (kotwali)	Yes	Yes	Yes	Yes	Yes		
Barishal	Barishal	Gaurnadi	Yes	Yes	Yes	Yes			SIRWP
Barishal	Barishal	Hizla	Yes	Yes	Yes	Yes			SIRWP
Barishal	Barishal	Wazirpur	Yes	Yes	Yes	Yes	Yes		
Barishal	Bhola	Bhola Sadar	Yes	Yes	Yes	Yes	Yes		
Barishal	Bhola	Burhanuddin	Yes	Yes	Yes	Yes	Yes		
Barishal	Bhola	Char Fasson	Yes	Yes	Yes	Yes	Yes		
Barishal	Bhola	Daulat Khan	Yes	Yes	Yes	Yes			
Barishal	Bhola	Lalmohan	Yes	Yes	Yes	Yes			
Barishal	Bhola	Tazumuddin	Yes	Yes	Yes	Yes			
Barishal	Jhalokati	Jhalokati Sadar		Yes	Yes	Yes	Yes		

District	District	Upazila	Y1	Y2	Y3	Y4	Y5	Unsuitable Surface Water Area for LLPs or AFPs	AFP Use Mainly for Limited Aquaculture Production & SWIRP Areas
Barishal	Jhalokati	Nalchity	Yes	Yes	Yes	Yes	Yes		
Barishal	Madaripur	Kalkini		Yes	Yes	Yes			
Barishal	Madaripur	Madaripur Sadar	Yes	Yes	Yes	Yes			
Barishal	Madaripur	Rajoir			Yes	Yes			
Barishal	Madaripur	Shibchar		Yes	Yes	Yes			
Barishal	Patuakhali	Bauphal	Yes	Yes	Yes	Yes			
Barishal	Patuakhali	Dashmina				Yes	Yes		
Barishal	Patuakhali	Galachipa	Yes	Yes	Yes	Yes	Yes		
Barishal	Patuakhali	Kalapara	Yes	Yes	Yes	Yes	Yes		
Barishal	Patuakhali	Mirzaganj	Yes	Yes	Yes	Yes			
Barishal	Patuakhali	Patuakhali Sadar	Yes	Yes	Yes	Yes	Yes		
Barishal	Patuakhali	Rangabali	Yes	Yes	Yes	Yes			
Dhaka	Faridpur	Alfadanga	Yes	Yes	Yes	Yes			
Dhaka	Faridpur	Bhanga	Yes	Yes	Yes	Yes	Yes		
Dhaka	Faridpur	Boalmari	Yes	Yes	Yes	Yes	Yes		
Dhaka	Faridpur	Char Bhadrasan				Yes			
Dhaka	Faridpur	Faridpur Sadar		Yes	Yes	Yes	Yes		
Dhaka	Faridpur	Madhukhali	Yes	Yes	Yes	Yes	Yes		
Dhaka	Faridpur	Nagarkanda		Yes	Yes	Yes	Yes		
Dhaka	Faridpur	Sadarpur				Yes			
Dhaka	Faridpur	Saltha	Yes	Yes	Yes	Yes	Yes		
Dhaka	Gopalganj	Gopalganj Sadar	Yes	Yes	Yes	Yes	Yes		

District	District	Upazila	Y1	Y2	Y3	Y4	Y5	Unsuitable Surface Water Area for LLPs or AFPs	AFP Use Mainly for Limited Aquaculture Production & SWIRP Areas
Dhaka	Gopalganj	Kashiani	Yes	Yes	Yes	Yes	Yes		
Dhaka	Gopalganj	Kotalipara		Yes	Yes	Yes	Yes		
Dhaka	Gopalganj	Muksudpur	Yes	Yes	Yes	Yes	Yes		
Dhaka	Gopalganj	Tungipara				Yes			
Dhaka	Rajbari	Baliakandi	Yes	Yes	Yes	Yes	Yes		
Dhaka	Rajbari	Goalanda				Yes			
Dhaka	Rajbari	Kalukhali	Yes	Yes	Yes	Yes	Yes		
Dhaka	Rajbari	Pangsha	Yes	Yes	Yes	Yes	Yes		
Dhaka	Rajbari	Rajbari Sadar	Yes	Yes	Yes	Yes	Yes		
Dhaka	Shariatpur	Bhedarganj				Yes			
Dhaka	Shariatpur	Gosairhat			Yes	Yes			
Khulna	Bagerhat	Bagerhat Sadar		Yes	Yes	Yes			
Khulna	Bagerhat	Chitalmari	Yes	Yes	Yes	Yes			
Khulna	Bagerhat	Fakirhat	Yes	Yes	Yes	Yes	Yes		
Khulna	Bagerhat	Kachua			Yes	Yes	Yes		
Khulna	Bagerhat	Mollahat	Yes	Yes	Yes	Yes	Yes		
Khulna	Bagerhat	Mongla	Yes	Yes	Yes	Yes			
Khulna	Bagerhat	Morrelganj				Yes			
Khulna	Bagerhat	Rampal		Yes	Yes	Yes	Yes		
Khulna	Chuadanga	Alamdanga			Yes	Yes			
Khulna	Jashore	Abhaynagar			Yes	Yes		X	
Khulna	Jashore	Bagher Para	Yes	Yes	Yes	Yes		X	

District	District	Upazila	Y1	Y2	Y3	Y4	Y5	Unsuitable Surface Water Area for LLPs or AFPs	AFP Use Mainly for Limited Aquaculture Production & SWIRP Areas
Khulna	Jashore	Chaugachha			Yes	Yes		X	
Khulna	Jashore	Jashore Sadar	Yes	Yes	Yes	Yes		X	
Khulna	Jashore	Jhikargachha	Yes	Yes	Yes	Yes		X	
Khulna	Jashore	Keshabpur	Yes	Yes	Yes	Yes	Yes	X	
Khulna	Jashore	Manirampur		Yes	Yes	Yes	Yes	X	
Khulna	Jashore	Sharsha	Yes	Yes	Yes	Yes		X	
Khulna	Jhenaidah	Harinakunda	Yes	Yes	Yes	Yes		X	
Khulna	Jhenaidah	Jhenaidah Sadar	Yes	Yes	Yes	Yes	Yes	X	
Khulna	Jhenaidah	Kaliganj	Yes	Yes	Yes	Yes		X	
Khulna	Jhenaidah	Kotchandpur				Yes		X	
Khulna	Jhenaidah	Maheshpur	Yes	Yes	Yes	Yes		X	
Khulna	Jhenaidah	Shailkupa	Yes	Yes	Yes	Yes	Yes		
Khulna	Khulna	Batiaghata	Yes	Yes	Yes	Yes	Yes		
Khulna	Khulna	Dacope				Yes			X
Khulna	Khulna	Dighalia	Yes	Yes	Yes	Yes			X
Khulna	Khulna	Dumuria		Yes	Yes	Yes	Yes		X
Khulna	Khulna	Koyra	Yes	Yes	Yes	Yes			X
Khulna	Khulna	Paikgachha		Yes	Yes	Yes			X
Khulna	Khulna	Phultala	Yes	Yes	Yes	Yes			X
Khulna	Khulna	Rupsa		Yes	Yes	Yes			X
Khulna	Khulna	Sonadanga	Yes	Yes	Yes	Yes			X
Khulna	Khulna	Terokhada	Yes	Yes	Yes	Yes			X

District	District	Upazila	Y1	Y2	Y3	Y4	Y5	Unsuitable Surface Water Area for LLPs or AFPs	AFP Use Mainly for Limited Aquaculture Production & SWIRP Areas
Khulna	Kushtia	Khoksa	Yes	Yes	Yes	Yes		X	
Khulna	Kushtia	Kumarkhali	Yes	Yes	Yes	Yes		X	
Khulna	Kushtia	Mirpur	Yes	Yes	Yes	Yes		X	
Khulna	Magura	Magura Sadar	Yes	Yes	Yes	Yes	Yes	X	
Khulna	Magura	Mohammadpur			Yes	Yes	Yes	X	
Khulna	Magura	Shalikha			Yes	Yes	Yes	X	
Khulna	Magura	Sreepur	Yes	Yes	Yes	Yes	Yes	X	
Khulna	Meherpur	Gangni	Yes	Yes	Yes	Yes		X	
Khulna	Meherpur	Meherpur Sadar				Yes	Yes	X	
Khulna	Meherpur	Mujib Nagar			Yes	Yes	Yes	X	
Khulna	Narail	Lohagara		Yes	Yes	Yes	Yes	X	
Khulna	Narail	Narail Sadar		Yes	Yes	Yes	Yes	X	
Khulna	Satkhira	Debhata		Yes	Yes	Yes			
Khulna	Satkhira	Kalaroa		Yes	Yes	Yes			
Khulna	Satkhira	Satkhira Sadar	Yes	Yes	Yes	Yes			X
Khulna	Satkhira	Shyamnagar	Yes	Yes	Yes	Yes			X
Khulna	Satkhira	Tala		Yes	Yes	Yes	Yes		X
		Total	62	82	92	103	49		

ANNEX 2: CSISA-MI TARGETED VALUE CHAIN ACTORS BY UPAZILA

District	Upazila	Value Chain Actor			
		LSP	Dealer	Mechanic	Spare Parts Shop
Bagerhat	Bagerhat Sadar	13	1		
Bagerhat	Chitalmari	16	1	1	
Bagerhat	Fakirhat	31	1	8	1
Bagerhat	Kachua	16	1	2	
Bagerhat	Mollahat	16		2	
Bagerhat	Mongla	3			
Bagerhat	Morrelganj	2		1	
Bagerhat	Rampal	14	1	4	
Barguna	Amtali	55		19	1
Barguna	Barguna Sadar	40	1	7	
Barguna	Betagi	3			
Barguna	Patharghata	31		1	1
Barguna	Taltali	2	1		
Barishal	Agailjhara	23	1	4	1
Barishal	Babuganj	10	1	7	
Barishal	Bakerganj	18	1	1	
Barishal	Banari Para	2			
Barishal	Barishal Sadar (Kotwali)	35	2	22	
Barishal	Gaurnadi	9	1	10	
Barishal	Hizla	2			
Barishal	Mehendiganj			1	
Barishal	Wazirpur	75	2	21	1
Bhola	Bhola Sadar	53	1	11	
Bhola	Burhanuddin	53	2	19	1
Bhola	Char Fasson	143	3	22	1
Bhola	Daulat Khan	6		1	
Bhola	Lalmohan	32	3	2	
Bhola	Manpura	9			
Bhola	Tazumuddin	25	1	3	1
Chuadanga	Alamdanga	18			
Chuadanga	Chuadanga Sadar	21	4	2	
Chuadanga	Damurhuda	5			
Chuadanga	Jiban Nagar	2			
Faridpur	Alfadanga	35		1	
Faridpur	Bhanga	45	1	11	1
Faridpur	Boalmari	100	6	6	3
Faridpur	Char Bhadrasan	27			
Faridpur	Faridpur Sadar	86	12	14	7

District	Upazila	Value Chain Actor			
		LSP	Dealer	Mechanic	Spare Parts Shop
Faridpur	Madhukhali	119	2	10	1
Faridpur	Nagarkanda	77		13	5
Faridpur	Sadarpur	15		1	
Faridpur	Saltha	115		6	1
Gopalganj	Gopalganj Sadar	17	3	7	1
Gopalganj	Kashiani	26	1	8	
Gopalganj	Kotalipara	57	2	21	1
Gopalganj	Muksudpur	22	1	4	
Gopalganj	Tungipara	28		5	
Jashore	Abhaynagar	5			
Jashore	Bagher Para	13			
Jashore	Chaugachha	12			
Jashore	Jashore Sadar	11	6	7	7
Jashore	Jhikargachha	25	1	16	
Jashore	Keshabpur	26	1	18	1
Jashore	Manirampur	32		26	1
Jashore	Sharsha	9	1	1	1
Jhalokati	Jhalokati Sadar	17	1	5	
Jhalokati	Nalchity	3	1		
Jhenaidah	Harinakunda	19		3	
Jhenaidah	Jhenaidah Sadar	28	2	20	3
Jhenaidah	Kaliganj	14	1	2	
Jhenaidah	Kotchandpur	4			
Jhenaidah	Maheshpur	11			
Jhenaidah	Shailkupa	121		36	1
Khulna	Batiaghata	11		2	
Khulna	Dacope	65	1	8	
Khulna	Dighalia	1	1		
Khulna	Dumuria	63	1	29	1
Khulna	Khalishpur		1		
Khulna	Khulna Sadar		2	1	3
Khulna	Koyra	4			
Khulna	Paikgachha	16		2	1
Khulna	Phultala	5	1	7	
Khulna	Rupsa	6	1	3	
Khulna	Sonadanga	1			
Khulna	Terokhada	5			
Kushtia	Khoksa	3	1		2
Kushtia	Kumarkhali	8			3

District	Upazila	Value Chain Actor			
		LSP	Dealer	Mechanic	Spare Parts Shop
Kushtia	Kushtia Sadar		2	1	
Kushtia	Mirpur	1			
Madaripur	Kalkini	20		1	
Madaripur	Madaripur Sadar	6	1	2	
Madaripur	Rajoir	11		5	
Madaripur	Shibchar	3			
Magura	Magura Sadar	49	2	24	
Magura	Mohammadpur	51		7	
Magura	Shalikha	45	2	16	2
Magura	Sreepur	166	3	23	9
Meherpur	Gangni	17	2	3	1
Meherpur	Meherpur Sadar	32	1	13	1
Meherpur	Mujib Nagar	44	1	14	2
Narail	Kalia	32		15	1
Narail	Lohagara	37	1	18	3
Narail	Narail Sadar	46	2	29	4
Patuakhali	Bauphal	20		6	
Patuakhali	Dashmina	24		5	
Patuakhali	Dumki	4		1	
Patuakhali	Galachipa	72	6	19	1
Patuakhali	Kalapara	81	3	17	1
Patuakhali	Mirzaganj	22		3	
Patuakhali	Patuakhali Sadar	24		3	
Patuakhali	Rangabali	21		5	
Pirojpur	Mathbaria	4			
Pirojpur	Pirojpur Sadar		1		
Pirojpur	Zianagar	3			
Rajbari	Baliakandi	209	3	5	2
Rajbari	Goalanda	24		1	
Rajbari	Kalukhali	66	2	1	
Rajbari	Pangsha	41	2	1	1
Rajbari	Rajbari Sadar	71	2		2
Satkhira	Assasuni	12			
Satkhira	Debhata	8			
Satkhira	Kalaroa	3		1	1
Satkhira	Kaliganj	2	1	4	
Satkhira	Satkhira Sadar	8	1	16	
Satkhira	Shyamnagar	57	1	11	
Satkhira	Tala	33	1	22	1

District	Upazila	Value Chain Actor			
		LSP	Dealer	Mechanic	Spare Parts Shop
Shariatpur	Bhedarganj	6			
Shariatpur	Gosairhat	1	1		
Shariatpur	Zanjira	5			
Grand Total					

ANNEX 3: PLANNED NUMBER OF KIIS AND FGDS BY LOCATION¹³

Data Collection Activities	Total FGD Participants	Total FGDs/ KIIs	Dhaka City	Dhaka/ Faridpur	Khulna/ Jessore	Barishal
FGDs with the International Maize and Wheat Improvement Center (CIMMYT), iDE, and Partner NGO staff	12	3		1	1	1
KIIs						
KIIs with GOB officials		4	1	1	1	1
KII with CIMMYT and iDE staff		2	2			
KII with manufacturers/importers		3	3			
KII with partner and/or other NGOs		3		1	1	1
KIIs with LSPs		35		10	15	10
KIIs with mechanics		7		2	3	2
KIIs with equipment dealers		7		2	3	2
KIIs with SPS owners		7		2	3	2
KIIs with farmers		30		10	10	10
Sub-Totals in Dhaka and Districts			6	28	36	28
Total KIIs		89				
Grand Total		89 KIIs, 3 FGDs (≈101 people)				

¹³ The actual number of KIIs and FGDS may be higher or lower than this estimate depending on the availability of KIs, the identification of additional KIs, and conditions encountered in the field.

ANNEX 4: DATA ON IRRIGATION

4.1: Primary and Secondary Sources of Irrigation as Reported by LSPs

Percentage of LSPs That Mention These Sources as Their Upazila's Primary and Secondary Sources of Irrigation Water					
	STWs as the Primary Source of Irrigation	Average % of Land Covered By Primary Source	Surface Water as Primary Source of Irrigation	Surface Water as Secondary Source of Irrigation*	Average % of Land Coverage by Secondary Source*
Barisal	0.0	100	100.0	0.0	-
Dhaka	100.0	91	0.0	64.3	8.6
Khulna	100.0	95	0.0	58.3	8.0

4.2: Major Sources of Surface Water

	Where Surface Water Is a Primary Source	Where Surface Water Is a Secondary Source
Large Canals	10 (52.6)	1 (5.3)
Small Canals	8 (42.1)	6 (31.6)
Ponds	1 (5.3)	2 (10.5)

4.3: Use of Surface Water, AFPs, and LLPs as Reported by Farmers by Division

Division	% of Farmers That Report the Use of Surface Water in Their Village or Union	% of Farmers That Report the Use of <u>Both</u> LLP and AFP for Surface Water Irrigation	% of Farmers That Report the Use of LLPs Only	% of Respondents That Report the Use of AFPs in Their Village	Total # of AFPs in These Villages (Average/ Village)	Total # of Farmers in These Villages Using AFPs
Barisal	11/11 (100%)	5/11 (45.5%)	6/11 (54.5%)	7/11 (63.6%)	9 (1.5)	201
Dhaka	6/10 (60%)	1/10 (10%)	5/10 (50.0%)	1/10 (10.0%)	10 (10)	10
Khulna	12/15 (80%)	4/15 (26.7%)	8/15 (53.3%)	6/15 (40.0%)	24 (4)	359
Total Sample	29/36 (80.6%)	10/36 (27.8%)	19/36 (52.8%)	14/36 (38.9%)	43	570

ANNEX 5: 2020-2025 GOB PLAN FOR SUBSIDIZED FARMER MACHINERY

Machine	Quantity	Remarks
Combine	15,500	70% subsidy for coastal and <i>haor</i> areas; 50% subsidy for rest of the areas BDT 302 million project, 2020-2025
Reaper (type not specified)	4,000	
Reaper binder	2,000	
Rice transplanter	3,000	
Seeder/bed planter	5,000	
Power thresher	5,000	
Maize sheller	5,000	
Dryer	5,000	
Power sprayer	2,000	
Power weeder	500	
Potato digger	3,000	
Potato slicer	1,000	
Carrot washer	300	
Total	51,300	

ANNEX 6: NUMBER OF CSISA-MI LISTED STAKEHOLDERS IN SELECTED UPAZILAS

District	Upazila	Value Chain Actor				
		LSP	Dealer	Mechanic	SPS	Estimated # of SPS by Respondents
Barishal	Barishal Sadar	35	2	22	NA	NA
Barishal	Wazirpur	75	2	21	1	50
Patuakhali	Galachipa	72	6	19	1	8
Faridpur	Faridpur Sadar	86	12	14	7	NA
Faridpur	Nagarkanda	77		13	5	11
Rajbari	Baliakandi	209	3	5	2	20
Jashore	Manirampur	32		26	1	125
Jashore	Jashore Sadar	11	6	7	7	NA
Magura	Sreepur	166	3	23	9	33
Meherpur	Mujib Nagar	44	1	14	2	30

ANNEX 7: EQUIPMENT SALES BY RESPONDENT MACHINERY DEALER/RETAILERS

Machine	% of Participants Who Sold This Equipment by Year					% Who Sold Spare Parts for These Machines	% of Participants Who Perceive an Increase in Demand	% Who Perceive a Decline in Demand
	2015	2016	2017	2018	2019			
Land Preparation								
2WT/Power tiller	28.6	57.1	57.1	100	100	100	71.4	0
Total # sold	217	235	308	322	417			
PTOS	0	28.6	42.9	42.9	71.4	80	80	20
Total # sold	0	61	66	114	124			
Harvesting/Threshing Equipment								
Reaper	14.3	28.6	28.6	42.9	57.1	80	25	50
Total # sold	4	7	7	9	8			
Reaper Attachment			28.6	28.6	57.1	75	25	75
Total # sold			21	32	39			
Threshers	28.6	42.9	42.9	57.1	57.1	100	75	25
Total # sold	55	170	252	210	255			
Combines		14.3	14.3	14.3	28.6	100	100	0
Total # sold		4	6	7	12			
Irrigation Equipment								
AFP		14.3	42.9	42.9	42.9	66	0	100
Total # sold		1	15	6	5			
CP (LLP/STW)	14.3	28.6	57.1	57.1	57.1	100	75	25
Total # sold	6	407	485	441	452			

ANNEX 8: MECHANIC DATA

8.1: Machines Worked on by Respondent Mechanics

Machine Type	# and % of Mechanics That Report Servicing This Machine	Top Three Most Common Problems Reported	Number of Machines Repaired in the Last Season		% of Respondents Who Service This Machine That Report an Increasing Presence of These Machines in Their Upazila
			Range	Average	
CPs (LLPs/STW)	5 (71.4)	Piston, Bearing/Seal, Nozzle	5-400	195	80
2WTs	5 (71.4)	Gearbox, Chain, Belt	5-100	36	100
PTOS	5 (71.4)	Gearbox, Shaft/pinion	2-100	40	60
AFP (Barisal & Patuakhali)	2 (28.6)	Bearing/Seal, Gear box, Chain/belt	7-55	31	100
Reaper (Patuakhali)	1 (14.4)	Chain/belt, Cutting blade, Bearing/Seal		2	100
Reaper Attachment (Faridpur)	1 (14.4)	Chain/belt, Cutting blade and Star Wheel		8	100

8.2: Most Common Repair Issues as Reported by Respondents

Name of the Machine	What Are the Most Common Repair Problems for the Machines Below? (1 = most common, 5 = least common)				
	1	2	3	4	5
PTOS	Gear Box	Bearing Seal	Furrow Opener	Clutch	Piston
Reaper	Cutting Blade	Chain belt	Finger (star wheel)	Bearing & Seal	Welding
AFP	Bearing & Seal	Gear Box	Chain Belt	Ring	

ANNEX 9: EQUIPMENT OWNED BY LSP KIS BY UPAZILA

Division	Barisal		Dhaka		Khulna			Total
District	Barisal	Patuakhali	Faridpur	Rajbari	Jessore	Meherpur	Magura	
Upazila	Wazirpur	Galachipa	Nagarkanda	Baliakandi	Manirampur	Mujibnagar	Sreepur	
# of LSPs interviewed	2	5	7	7	0	7	5	33
LSPs with AFPs	1 (50.0)	3 (60.0)	0 (0.0)	0 (0.0)	0	0 (0.0)	0 (0.0)	4 (12.1)
LSPs with Reapers	1 (50.0)	1 (20.0)	2 (28.6)	1 (14.3)	0	1 (14.3)	0 (0.0)	6 (18.2)
LSPs with PTOS	1 (50.0)	1 (20.0)	6 (85.7)	7 (100)	0	6 (85.7)	4 (80.0)	25 (75.8)
LSPs with additional equipment								
LSPs with LLPs	1 (50.0)	3 (60.0)	0 (0.0)	3 (42.9)	0	1 (14.3)	0 (0.0)	8 (24.2)
LSPs with 2WTs	1 (50.0)	1 (20.0)	6 (85.7)	2 (28.6)	0	3 (42.9)	3 (60.0)	16 (48.5)
LSPs with STW	0 (0.0)	1 (20.0)	3 (42.9)	7 (100.0)	0	5 (71.4)	3 (60.0)	19 (57.6)
# of LSPs that received subsidies								
	1 (50.0)	3 (60.0)	2 (28.6)	2 (28.6)	0	6 (85.7)	0 (0.0)	14 (42.4)
Number of still active LSPs								
	2 (100.0)	5 (100.0)	6 (85.7)	7 (100.0)	0	6 (85.7)	4 (80.0)	30 (90.9)

Note: Values in parenthesis indicate percentage.

ANNEX 10: LSP NETWORKS WITH WHOM CSISA-MI WORKED

Network Name	LSP Network Address/Location			
	District	Upazila	Union	Village
Jhunakhali LSP Network	Faridpur	Saltha	Gatti	Jhunakhali
Tungipara LSP Network	Gopalganj	Tungipara	Dumuria	Pakutia
Adhunik Krishi Jontropati Samadankari Somobay Somity	Rajbari	Baliakandi	Baliakandi	Chamta
Adhunik Krishi Jontroer Sheba Forum	Barishal	Wazirpur	Sikarpur	Mondupasha
Ahommod pur Adorsho Krishok Club	Bhola	Charfession	Nurabad	Ahommod pur
Adhunik Krishi jontro sebadankari Forum	Barguna	Amtoli	Atarogasia	Gazipur
Shailkupa Krishi Unnayan Sebadankari Somobay Samittee	Jhenaidah	Shailkupa	Sarutia	Gosaidanga
Narail Krishi Sebadan Kari Songsha	Narail	Kalia	Chanchuri	Chanchuri

ANNEX II: EQUIPMENT TYPES NEW TO LSP AREA AND CHANGES IN AVAILABILITY

Division	AFP	PTOS	Reapers	Combine Harvester	Rice Transplanter	Other**
Equipment types newly introduced in your area as reported by LSPs						
Barisal	3 (42.9)	2 (28.6)	1 (14.3)	2 (28.6)	0 (0.0)	1 (14.3)
Dhaka	1 (7.1)	7 (50.0)	2 (14.3)	1 (7.1)	2 (14.3)	0 (0.0)
Khulna	0 (0.0)	2 (16.7)	3 (25.0)	2 (16.7)	0 (0.0)	1 (8.3)
Total count	4	11	6	5	2	2
Equipment types which have increased in availability						
Barisal	4 (57.1)	3 (42.9)	2 (28.6)	1 (14.3)	0 (0.0)	2 (28.6)
Dhaka	2 (14.3)	13 (92.9)	2 (14.3)	0 (0.0)	1 (7.1)	1 (7.1)
Khulna	0 (0.0)	8 (66.7)	1 (8.3)	0 (0.0)	0 (0.0)	1 (8.3)
Total count	6	24	5	1	1	4

Note: Values in parenthesis indicate percentages in each division.

ANNEX 12: FARMERS INTERVIEWED BY UPAZILA

Division	District	Total Number of Farmers Interviewed	# of Women	# of LSPs
Barisal	Barisal	4	1	1
Barisal	Patuakhali	7	-	3
Dhaka	Faridpur	5	-	1
Dhaka	Rajbari	5	-	2
Khulna	Jashore	5	1	2
Khulna	Magura	6	-	0
Khulna	Meherpur	4	-	0
		36	2	9

ANNEX 13: NUMBER OF MACHINES PROCURED BY LSPS BY UPAZILA

Row Labels	Sum of AFP	Sum of PTOS	Sum of Reaper	Sum of Total Machines
Bagerhat	85	1	36	122
Bagerhat Sadar	13	0	0	13
Chitalmari	19	0	1	20
Fakirhat	13	1	19	33
Kachua	14	0	3	17
Mollahat	14	0	4	18
Mongla	3	0	0	3
Morrelganj	0	0	2	2
Rampal	9	0	7	16
Barguna	45	33	62	140
Amtali	25	11	25	61
Barguna Sadar	17	18	7	42
Betagi	0	3	0	3
Patharghata	2	1	29	32
Taltali	1	0	1	2
Barishal	148	17	20	185
Agailjhara	24	0	2	26
Babuganj	7	4	1	12
Bakerganj	15	1	2	18
Banari Para	2	0	0	2
Barishal Sadar (kotwali)	32	6	0	38
Gaurnadi	6	1	3	10
Hizla	2	0	0	2
Wazirpur	60	5	12	77
Bhola	228	65	64	357
Bhola Sadar	14	29	13	56
Burhanuddin	41	5	10	56
Char Fasson	132	25	13	170
Daulat Khan	1	1	4	6
Lalmohan	25	1	8	34
Manpura	0	0	10	10
Tazumuddin	15	4	6	25
Chuadanga	0	40	6	46
Alamdanga	0	17	1	18
Chuadanga Sadar	0	18	3	21
Damurhuda	0	5	0	5
Jiban Nagar	0	0	2	2
Faridpur	19	549	90	658
Alfadanga	3	29	5	37
Bhanga	0	33	14	47
Boalmari	4	88	10	102
Char Bhadrasan	0	27	0	27
Faridpur Sadar	12	68	24	104
Madhukhali	0	107	15	122
Nagarkanda	0	70	10	80
Sadarpur	0	12	3	15
Saltha	0	115	9	124
Gopalganj	36	31	101	168
Gopalganj Sadar	7	1	11	19

Row Labels	Sum of AFP	Sum of PTOS	Sum of Reaper	Sum of Total Machines
Kashiani	4	15	9	28
Kotalipara	22	1	37	60
Muksudpur	3	11	8	22
Tungipara	0	3	36	39
Jashore	90	47	52	189
Abhaynagar	1	0	4	5
Bagher Para	0	9	4	13
Chaugachha	1	7	4	12
Jashore Sadar	3	5	5	13
Jhikargachha	6	10	14	30
Keshabpur	58	2	6	66
Manirampur	18	11	10	39
Sharsha	3	3	5	11
Jhalokati	20	4	1	25
Jhalokati Sadar	16	4	1	21
Nalchity	4	0	0	4
Jhenaidah	0	167	35	202
Harinakunda	0	16	4	20
Jhenaidah Sadar	0	19	9	28
Kaliganj	0	12	2	14
Kotchandpur	0	0	4	4
Maheshpur	0	5	7	12
Shailkupa	0	115	9	124
Khulna	68	4	115	187
Batiaghata	5	0	9	14
Dacope	0	0	66	66
Dighalia	1	0	1	2
Dumuria	42	1	24	67
Koyra	0	1	3	4
Paikgachha	13	1	2	16
Phultala	5	0	1	6
Rupsa	0	0	6	6
Sonadanga	0	0	1	1
Terokhada	2	1	2	5
Kushtia	0	10	2	12
Khoksa	0	3	0	3
Kumarkhali	0	7	1	8
Mirpur	0	0	1	1
Madaripur	14	8	23	45
Kalkini	7	7	8	22
Madaripur Sadar	1	0	7	8
Rajoir	5	0	7	12
Shibchar	1	1	1	3
Magura	4	287	31	322
Magura Sadar	0	42	8	50
Mohammadpur	0	44	12	56
Shalikha	4	36	5	45
Sreepur	0	165	6	171
Meherpur	0	76	17	93
Gangni	0	11	6	17
Meherpur Sadar	0	27	5	32

Row Labels	Sum of AFP	Sum of PTOS	Sum of Reaper	Sum of Total Machines
Mujib Nagar	0	38	6	44
Narail	55	46	49	150
Kalia	17	12	17	46
Lohagara	14	15	13	42
Narail Sadar	24	19	19	62
Patuakhali	131	57	90	278
Bauphal	17	2	1	20
Dashmina	4	8	12	24
Dumki	0	2	2	4
Galachipa	25	16	32	73
Kalapara	43	10	33	86
Mirzaganj	18	2	4	24
Patuakhali Sadar	12	10	2	24
Rangabali	12	7	4	23
Pirojpur	0	6	1	7
Mathbaria	0	3	1	4
Zianagar	0	3	0	3
Rajbari	2	387	30	419
Baliakandi	2	202	7	211
Goalanda	0	21	5	26
Kalukhali	0	63	4	67
Pangsha	0	39	3	42
Rajbari Sadar	0	62	11	73
Satkhira	72	3	61	136
Assasuni	0	0	12	12
Debhata	7	0	2	9
Kalaroa	4	0	0	4
Kaliganj	1	0	1	2
Satkhira Sadar	8	0	2	10
Shyamnagar	22	1	36	59
Tala	30	2	8	40
Shariatpur	0	10	3	13
Bhedarganj	0	5	2	7
Gosairhat	0	0	1	1
Zanjira	0	5	0	5
Grand Total	1,017	1,848	889	3,754

ANNEX 14: SCOPE OF WORK

Tasking Request S021: Final Performance Evaluation: Cereal Systems Initiative for South Asia-Mechanization and Irrigation (CSISA-MI) Activity

Date of Request: February 19, 2020

Description:

This is the final performance evaluation for the Cereal Systems Initiative for South Asia-Mechanization and Irrigation (CSISA-MI) Phase I Activity under the Mission's Feed the Future (FTF) portfolio with the Economic Growth office. CSISA MI Phase I was implemented by CIMMYT in collaboration with International Development Enterprises (iDE) and focused on scale-appropriate mechanization to improve timely and precision planting and harvesting, while responding to escalating rural labor costs and scarcity, and surface water irrigation, to intensify dry season cropping.

CSISA-MI had three core strategic objective areas:

1. Strategic Objective 1: To sustainably intensify and diversify agricultural production in southern Bangladesh through surface water irrigation to increase household income
2. Strategic Objective 2: To sustainably transform agriculture in southern Bangladesh through broad-based access to agricultural mechanization services
3. Strategic Objective 3: To develop new models for public and private institutions to support irrigation and agricultural mechanization in Southern Bangladesh

Cumulatively, the interventions comprised of these objective outputs, is aimed at approximately 68,000 ha (125,000 farmers) of land in the FTF zone placed under surface water irrigation and/or best-bet, and resource conserving agricultural machinery services supplied by local service providers over a five-year investment period. To assure the long-term durability of these interventions, the activity strategically strengthened the capacities of the Government of Bangladesh (GOB) and the relevant private sector partners.

The total estimated cost (TEC) for CSISA-MI was \$15,756, 266 and the duration was August 20, 2013-September 30, 2019. The activity was implemented across the FTF ZOI to promote mechanization and conservation agriculture through public-private partnership. Please see the attached program description for more information.

Research Questions:

1. To what extent was the CSISA MI phase I Activity successful in increasing smallholders' access to surface water irrigation through the Local Service Providers (LSP)? How effective has the flow pumps been to address the irrigation issues in the FTF ZOI?
2. How successful was the activity in leveraging private sector investment and developing public-private partnerships in the agricultural machinery sector? What were some of the challenges in forming partnerships? How effective was the partnership in conducting risk management?
3. How successful and sustainable are the businesses that have been developed by rural entrepreneurs, as a result of the Activity? What have been the major constraints and opportunities with respect to sustainability of the LSP business model? What measures should be taken to enhance sustainability?
4. How successful was the activity in terms of developing and expanding farmers' access to the mechanized and related extension services? What were some of the challenges?
5. How successful was the Activity in increasing the diversification and intensity of farm production and what was the effect on the 'pull' factor for the irrigation market?

6. To what extent has CSISA MI integrated or incorporated gender in the interventions? What have been the challenges and opportunities, if any? What has been the impact of mechanization on women's economic empowerment?
7. How successful was the activity in developing the upstream supply chain (production, imports, distribution), the downstream market and access to finance and credit for mechanization?

Geographic Coverage:

The evaluation will cover sites from 21 districts in the FTF ZOI in Khulna and Barisal divisions.

Dates of performance and timeline:

Expected start date is o/a March 20, 2020 with field work commencing o/a March 30, 2020.

Team Composition/Qualifications of Consultants:

USAID recommends a three-person team for undertaking this evaluation. The team will include a Team Leader/Evaluation Specialist, a Mechanization Specialist, and an Irrigation System Specialist.

Team Leader/Evaluation Specialist (International): The Team Leader must have:

- ✧ Master's degree or higher degree in a relevant discipline such as Economics, Agriculture, Business Administration, Management and Marketing.
- ✧ At least 15 years of experience in evaluating projects with focus on agribusiness and market development, public-private partnerships, agricultural mechanization, value added agriculture enterprises or agriculture credit sector for USAID or other international development agencies.
- ✧ Significant experience in designing quantitative and qualitative surveys/studies/evaluations
- ✧ Strong knowledge and experience of agriculture production, agricultural mechanization, post-harvest management and marketing processes.
- ✧ Knowledge of USAID Feed the Future program, USAID regulations and systems, performance monitoring and evaluation guidance, evaluation policy, gender policy, annual reporting etc.
- ✧ Experience working with private sector firms.
- ✧ Relevant experience in Bangladesh or South Asia preferred.

The team leader will provide overall leadership for the team, and s/he will finalize the evaluation design, coordinate activities, arrange periodic meetings, consolidate individual input from team members, and coordinate the process of assembling the findings and recommendations into a high quality document. The team leader will possess good organizational and team building skills. S/he must demonstrate cultural sensitivity, particularly when interacting with a range of stakeholders. S/he will lead the preparation and presentation of the key evaluation findings and recommendations to the USAID/Bangladesh team and the major stakeholders. S/he will have communications and writing skills in English.

Mechanization Specialist (National):

The Mechanization Specialist must have:

- ✧ A minimum of bachelor's degree in agricultural engineering or other agricultural related discipline
- ✧ Demonstrated experience in agricultural engineering and in training farmers in the efficient and effective use of agricultural machineries
- ✧ Good understanding of conservation agriculture practices and scale-appropriate machinery, and demonstrated ability to find innovative solutions to problems encountered in the field

- ⌘ Demonstrated partnership building and networking experience with both the public and private sectors
- ⌘ 10+ years of experience working in the areas of agribusiness, private sector development and partnerships, agricultural mechanization and commercialization of new and improved technologies
- ⌘ Significant knowledge and experience in evaluations and/or assessments of projects with similar scopes
- ⌘ Have experience with market systems approach and value chain projects
- ⌘ Have strong analytical skills
- ⌘ Have strong oral communications and writing skills in English

The Mechanization specialist will provide technical assistance in the evaluation of the mechanization interventions of the Activity. S/he will actively participate in the desk review of materials and assist the team leader in developing methodologies, work plans and report outlines. S/he will assist the team leader in setting and conducting interviews with relevant stakeholders and actively take part in these.

S/he will participate in team meetings, site visits, and draft the sections of the report relevant to his/her expertise. S/he will also participate in presenting the report to USAID or other stakeholders and be responsible for addressing pertinent comments provided by USAID/Bangladesh or other stakeholders.

Irrigation System Specialist (National):

The Irrigation Specialist will:

- ⌘ A minimum of bachelor's degree in agricultural engineering, water management and irrigation, or in a related discipline
- ⌘ Have 10+ years of experience working in the areas of irrigation systems management, irrigated agriculture and water management
- ⌘ Have significant knowledge and experience of tools, equipment, techniques, skills, materials, and methods of irrigation system design, installation and maintenance
- ⌘ Ability to read and interpret maps, plans, sketches, blueprints, schematics and drawings
- ⌘ Have strong oral communications and writing skills in English

The Irrigation System Specialist will be responsible for providing technical assistance in the evaluation of the irrigation interventions of the Activity. S/he will actively participate in the desk review of materials and assist the team leader in developing methodologies, work plans and report outlines. S/he will assist the team leader in setting up and conducting interviews with relevant stakeholders. S/he will participate in all meetings, site visits, and draft the sections of the report relevant to his/her focus area. S/he will also participate in presenting the report to USAID or other stakeholders and be responsible for addressing pertinent comments provided by USAID/Bangladesh or other stakeholders.

Deliverables:

The evaluation team will provide deliverables as per the USAID Bangladesh standard evaluation requirements.

ANNEX 15: EVALUATION DESIGN MATRIX

#	Assessment Questions	Data Source	Data Collection Methods	Data Analysis Methods
I.	To what extent was the CSISA-MI Phase I Activity successful in increasing smallholders' access to surface water irrigation through the LSPs? How effective have the flow pumps been to address the irrigation issues in the FTF ZOI?	• Output data analysis for number of LSPs, mechanic and other stakeholders • Activity contracts and Cooperative Agreements (CAs) • Activity semi-annual and annual reports • Special studies • Site visits to selected intervention sites • KIIs with USAID, IPs, manufacturers, importers, and dealers • FGDs with farmers, LSPs, mechanics, spare shop owners, and project staff	• Desk review • KIIs • FGDs	• Content analysis to identify technical challenges and how they were addressed, as well as, the drivers of adoption of the axial flow pumps (AFPs) and other irrigation • Comparative analyses (among levels/informant groups) • Cross-checking/triangulation between/among methods as appropriate • Sequential analyses (building a logical chain of evidence)
I.1	How successful was the Activity in terms of developing and expanding farmers' access to the mechanized and related extension services? What were some of the challenges?	• Activity contracts and CAs • Activity annual reports • Site visits to selected intervention sites • Special studies • KIIs with USAID, IPs, manufacturers, importers, and dealers • FGDs with farmers, LSPs, mechanics, spare shop owners, and project staff	• Desk review • KIIs • FGDs	• Content analysis to identify technical challenges and how they were addressed as well as the drivers of adoption, including area cropping patterns • Comparative analyses (among levels/informant groups) • Cross-checking/triangulation between/among methods as appropriate
I.2	How successful was the Activity in increasing the diversification and intensity of farm production and what was the effect on the "pull" factor for the irrigation market?	• Available project data are not very specific for changes in agriculture intensification so this will mostly be based on site visits to selected intervention sites • KIIs with USAID, IPs, manufacturers, importers, and dealers • FGDs with farmers, LSPs, mechanics, spare shop owners, and project staff • Gray and peer-reviewed literature	• Desk review • KIIs • FGDs	• Content analysis to identify issues related to increased crop diversification and intensification • Comparative analyses (among levels/informant groups) • Cross-checking/triangulation between/among methods as appropriate
2.	How successful was the Activity in leveraging private sector	• Activity contracts and CAs • Activity annual reports	• Desk review • KIIs • FGDs	• Content analysis to identify trends in private sector investment as a

#	Assessment Questions	Data Source	Data Collection Methods	Data Analysis Methods
	investment and developing public-private partnerships in the agricultural machinery sector? What were some of the challenges in forming partnerships? How effective was the partnership in conducting risk management?	• KIs with IPs, manufacturers, importers, and dealers • FGDs with farmers, LSPs, mechanics, spare shop owners, and project staff • Specific data on investment trends by manufacturers and importers • Activity annual reports		result of the project and other factors • Comparative analyses (among levels/informant groups) • Cross-checking/triangulation between/among methods as appropriate • Sequential analyses (building a logical chain of evidence)
3.	How successful and sustainable are the businesses that have been developed by rural entrepreneurs as a result of the Activity? What have been the major constraints and opportunities with respect to sustainability of the LSP business model? What measures should be taken to enhance sustainability?	• Activity contracts and CAs • Activity annual reports • In-depth output data analysis • KIs with IPs, manufacturers, importers, and dealers • FGDs with farmers, LSPs, mechanics, spare shop owners, and project staff	• Desk review • Project data analysis • KIs • FGDs	• Detailed project data analysis of the various stakeholders and priority machinery at the upazila level • Comparative analyses (among levels/informant groups) • Cross-checking/triangulation between/among methods, as appropriate • Sequential analyses (building a logical chain of evidence)
4	To what extent has CSISA-MI integrated or incorporated gender in the interventions? What have been the challenges and opportunities, if any? What has been the impact of mechanization on women's economic empowerment?	• Review of project proposal and annual reports • KIs with IPs, manufacturers, importers, and dealers • FGDs with farmers, LSPs, mechanics, spare shop owners, and project staff • If possible, separate FGDs with female farmers	• Desk review • KIs • FGDs	• Comparative analyses (among levels/informant groups) • Cross-checking/triangulation between/among methods, as appropriate • Sequential analyses (building a logical chain of evidence)
5	How successful was the Activity in developing the upstream supply chain (production, imports, distribution), the downstream market, and access to finance and credit for mechanization?	• Activity contracts and CAs • Activity annual reports • In-depth output data analysis • KIs with IPs, manufacturers, importers, and dealers • FGDs with farmers, LSPs, mechanics, spare shop owners, and project staff	• Desk review • Project data analysis • KIs • FGDs	• Detailed project data analysis of the various stakeholders and priority machinery at the upazila level • Comparative analyses (among levels/informant groups) • Cross-checking/triangulation between/among methods, as appropriate • Sequential analyses (building a logical chain of evidence)

ANNEX 16: KII AND FGD GUIDELINES

CSISA and iDE Leadership Team Interview Questions

This survey will be conducted as an FGD with the CSISA Core team of iDE and CIMMYT leadership. Based on the responses and what is learned, a shorter form of the discussion guidelines will be used as a FGD at the regional offices to get more specific district and upazila information.

Questions in Advance Related to Data

1. There is a summary of results in the final report. However, do they have a table that provides the total achieved, with another column for the total target for each year and by district and upazila?
2. Do they have more specific data with regard to “improved management practices and technologies”?
3. Which improved practices or conservation agriculture techniques were most commonly adopted and which created the greatest pull for the adoption of mechanization and which kind of mechanization?
4. Are there data on the level of adoption by upazila?
5. Are there data on the number of hectares for which mechanized seeding and harvesting was done, in comparison to just tillage?
6. What “post-harvesting” practices or technology were promoted?
7. To what degree has boro rice, wheat, and maize cropping increased in the specific districts and upazilas?

Pre-Early Project Feasibility Analysis

8. Did the project do any initial analysis to determine which crops are most profitable and of greatest interest to the farmers in the specific districts and upazilas?
9. Are boro, wheat, and/or maize the most profitable crop choices for farmers in the southwest? If not, why would they increase their production of these crops regardless of the availability of machinery?
10. What about women and their cropping priorities? Was there any research done on this?
11. Was there any detailed analysis of pulses grown on “fallow” land in Patuakhali and other districts?
12. Is the lack of irrigation the only hindrance to expanded boro production in SW Bangladesh? If not, what were the other issues that constrain boro rice production in each of the districts?
13. Considering the climate and soil types will maize and wheat grow as well as they do in the north?
14. How many years does the project work with the LSPs? According to the final report 2,107 out of 3,474 LSPs remain active; however, according to the list of active LSPs, it is only around 1,200. What does this mean?
15. As the project worked with new LSPs how did they support existing LSPs?
16. AR 2019, p. 20: “Market Facilitation: CSISA MI had developed over 3,400 LSPs over the course of the project and as a rule of thumb each entrepreneur creates 7 other jobs. However, as with any group of entrepreneurs, some LSP were performing better than others. Major reasons for low performance included:

€ Lack of knowledge on the market,

- ⌘ *Factors in the enabling environment (i.e., access to spare parts, mechanics, etc.),*
- ⌘ *Lack of functional linkages with relevant market actors, and*
- ⌘ *Recalcitrance due to subsidies.”*

Can you elaborate on these issues in greater detail? Which were the most common and what should be done to address each of the issues?

17. How are the LSP Networks expected to address these issues?

18. Is there a list of LSP Networks?

More Detailed Technical Issues

19. To what degree do LSPs get spare parts from the machinery suppliers verses independent spare part stores?
20. What is meant under 4.2.6 in the 2017 annual report? How does the project “**ensure spare parts**” for LSPs?
21. If LSPs are not inclined to do seeding, why would they seed more than one kind of crop, especially in the same day? Would it not be better for them to become confident with the most common and profitable crop in their area?
22. Why not get maize companies to size grade their seed? Is large seed better than small seed? AR 2018, p. 34: “Does it make agronomic sense to have different rows for small and large seed? Is it worth the effort to LSPs and farmers?”
23. Who are the Farm Business Advisors and how do they make money?

Role of Government

24. How do the government subsidies work?
25. How important is the role of Bangladesh Agricultural Research Institute (BARI)/BADC in developing/testing equipment? Do they help or hinder the timely availability of quality equipment on the market?
26. Where is the 50 km canal? Who are the “water sellers” that direct water to farmers fields (2017 report annex)?
27. What are the three things that you would differently in a future project

CSISA-MI Field Team FGD Guidelines

1. How did you identify potential LSPs? (আপনি কিভাবে সম্ভাব্য এলএসপি সনাক্ত করেছিলেন?)
2. What percentage of them were already LSPs? (তাদের মধ্যে কত শতাংশ পূর্বেই এলএসপি ছিলেন?)
3. Of those who were already LSPs what percentage owned their own equipment rather than operating equipment which belonged to others? (যারা ইতোমধ্যে এলএসপি ছিলেন তাদের মধ্যে কত শতাংশ অন্যদের যন্ত্র চালনার বদলে তারা নিজেরাই যন্ত্রের মালিক ছিলেন?)
4. Of those who owned their own equipment what percentage had the following types of equipment? (যারা নিজেরাই যন্ত্রের মালিক তাদের মধ্যে নিম্নলিখিত ধরনের যন্ত্র কত শতাংশ ছিল?)
 _____irrigation (সেচ যন্ত্র)_____harvesting(কর্তনযন্ত্র) _____tillage(চাষের যন্ত্র) _____ planting(রোপণ যন্ত্র)
5. Of those who bought new equipment, how did they know what they wanted? (যারা নতুন যন্ত্র কিনেছেন, তারা কিভাবে তাদের চাহিদা জানতে পেরেছিলেন?)

6. Which equipment did they find to be most profitable? (তারা কোন যন্ত্রটি সবচেয়ে লাভজনক হিসেবে খুঁজে পেয়েছিলেন?)
7. How did you identify and develop new LSPs? (আপনি কিভাবে নতুন এলএসপি সনাক্ত করেছিলেন এবং তাদের উন্নয়ন করেছিলেন?)
8. What were the greatest challenges to developing new LSPs? (নতুন এলএসপিদের উন্নয়নে সবচেয়ে বড় সমস্যা কি ছিল?)
9. What kind of interventions were most effective in helping the LSPs to be successful? List the top five in order of importance. (এলএসপিদের সফল হতে সাহায্য করার জন্য কি ধরনের উদ্যোগ সবচেয়ে কার্যকরী ছিল? গুরুত্ব বিবেচনা করে সেরা পাঁচটি উদ্যোগের তালিকা করুন।)
10. How long did the project work with LSPs as per the project plan? (প্রকল্পের নির্ধারিত পরিকল্পনা অনুযায়ী এলএসপিদের সাথে কত দিন কাজ চালিয়েছিলেন?)
11. How often did the project interact with the LSPs during this time? (প্রকল্প চলাকালীন সময়ে কত দিন অন্তর অন্তর এলএসপিদের সাথে মিথস্ক্রিয়া/যোগাযোগ হয়েছে?)
- _____ weekly(সাপ্তাহিক) _____ monthly(মাসিক) _____ once during a season (মৌসুমে একবার)
 _____ twice during a season (মৌসুমে দুই বার) _____ Other (অন্যান্য)
12. Who within the project interacted with the LSPs most? (প্রকল্পের মধ্যে কে সবচেয়ে বেশি এলএসপিদের সাথে যোগাযোগ করেছে?)
- Which organization (কোন প্রতিষ্ঠান) _____ and their position (এবং তাদের পদ/অবস্থান) _____?
13. It seems from the data that there are only about 1,200 active LSPs out of the 3,400 LSPs that were developed. What does it mean to be an “inactive LSP”? Did they sell their equipment?
- (তথ্য থেকে মনে হচ্ছে যে প্রতিষ্ঠিত ৩,৪০০ টি এলএসপির মধ্যে মাত্র ১,২০০ টি সক্রিয় রয়েছে। "নিষ্ক্রিয় এলএসপি" বলতে কি বুঝায়? তারা কি তাদের যন্ত্র বিক্রি করে দিয়েছেন?)
14. One of the reports stated that the major reasons for low performance of LSPs included: (একটি প্রতিবেদনে বলা হয়েছে যে এলএসপিগণের কর্মসম্পাদন কম হওয়ার প্রধান কারণগুলোর মধ্যে রয়েছে):
- ☒ _____ Lack of knowledge on the market, (যন্ত্রের বাজার সম্পর্কে জ্ঞানের অভাব)
- ☒ _____ Factors in the enabling environment (i.e., access to spare parts, mechanics, etc.),
 (যন্ত্র সক্রিয় রাখার উপাদানের (অর্থাৎ, খুচরা যন্ত্রাংশ, মেকানিক ইত্যাদির) অপ্রতুলতা),
- ☒ _____ Lack of functional linkages with relevant market actors, (প্রাসঙ্গিক বাজার নিয়ন্ত্রকের সাথে কার্যকরী সংযোগের অভাব), and এবং
- ☒ _____ Recalcitrance due to subsidies. (ভর্তুকির কারণে অবহেলা করা) /
- What is meant by the knowledge of the market? (বাজার জ্ঞান বলতে কী বোঝায়?)
- What is the difference between “factors in the enabling market” and “functional linkages.....
- (“বাজারে সক্ষম করার কারণসমূহ” এবং “কার্যকরী সংযোগগুলির” মধ্যে পার্থক্য কী?)

Can you rank these in order of importance? (আপনি কি এগুলোকে গুরুত্ব বিবেচনা করে র্যাংকিং করতে পারবেন?)

15. Were there other reasons not mentioned in the report? (অন্য কোন কারণ আছে কি যা প্রতিবেদনে উল্লেখ করা হয়নি?) What were they? (সেগুলো কি ছিল?)

16. Which of these issues do you think the project was best at addressing and why? (এই বিষয়গুলির মধ্যে কোনটি এই প্রকল্পে সবচেয়ে ভালোভাবে মোকাবেলা করা হয়েছিল বলে আপনি মনে করেন এবং কেন?)

Which of these was the project least effective in addressing and why? (এগুলির মধ্যে কোনটি এই প্রকল্পে সবচেয়ে কম কার্যকরীভাবে মোকাবেলা করা হয়েছিল এবং কেন?)

17. Which type of machinery were LSPs most interested in? (কোন ধরনের যন্ত্রপাতিতে এলএসপিগণের আগ্রহ সবচেয়ে বেশি ছিল?)

18. Was there any machinery desired by LSP or farmers that was not promoted by the project? (এলএসপি বা কৃষকদের কাঙ্ক্ষিত এমন কোন যন্ত্রপাতি ছিল যা এই প্রকল্প দ্বারা প্রবর্তিত করা হয়নি?)

What were they? (সেগুলো কি ছিল?) _____

19. Which market stakeholder (LSPs, dealers, other?) is best at identify and communicating the demand for machinery to manufacturers and importers? (প্রস্তুতকারক এবং আমদানিকারকদের কাছে যন্ত্রপাতির চাহিদা সনাক্ত এবং যোগাযোগ করার জন্য সবচেয়ে ভালো বাজার অংশীদার (এলএসপি, ডিলার, অন্যান্য?) কে?)

20. What was the bigger challenge for the project, increasing farmer demand for machinery services or increasing the availability of quality services? (এই প্রকল্পের জন্য সবচেয়ে বড় চ্যালেঞ্জ কি ছিল, যন্ত্রপাতি সেবার জন্য কৃষকদের চাহিদা বৃদ্ধি অথবা গুণগত মানের সেবার প্রাপ্যতা বৃদ্ধি?) Why? (কেন?)

21. How effective was the project in increasing farmer demand for LSP services? (এলএসপি সেবার জন্য কৃষকদের চাহিদা বৃদ্ধিতে প্রকল্পটি কতটা কার্যকর ছিল?)

Manufacturer/Importer KII Questions

প্রস্তুতকারক/ আমদানিকারকের জন্য কেআইআই প্রশ্নপত্র

Name of the Manufacturer/Importer প্রস্তুতকারক/আমদানিকারকের নাম: _____

Location ঠিকানা : _____

Interviewee সাক্ষাৎকার দাতার নাম : _____

Position in Company কোম্পানিতে তার পদবী : _____

Cell মোবাইল নাম্বার : _____

Other participants in the discussion – Name and Positions আলোচনায় অংশগ্রহণকারি অন্যান্য

সদস্যদের নাম এবং পদবী

অংশগ্রহণকারির নাম	পদবী

1. When did your organization become involved with the project? আপনার প্রতিষ্ঠান কবে প্রকল্পের সাথে জড়িত হয়েছিল? Year সাল : _____
2. How did you first hear about the project and what motivated you to get involved? প্রকল্পের সাথে আপনার প্রথম পরিচয় কিভাবে? প্রকল্পের সাথে জড়িত হতে প্রকল্পের কোন বিষয়গুলো আপনাকে প্রেরণা দিয়েছিল?
3. Which products did you begin manufacturing or importing as a result of support from the CSISA MI project? CSISA MI প্রকল্পের সহায়তার ফলে আপনি কোন পণ্যগুলো উৎপাদন বা আমদানি শুরু করেন?

Document in Table 20

4. Were there any products that you decided to produce or sell more of due to your involvement in the project? প্রকল্পের সাথে জড়িত হওয়ার কারণে এমন কোন পণ্য রয়েছে কি যা আরও বেশি উৎপাদন বা আমদানি করার সিদ্ধান্ত নিয়েছিলেন?

Manufactured

উৎপাদন: _____

Import আমদানি: _____

5. How do you forecast the number of machines to import or produce for the following season or year? পরবর্তী মৌসুম অথবা পরবর্তী বছরের জন্য কতগুলো মেশিন আমদানী বা প্রস্তুত করতে হতে পারে সেই সংখ্যা কিভাবে নির্ধারণ করেন?
6. Do retailers contact you and put in orders? খুচরা বিক্রেতারা কি আপনার সাথে যোগাযোগ করে পণ্যের অর্ডার দিয়ে থাকেন? _____
7. What do you do to increase the demand for these products? এই পণ্যগুলোর চাহিদা বাড়ানোর জন্য আপনি কি কি করেন?
8. How did the project support you to increase the demand for these products? এই পণ্যগুলোর চাহিদা বাড়ানোর জন্য অত্র প্রকল্পটি আপনাকে কিভাবে সহায়তা করেছে?
9. Did you receive any financial or other support that enabled you to increase the import or production of any equipment? Yes or No আপনি কি প্রকল্প থেকে আর্থিক বা অন্য কোন সহায়তা পেয়েছেন যা আপনাকে কোন যন্ত্রপাতি আমদানি বা উৎপাদন বৃদ্ধি করতে সক্ষম করেছে? হ্যাঁ বা না?
10. If yes, what was the nature and value of that support? উত্তর হ্যাঁ হলে সেই সহায়তার ধরণ ও আর্থিকমূল্যের পরিমাণ কত?

11. What kind of support did you receive from the project that you most appreciated? List the top three. আপনি প্রকল্প থেকে যে সকল সহায়তা পেয়েছেন এর মধ্যে কোনগুলো আপনার কাছে বেশি গুরুত্বপূর্ণ ছিল? প্রধান তিনটি সহায়তার নাম তালিকা করুন।

12. What support was provided by the project that could have been done better or was not very effective? For example: product testing, marketing (প্রকল্পটি এমন কোন সহায়তা সরবরাহ করেছিল যা আরও ভাল করা যেতে পারত বা খুব কার্যকর ছিল না? উদাহরণস্বরূপঃ পণ্য পরীক্ষা, বিপণন ইত্যাদি।)

13. What could the project have done differently that would help to increase mechanization by farmers? প্রকল্পটি অন্য কিভাবে কাজ করলে আরও বেশি কৃষি যান্ত্রিকীকরণ করতে সহায়তা করতে পারতো?

14. What were/are your biggest challenges with increasing your sales or production of any product? আপনার পণ্যের বিক্রয় বা উৎপাদন বাড়ানোর ক্ষেত্রে সবচেয়ে বড় বাধাগুলো কি কি

15. Did your business expand as a result of the partnership? By what degree? Tick অংশীদারিত্বের ফলে কি আপনার ব্যবসার প্রসার ঘটেছে? কি পরিমাণ প্রসার ঘটেছে? টিক দিন।

- Less than 1 percent এক শতাংশের কম (1)
- Between 1 and 5 percent ১ থেকে ৫ শতাংশের মধ্যে (2)
- Between 6 and 10 percent ৬ থেকে ১০ শতাংশের মধ্যে (3)
- Between 10 and 20 percent ১০ থেকে ২০ শতাংশের মধ্যে (4)
- Between 20 and 40 percent ২০ থেকে ৪০ শতাংশের মধ্যে (5)
- Between 40 & 60 percent ৪০ থেকে ৬০ শতাংশের মধ্যে (6)
- More than 60 percent ৬০ শতাংশের বেশি (7)

16. Do you market your product through your own dealers or do you use retailers that sell machinery for various companies? আপনি কি আপনার নিজস্ব ডিলারের মাধ্যমে পণ্য বাজারজাত করেন অথবা যারা অন্য কোম্পানির যন্ত্রপাতি বিক্রি করে এমন খুচরা বিক্রেতাদের মাধ্যমে বাজারজাত করেন?

1. Own dealers নিজস্ব ডিলার 2) retailers খুচরা বিক্রেতা 3) Other অন্যান্য _____

17. If you use only your own dealers, are they considered as your employees on a fixed salary or do they make their money through commissions? আপনি যদি কেবল নিজস্ব ডিলারই ব্যবহার করেন, তবে তারা কি আপনার বেতনভুক্ত কর্মচারী নাকি কমিশনের মাধ্যমে তারা তাদের অর্থ উপার্জন করেন?

1) Employees বেতনভুক্ত কর্মচারী 2) Commission only শুধু কমিশন গ্রহন 3) salary and commission বেতন এবং কমিশন গ্রহন 4) Other অন্যান্য : explain ব্যাখ্যা করুন। _____

18. If they earn a commission, what percentage of the sale do they earn? যদি তারা কমিশন গ্রহন করে, তবে বিক্রয়ের শতকরা কত ভাগ কমিশন হিসাবে গ্রহন করেন? _____

19. Do your dealers use commissioning agents or sub-dealers that travel to and reach farmers and LSPs in more remote areas? আপনার ডিলাররা কি কোন কমিশন এজেন্ট বা সাব-ডিলার ব্যবহার করেন যারা প্রত্যন্ত অঞ্চলে ভ্রমণ করে এবং কৃষক ও এলএসপিদের নিকট সেবা পৌঁছে দেয়? হ্যাঁ অথবা না (বৃত্ত পূরণ করুন) Yes হ্যাঁ No না (circle)

20. Do you mind sharing with us the number of machines, that you have been importing and or producing in part due to your involvement with the project? List in the table below along with the number of machines produced and imported. প্রকল্পের সাথে জড়িত থাকার কারণে, আপনি কি পরিমাণ মেশিন আমদানি করেছেন বা মেশিনের পার্টস উৎপাদন করেছেন তার তথ্য আমাদের দিতে আপত্তি আছে কি? উৎপাদিত ও আমদানিকৃত মেশিনের সংখ্যা নিচে তালিকাভুক্ত করুন।

Name of the machine মেশিনের নাম	Number of machines manufactured or imported in a particular year একটি নির্দিষ্ট বছরে উৎপাদিত বা আমদানিকৃত মেশিনের সংখ্যা							Is demand increasing, decreasing, or level? I or D or L চাহিদা কি বাড়ছে, হ্রাস পাচ্ছে না একই রকম আছে?	What are the drivers of increased demand? চাহিদা বৃদ্ধির পরিচালকগুলো কি কি?
	2013	2014	2015	2016	2017	2018	2019		

Name of the machine মেশিনের নাম	Number of machines manufactured or imported in a particular year একটি নির্দিষ্ট বছরে উৎপাদিত বা আমদানিকৃত মেশিনের সংখ্যা							Is demand increasing, decreasing, or level? I or D or L চাহিদা কি বাড়ছে, হ্রাস পাচ্ছে না একই রকম আছে?	What are the drivers of increased demand? চাহিদা বৃদ্ধির পরিচালকগুলো কি কি?
PTOS: Imported আমদানীকৃত									
Seeding attachments (imported)									
Seeding attachments Mfd পাওয়ার টিলার পরিচালিত বীজ বপন যন্ত্রঃ উৎপাদিত									
Self Propelled Reaper: Imported আমদানীকৃত									
Rice/wheat Reaper Attachment Imported আমদানীকৃত									
Jute Reaper Attachment Mfd রীপারঃ উৎপাদিত									
Reaper Attachment Mfd রীপারঃ উৎপাদিত									
Combine harvester: কম্বাইন হার্ভেস্টার:									
AFP: Mfg এফপি: উৎপাদিত									

Name of the machine মেশিনের নাম	Number of machines manufactured or imported in a particular year একটি নির্দিষ্ট বছরে উৎপাদিত বা আমদানিকৃত মেশিনের সংখ্যা							Is demand increasing, decreasing, or level? I or D or L চাহিদা কি বাড়ছে, হ্রাস পাচ্ছে না একই রকম আছে?	What are the drivers of increased demand? চাহিদা বৃদ্ধির পরিচালকগুলো কি কি?
AFP: Imported এফপি: আমদানিকৃত।									
Others অন্যান্য।									

21. Detail Questions about three most important products listed above. উপরের তালিকাভুক্ত সবচেয়ে গুরুত্বপূর্ণ তিনটি পণ্য সম্পর্কে বিস্তারিত প্রশ্ন

Product পণ্য	Are you the only manufacturer or importer of this product? Y or N আপনি কি এই পণ্যের একমাত্র প্রস্তুতকারক বা আমদানিকারক? হ্যাঁ/ না?	Did you conduct the performance tests yourselves? If not, who did? কর্মদক্ষতার পরীক্ষা কি নিজেরাই করেছেন? যদি নিজেরা না করে থাকেন তবে কে করেছে?	Was the product subsidized by the government in 2019? ২০১৯ সালে এই পণ্যটিতে সরকার কি ভর্তুকি দিয়েছিল?	Biggest challenge with this product? এই পণ্যটির ক্ষেত্রে সবচেয়ে বড় বাধা কি?

KII Guidelines for Equipment Dealers/Retailers

কৃষিযন্ত্র ডিলারদের জন্য কেআইআই নির্দেশিকা

INTERVIEW NUMBER (ইন্টারভিউ নম্বর):	
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Name of interviewer (সাক্ষাৎকারগ্রহণকারীর নাম): _____ Date (তারিখ): _____

District (জেলা): _____ Upazila (উপজেলা): _____

Begin with the Introduction (ভূমিকা দিয়ে শুরু করুন)

Hello, my name is _____ and I understand that my colleague Saiful Islam explained why I am calling (হ্যালো, আমার নাম _____ এবং আমার সহকর্মী সাইফুল ইসলাম আপনার সাথে কথা বলে সব ব্যাখ্যা করেছেন কেন আমি কল করছি)

We understand that you were involved with the CSISA-MI project whose goal was to increase the availability of _____ and farmer demand for agriculture machinery (আমরা জানি যে আপনি সিএসআইএসএ-এমআই প্রকল্পের সাথে জড়িত ছিলেন যার লক্ষ্য ছিল কৃষি যন্ত্রপাতির জন্য কৃষকের চাহিদা বৃদ্ধি করা।)

We would like to get your perspective on that project and issues related to increasing farmer access to and demand for agriculture machinery (আমরা এই প্রকল্প এবং কৃষি যন্ত্রপাতির চাহিদা বৃদ্ধি সম্পর্কিত বিষয়ে আপনার দৃষ্টিভঙ্গি জানতে চাই।)

First we need some basic information about your business (প্রথমে আপনার ব্যবসা সম্পর্কে আমাদের কিছু মৌলিক তথ্য প্রয়োজন।)

What year did you first establish your business? (কোন বছর আপনি প্রথম আপনার ব্যবসা প্রতিষ্ঠা করেছিলেন?)

Year that business was established (যে বছর ব্যবসা প্রতিষ্ঠিত হয়।)	
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What is your role in the business (mark tick): (ব্যবসায় আপনার ভূমিকা কি (মার্ক টিক)):	1. Business owner (ব্যবসা মালিক) 2. Employee (কর্মচারী) (Title (পদের নাম): _____) 3. An agent (name of company) একজন এজেন্ট (কোম্পানির নাম): _____ 4. Other(অন্যান্য) _____
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1. How were you involved with the CIMMYT – MI Project? আপনি কিভাবে সিএমআইটি - এমআই প্রজেক্টের সাথে জড়িত ছিলেন?	
2. What kind of support did you receive from the project? এই প্রকল্প থেকে আপনি কি ধরনের সহযোগিতা পেয়েছেন?	

3. Which kind of support did you find most valuable? আপনি কোন ধরনের সহযোগীতা সবচেয়ে মূল্যবান খুঁজে পেলেন?	
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4. Did you receive any training and what was the topic/s? আপনি কি কোন প্রশিক্ষণ পেয়েছেন এবং বিষয় কি ছিল?	
5. Did your staff receive training? What topic/s? আপনার কর্মীরা কি প্রশিক্ষণ পেয়েছে? কোন বিষয়ে?	

6. Did the project introduce you to manufacturers or importers whose equipment you did not sell before?

প্রকল্পটি আপনাকে এমন প্রস্তুতকারক বা আমদানিকারকদের সাথে পরিচয় করিয়ে দিয়েছে যার সরঞ্জাম আপনি আগে বিক্রি করেননি?

7. If so, which companies and what equipment do you buy from them?

যদি তা হয় তবে কোন সংস্থা এবং কোন সরঞ্জাম আপনি তাদের কাছ থেকে কিনবেন?

8. Did they introduce you to local service providers or others who started buying equipment from you? তারা কি আপনাকে এলএসপি (স্থানীয় পরিষেবা সরবরাহকারী) বা অন্যদের সাথে পরিচয় করিয়ে দিয়েছে যারা আপনার কাছ থেকে সরঞ্জাম কেনা শুরু করেছিল?

9. What kind of support would you have appreciated more of? (কি ধরনের সহযোগীতাকে আপনি ভালো লেগেছে?)

10. What is the bigger challenge for you as a business man, meeting the demand for machinery or increasing the demand for machinery? (একজন ব্যবসায়ী হিসেবে আপনার জন্য সবচেয়ে বড় সুযোগ কি হতে পারে, যন্ত্রপাতির চাহিদা পূরণ করা বা যন্ত্রপাতির চাহিদা বাড়ানো?)

11. Is there any equipment in high demand which you cannot supply? Y or N

প্রবল চাহিদার এমন কোন যন্ত্র আছে যা আপনি সরবরাহ করতে পারবেন না? হ্যাঁ অথবা না

12. If so, what is it and why cannot you not supply it?

যদি থাকে, তাহলে এটা কি এবং কেন আপনি তা সরবরাহ করতে পারছেন না?

13. Do you use commissioning agents or sub-dealers to sell any of the equipment associated with the project? If so how many? (আপনি কি এই প্রকল্পের সাথে সংশ্লিষ্ট কোন যন্ত্র বিক্রি করতে কমিশনিং এজেন্ট বা সাব-ডিলার ব্যবহার করেন? যদি তাই হয় তাহলে কয়জন?)	
commissioning agents: (কমিশনিং এজেন্ট)	 Nos. সংখ্যা
Sub-dealers (সাব-ডিলার) :	 Nos. সংখ্যা
Other1 (অন্যান্য-১):.....	 Nos. সংখ্যা
Other2 (অন্যান্য-২):.....	 Nos. সংখ্যা

14. Can you provide approximate numbers on the machinery that you sold since getting involved in the project? (এই প্রকল্পের সাথে জড়িত হওয়ার পর থেকে আপনার বিক্রি করা যন্ত্রপাতি সম্পর্কে আনুমানিক সংখ্যা প্রদান করতে পারেন?)

Name of the machine (মেশিনের নাম)	Number of machines sold each year: (প্রতি বছরে বিক্রি মেশিনের সংখ্যা):					Do you provide spare parts for these machines? (আপনি কি এই মেশিনের জন্য খুচরা যন্ত্রাংশ সরবরাহ করেন?)	Do you expect demand for the machines to increase or decrease? (আপনার মতে এ মেশিনের চাহিদা বাড়বে না কমবে?)	Why? (কেন?)	Rank these in terms of importance to your business. ব্যবসার সাফল্যের দিক থেকে এ যন্ত্রগুলোর র্যাংকিং করুন।
	2015 (২০১৫)	2016 (২০১৬)	2017 (২০১৮)	2018 (২০১৮)	2019 (২০১৯)				
Power tiller 18 tines আঠার টাইন বিশিষ্ট পাওয়ার টিলার									
PTOS (48 tines with seeder) ৪৮ টাইন বিশিষ্ট সীডারসহ পাওয়ার টিলার									
Reaper: Self propelled reaper সেক্স প্রোপেল্লড রিপার									
Reaper attachment Imported শুধু রিপার অংশ ((আমদানী))									
Combine harvester: Imported কম্বাই হার্ভেস্টার (আমদানী)									
Other:									
AFP Imported									

Name of the machine (মেশিনের নাম)	Number of machines sold each year: (প্রতি বছরে বিক্রি মেশিনের সংখ্যা):					Do you provide spare parts for these machines? (আপনি কি এই মেশিনের জন্য খুচরা যন্ত্রাংশ সরবরাহ করেন?)	Do you expect demand for the machines to increase or decrease? (আপনার মতে এ মেশিনের চাহিদা বাড়বে না কমবে?)	Why? (কেন?)	Rank these in terms of importance to your business. ব্যবসার সাফল্যের দিক থেকে এ যন্ত্রগুলোর র‍্যাংকিং করুন।
এফপি (আমদানী)									
AFP (local) এফপি (দেশে তৈরী)									
Other irrigation: Name অন্যান্য (সেচযন্ত্র)									
Others (অন্যান্য)									

15. Is there any equipment that you used to sell associated with the project that you no longer sell?

(প্রকল্পের সাথে সংশ্লিষ্ট এমন কোন যন্ত্র ছিল যা আপনি আর বিক্রি করেন না?)

Name (যন্ত্রের নাম)	Manufacturer (প্রস্তুতকারক)	Year you began selling this product? (কোন বছরে আপনি এই যন্ত্র বিক্রি শুরু করেছিলেন?)	Last year sold? (গত বছর কতটি যন্ত্র বিক্রি হয়েছিল?)	Primary Reason for ceasing sales 1/ যদি বিক্রয় বন্ধ করে থাকেন, তাহলে প্রাথমিক কারণ কি? 1/	If the reason is lack of demand ask why? 2/ (যদি চাহিদার অভাব হয় তাহলে কেন? 2/)

1/ Options for reasons for ceasing sales 1/(বিক্রয় বন্ধ করার কারণ)	2/ Causes for lack of demand 2/ চাহিদার অভাবের কারণ
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1. Lack of demand (চাহিদার অভাব); 2. Unavailable (অপ্রাপ্যতা); 3. Low profit margin (লভ্যাংশ কম); 4. Other – specify (অন্যান্য উল্লেখ করুন)	1. Too expensive for LSPs (এলএসপি জন্য ব্যবহুল); 2. Not appropriate for the local cropping systems (স্থানীয় শস্য আবাদ পদ্ধতির জন্য উপযুক্ত নয়); 3. Not appropriate for local soil types (স্থানীয় মাটির উপযোগী নয়); 4. Frequent breakdowns (প্রায়শই অকেজো হয়ে যায়); 5. Lack of spare parts (খুচরা যন্ত্রাংশের অভাব); 6. Other more reliable equipment is available (অন্য ভালো যন্ত্রের প্রাপ্যতা); 7. Other less expensive equipment is available (অন্য কমদামী যন্ত্রের প্রাপ্যতা)
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16. Status of frequently troubleshooting spare parts of machines (যেসকল খুচরা যন্ত্রাংশ ঘন ঘন সমস্যা দেখা দেয় তাদের অবস্থা)

Machine (যন্ত্র)	Status of spare parts at your store (আপনার দোকানে এ যন্ত্রাংশের প্রাপ্যতা)	Three most important spare parts that you sell? (সবচেয়ে গুরুত্বপূর্ণ তিনটি যন্ত্র কি কি যা আপনি বিক্রি করেন)	Primary source of spare parts (খুচরা যন্ত্রাংশের প্রাথমিক উৎস কি?) (Use code below) নিচের কোড ব্যবহার করুন
PTOS: Imported (পিটিওএস: আমদানী করা)	Available (সহজে পাওয়া যায়)		
	Difficult to collect (সংগ্রহ করা কঠিন)		
	Not available (পাওয়া যায় না)		
Self Propelled Reaper:	Available (সহজে পাওয়া যায়)		
	Difficult to collect (সংগ্রহ করা কঠিন)		
	Not available (পাওয়া যায় না)		
Reaper Attachment: Imported (রিপার: আমদানী করা)	Available (সহজে পাওয়া যায়)		
	Difficult to collect (সংগ্রহ করা কঠিন)		
	Not available (পাওয়া যায় না)		
Combine harvester: Manufactured (কম্বাইন হারভেস্টার: দেশে প্রস্তুত)	Available (সহজে পাওয়া যায়)		
	Difficult to collect (সংগ্রহ করা কঠিন)		
	Not available (পাওয়া যায় না)		
AFP: Manufactured	Available (সহজে পাওয়া যায়)		

(এফপি: দেশে প্রস্তুত)	Difficult to collect (সংগ্রহ করা কঠিন)		
	Not available (পাওয়া যায় না)		
AFP: Imported (এফপি: আমদানী করা)	Available (সহজে পাওয়া যায়)		
	Difficult to collect (সংগ্রহ করা কঠিন)		
	Not available (পাওয়া যায় না)		

Source of spare parts:

1. Import directly (সরাসরি আমদানী করা);
2. District or Dhaka based wholesaler (জেলা শহর বা ঢাকার পাইকারী বিক্রেতা)
3. Manufacturer within desh (দেশে তৈরী)
4. Local workshop (স্থানীয় ওয়ার্কশপ)

17. What did the project do that most effectively help to increase the demand for machinery?

(প্রকল্পটি কার্যকরীভাবে কি করেছিল যা মেশিনের চাহিদা বৃদ্ধিতে সাহায্য করেছে?)

18. Do you have any recommendation for what the project could have done to increase LSP demand for equipment or farmer demand for the use of mechanization services? (আপনার কি কোনও সুপারিশ আছে যা প্রকল্পটি বাস্তবায়ন করলে এলএসপিগণের যন্ত্রের চাহিদা বাড়বে অথবা কৃষকের জন্য যান্ত্রিকীকরণ পরিষেবা চাহিদা বাড়তে পারে?)

19. Approximately what share of your total business comes from the following (আপনার ব্যবসার আনুমানিক কত শতাংশ নিচে উল্লেখিত কোন ধরনের যন্ত্র থেকে আসে):

Irrigation equipment (সেচ যন্ত্র): _____

Tillage equipment (চাষের যন্ত্র): _____

Seeding/planting equipment (PTOS) (বপন/রোপন যন্ত্র): _____

Harvest equipment (কর্তন যন্ত্র): _____

Other (অন্যান্য): _____

KII Questions for Mechanics

মেকানিক্সের জন্য কেআইআই প্রশ্নসমূহ

INTERVIEW NUMBER (সাক্ষাৎকার নং):	
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Name of Interviewee (তথ্য প্রদানকারীর নাম): _____ Date (তারিখ): _____

District জেলা: _____

Upazila উপজেলা: _____

Begin with the Introduction

Hello, my name is _____ and I understand that my colleague Saiful Islam explained why I am calling. We understand that you were involved with the CSISA-MI project whose goal was to increase the availability of and farmer demand for agriculture machinery. We would like to get your perspective on that project and issues related to increasing farmer access to and demand for agriculture machinery.

First we need some basic information about your business.

সূচনা দিয়েই শুরু করুন।

হ্যালো, আমার নাম এবং আমি বুঝতে পারি যে, আমার সহকর্মী সাইফুল ইসলাম বুঝতে পারতেন যে কোন আমি ফোন করেছি। আমরা বুঝতে পারি যে, আপনি সিএসআইএসএ-এমআই প্রকল্পের সাথে জড়িত ছিলেন যার লক্ষ্য ছিল কৃষিক্ষেত্রের সহজলভ্যতা এবং কৃষকের চাহিদা বৃদ্ধি করা। আমরা সেই প্রকল্পের বিষয়ে আপনার দৃষ্টিভঙ্গি পেতে চাই এবং কৃষকের কাছে ক্রমবর্ধমান এক্সেস এবং কৃষিক্ষেত্রের চাহিদা সম্পর্কিত বিষয়গুলি নিয়ে আলোচনা করতে চাই।

প্রথমে আমাদের আপনার ব্যবসায় সম্পর্কে কিছু প্রাথমিক তথ্য প্রয়োজন।

Education level শিক্ষাগত যোগ্যতা:	[1. Primary (প্রাইমারী), 2. SSC/HSC (এসএসসি/এইচএসসি), 3. Trade course/Diploma (ট্রেডকোর্স/ডিপ্লোমা), 4. Higher education (উচ্চশিক্ষা)]
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1. What type of job are you doing? আপনি কি ধরনের চাকরিত নিয়োজিত আছেন? [Rank in order of importance if the person does more than one job.] [পদমর্যাদা উল্লেখ করতে হবে যদি ব্যক্তি একাধিক কাজের সাথে জড়িত থাকেন]

Employee in a dealer shop সরবরাহকারীর দোকানের কর্মচারী	Employee in a workshop ওয়ার্কশপের কর্মচারী	Freelance mechanic ফ্রিল্যান্স মেকানিক	Job under manufacturer/ importer (উৎপাদনকারী/আমদানিকারকের অধীনে চাকুরী)	Own workshop নিজস্ব ওয়ার্কশপ	Seasonal job মৌসুমী চাকুরী	Other (specify) ন্যান্য (উল্লেখ করুন)

2. If you have your own business when did you start it [year]? (যদি আপনার নিজের ব্যবসা থাকে তাহলে কখন তা শুরু করেছিলেন? (বছর) _____

3. When did you become aware of the CSISA project which is promoting the use of agriculture machinery in your area? (আপনি কখন সিএসআইএসএ (সিসা) প্রকল্প সম্পর্কে অবহিত হয়েছিলেন যা আপনার অঞ্চলে কৃষি যন্ত্রপাতি ব্যবহার বৃদ্ধির জন্য প্রচার কাজ করছে?)

Year (সাল):

4. Was there anything they encouraged you to do differently to help farmers and Local Service Providers to use more agriculture machinery? (তারা (প্রকল্প থেকে) আপনাকে আলাদাভাবে এমন কোন উৎসাহ দিয়েছিল যাতে আপনি কৃষক এবং স্থানীয় সেবা সরবরাহকারীদেরকে (এলএসপি) আরও বেশি বেশী কৃষি যন্ত্রপাতি ব্যবহার করতে সহায়তা করেছিলেন?)

5. Was there anything they did to help you improve or expand your business? (তারা (প্রকল্প থেকে) কি এমন কিছু করেছিল যাতে আপনার ব্যবসার উন্নতি করতে বা ব্যবসা বাড়াতে সাহায্য করেছিল?)

6. Did they provide you with any training? Y or N. If yes, on what subject? (তারা কি আপনাকে কোনও প্রশিক্ষণ দিয়েছিল? যদি দিয়ে থাকে, তবে কোন বিষয়ের উপর?)

7. Did they introduce you to Local Service providers, or other people to help you expand your business? (তারা কি আপনার সাথে স্থানীয় সেবা সরবরাহকারী (এলএসপি) বা অন্য লোকের সাথে পরিচয় করে দিয়েছিল যা আপনার ব্যবসা বাড়াতে সহায়ক ছিল?) Y or N?

If yes, what kind of service providers? who? যদি দিয়ে থাকে, তবে কে?)

Mechanics (মেকানিক), machine operators (মেশিন চালক), spare part dealers (খুচরা যন্ত্রাংশের দোকান/ডিলার) Others (অন্যান্য):

8. Has your job or business expanded since getting involved with the project? (প্রকল্পের সাথে জড়িত হওয়ার পর থেকে আপনার কাজ বা ব্যবসা বেড়েছে কি?)

9. If yes, how? (যদি হ্যাঁ হয়, তবে ভাবে?)

10. Do you have any idea of about how many mechanics work on agriculture machinery in this upazila? (আপনার কি কোন ধারণা আছে এই উপজেলায় কতজন মেকানিক কৃষি যন্ত্রপাতি সংক্রান্ত কাজ করেন?)

11. What type of machinery do you service? [List the five most common in the order of frequency.] কোন ধরনের মেশিন আপনি মেরামত করেন? [মাত্রা অনুসারে ৫টি অতি সাধারণকে তালিকাভুক্ত করুন।]

Part A: Machine type (use code below) পার্ট-এ: যন্ত্রের ধরণ (নিচের কোড ব্যবহার করুন)	Part B: Top three most common problems পার্ট-বি: তিনটি সর্বোচ্চ অতি সাধারণ সমস্যাসমূহ (নিচের কোড ব্যবহার করুন)	Part C: Number of machines repaired in the last season? পার্ট-সি: গত মৌসুমে মেরামতকৃত মেশিনের সংখ্যা	Part D: Is the presence of these machines increasing or decreasing in this upazila? (I or D) পার্ট-ডি: এই উপজেলায় এসব মেশিনের ব্যবহার কমছে নাকি বাড়ছে

Codes for part A: পার্ট-এ তে ব্যবহৃত কোডসমূহ:

Codes for part B: পার্ট-বি এর জন্য কোডসমূহ

1. Two-wheeled tractors পাওয়ার টিলার	1. Black smoke: piston/liner/ring, etc.) ইঞ্জিন (কালো ধোয়া: পিস্টন/লাইনার/রিং ইত্যাদি)
2. 18 tine tilling attachment আঠারো ফলার টিলার	1. Gear box গিয়ার বক্স
3. PTOS (48 tines) পাওয়ার টিলার চালিত সিডার	1. Bearing & seal বিয়ারিং ও সিল
	1. Chain/belt চেইন/বেল্ট

4. Low lift centrifugal pump সেচ যন্ত্র - মাটির উপরের পানি তোলা (খাল/ডোবা/নদী/বিলের পানি)	I. Cutter bar কাটার বার
5. AFP এক্সিয়াল ফ্লো পাম্প/জাম্বো পাম্প	I. Furrow opener (ফারো ওপেনার)
6. Other irrigation device অন্যান্য সেচ যন্ত্র	I. Fuel line ফ্যুয়েল লাইন
7. Bed planters বেড প্লান্টার	I. Welding ওয়েলডিং
8. Rice transplanter ধানের চারা রোপন যন্ত্র	I. Problem due to Inappropriate operation ভুল কার্যের ফলে সৃষ্ট সমস্যা
9. Self-Propelled Multi-crop reaper রিপার মেশিন	I. Clutch ক্লাচ
10. Reaper attachment পাওয়ার টিলারের সামনে সংযুক্ত রিপার	I. Break ব্রেক
11. Combine harvester কম্বাইন হার্ভেস্টার	I. Overhauling ওভারহোলিং
12. Other Equipment অন্যান্য যন্ত্র:	I. Other (specify) অন্যান্য (উল্লেখ করুন)

12. How do you provide repair service of the machines? [Tick each that applies.] আপনি কিভাবে যন্ত্রের মেরামত সেবা প্রদান করেন? [যেটি প্রযোজ্য হবে তাতে টিক দিন]

Machine যন্ত্রপাতি	Farmers come with machine to your workshop. কৃষকরা আপনার ওয়ার্কশপে যন্ত্রপাতি নিয়ে আসে	The farmer telephones you and you go to the farmer. কৃষক আপনাকে ফোন দেয় এবং আপনি কৃষকের কাছে যান	The machine dealer contacts you. যন্ত্রপাতি সরবরাহকারী আপনার সাথে যোগাযোগ করেন
2WT পাওয়ার টিলার			
PTOS পাওয়ার টিলার চালিত সিডার			
AFP – imported এক্সিয়াল ফ্লো পাম্প/জাম্বো পাম্প - আমদানিকৃত			
AFP – Bdes made এক্সিয়াল ফ্লো পাম্প/জাম্বো পাম্প - বাংলাদেশে প্রস্তুতকৃত			
LLP সেচ যন্ত্র - মাটির উপরের পানি তোলা (খাল/ডোবা/নদী/বিলের পানি)			
Other irrigation equipment অন্যান্য সেচযন্ত্র			
Self-Propelled multi-crop Reaper রিপার মেশিন			
Reaper Attachment পাওয়ার টিলারের সামনে সংযুক্ত রিপার			
Combine harvester কম্বাইন হার্ভেস্টার			

13. I am going to ask you about your most common repair requests for PTOS, Self-Propelled Reapers, Reaper attachments and AFPs. What are the most common repair problems that you deal with? [Use

coded responses below.] আমি আপনাকে পিটিওএস, স্ব-চালিত রিপার, রিপার সংযুক্তি এবং এএফপি-র জন্য সবচেয়ে সচরাচর মেরামতের অনুরোধগুলি সম্পর্কে জিজ্ঞাসা করতে যাচ্ছি। সবচেয়ে সচরাচর সমস্যা কোনগুলি যা আপনি মোকাবেলা করেন? [নীচে কোডেড তালিকা ব্যবহার করুন।]

Name of the machine যন্ত্রপাতির নাম	What are the most common repair problems for the machines below? (rank 1 to 5) নিচের যন্ত্রপাতিসমূহের সবচেয়ে সাধারণ সমস্যাসমূহ (মান ১ থেকে ৫)				
	1	2	3	4	5
PTOS পাওয়ার টিলার চালিত সিডার					
Self-Propelled multi-crop Reaper রিপার মেশিন					
Reaper Attachment পাওয়ার টিলারের সামনে সংযুক্ত রিপার					
AFP – imported এক্সিয়াল ফ্লো পাম্প/জাম্বো পাম্প - আমদানিকৃত					
AFP made in Bdesb এক্সিয়াল ফ্লো পাম্প/জাম্বো পাম্প - বাংলাদেশে প্রস্তুতকৃত					

Coded list for repair issue:

1. Engine (Black smoke: piston/liner/ring, etc.)
ইঞ্জিন (কালো ধোয়া: পিস্টন/লাইনার/রিং ইত্যাদি)
2. Gear box (গিয়ার বক্স)
3. Bearing & seal (বিয়ারিং ও সিল)
4. Chain/belt (চেইন/বেল্ট)
5. Cutter bar (কাটার বার)
6. Furrow opener (ফারো ওপেনার)
7. Fuel line (ফ্যুয়েল লাইন)
8. Welding (ওয়েলডিং)
9. Problem due to Inappropriate operation (ভুল কার্যের ফলে সৃষ্ট সমস্যা)
10. Clutch (ক্লাচ)
11. Break (ব্রেক)
12. Overhauling (ওভারহোলিং)
13. Other (specify) অন্যান্য (উল্লেখ করুন) write in cell

14. I would like to ask you some questions about spare parts for PTOS, Reapers, Combine harvesters and AFPs. 'পাওয়ার টিলার চালিত সিডার, রিপারস মেশিন, কম্পাইন্ড হার্ভেস্টার এবং এক্সিয়াল ফ্লো পাম্প/জাম্বো পাম্প'এর খুচরা যন্ত্রাংশ সম্পর্কে আমি আপনাকে কিছু প্রশ্ন করতে চাই। (choose from list below) (নিচের তালিকা থেকে বাছাই করুন)

Machine (যন্ত্রের নাম)	Most commonly required spare parts 1/ অতি সাধারণ প্রয়োজনীয় খুচরা যন্ত্রাংশ ১/	Primary source of spare parts 2/ প্রাথমিক সোর্স	Are these parts readily available? 3/ এ যন্ত্রাংশগুলো কি সহজেই পাওয়া যায়? ৩/	How is the quality? (excellent, good, fair, terrible)

		অতি সাধারণ খুচরা যন্ত্রাংশের প্রাথমিক উৎস ২/		এর মান কেমন? (চমৎকার, ভাল, মোটামুটি ভাল, খুব খারাপ)
PTOS পাওয়ার টিলার চালিত সিডার				
Self-Propelled multi-crop Reaper রিপার মেশিন				
Reaper Attachment পাওয়ার টিলারের সামনে সংযুক্ত রিপার				
AFP এক্সিয়াল ফ্লো পাম্প/জাম্বো পাম্প				
Combine harvester কম্বাইন হার্ভেস্টার				

1/ Spare parts: 1) Piston ring (পিস্টন রিং), 2) Bearing (বিয়ারিং), 3) Big end bearing (বিগ এন্ড বিয়ারিং), 4) Gasket (গ্যাসকেট), 5) Fuel filter (ফ্যুয়েল ফিল্টার), 6) Fuel pump (ফ্যুয়েল পাম্প), 7) Injector nozzle (ইনজেক্টর নজেল), 8) Clutch (ক্লাচ), 9) Break ব্রেক, 10) Gear (গিয়ার), 11) Nut and bolt (নাট এন্ড বোল্ট), 12) Clutch wire (ক্লাচ ওয়্যার), 13) Other (specify) অন্যান্য (উল্লেখ করুন) _____

2/ Source: 1) Farmer provides (কৃষক প্রদত্ত), 2) Dealer (সরবরাহকারী), 3) Local store (স্থানীয় দোকান), 4) District sadar upazila (জেলা/সদর উপজেলা), 5) Made in local workshop (স্থানীয় ওয়ার্কশপে তৈরী), 6) Other (specify) অন্যান্য (উল্লেখ করুন) _____

3/ Availability: 1) Always available (সবসময় পর্যাপ্ত), 2) Usually available (সাধারণত পাওয়া যায়), 3) Rarely available (খুবই কম পাওয়া যায়), 4) Never available (কখনো পাওয়া যায় না)

15. Do you need more training to do your job better? (If yes, for which machine/component)

আপনার কাজের জন্য আরও প্রশিক্ষণের দরকার কিনা? (যদি হ্যাঁ হয় তবে কোন যন্ত্র/যন্ত্রাংশের জন্য) [নিচের সারিতে টিক দিন]

PTOS পাওয়ার টিলার চালিত সিডার	2WT পাওয়ার টিলার	LLP সেচ যন্ত্র - মাটির উপরের পানি তোলা (খাল/ডোবা/নদী/বিলের পানি)	AFP এক্সিয়াল ফ্লো পাম্প/জাম্বো পাম্প	Self- propelled Reaper রিপার মেশিন	Combine harvester কম্বাইন হার্ভেস্টার	Reaper attachment পাওয়ার টিলারের সামনে সংযুক্ত রিপার	Others (specify) অন্যান্য (উল্লেখ করুন)

16. What are the challenges that you are facing in operating your business?

আপনি আপনার ব্যবসা পরিচালনায় কি কি চ্যালেঞ্জের সম্মুখীন হন?

17. Do you have any plan to expand your business? If so, explain your plan.

আপনার ব্যবসার সম্প্রসারণে কোন পরিকল্পনা আছে কিনা? যদি থাকে ব্যাখ্যা করুন।

18. Do you need any support related to servicing agri. machineries? If yes, please explain.

কৃষি যন্ত্রপাতি মেরামতে আপনার কোন সহায়তা প্রয়োজন কিনা ? যদি হয় তবে ব্যাখ্যা করুন।

Thank you very much for your time.

KII Questions for Spare-Part Shop Owners

খুচরা যন্ত্রাংশের দোকান মালিকের কেআইআই প্রশ্নপত্র

INTERVIEW NUMBER (সাক্ষাৎকার নম্বর):	
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Date (তারিখ): ___/___/___

Name of Interviewer (সাক্ষাৎকার গ্রহনকারীর নাম): _____

Name of Interviewee (সাক্ষাৎকার প্রদানকারীর নাম): _____

Name of business (দোকান/ব্যবসা প্রতিষ্ঠানের নাম): _____

District(জেলা): _____ Upazila(উপজেলা): _____

Begin with the Introduction (ভূমিকা দিয়ে শুরু করুন)

Hello, my name is _____ and I understand that my colleague Saiful Islam explained why I am calling (জনাব, আমার নাম _____ | আমি জানি আমার সহকর্মী সাইফুল ইসলাম আপনাকে কল করার কারণ ব্যাখ্যা করেছেন)

We understand that you were involved with the CSISA-MI project whose goal was to increase the availability of and farmer demand for agriculture machinery (আমরা জানি যে আপনি সিএসআইএসএ-এমআই (CSISA-MI) প্রকল্পের সাথে জড়িত ছিলেন যার লক্ষ্য ছিল কৃষি যন্ত্রপাতি সহজলভ্য করা এবং কৃষকদের মধ্যে কৃষি যন্ত্রপাতির চাহিদা বৃদ্ধি করা।)

We would like to get your perspective on that project and issues related to increasing farmer access to and demand for agriculture machinery (আমরা এই প্রকল্প সম্বন্ধে এবং কৃষকদের কাছে কৃষি যন্ত্রপাতির সহজলভ্যতা এবং কৃষি যন্ত্রপাতির প্রতি কৃষকদের চাহিদা সম্পর্কে আপনার দৃষ্টিভঙ্গি জানতে চাই।)

First, we need some basic information about your business (প্রথমে আপনার ব্যবসা সম্পর্কে কিছু মৌলিক তথ্য আমাদের জানা প্রয়োজন।)

1. Address (ঠিকানা): Town, Union (শহর, ইউনিয়ন)	
2. Year that business was established (যে সালে ব্যবসা প্রতিষ্ঠিত হয়)	
3. How many other spare shops are there in this upazila? (এই উপজেলায় আর কতগুলো খুচরা যন্ত্রাংশের দোকান রয়েছে)	
4. Are there any women spare parts retailers in this upazila? (এই উপজেলায় খুচরা যন্ত্রাংশের কোন খুচরা মহিলা বিক্রেতা রয়েছে)	

5. How were you first made aware of the CSISA – MI Project? (CSISA – MI প্রকল্প সম্পর্কে প্রথমে আপনি কিভাবে অবহিত হয়েছেন?)

6. Did you receive any kind of support or training from the project? (আপনি কি প্রকল্প থেকে কোন প্রকার সহায়তা বা প্রশিক্ষণ পেয়েছেন?) Yes/No হ্যাঁ / না

7. Did you receive any training and if so, what was the topic? (আপনি কি কোন প্রশিক্ষণ পেয়েছেন, যদি পেয়ে থাকেন, কি বিষয়ের উপর প্রশিক্ষণ পেয়েছেন?)

8. Rather than training, what other kind of support did you receive? (প্রশিক্ষণ ছাড়া আপনি অন্য কি ধরনের সহায়তা পেয়েছেন?)

9. Did the project introduce you to equipment or spare part importers? (প্রকল্প কি আপনাকে কোন যন্ত্রপাতি বা খুচরা যন্ত্রাংশের আমদানীকারকের সাথে পরিচয় করিয়ে দিয়েছিল?) Yes/No হ্যাঁ / না

10. If yes, which companies? (উত্তর হ্যাঁ হলে, কোন কোম্পানীর সাথে পরিচয় করিয়ে দিয়েছিল?)

11. Did you then start buying parts from those companies? (তার পর থেকে কি আপনি ঐ কোম্পানীগুলি থেকে যন্ত্রাংশ কেনা শুরু করেছিলেন?) Yes/No হ্যাঁ / না

12. If yes, for which machines? (উত্তর হ্যাঁ হলে, কোন যন্ত্রের জন্য?)

13. Did the project do anything else to help you expand your business? (আপনার ব্যবসা সম্প্রসারণের জন্য প্রকল্প কি অন্য কোন ধরনের সহায়তা করেছিল?)

14. Did the project introduce you to Service Providers who sell agriculture machinery services to farmers? (প্রকল্প কী আপনাকে সেবা প্রদানকারীদের সাথে পরিচয় করিয়ে দিয়েছে যারা কৃষকদের কাছে কৃষি যন্ত্রপাতির পরিষেবা বিক্রয় করে বা ভাড়া ঘাটায়?) Yes/No হ্যাঁ / না

15. Did this help your business? If so, how? (এটা কি আপনার ব্যবসায় সহায়তা করেছে? উত্তর হ্যাঁ হলে, কিভাবে?)

16. Who are your main customers (Farmer/LSP/Other)?

(আপনার প্রধান ক্রেতা কারা? — কৃষক / এলএসপি / অন্যান্য-)

17. About how many of these LSPs did you meet through the project? (এই প্রকল্পের মাধ্যমে আপনি কতজন এলএসপির সহিত সাক্ষাৎ করেছেন?)

18. Did the project provide training on how to provide technical advice to the LSPs? _____ Can you give an example? (কিভাবে এলএসপিদেরকে কারিগরি পরামর্শ প্রদান করতে হবে এ বিষয়ে প্রকল্প থেকে কোন প্রশিক্ষণ দেয়া হয়েছিল কি? _____ আপনি কি একটি উদাহরণ দিতে রেন?)

19. Have you noticed an increased demand for spare parts in the last three years? (গত তিন বছরে খুচরা যন্ত্রাংশের চাহিদা বেড়েছে কি না?)

Yes/No হ্যাঁ / না

20. What are the top three machines for which there has been an increased demand for spare parts? Give the list: (খুচরা যন্ত্রাংশের চাহিদা বেড়েছে এমন শীর্ষ তিনটি মেশিন কি কি?) তাদের তালিকা দিনঃ

21. Do LSPs or farmers request you to order parts on their behalf? (এলএসপি বা কৃষকরা কি তাদের হয়ে যন্ত্রাংশ অর্ডার করার জন্য আপনাকে অনুরোধ করেছেন?) Yes/No হ্যাঁ / না

22. Do they do that only when the part is broken, or do they plan in advance for the season? (কোন যন্ত্রাংশ নষ্ট হয়ে গেলেই কি তারা এটা করে, নাকি মৌসুমের জন্য অগ্রিম পরিকল্পনা করে এটা করে?):

When broken / Plan in advance (নষ্ট হয়ে গেলে / অগ্রিম পরিকল্পনা করে)

23. Are you able to acquire all of the parts that are needed by your customers? Yes/No (আপনি কি আপনার গ্রাহকদের প্রয়োজনীয় সমস্ত যন্ত্রাংশ সংগ্রহ করতে সক্ষম? হ্যাঁ / না)

24. If not, which ones do you have the most difficulty obtaining that are in most demand? (যদি না হয়, তবে অধিক চাহিদা রয়েছে এমন কোন যন্ত্রাংশটি সংগ্রহ করতে আপনার বেশি অসুবিধা হচ্ছে?)

25. What are the three most common spare parts that you sell for PTOs, reapers, and AFPs? (প্রকল্পের সাথে সম্পর্কিত বা প্রকল্প কর্তৃক প্রচারিত যে চারটি খুচরা যন্ত্রাংশ আপনি সবচেয়ে বেশী বিক্রি করেন সেগুলি কী কী?)

What are the most common spare parts required for the following machines? (নিম্নলিখিত যন্ত্রপাতিগুলোর জন্য প্রয়োজনীয় সাধারণ খুচরা যন্ত্রাংশগুলি কী কী?)	Manufacturer/Importer (উৎপাদক/আমদানিকারক)	Who is your supplier for these parts? (কে আপনাকে এই যন্ত্রাংশ সরবরাহ করতো?)	Year you began selling this product (কোন সালে আপনি এই পণ্য বিক্রয় শুরু করেন?)	Number sold in 2019 (২০১৯ সালে কতগুলো বিক্রয় করেছেন?)	According to your customers how is the quality? (আপনার গ্রাহকদের মতে গুণগত মান কেমন?) (good, fair, poor - ভালো, চলনসই, ঝঞ্ঝিপূর্ণ)	Is demand declining or increasing? (চাহিদা কি হ্রাস পাচ্ছে বা বাড়ছে?) (D or I - হ্রাস পাচ্ছে বা বাড়ছে)
PTOS (পাওয়ার টিলার চালিত সিডার):						
Self-Propelled Reapers (রিপার মেশিন)						
Reaper attachments (পাওয়ার টিলারের সামনে সংযুক্ত রিপার)						
AFPs (এক্সিয়াল ফ্লো পাম্প/জানো পাম্প)						

এলএসপি কেআইআই নির্দেশনা

Interview Number (সাক্ষাৎকার নম্বর):	LSP # (এলএসপি নম্বর)
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Date: (তারিখ): ____/____/____

Interviewer Name (সাক্ষাৎকার গ্রহনকারীর নাম): _____

LSPs name: _____

District (জেলা): _____ Upazila (উপজেলা): _____

Union (ইউনিয়ন): _____

Village

(গ্রাম): _____

Type of LSP according to project list (প্রকল্পের তালিকা অনুযায়ী এলএসপির ধরন):

(1) AFP (এক্সিয়াল ফ্লো পাম্প) _____ (2) PTOS (পাওয়ার টিলার অপারেটেড সীডার) _____ (3) Reaper (রিপার) _____

Begin with the Introduction (ভূমিকা দিয়ে শুরু করুন)

Hello, my name is _____ and I understand that my colleague Saiful Islam explained why I am calling (জনাব, আমার নাম _____ | আমি জানি আমার সহকর্মী সাইফুল ইসলাম আপনাকে কল করার কারণ ব্যাখ্যা করেছেন)

We understand that you were involved with the CSISA-MI project whose goal was to increase the availability of and farmer demand for agriculture machinery (আমরা জানি যে আপনি সিএসআইএসএ-এমআই (CSISA-MI) প্রকল্পের সাথে জড়িত ছিলেন যার লক্ষ্য ছিল কৃষি যন্ত্রপাতি সহজলভ্য করা এবং কৃষকদের মধ্যে কৃষি যন্ত্রপাতির চাহিদা বৃদ্ধি করা।)

We would like to get your perspective on that project and issues related to increasing farmer access to and demand for agriculture machinery (আমরা এই প্রকল্প সম্বন্ধে এবং কৃষকদের কাছে কৃষি যন্ত্রপাতির সহজলভ্যতা এবং কৃষি যন্ত্রপাতির প্রতি কৃষকদের চাহিদা সম্পর্কে আপনার দৃষ্টিভঙ্গি জানতে চাই।)

Introduce yourself as per the guidelines. Ask if they understand why you are calling. If not, then explain. Explain about keeping personal information confidential. (গাইডলাইন অনুযায়ী নিজেকে পরিচিত করুন। আপনি কেন ফোন করছেন তা তারা বুঝতে পারে কিনা তা জেনে নিন। যদি না হয়, তবে ব্যাখ্যা করুন। ব্যক্তিগত তথ্য গোপনীয় রাখার বিষয়ে ব্যাখ্যা করুন।)

Code: 1 = Yes 2 = No [কোড: ১ = (হ্যাঁ) ২=(না)]

CSISA MI QUESTIONS (সিএসআইএসএ-এমআই (CSISA-MI) প্রশ্নপত্র)

1. Are you familiar with the CSISA-MI project? Y or N circle

(আপনি কি সিএসআইএসএ-এমআই প্রকল্পের সাথে পরিচিত?) (হ্যাঁ) অথবা (না) (বৃত্ত করুন)

2. How did you first learn about the project? (প্রকল্প সম্পর্কে প্রথমে আপনি কিভাবে অবহিত হয়েছেন?)

3. What year did you first become involved with the project? (কোন বছর আপনি প্রথম এই প্রকল্পের সাথে জড়িত হয়েছিলেন?)

4. Who did you first meet involved with the project? This could be an DAE, NGO or business (প্রকল্পের সাথে জড়িত আপনি প্রথম কার সাথে দেখা করেছেন?) এটি কোনও এনজিও বা ব্যবসা হতে পারে

Their name (তাদের নাম): _____ Organization (সংস্থা): _____

Title (পদবী): _____

5. Did you already own equipment before meeting this person? Y or NO (এই ব্যক্তির সাথে দেখা করার আগে আপনি কি ইতিমধ্যে যন্ত্রপাতিগুলির মালিক ছিলেন?) (হ্যাঁ) অথবা (না)

6. If yes, what did you have? (যদি হ্যাঁ হয়, আপনার কি ছিল?) _____

7. What year did you buy it? (আপনি কোন বছর এটি কিনেছিলেন?) _____

8. Was your equipment for your (tick) যন্ত্রপাতিগুলি আপনি কোন জমির জন্য ব্যবহার করেছেন? (টিক দিন)

_____ (1) own land only (শুধুমাত্র নিজের জমি)

_____ (2) yourself and other farmers (আপনার নিজের এবং অন্যান্য কৃষকের)

_____ (3) other farmers only (শুধুমাত্র অন্য কৃষকের জন্য)

9. If you worked for other farmers, about how many each season? আপনি যদি অন্য কৃষকদের জন্য কাজ করেন, প্রতি মৌসুমে কতটি? _____

10. What year did you start selling services to others? আপনি কোন বছর থেকে অন্যের কাছে পরিষেবা বিক্রি শুরু করেছিলেন? _____

11. What kinds of equipment do you have now and when did you buy them? Record answers below. আপনার কাছে এখন কী কী ধরনের সরঞ্জাম রয়েছে এবং আপনি কখন এগুলি কিনেছিলেন? (নীচে উত্তর রেকর্ড/লিপিবদ্ধ করুন।)

11. A. Did you get a government subsidy for any of these? (আপনি কি এ যন্ত্রগুলোর কোনটির জন্য সরকারী ভর্তুকী পেয়েছেন?)

Please note in table (নিচের ছকে লিপিবদ্ধ করুন)।

Type (ধরন)	2 Wheel tractor (পাওয়ার টিলার)	PTOS (পাওয়ার টিলার চালিত সিডার)	Self-propelled Reaper (রিপার মেশিন)	Reaper attachment (পাওয়ার টিলারের সামনে সংযুক্ত রিপার)	LLP (সেচ যন্ত্র - মাটির উপরের পানি তোলা)	AFP (এক্সিয়াল ফ্লো পাম্প)	Other (অন্যান্য)
Year purchased ক্রয়কৃত (বছর)							
1st piece (প্রথম পিচ)							
2nd piece (দ্বিতীয় পিচ)							
Subsidy machine (টিক)							

12. Did you purchase your first equipment or additional equipment because of your interaction with the project? Tick _____ (1) First Machine _____ (2) Additional _____ (3) NA

প্রকল্পের সাথে আপনার আলাপচারিতার কারণে আপনি কি আপনার প্রথম সরঞ্জাম বা অতিরিক্ত সরঞ্জাম কিনেছিলেন? টিক দিন _____ (1) প্রথম মেশিন _____ (2) অতিরিক্ত _____ (3) প্রযোজ্য নহে

13. Are you still working as an LSP? Y or N If yes, continue to 16

আপনি কি এখনও এলএসপি হিসাবে কাজ করছেন? হ্যাঁ বা না, যদি হ্যাঁ হয়, তবে ১৬ নম্বর প্রশ্নে চলে যান

14. If no, what year did you stop? _____

যদি না হয়, তবে আপনি কোন বছর বন্ধ করলেন?

15. Why did you stop working as an LSP? Use tick

আপনি এলএসপি হিসাবে কাজ করা কেন বন্ধ করলেন? টিক ব্যবহার করুন

___ (1) No farmer demand (কৃষকের চাহিদা নেই); ___ (2) Not enough time (পর্যাপ্ত সময়ের অভাব)

___ (3) Not profitable enough (যথেষ্ট লাভজনক নয়); ___ (4) Other (অন্যান্য) উল্লেখ করুন

16. Do you operate all of your machines? Use tick: ___ (1) yourself or ___ (2) do you have employees? আপনি কি আপনার সমস্ত মেশিন পরিচালনা করেন? (টিক দিন) ___ (১) নিজে নিজে অথবা ___ (২) আপনার কি কর্মচারী আছে?

17. How many employees do you have? আপনার কতজন কর্মচারী আছেন? _____

Project Support for LSPs

18. How did the project support you to become an LSP?

প্রকল্পটি কীভাবে আপনাকে একজন এলএসপিতে পরিণত করতে সহায়তা করেছিল?

19. Were you provided with any kind of training? What kind of training Which of these trainings was most important to you? Record in the table

আপনি কি কোনও ধরনের প্রশিক্ষণ পেয়েছিলেন? কোন ধরনের প্রশিক্ষণ আপনার পক্ষে সবচেয়ে গুরুত্বপূর্ণ ছিল? নিচের টেবিলে লিপিবদ্ধ করুন।

Type of training (প্রশিক্ষণের ধরণ)	Rank importance (1 to 3 with 1 as most valuable) (গুরুত্বের ক্রম 1 থেকে 3, যেখানে ১ সবচেয়ে মূল্যবান)

20. Did you learn about how to increase demand for your services? Y or N

কীভাবে আপনার পরিষেবার চাহিদা বাড়ানো যায়, সে বিষয়ে আপনি কি শিখেছেন? হ্যাঁ বা না,

21. If yes, what did you learn? আপনি কি কি শিখেছেন/শিখলেন?

22. Has the demand for your services increased? Y / N By how much?

আপনার পরিষেবার চাহিদা কি বৃদ্ধি পেয়েছে? হ্যাঁ / না যদি বৃদ্ধি পেয়ে থাকে তবে বক পরিমাণ?

23. Was there any media advertisement on improved agricultural technology that increased the demand for your services? Y or N

If yes, please describe the topic (উন্নত কৃষি প্রযুক্তির উপর এমন কোনও মিডিয়া বিজ্ঞাপন ছিল যা আপনার পরিষেবার চাহিদা বাড়িয়েছিল? হ্যাঁ বা না; বিষয়টি বর্ণনা করুন)

Project Effect on the Area (অঞ্চলটিতে প্রকল্পের প্রভাব)

24. What other kinds of equipment were newly introduced into your union as a result of the project?

(প্রকল্পের ফলস্বরূপ আপনার ইউনিয়নে অন্য কোন কোন উপকরণ নতুনভাবে চালু হয়েছে?)

25. Which kinds of equipment have increased in availability as a result of the project?

(প্রকল্পের ফলস্বরূপ, কোন ধরনের সরঞ্জামের প্রাপ্যতা বৃদ্ধি পেয়েছে?)

26. Is there any demand for machinery not available in the area? Yes or No

আপনার এলাকায় যেসব যন্ত্রপাতি নেই, সেগুলোর কি কোন চাহিদা আছে? হ্যাঁ বা না

27. If yes, What kind and for what crop? Record in the table

(কোন ধরনের এবং কোন ফসল এবং মৌসুমের জন্য? নিচের টেবিলে লিপিবদ্ধ করুন।)

Machinery (যন্ত্রপাতি)	Crops (ফসল)

28. Did you learn about any new agriculture practices? Y or N

If yes, what are these and ask follow-up questions:

আপনি কোনও নতুন কৃষিকাজ/ কৃষি অনুশীলন সম্পর্কে শিখেছেন? এগুলি কী এবং ফলো-আপ / নিচের প্রশ্নগুলো জিজ্ঞাসা করুন :

Specific practice (নির্দিষ্ট কৃষিকাজ/ কৃষি অনুশীলন)	Do you promote this practice with other farmers or your customers? Y or N (আপনি কি এই অনুশীলন গুলো অন্যান্য কৃষক বা আপনার গ্রাহকদের সাথে প্রচার করেন?) হ্যাঁ বা না	If no, why not? // (যদি না হয় তবে কেন? ১)	Have farmers begun to adopt this practice? Y or N (কৃষকরা কি এই প্রথা অবলম্বন করতে শুরু করেছেন? হ্যাঁ বা না)	Has this practice increased the demand for your services? Y or N (এই অনুশীলনটি কি আপনার পরিষেবাগুলির চাহিদা বাড়িয়েছে? হ্যাঁ বা না)

I/ Code: (কোড

- That crop does not grow well in this area.(এই ফসল ভাল হয় না এই এলাকায়।)
- There are other more profitable crops. (আরও লাভজনক ফসল রয়েছে)
- That practice is too much work. (সেই অনুশীলনটি খুব বেশি কাজ করতে হয়)

d. The benefit of implement that practice is not worth the effort or cost. (এই অনুশীলনটি বাস্তবায়নের সুবিধা, প্রচেষ্টা বা ব্যয়ের পক্ষে সামঞ্জস্য নয়।)

e. Other: (অন্যান্য) _____

29. Did you or do you work with any farmer groups or water user associations? Y or N

(আপনি কি কোনও কৃষক দল বা জল ব্যবহারকারী সমিতিগুলির সাথে কাজ করেছিলেন বা করেন? হ্যাঁ বা না)

If yes, what is the name of the group? _____ (গ্রুপটির নাম কী?)

30. Were you connected to this or these groups by the project?

(আপনি কি প্রকল্পের দ্বারা এই সমিতি বা এই সমিতিগুলির সাথে সংযুক্ত ছিলেন?)

Access to Finance

31. How do you get finance for buying your machines? [Family, MFI, bank, dealer, other]

(আপনি আপনার মেশিন কেনার জন্য অর্থ কীভাবে পান? [পরিবার, এমএফআই, ব্যাংক, ব্যবসায়ী, অন্যান্য])

32. Did the project help you to access finance for equipment purchase? Yes / No.

প্রকল্পটি কি আপনাকে সরঞ্জাম ক্রয়ের জন্য অর্থ পেতে/অ্যাক্সেস করতে সহায়তা করেছিল? হ্যাঁ বা না)

33. If yes, what did they do? (তারা কি করেছিল?) _____

34. Are you a member of any kind of LSP Network (LSPN)? Yes / No.

(আপনি কি কোনও ধরনের এলএসপি নেটওয়ার্ক (এলএসপিএন) এর সদস্য? হ্যাঁ বা না.)

35. If yes, what is the name of the Network? _____

(যদি হ্যাঁ হয়, তবে নেটওয়ার্কটির নাম কী?)

36. Does the Network have LSPs from the whole upazila? Yes / No

(এই নেটওয়ার্কে পুরো উপজেলা থেকে কী এলএসপি রয়েছে? হ্যাঁ বা না)

37. How many members are there? _____

(সেখানে কতজন সদস্য আছে?)

Equipment and Business Challenges (সরঞ্জাম এবং ব্যবসায়িক চ্যালেঞ্জগুলি)

38. What is your busiest season? (আপনার ব্যস্ততম মৌসুম কোনটি?)

_____ Boro(বোরো) _____ Rabi(রবি) _____ Aman(আমন) _____ Other (অন্যান্য) _____

39. How many customers did you serve during that season? _____

(আপনি এই মৌসুমে কতজন গ্রাহককে পরিসেবা দিয়েছেন?)

40. How many different villages are you able to serve? _____

(আপনি কতগুলি বিভিন্ন গ্রামে পরিসেবা দিতে সক্ষম?)

41. How many different unions? (কতগুলি বিভিন্ন ইউনিয়নে?) _____

42. How many upazilas? (কতগুলি উপজেলাতে?) _____

43. What are your three greatest challenges with your equipment? [Ask what they are and then ask the LSP to rank them in terms of importance with Number 1 being the most important.]

(আপনার সরঞ্জাম নিয়ে আপনার তিনটি বৃহত্তম চ্যালেঞ্জ কি? [তারা কী তা জিজ্ঞাসা করুন এবং তারপরে এলএসপিকে বলুন তাদেরকে গুরুত্বের সাথে র‍্যাঙ্ক করতে যেখানে ১ নম্বর সর্বাধিক গুরুত্বপূর্ণ হিসেবে])

- a. Finding a good mechanic Ranking: _____
(একটি ভাল মেকানিকের সন্ধান করা)
- b. Transporting equipment to more distant farmers Ranking: _____
(দূরের কৃষকদের কাছে সরঞ্জাম পরিবহন)
- c. Getting spare parts Ranking: _____
(খুচরা যন্ত্রাংশ প্রাপ্তি)
- d. Knowledge on regular maintenance Ranking: _____
(নিয়মিত রক্ষণাবেক্ষণ সম্পর্কে জ্ঞান)
- e. Finding qualified employees to run machinery Ranking: _____
(যন্ত্রপাতি চালানোর জন্য যোগ্য কর্মীদের সন্ধান করা)
- f. Other/Specify: _____ Ranking: _____
(অন্যান্য/ নির্দিষ্ট করুন)
- g. Other/Specify: _____ Ranking: _____
(অন্যান্য/ নির্দিষ্ট করুন)

44. What are the three greatest challenges you are having with your business?

[Ask what they are and then ask the LSP to rank them in terms of importance with Number 1 being the most important.] (আপনার ব্যবসার প্রধান তিনটি চ্যালেঞ্জ কী কী?) তারা কী তা জিজ্ঞাসা করুন এবং তারপরে এলএসপিকে বলুন তাদেরকে গুরুত্বের সাথে র‍্যাঙ্ক করতে যেখানে ১ নম্বর সর্বাধিক গুরুত্বপূর্ণ হিসেবে)

- | | Rank |
|--|-------|
| a. Keeping track of your customers
(গ্রাহকদের তথ্য রাখা) | _____ |
| b. Getting people to pay on time
(সময়মতো টাকা পরিশোধ করার মানুষ পাওয়া) | _____ |
| c. Everyone needs you at the same time
(প্রত্যেকের একই সাথে আপনার প্রয়োজন) | _____ |
| d. Other/Specify: _____
(অন্যান্য/ নির্দিষ্ট করুন) | _____ |
| e. Other/Specify: _____
(অন্যান্য/ নির্দিষ্ট করুন) | _____ |

45. Do you have sufficient customers, or do you need more, or do you have too much demand? (আপনার কি পর্যাপ্ত গ্রাহক রয়েছে, বা আপনার কি আরও বেশি প্রয়োজন, বা আপনার খুব চাহিদা রয়েছে?) Tick (টিক দিন)

___(1) Sufficient (পর্যাপ্ত)___(2) Need More (আরও বেশি প্রয়োজন) ___(3) too much demand (খুব বেশি চাহিদা)

46. If you need more, what do you think can be done to increase farmer demand for machinery services? (আপনার যদি আরও বেশি প্রয়োজন হয়, তবে যন্ত্রপাতি সংক্রান্ত পরিষেবার জন্য কৃষকদের চাহিদা বাড়াতে কী করা যেতে পারে বলে আপনার মনে হয়?)

47. If you have more customers than you can serve, do you refer these farmers to other LSPs?

Y or N (আপনি যে পরিষেবা দিতে পারেন তার চেয়ে বেশি গ্রাহক থাকলে আপনি কি এই কৃষকদের অন্যান্য এলএসপি'র কাছে রেফার/ অর্পণ করবেন?) হ্যাঁ বা না)

48. Are there new LSPs establishing themselves to meet this demand? Yes / No (এই চাহিদা মেটাতে কি নতুন নতুন এলএসপি'রা নিজেদের প্রতিষ্ঠা করছে? হ্যাঁ বা না)

If no, why not? যদি না হয়, তবে কেন নয়? _____

Gender (লিঙ্গ)

49. Do you have any women customers? Y or N If yes, how many? _____

(আপনার কি কোনও নারী গ্রাহক আছে? হ্যাঁ বা না) যদি হ্যাঁ হয়, তবে কতজন?

If no, are you aware of any machinery services that women are interested in? (যদি না হয়, তবে আপনি কি এমন কোনও যন্ত্রপাতির ব্যবহার সম্পর্কে সচেতন/জানেন যাহাতে মহিলাদের আগ্রহ আছে?) Yes(হ্যাঁ)/ No(না)

50. What kind of service are they usually looking for and for what crop? _____

(তারা সাধারণত কোন ধরনের পরিষেবা খুঁজেন এবং কোন ফসলের জন্য?)

51. Do they ever ask about any machinery that is not available in the area? Y or N

(তারা কি কখনও এলাকায় পাওয়া যায় না এমন কোনও যন্ত্রপাতি সম্পর্কে জিজ্ঞাসা করে?) হ্যাঁ বা না)

52. What kind and for what crop? (কোন ধরনের এবং কোন ফসলের জন্য?) _____

Specific Irrigation Questions (নির্দিষ্ট সেচ সংক্রান্ত প্রশ্ন)

53. What are the main types of irrigation in this area and for what percentage of irrigated land?

(এই অঞ্চলে প্রধান প্রধান সেচ কি এবং শতকরা কত শতাংশ সেচকৃত জমি?)

Irrigation type (সেচের ধরন)	What are the major sources of surface water? (ভূ-পৃষ্ঠস্থ পানির প্রধান উৎসগুলো কী কী?) Large canals (বড় খাল), small canals (ছোট খাল), ponds (পুকুর) other (অন্যান্য)	% of irrigated land (% সেচকৃত জমি)	Primary crop (প্রধান প্রধান ফসল)	Is use increasing or decreasing? (ব্যবহার কি বাড়ছে নাকি কমছে?)	Why? (কেন?)
Deep tubewell					
Shallow tube well					

Irrigation type (সেচের ধরন)	What are the major sources of surface water? (ভূ-পৃষ্ঠস্থ পানির প্রধান উৎসগুলো কী কী?) Large canals (বড় খাল), small canals (ছোট খাল), ponds (পুকুর) other (অন্যান্য)	% of irrigated land (% সেচকৃত জমি)	Primary crop (প্রধান প্রধান ফসল)	Is use increasing or decreasing? (ব্যবহার কি বাড়ছে নাকি কমছে?)	Why? (কেন?)
LLP/Surface water (সেচ যন্ত্র - মাটির উপরের পানি তোলা)					
AFP/Surface water (এক্সিয়াল ফ্লো পাম্প)					
Other:					

53 b. What are the most important sources of surface water in your area? What percentage for each (আপনার অঞ্চলে ভূ-পৃষ্ঠস্থ পানির সবচেয়ে গুরুত্বপূর্ণ উৎসগুলো কী কী? প্রতিটি জন্য কত শতাংশ)

Source (উৎস)	Percentage of Surface water use (ভূ-পৃষ্ঠস্থ পানির কত শতাংশ)	What is the preferred pump for this source? (এই পানির উৎসের জন্য কোন ধরনের সেচ পাম্প উপযুক্ত) AFP, LLP or other	Why? (কেন?)
Large canals (বড় খাল)			
Small canals (ছোট খাল)			
Ponds (পুকুর)			
Other (অন্যান্য)			

54. Is anyone in your area using Axial Flow Pumps for irrigation? (আপনার অঞ্চলের কেউ কি সেচ দেওয়ার জন্য এক্সিয়াল ফ্লো পাম্প/জাম্বো পাম্প ব্যবহার করছেন?)

Y(হ্যাঁ) / N(না)

If yes, what do people think of them? How do they compare AFP with LLP? (যদি হ্যাঁ, লোকেরা তাদের সম্পর্কে কী মনে করে? তারা কীভাবে এক্সিয়াল ফ্লো পাম্পটিকে এলএলপি'র সাথে তুলনা করে?)

55. Has the area of production of any crop increased in your working area due to the availability of surface water irrigation? (ভূ-পৃষ্ঠস্থ জল সেচের সহজলভ্যতার কারণে কি আপনার কর্মক্ষেত্রে কোনও ফসলের উৎপাদন অঞ্চল/ক্ষেত্র বৃদ্ধি পেয়েছে?)

Yes (হ্যাঁ) / No (না)

If so, what crop? (যদি তাই হয়, তবে কোন ফসল?) _____

56. What are the major problems with the existing irrigation technology presently available in your area? (আপনার অঞ্চলে বর্তমানে বিদ্যমান সেচ প্রযুক্তির প্রধান প্রধান সমস্যাগুলি কী?)

57. Are you aware of any irrigation machines that you think would be more effective but are not available in your area? If so, what are they? (আপনি কি এমন কোনও সেচ মেশিন সম্পর্কে জানেন যা আরও কার্যকর হবে তবে আপনার অঞ্চলে নেই? যদি তাই হয়, তবে সেগুলো কি কি?)

58. Are there other machinery needs in your area not related to irrigation that you would like to procure? If so, what are they? (আপনার অঞ্চলে সেচ সম্পর্কিত নয় এমন অন্যান্য যন্ত্রপাতির কি প্রয়োজনীয়তা আছে যা আপনি সংগ্রহ করতে চান? যদি তাই হয়, তবে সেগুলো কি কি?)

Farmer KII Questions

কৃষক এর কেআইআই প্রশ্নপত্র

Record basic administrative information (মৌলিক প্রশাসনিক তথ্য রেকর্ড করুন)

Farmer Name (কৃষকের নাম): Male or Female? Land holdings from Farmer list (decimals):

District (জেলা):	Upazila (উপজেলা):
Union (ইউনিয়ন):	Village (গ্রাম):
Phone # (ফোন নম্বর):	Date (তারিখ):
Facilitator (সাক্ষাৎকার গ্রহণকারী):	

Begin with the Introduction (ভূমিকা দিয়ে শুরু করুন)

Hello, my name is _____ and I understand that my colleague Saiful Islam explained why I am calling (হ্যালো, আমার নাম _____ এবং আমার সহকর্মী সাইফুল ইসলাম আমার সাথে কথা বলে সব ব্যাখ্যা করেছেন কেন আমি কল করছি)

We understand that you were involved with the CSISA-MI project whose goal was to increase the availability of _____ and farmer demand for agriculture machinery (আমরা জানি যে আপনি সিএসআইএসএ-এমআই প্রকল্পের সাথে জড়িত ছিলেন যার লক্ষ্য ছিল কৃষি যন্ত্রপাতির জন্য কৃষকের চাহিদা বৃদ্ধি করা।)

We would like to get your perspective on that project and issues related to increasing farmer access to and demand for agriculture machinery (আমরা এই প্রকল্প এবং কৃষি যন্ত্রপাতির চাহিদা বৃদ্ধি সম্পর্কিত বিষয়ে আপনার দৃষ্টিভঙ্গি জানতে চাই।)

Read the introduction and confidentiality description, and obtain the interviewee's consent. Remind them at the interview will take at least 1.5 hours.

I. Are you familiar with a project that was promoting the use of Power tiller Operated Seeders, self-propelled reapers, reaper attachments, Axial Flow Pumps (AFPs) and other equipment? It was called the CSISA- MI project but it worked through local service providers, machinery companies and dealers. Y or N?

যেই প্রজেক্ট থেকে পাওয়ার ট্রিলার চালিত সিডার, স্ব-চালিত রিপারস, সংযুক্ত যন্ত্র, এক্সিয়াল ফ্লো পাম্প (এএফএস) এবং অন্যান্য যন্ত্রপাতির ব্যবহার নিয়ে প্রমোট করা হয় আপনি কি সে প্রকল্পের সাথে পরিচিত? এটি সিএসআইএসএ-এমআই প্রকল্প নামে পরিচিত কিন্তু এটি স্থানীয় সেবাদানকারী (এলএসপি), বিভিন্ন যন্ত্রপাতি সংস্থা এবং ডিলারদের মাধ্যমে কাজ করে। হ্যাঁ অথবা না?

2. How did you become aware of the project? If they mention a Farmer Field Day, demonstration, or training ask what year that took place and who organized the event.

আপনি কিভাবে এই প্রকল্প সম্পর্কে জানতে পেরেছিলেন? যদি তারা কৃষকের মাঠ দিবস, প্রদর্শনি অথবা প্রশিক্ষণ এর কথা উল্লেখ করে তবে জিজ্ঞাসা করুন সেটা কোন সালে হয়েছিলো এবং কারা এই অনুষ্ঠান আয়োজন করেছিলো।

3. Were you invited to any training events about agriculture machinery or improved cropping practices? Yes/ No

আপনি কি কখনো কৃষি যন্ত্রপাতি বা উন্নত ফসলের চর্চা সম্পর্কিত প্রশিক্ষণের অনুষ্ঠানের জন্য নিমন্ত্রণ পেয়েছিলেন? হ্যা/ না

- If yes, what was the type of event and subject? যদি হ্যা হয়, কি ধরনের অনুষ্ঠান ছিলো এবং অনুষ্ঠানের বিষয়বস্তু কি ছিলো?
- What year did it take place? কোন বছর এটা হয়েছিলো?
- Did you do anything new as a result of the training (If “yes”, ask what?)? For example, start using any new machinery or apply a new cropping practice. আপনি এই ট্রেনিং এর ফলস্বরূপ নতুন কিছু করেছিলেন (যদি হ্যা হয়, জিজ্ঞেস করুন কি করেছিলেন?)? উদাহরণস্বরূপ, নতুন যন্ত্রপাতির ব্যবহার শুরু করা অথবা নতুন চাষাবাদের চর্চা প্রয়োগ করা।

Type of training event ¹ প্রশিক্ষণ অনুষ্ঠানের ধরণ	Training subject প্রশিক্ষণের বিষয়	Year সাল	Did you do anything new as a result of this event? (If yes, what?) এই অনুষ্ঠানের ফলস্বরূপ আপনি কি নতুন কিছু করেছিলেন? (যদি হ্যা হয়, কি করেছিলেন?)

¹/A. Farmer field day B. Formal training C. Demonstration C. Other

ক। কৃষকের মাঠ দিবস খ। অনুষ্ঠানিক প্রশিক্ষণ গ। প্রদর্শনী ঘ। অন্যান্য

4. Are you a member of any farmer group, MFI, water association, or other group? (আপনি কি কোন কৃষক দল, ক্ষুদ্রঋণ সংস্থা, পানি (সেচ) সমিতি অথবা অন্যান্য দলের সদস্য?)

Name of group দলের নাম	Group type (water, savings, etc.) গ্রুপের ধরণ (পানি/ সেচ, সঞ্চয় ইত্যাদি)	How many people are in this group? এই দলে কতজন সদস্য ছিলো?		From how many villages? কতগুলো গ্রাম থেকে?
		Male পুরুষ	Female মহিলা	

5. Were either of these groups invited to the events mentioned in question 3? Y or N

৩ নম্বর প্রশ্নে উল্লেখ করা অনুষ্ঠানে এই দলগুলোর কি আমন্ত্রিত ছিলো?

6. If so, which ones? যদি তাই হয়, কোনটাকে?

7. Do you own any agricultural machinery? Yes/ No আপনি কি কোন কৃষি যন্ত্রপাতির মালিক? হ্যা/ না

8. If yes, then what kind of machinery do you own? [Use code from the list below] যদি হ্যাঁ হয়, তাহলে আপনি কোন ধরনের যন্ত্রপাতির মালিক? [নিচের লিস্ট এর কোডগুলো ব্যবহার করুন]

9. What crop or crops do you use this machine for and when did you buy it? কোন ধরনের শস্য বা শস্যগুলোর জন্য এই যন্ত্রপাতিগুলো ব্যবহার করেন এবং আপনি কখন এটি কিনেছিলেন?

Machine যন্ত্র	Crops শস্য	What year did you first buy this kind of machine? কোন সালে আপনি প্রথম এই ধরনের যন্ত্র কিনেছিলেন?

Machinery Codes: for questions 8 & 20 & 21

যন্ত্রপাতির কোডঃ ৮, ২০ এবং ২১ নম্বর প্রশ্নের জন্য

1. Two-wheeled tractors	পাওয়ার টিলার
2. 18 tine tilling attachment	আঠারো ফলার টিলার
3. PTOS (48 tines)	পাওয়ার টিলার চালিত সিডার
4. Low lift centrifugal pump	সেচ যন্ত্র - মাটির উপরের পানি তোলা (খাল/ডোবা/নদী/বিলের পানি)
5. AFP	এক্সিয়াল ফ্লো পাম্প/জাম্বো পাম্প
6. Other irrigation device	অন্যান্য সেচ যন্ত্র
7. Bed planters	বেড প্লান্টার
8. Rice transplanter	ধানের চারা রোপন যন্ত্র
9. Self-Propelled Multi-crop reaper	রিপার মেশিন
10. Reaper attachment	পাওয়ার টিলারের সামনে সংযুক্ত রিপার
11. Combine harvester	কম্বাইন হার্ভেস্টার
12. Other Equipment	অন্যান্য যন্ত্র:

10. Have you learned about or used any new agriculture machinery over the last 4 years? Y or N গত চার বছরে আপনি নতুন কোন যন্ত্রপাতি সম্পর্কে শিখেছিলেন বা ব্যবহার করেছিলেন? হ্যাঁ/ না

11. If yes, what machines? List the machines and then ask the following questions:

যদি হ্যাঁ হয়, কোন যন্ত্র? যন্ত্রের তালিকা করুন এবং নিচের প্রশ্নগুলো জিজ্ঞাস করুনঃ

Machine List all machines he/she has learned about যন্ত্র	Have you ever used <u>this</u> machine for your land? Y or N আপনি আপনার জমিতে কখনো এই যন্ত্র ব্যবহার করেছিলেন?	Did you use a service provider who owns the machine? Y or N যন্ত্রাদি আছে এমন কোন সেবা দানকারিকে কি আপনি ব্যবহার করেছিলেন?	How many seasons have you used this machine or service? কতগুলো মৌসুমে আপনি এই যন্ত্রাদি বা সেবা ব্যবহার করেছেন?	Do you continue to use this service? Y or N আপনি কি এই সেবা এখনো নিতেছেন?	Why or why not? কেন অথবা কেন না?
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সে যতগুলো যন্ত্র সম্পর্কে শিখেছিলো তার সবগুলোর তালিকা করুন	হ্যা/ না	হ্যা/ না		হ্যা/ না	

12. Have you met any new Machinery service providers, mechanics, or other people involved in agriculture machinery over the last few years? (since 2016) Y or N আপনি গত কয়েক বছরের মধ্যে (২০১৬ থেকে) নতুন কোন যন্ত্রাদি সেবা প্রদানকারীদের, যন্ত্রাদি অথবা অন্যান্য মানুষ যারা কৃষি যন্ত্রাদির সাথে যুক্ত এরকম কারো সাথে সাক্ষাত করেছিলেন? হ্যা/ না

13. If yes, who specifically? A mechanic, LSP etc.

যদি হ্যা হয়, বিশেষত কার সাথে? একজন কারিগর (মেকানিক), এলএসপি ইত্যাদি।

14. Do you feel like the number of agriculture machine mechanics, spare parts shops, dealers/retailers/commission agents, or machine operators (LSPs) have increased in your area? Y or N

আপনি কি মনে করেন যে, আপনার এলাকায় কৃষি যন্ত্রাদির কারিগর, খুচরা যন্ত্রাংশের দোকান, ডিলার/খুচরা বিক্রেতা/ কমিশন এজেন্ট অথবা মেশিন চালকের সংখ্যা বৃদ্ধি পেয়েছে? হ্যা/ না

15. If yes, which ones? যদি হ্যা হয়, কোনগুলো?

16. Do you feel like the quality of these services have improved? Y or N

আপনার কি মনে হয় যে এই ধরনের সেবার মান বৃদ্ধি পেয়েছে? হ্যা/ না

17. If yes, which ones and how?

যদি হ্যা হয়, কোনগুলোর এবং কিভাবে?

18. Do you feel like there has been an increase in machine availability in your area? If yes, which machines? আপনি কি মনে করেন যে, আপনার এলাকায় এখন যন্ত্রাদির প্রাপ্যতা বৃদ্ধি পেয়েছে? যদি হ্যা হয়, কোন যন্ত্রাদিগুলো?

19. Do you pay anyone for providing any machinery services on your land? Y or N

আপনার জমিতে যন্ত্রাদি ব্যবহার এর জন্য আপনি কি কাউকে মূল্য পরিশোধ করেন? হ্যা/ না

20. If yes, what machine and for what crops? Ask the other questions in the table.

যদি হ্যা হয়, কি যন্ত্র এবং কোন শস্যের জন্য? টেবিলে উল্লিখিত প্রশ্নগুলো জিজ্ঞাসা করুন।

Machine যন্ত্রাদি Use code above উপরের কোডগুলো ব্যবহার করুন	Crops শস্য Use code below নিচের কোডগুলো ব্যবহার করুন	What year did this service become available in your area? এই ধরনের সেবা আপ্যান এলাকায় কবে থেকে সহজলভ্য হয়েছে?	Is the demand for this service increasing or decreasing? এই ধরনের পরিসেবার চাহিদা বৃদ্ধি পাইতেছে অথবা কমে যাচ্ছে?	Why? কেনো?

Crop Code: 1) rice 2) wheat 3) maize 4) lentils/dal 5) potatoes 6) jute 7) onion 8) coriander 9) other _____ write in _____

শস্য কোডঃ ১) ধান ২) গম ৩) ভুট্টা ৪) মসুর / ডাল ৫) আলু ৬) পাট ৭) পেঁয়াজ ৮) ধনিয়া ৯) অন্যান্য
_____ লিখুন

21. Are there machinery services available in your area that you do not use? List them starting with the most common.

আপনি ব্যবহার করেন না এমন যন্ত্রাদি পরিষেবা আপনার এলাকায় আছে? সবচেয়ে প্রচলিতগুলো থেকে তালিকা করা শুরু করুন।

Equipment type (use codes above সরঞ্জামের ধরণ (উপরে উল্লিখিত কোডগুলো ব্যবহার করুন))	Why do you not use this machine? Use code below আপনি কেন এই যন্ত্রাদি ব্যবহার করেন না (নিচের উল্লিখিত লিস্ট থেকে কোড ব্যবহার করুন)	Is there an increasing or decreasing demand for this equipment in your area? আপনার এলাকায় এই ধরনের সরঞ্জামের চাহিদা বৃদ্ধি পাইতেছে অথবা কমে যাচ্ছে?	Why? কেনো?
1.			
2.			
3.			
4.			

Code: 1) prefers his present practice; 2) LSP is too expensive; 3) LSP is unreliable; 4) LSP is too busy or unavailable; 5) the equipment is unreliable; 6) Other: _____

কোডঃ ১) বর্তমান চর্চাকেই পছন্দ করে; ২) এলএসপি খুব ব্যয়সাধ্য; ৩) এলএসপি অনির্ভরযোগ্য; ৪) এলএসপি অনেক ব্যস্ত থাকে এবং
অপ্রাপ্য ৫) এই সরঞ্জামগুলো অনির্ভরযোগ্য ৬) অন্যান্যঃ

22. Is there any agriculture machinery not available in your area that you would like to have access to? Y or No আপনার এলাকায় পাওয়া যায় না এমন কোন ধরনের যন্ত্রাদি আপনি কি ব্যবহার করতে ইচ্ছুক? হ্যাঁ/ না

23. What machine and for what crop?

কোন মেশিন এবং কোন শস্য?

Specific questions for PTOS, Self-Propelled Reapers, and reaper attachments if they own one of these machines or have experienced it through an LSP?

পাওয়ার টিলার চালিত সিডার (পিটিওএস), রিপার মেশিন, এবং পাওয়ার টিলারের সামনে সংযুক্ত রিপার এর জন্য নির্দিষ্ট প্রশ্ন; যদি তারা এসব যন্ত্রের মালিক হয়ে থাকে বা এলএসপি এর মাধ্যমে ব্যবহারের অভিজ্ঞ থাকে?

24. What do you think of the PTOS?

পাওয়ার টিলার চালিত সিডার (পিটিওএস) এর ব্যাপারে আপনি কি মনে করেন?

25. What do you think of the self-propelled reaper?

স্ব-চালিত রিপার মেশিন এর ব্যাপারে আপনি কি মনে করেন?

26. What do you think of the reaper attachment?

পাওয়ার টিলারের সামনে সংযুক্ত রিপার এর ব্যাপারে আপনি কি মনে করেন?

27. Please name your top three sources of information about agriculture machinery services. [Use code below.] কৃষি যন্ত্রাদি সেবা সম্পর্কিত তথ্য জানার জন্য আপনার যে উৎস ব্যবহার করেন এমন শীর্ষ তিনটির নাম বলেন। (নিচের কোডগুলো ব্যবহার করেন)

1. _____ 2. _____ 3. _____
১. _____ ২. _____ ৩. _____

[Code: 1. LSP, 2. Machinery dealer 3. Extension personnel, 4. Media, 5. Agri. Machinery fair, 6. Other (specify)]

কোডঃ ১) এলএসপি, ২) যন্ত্রাংশের ডিলার, ৩) সম্প্রসারণ কর্মী, ৪) প্রচার মাধ্যম ৫) কৃষি যন্ত্রাদির মেলা, ৬) অন্যান্য (উল্লেখ করুন)

Irrigation Questions

সেচ সম্পর্কিত প্রশ্ন

28. What are the primary sources of water for irrigation in your upazila and what percentage of irrigated land relies on this source?

আপনার উপজেলায় সেচের পানির প্রাথমিক উৎসগুলো কি কি এবং এই উৎসের উপর শতকরা কতটুকু সেচ সম্পন্ন জমি নির্ভরশীল?

_____ Deep tube wells _____ shallow tubewells _____ surface water _____ Other
_____ গভীর নলকূপ _____ অগভীর নলকূপ _____ উপরের লেভেলের পানি _____ অন্যান্য

29. Have you or do you know of anyone in your village or union who uses surface water for irrigation? Y or N

আপনার গ্রাম অথবা ইউনিয়নের মধ্যে আপনি নিজে বা আপনার পরিচিত কেউ কি মাটির উপরি ভাগের পানি সেচের জন্য ব্যবহার করেন? হ্যা/না

30. If yes, is it him/her or someone else? যদি হ্যা হয়, এটি কি সে নিজে অথবা অন্যকেউ?

31. If yes, for which crop? যদি হ্যা হয়, কোন শস্যের জন্য?

32. If yes, what kind of pump do they use?

যদি হ্যা হয়, তারা কোন ধরনের পাম্প ব্যবহার করে?

33. Have you or anyone in your village used an Axial Flow Pump? _____

আপনার এলাকায় আপনি অথবা আপনার পরিচিত কেউ কি জাম্বো পাম্প ব্যবহার করেছিলো? _____

34. Are there any AFPs in your village now? Y or N If yes, how many? _____

আপনার গ্রামে কি এখনো জাম্বো পাম্প আছে? হ্যা/ না যদি হ্যা হয়, কতগুলো? _____

35. What are they used for? Which crop and what season? _____

সেগুলো কি কাজে ব্যবহার হয়? কোন ধরনের শস্য এবং কোন মৌসুমে? _____

36. How many people in your village continue to use AFPs for irrigation?

আপনার গ্রামের কতজন মানুষ এখনো সেচের জন্য জাম্বো পাম্প ব্যবহার করছে?

37. For those who continue to use the AFP, why do they prefer the AFP over the LLP?

যারা এখনো জাম্বো পাম্প ব্যবহার করে, তারা পাওয়ার পাম্প (এলএলপি) এর বদলে কেনো জাম্বো পাম্প পছন্দ করে?

38. For those who stopped using, why did they stop?

যারা ব্যবহার করা বাদ দিয়েছে, তারা কেন বন্ধ করে দিয়েছে?

39. What is your level of education? আপনার শিক্ষাগত যোগ্যতা কি?

1. Cannot read/write লিখতে পড়তে বা লিখতে পারে না

2. Can read/write পড়তে বা লিখতে পারে

3. Primary প্রাথমিক

4. SSC/HSC এসএসসি/ এইচএসসি

5. Trade course/Diploma কারীগরী প্রশিক্ষণ/ ডিপ্লোমা

6. Higher education উচ্চতর শিক্ষা

7. Pass class 8

Do you have any questions for me or other thoughts you would like to share?

আপনার কি আমার কাছে কোন প্রশ্ন করার আছে অথবা অন্য কোন চিন্তাভাবনা যেগুলো আপনি শেয়ার করতে চান?

ANNEX 17: CSISA-MI EVALUATION INTERVIEW SCHEDULE

KII Type	Upazila	Farmer land in dec.	Date	Monowar	Ahid	Rashid	Saiful	Rasel	Notes
CSISA MI Leadership Team			11-Aug-20		X	X			
Jashore Team FGD			12-Aug-20		X	X			
Interview with Importer/Manufacturer			13-Aug-20		X	X			
Barishal Team FGD			16-Aug-20		X	X			
Faridpur Team FGD			17-Aug-20		X	X			
Importer/Manufacturer KII			16-Aug-20		X	X			
Importer/Manufacturer KII			17-Aug-20		X	X			
Dealer KII 1			18-Aug-20		X				
Mechanic KII 1			18-Aug-20			X			
Dealer KII 2			18-Aug-20			X			
Dealer KII 3			18-Aug-20		X				
Dealer KII 4			19-Aug-20		X				
Dealer KII 5			19-Aug-20			X			
Dealer KII 6			19-Aug-20		X				
Mechanic KII 2	Manirampur		20-Aug-20		X				
Mechanic KII 3	Srepur		23-Aug-20			X			
Mechanic KII 4	Nagorkanda		23-Aug-20		X				
Mechanic KII 5	Galachipa		23-Aug-20			X			
Mechanic KII 6	Mujibnagor		23-Aug-20		X				
Mechanic KII 7	Baliakandi		24-Aug-20			X			
Dealer KII 7	Jashore		24-Aug-20		X				
LSP interview 1	Wazirpur		24-Aug-20				X		
LSP interview 2	Wazirpur		24-Aug-20					X	Phone was off
SPS KII 1	Wazirpur		24-Aug-20		X				
SPS KII 2	Galachipa		24-Aug-20			X			

KII Type	Upazila	Farmer land in dec.	Date	Monowar	Ahid	Rashid	Saiful	Rasel	Notes
LSP interview 3	Nagorkanda		24-Aug-20					X	
LSP interview 4	Nagorkanda		24-Aug-20				X		
LSP interview 5	Nagorkanda		25-Aug-20		X				
LSP interview 6	Baliakandi 1		25-Aug-20			X			
LSP interview 7	Baliakandi 2		25-Aug-20				X		
LSP interview 8	Nagorkanda		25-Aug-20					X	
LSP interview 9	Nagorkanda		25-Aug-20		X				
LSP interview 10	Nagorkanda		25-Aug-20			X			
LSP interview 11	Nagorkanda		25-Aug-20					X	
SPS KII 3	Baliakandi		26-Aug-20		X				
SPS KII 4	Nagorkanda		26-Aug-20			X			
LSP interview 12	Baliakandi 3		26-Aug-20				X		
SPS KII 5	Sreepur 1		26-Aug-20					X	
SPS KII 6	Mujibnagor		26-Aug-20		X				
SPS KII 7	Monirumpur		26-Aug-20			X			
LSP interview 13	Wazirpur		26-Aug-20					x	
LSP interview 14	Baliakandi 4		27-Aug-20		X				
LSP interview 15	Sreepur 2		27-Aug-20			X			
LSP interview 16	Baliakandi 5		27-Aug-20				X		
LSP interview 17	Baliakandi 6		27-Aug-20					X	
LSP interview 18	Sreepur 3		27-Aug-20		X				Interviewee was sick and could not talk
LSP interview 19	Sreepur 3		27-Aug-20		X				
LSP interview 20	Baliakandi 7		27-Aug-20			X			
LSP interview 21	Sreepur 4		27-Aug-20					x	Number switched off
LSP interview 22	Sreepur		29-Aug-20		X				
LSP interview 23	Mujibnagor		29-Aug-20			X			
LSP interview 24	Mujibnagor		29-Aug-20				X		Called several times but didn't receive the call.
LSP interview 25	Sreepur		29-Aug-20					X	
LSP interview 26	Sreepur		29-Aug-20		X				
LSP interview 27	Sreepur		29-Aug-20			X			
LSP interview 28	Mujibnagor		29-Aug-20				X		
LSP interview 29	Mujibnagor		29-Aug-20					X	
LSP interview 30	Mujibnagor		29-Aug-20				X		

KII Type	Upazila	Farmer land in dec.	Date	Monowar	Ahid	Rashid	Saiful	Rasel	Notes
LSP interview 31	Galachipa		30-Aug-20		X				
LSP interview 32	Galachipa		30-Aug-20			X			
LSP interview 33	Galachipa		30-Aug-20				X		
LSP interview 34	Galachipa		30-Aug-20					X	
LSP interview 35	Mujibnagor		30-Aug-20		X				
LSP interview 36	Mujibnagor		30-Aug-20			X			
LSP interview 37	Galachipa		30-Aug-20					X	
Farmer KII 1	Wazirpur	160	31-Aug-20		X				
Farmer KII 2	Wazirpur	30	31-Aug-20			X			
Farmer KII 3	Wazirpur	200	31-Aug-20				X		
Farmer KII 4	Galachipa	300	31-Aug-20					X	
Farmer KII 5	Wazirpur	20	31-Aug-20		X				Could not be reached. Last call at 9:18 pm
Farmer KII 6	Galachipa	100	31-Aug-20			X			
Farmer KII 7	Galachipa	620	31-Aug-20					X	busy with machine repair. Last call at 10.45 pm.
Farmer KII 8	Galachipa	200	Sept 1		X				Called 3 times before responding.
Farmer KII 9	Galachipa	300	Sept 1			X			
Farmer KII 10	Galachipa	600	Sept 1				X		
Farmer KII 11	Nagarkanda	78	Sept 1					X	
Farmer KII 12	Nagarkanda	104	Sept 1		X				Mr. Baizid is driving car in Dhaka and not able to provide information about the project
Farmer KII 13	Nagarkanda	230	Sept 1			X			
Farmer KII 14	Nagarkanda	78	Sept 1		X				
Farmer KII 15	Nagarkanda	260	Sept 1					X	
Farmer KII 16	Manirampur	168	Sept 2		X				
Farmer KII 17	Sreepur	33	Sept 2	X					
Farmer KII 18	Manirampur	64	Sept 2			X			
Farmer KII 19	Sreepur	100	Sept 2				X		
Farmer KII 20	Sreepur	60	Sept 2					X	
Farmer KII 21	Wazirpur	50	Sept 2	X					
Farmer KII 22	Manirampur	40000	Sept 2		X				
Farmer KII 23	Sreepur	80	Sept 2			X			
Farmer KII 24	Sreepur	46	Sept 2				X		

KII Type	Upazila	Farmer land in dec.	Date	Monowar	Ahid	Rashid	Saiful	Rasel	Notes
Farmer KII 25	Manirampur	84	Sept 2					X	
Farmer KII 26	Sreepur	40	Sept 2				X		
Farmer KII 27	Baliakandi	44	3-Sep-20	X					
Farmer KII 28	Baliakandi	110	3-Sep-20		X				
Farmer KII 29	Mujibnagor	17	3-Sep-20			X			
Farmer KII 30	Baliakandi	110	3-Sep-20		X				
Farmer KII 31	Mujibnagor	66	3-Sep-20					X	
Farmer KII 32	Baliakandi	190	3-Sep-20	X					
Farmer KII 33	Baliakandi	280	3-Sep-20		X		X		
Farmer KII 34	Mujibnagor	100	3-Sep-20			X			
Farmer KII 35	Mujibnagor	400	3-Sep-20				X		Not done due to his family accident.
Farmer KII 36	Mujibnagor	100	3-Sep-20					X	
Farmer KII 37	Nagorkanda	62	5-Sep-20		X				
Farmer KII 38	Galachipa	100	5-Sep-20					X	
Farmer KII 39	Baliakandi	100	5-Sep-20				X		Not done as he is Covid-19 affected
Farmer KII 40	Manirampur	154	5-Sep-20					X	

GOB KIIs

Interview Title and Date		Team Leader	Nazrul and/or Monowar	Preferred Media
GOB KII 01 BARI	22-Sep	X	X	Audio/ Video
GOB KII 02 BADC	21-Sep	X		Video
GOB KII 03 DAE	23-Sep		X	Audio/ Video
GOB KII 04 DAE	23-Sep	X	X	Video

ANNEX 18: LIST OF DOCUMENTS REVIEWED

Sl. #	Title
1	Cooperative Agreement
2	Program Description
3	Activity Monitoring, Evaluation and Learning (MEL) Plan (Approved 2015 & updated April 2017)
4	Multi Year Results Framework with annual targets and actuals
5	CSISA-MI Bangladesh Annual Reports: 2016, 2017, 2018,
6	CSISA MI Final Report 2019
7	CSISA Phase 3 Annual Report
8	CSISA Annual reports to BMGF 9/2015 & 12/2018 & 10/2019
9	CSISA Semi-Annual Reports to BMGF: March 2014 (94 pages)
10	CSISA Bangladesh SAR March 2015 (13 pages)
11	CSISA Bangladesh Semi-annual reports: 3/15 (64) MI starts on page 45
12	CSISA-MI SAR Oct 2015-Mar 2016 (40 pages)
13	CSISA-MI Semi-annual reports: March 2017 (35 pages)
14	CSISA-MI Semi-annual reports: March 2018 (56 pages)
15	CSISA-MI Semi-annual reports: March 2019 (58 pages)
16	Post Project Performance Review: August 5th, 2019
17	BMEI Third-Party Monitoring Report: Mini combine training in Jessore
18	BMEI Mini-Survey Report: Barisal division with 23/50 LSPs in 6 upazilas of 4 districts.
Special Studies	
19	Scaling Up of Agriculture Machinery in Bangladesh" by Dr. Richard Kohl --2016.
20	Qureshi 2015 Moving from Resource Development to Resource Management- Problems, Prospects and Policy Recommendations for Sustainable Groundwater Management in Bangladesh
21	Mottaleb 2016 Factors associated with small-scale agricultural machinery adoption in Bangladesh- Census findings
22	N. Theis 2019 Gender and Agricultural Mechanization A mixed-methods exploration of the impacts of multi-crop reaper-harvester service provision in Bangladesh. Synopsis of this study called "Overcoming Gender Gaps in Rural Mechanization".
23	Impact Evaluation Report for the Surface Water Irrigation Rehabilitation in the Southern Delta Region of Bangladesh June 2016
24	Sustainable crop intensification through surface water irrigation in Bangladesh? A geospatial assessment of landscape-scale production potential. Timothy J. Krupnik, Urs Schulthessa, Zia Uddin Ahmeda, Andrew J. McDonald, Land Use Policy 2017
25	Study Into The Commercialization of Selected Agricultural Machines in Bangladesh by iDE. August 2012.
Other Related Documents not Provided by USAID or CIMMYT	
26	Gain Report by USDA Foreign Agriculture Service 2019
27	FAO Aquastat for Bangladesh 2011
28	The Impact of Intensive Groundwater Abstraction on Recharge to a Shallow Regional Aquifer System: Evidence from Bangladesh. 2011
29	Bangladesh Agriculture Value Chain Project Final Report 2019
Specific Studies Covered in Annual and Semi Annual Reports	
30	Reaper Deep Dive by HCD (Page 26 2016 AR)
31	Market Study by ADI including annexes 6-10 (Page 26 2016 AR).
32	Access to Finance Study (Page 26 2016 AR)
33	Identifying and evaluating the existing business models in terms of economic and commercial viability
34	Determining the factors affecting the adoption of the small-scale farm mechanization technologies (p. 38 AR 2016)
35	Determining the factors affecting the utilization of the small-scale farm mechanization technologies (e.g. PTOS, AFP, and reaper) at the farm level. (p 39 2016 AR)

ANNEX 19: KEY EVALUATION TEAM MEMBERS

Name: Loretta Byrnes

Position: Team Leader: BMEL S02I

Key Qualifications

Ms. Loretta Byrnes has over 20 years of experience designing, managing, and evaluating agriculture research, extension, Farmer Field School (FFS), market development, and food security programs. She has extensive experience working with male and female farmers, service providers, input companies, and business membership organizations (BMOs), research and seed system institutions, and development agencies and organizations such as the United States Agency for International Development (USAID), Department for International Development (DFID), Bill and Melinda Gates Foundation (BMGF), International Development Enterprises (IDE), CARE, and World Vision. She has worked in numerous countries in Africa and South Asia, including for nearly 13 years in Bangladesh.

Ms. Byrnes also has significant experience in developing Logical and Results Frameworks; Monitoring, Learning, and Evaluation (MEL) systems; designing qualitative and quantitative surveys; conducting interviews; facilitating validation workshops; and writing reports. In addition to training staff in monitoring and evaluation (M&E) at numerous positions, her evaluation experience includes recent evaluations of the Enhancing Resilience Component of the World Food Program (WFP) Bangladesh Country Program and BRAC Bangladesh's \$33 million Integrated Development Program, including crop, fish and livestock production, water and sanitation, health service delivery, micro-finance, education, and food security interventions. In addition to her M&E experience, she has in-depth knowledge of rice, poultry, cassava, legume, vegetables, and other agriculture value chains.

From 2010-2014, as Agricultural Program Officer with BMGF, Ms. Byrnes worked with grantees—especially women—to ensure grants were based on in-depth understanding of beneficiary access to information, markets, inputs seed systems, and land as well as government policies and other factors affecting farmer decision-making. As Country Director with IDE in Bangladesh (2005-2008), among other duties, she led program research, development, and implementation; managed an International Fertilizer Development Center (IFDC)-funded grant to assess the economic impact of drip and other irrigation equipment for vegetable production; facilitated validation workshops with all stakeholders to analyze research results and develop interventions to improve value chains; co-facilitated joint M&E training for all IDE Country Directors to develop common indicators and M&E systems; and collaborated with and provided leadership to agriculture membership organizations, the private sector, and government institutions to improve the enabling environment.

From 2003-2005, as Coordinator with the DFID-funded Rural Livelihood Program (450+ staff, 2,000 Farmer Field Schools, and subcontracts with 50 local NGOs), Ms. Byrnes applied market development approaches to strengthen private sector services and increase male and female farmer awareness and demand for higher quality seeds and inputs; solicited and managed research contracts on small business incubators, debt and migration, women in agriculture, women's solidarity, and rural infrastructure investment and access to markets; and initiated establishment of the Market Development Forum to facilitate information sharing among more than 20 organizations involved in market development approaches.

Ms. Byrnes holds a Master's degree in Agriculture and Natural Resource Economics from Oregon State University and a Bachelor's degree in Agronomy from Washington State University. She speaks fluent English, Bengali, and French.

Education

M.S., Agriculture and Natural Resource Economics, Oregon State University, Corvallis, OR

B.S., Agronomy, Washington State University, Pullman, WA

Professional Experience

Independent Consultant, Various, Nigeria and Bangladesh, Jan. 2015-Present.

- Evaluated the BMGF-funded Building an Economically Sustainable, Integrated Seed System for Cassava in Nigeria (BASICS) Project. Reviewed all documents, spent 28 days in country interviewing all stakeholders (IITA, Fera, NRCRI, Context Consulting, Catholic Relief Services (CRS), NASC, two cassava processing companies, and cassava outgrowers), facilitated presentation with all partners, designed and wrote the final report.
- Evaluated the Enhancing Resilience Component of the World Food Program (WFP) Bangladesh Country Program. Reviewed Results Frameworks, data and data collection tools, project outputs, and Local Government Engineering Department interventions designed to decrease waterlogging, prevent flooding, and address encroaching salinization. Spent three weeks interviewing program staff, participants, and other stakeholders in some of the most remote and vulnerable areas of Bangladesh. Wrote report.
- Reviewed BRAC Bangladesh's \$33 million Integrated Development Program including crop, fish and livestock production, water and sanitation, health service delivery, micro-finance, education, and food security interventions. Conducted extensive field interviews with staff, beneficiaries, and other stakeholders in some of the most remote and vulnerable areas of Bangladesh to determine technical quality and efficacy of all interventions and their relevance to women. Developed the final Results Framework and wrote the draft proposal for the second phase with the internally displaced people (IDP) leadership team.

Agriculture Program Officer, BMGF, Apr. 2010-Apr. 2014. Worked with BMGF grantees to ensure grants were based on in-depth understanding of beneficiary access to information, markets, inputs seed systems, and land, as well as, government policies and other factors affecting farmer decision making—especially women. Facilitated finalization of grant proposals, budgets, Results Frameworks, M&E systems, and seed delivery plans for Yam Improvement for Income and Food Security in West Africa (YIIFSWA), the AGRA Program for African Seed Systems (PASS); Harvest Plus; Harnessing Opportunities for Productivity Enhancement (HOPE); Seed Policy Enhancement in African Regions (SPEAR); Great Lakes Cassava Initiative (GLCI); and others. Drafted the BMGF Agriculture Program Seed Systems Strategy and Operational Plan after reviewing all Research and Development grants, including CSISA. Visited Harvest Plus, Golden Rice, and CSISA projects in Bangladesh and conducted interviews with rice farmers and seed companies. Developed and managed commercial cassava seed system grants with Catholic Relief Services and Mennonite Economic Development Associates in Tanzania and Nigeria. Ensured alignment with other grants for value chain development, plant breeding, disease diagnostics, and phyto-sanitary and certification systems. Co-led the Cassava Integrated Value Chain Team in developing the BMGF Cassava Strategy. Initiated grant to improve agronomic research for cassava in Nigeria and Ghana. Developed and managed grant to strengthen Seed Trade Associations in Nigeria, Tanzania, and Bangladesh.

Country Director, IDE, Bangladesh, Jul. 2005-Jun. 2008. Provided leadership for all program research, development, and implementation for a team of 40 staff. Managed IFDC funded grant to assess economic impact of drip and other irrigation equipment for vegetable production. Developed proposals for the Netherlands, USAID, and the KATALYST project. Coordinated and led six value chain studies: livestock vaccines; fresh vegetables; rice and legume seed; fresh fish; and poultry. Facilitated validation workshops with all stakeholders to analyze research results and develop interventions to improve value chains. Supervised and trained the M&E coordinator on survey design, data analysis, training of enumerators, and reporting. Co-facilitated joint M&E training for all IDE Country Directors to develop common indicators and M&E systems. Collaborated with and provided leadership to poultry and seed business membership organizations, individual companies, and government institutions to improve the enabling environment. At the request of USAID, DFID and the EU, participated in the Local Consultative Donor Groups on Agriculture, Water and Sanitation, and Poverty. Executive Committee member of the Market Development Forum.

Coordinator, Rural Livelihood Program (RLP), CARE, Bangladesh, May 2003-Jun. 2005. Managed DFID-funded RLP, with over 450 staff, 2,000 Farmer Field Schools, and subcontracts with 50 local NGOs. Applied market development approaches to strengthen private sector services and increase male and female farmer awareness and demand for higher quality seeds and inputs. Supervised and mentored the Livelihood Impact, ML&E, and Social Development Coordinators and other senior staff. Provided quality control for all ML&E data collection and analysis. Solicited and managed research contracts with IFPRI, Natural Resources Institute, TANGO International, Institute of Development Studies, and others on small business incubators, debt and migration, Women in Agriculture, Women's Solidarity, and Rural Infrastructure Investment and Access to Markets. At the request of GTZ, SEDF/IFC (World Bank), and KATALYST, initiated establishment of the Market Development Forum to facilitate information sharing among more than 20 organizations involved in market development approaches.

USAID Food Security Program Coordinator, CARE, Sierra Leone, Sept. 2001-May 2003. Managed USAID-funded Food Security Program for distribution of 10,000 tons of commodities to internally displaced, refugees, and Food for Work participants. Acquired additional funding for seed distribution to returning farmers. At the request of USAID, assumed overall responsibility for M&E support to all Food Pipeline Agencies (FPAs)—WFP, CRS, and World Vision. Supervised and trained M&E team to develop and implement M&E systems to ensure accountability for the delivery of appropriate food rations. Co-facilitated two week-long M&E trainings for all CARE Sierra Leone senior staff. Partnered with all FPAs to implement a nationwide food security assessment. Developed annual funding proposals, all approved by USAID.

USAID Development Activities Program (DAP) Coordinator, World Vision Bangladesh (WVB), Bangladesh, Aug. 1999-Jul. 2000. Provided leadership and technical direction in preparation for \$60 million USAID-funded Food Security Enhancement Initiative (FSEI). Organized and supported week-long M&E training by WV Senior U.S. colleagues and worked with local team to develop an M&E system. Reviewed project design to elaborate on modalities of monetization, food-for-work, and integration within WVB's ongoing program. Conducted review of WVB's agriculture interventions and developed an integrated agricultural program approved by USAID.

Seed and Small Livestock Rehabilitation Project Manager, CARE, Rwanda, Mar. 1997-Jul. 1998. Managed a Norwegian-funded bean and potato seed and small livestock rehabilitation project with female farmer groups within the context of severe food insecurity. Supervised and trained 50 staff in M&E, data collection tools, agriculture production, seed systems, participatory research and training methods, and performance management. Revised program strategy to move from seed relief to a more sustainable multiplication project. Participated in UN and government workshops on agriculture, bio-diversity, food security, and land reform policies. Collaborated extensively with government at the national and field level. Developed annual funding proposals, all approved by Norwegian Foreign Affairs office.

Project Coordinator, Local Initiatives for Farmers Training, CARE, Bangladesh, Mar. 1992-Aug. 1995. Managed experiential learning agricultural extension project funded by DFID, Swiss Development Cooperation (SDC), and Danida. Trained local lead farmers (50 percent female) to expand seed and input supply chain and provide technical advice to farmers as an embedded service. Trained staff on participatory and experiential learning approaches and design of training modules to develop farmer capacity, which increased horticulture production using bio-intensive practices. Trained and mentored the M&E specialist on systems, data collection, analysis, and reporting. Developed five-year funding proposals and logical frameworks for each donor—all of which were approved. Increased percentage of female staff from 3 percent to 30 percent.

Socio-Economist, Farming Systems Research Team, Mennonite Central Committee, Bangladesh, Aug. 1989-Aug. 1992. Developed data collection tools to facilitate male and female farmer feedback on agronomic, horticultural, livestock, and fisheries research. Conducted impact evaluation of extension program and facilitated integration of extension and research programs. Compiled

and edited all station and on-farm research results presented to government research and extension institutions.

Graduate Research Assistant, Oregon State University, 1985-1988. Conducted impact evaluation of USAID poultry project in North Yemen. Spent three months surveying women and commercial poultry farmers to assess the sustainability and impact of the project on women at the village household level. Presented findings to USAID and wrote the final evaluation report.

Languages

English (native), Bengali (fluent), French (fluent)

Name: Md. Ahiduzzaman, Ph.D.

Position: National Mechanization Specialist

Key Qualifications

Dr Ahiduzzaman has more than 20 years of experience in the field of Agricultural Engineering, Development and improvement of farm machinery for harvesting and postharvest operations, Dissemination of Farm Machinery among the farmers at rural level, Farmers training and operation of farm machinery, Rice Mill Installation and Improvement, Rice drying system, parboiling boiler system installation and improvement, Energy efficiency of rice processing industries and waste management, Project Impact assessment and Evaluation, Conduct survey, stakeholder analysis. His MS and PhD thesis, research articles and journal papers of different journals related to mechanized rice cultivation system in Bangladesh, power tiller and traditional farming system, rice processing system improvement, energy utilization and environmental aspects of agro-processing industries, GHG emission mitigation options in agriculture and other sectors, value-added product development from agro-waste. He also worked for different donor agencies and worked as a Consultant in various Donor Funded Projects. He has experience working in multi-organizational and interdisciplinary team. He has strong experience in advising governmental ministries on agricultural mechanization, evaluation of research and development project in agricultural engineering sector.

Education

Post-Doctoral Program, University of Alberta, Canada, 2015-2017

Ph.D., Mechanical Engineering, Islamic University of Technology, OIC, Bangladesh, 2011

M.Sc., Energy Systems and Management, University of Flensburg, Germany, 2006

M.S., Farm Power and Machinery, Bangladesh Agricultural University (BAU), Bangladesh, 1999

B.Sc., Agricultural Engineering, BAU, Bangladesh, 1993

Selected Professional Experience

Principal Investigator (Consultant), GIZ, December 2019. Worked as Principal Investigator for the project of Operation and Trial Run of the Improved Version of the GIZ Piloted Energy Efficient Technology-Improved Rice Parboiling System cum Integrated Dryer. His major accomplishments were:

- Conducted visit the rice mill where the retrofitting works completed for preparation and inspection before conducting the trial run and commissioning, made necessary coordination with the dryer and boiler manufacturer and rice mill owner.
- Arranged necessary instrumentation for performance test of the improved rice parboiling system (IRPS) cum dryer
- Provided technical support to conduct the three stages (steamed, parboiled, drying) paddy drying before milling
- Conducted the trial run of the IRPS cum dryer with the presence of rice mills owners at M/S Sompod Traders, Ishwardi, Pabna

- Provided necessary steps to trouble shoot the system, if any kind of technical problem arised during trial run
- Provided a performance certificate of the retrofitted system with satisfaction of rice mill owner
- Provided training to the mill operators on the operation, cleaning and maintaining of the whole IRPS cum dryer unit.
- Project Completion Report submitted

Sub-Project Manager, HEQEP, World Bank, Jul. 2014-Dec. 2017. Worked as Sub-Project Manager for the project of Strengthening Postgraduate Research Capacities in Agro-processing. He performed the following tasks:

- Project staff recruitment, financial management of the project
- Procurement of laboratory equipment and established three laboratories for Agro-processing research at the Department of Agro-Processing, BSMRAU.
- Recruitment of a consultant and facilitate to develop MS and PhD course curriculum for Agro-processing
- Conducted research in mechanized processing agro-product, supervised six MS level student and awarded them MS in Agro-Processing degree
- Facilitate strengthening professional knowledge and skill of the academic staff.
- Project Completion Report submitted

Principal Investigator (Consultant), GIZ, Oct. 2014-Jun. 2015. Worked as Principal Investigator for the project of Piloting of Integrated Improved Rice Parboiling cum Drying Technology. His major accomplishments were:

- Determined drying load of paddy in terms of heat energy required
- Designed and fabricated the hot air producing heat exchanger as per required drying load
- Boiler design was modified and fabricated as per required steam production rate for combined parboiling and drying operation
- The boiler and heat exchanger (designed and fabricated), blower systems were installed on the civil construction of furnace & chimney at site in a rice mill at Sherpur district
- Conducted performance test of the integrated parboiling cum dryer system
- Rice mill owners of the local cluster were invited and the performance of the newly developed parboiling cum drying technology were demonstrated to them.
- Project Completion Report submitted

Principal Investigator, BSMRAU, Jul. 2012-Jun, 2013. Worked as Principal Investigator for the project of Production of dried powder products from bael fruit (Aeglemarmelos) and jackfruit (Artocarpus heterophyllus) bulbs. His major accomplishments were developed technology for drying and powder products from bael fruit (Aeglemarmelos) and jackfruit (Artocarpus heterophyllus) bulbs.

Agri-Engineer, IMED/GoB, Mar. 2014-Jun. 2014. Worked as Agri-Engineer for the impact Evaluation Study of National Agricultural Technology Project (NATP)-Phase I. His major accomplishments were:

- A sample of 300 common interest groups and 150 control farmers were chosen for the purpose and an extensive questionnaire was used for the survey. In addition, first hand qualitative data were generated using FGDs among farmers, extensive consultation with officials both in the field and the headquarters of the organizations involved.
- Research components, procurements, and farm level impacts were evaluated.
- Impact of the NATP technology on recipient farmers for producing more and earn higher profit compared to the control farmers were evaluated.
- Evaluated report submitted

Consultant, IFPRI/BIDS, Apr. 2012-Mar. 2013. Worked as Consultant for the project of Productivity and Efficiency of Rice Mills in Bangladesh: Economic, Social and Food Security Implications. His major accomplishments were:

- A survey questionnaire was developed to conduct survey of rice mill.
- Machinery used in rice mill both traditional and modern were evaluated.
- Energy efficiency of the rice mill were evaluated.
- Evaluated report submitted

Project Coordinator, MOA/GOB, Jun. 2011-Jun. 2012. Worked as Project Coordinator for the project Farm Machinery Technology Development and Dissemination (FMTD). He performed the following tasks:

- Improved agricultural machinery for mechanized cultivation and postharvest processing of rice (Weeder, Reaper, thresher, winnower, lost cost dryer etc.)
- Conducted extensive farmers training for increased use of modern machinery in agricultural operations.

Principal Investigator (Consultant), GIZ, Apr. 2008-May 2008. Worked as Principal Investigator for the project Survey of Major Rice Mill Clusters in Rajshahi Division of Bangladesh. His major accomplishments were:

- Developed a survey questionnaire and 500 rice mills were chosen and surveyed from different clusters of rice mill.
- Energy efficiency of rice mills were evaluated and potential savings of rice husk for further usage for example power generation was assessed.
- Complete Survey report submitted

Consultant, GIZ, Dec. 2006-Dec. 2007. Worked as consultant for the project Development and Extension of Energy Efficient Rice parboiling Systems in Bangladesh. His major accomplishments were:

- Improved design of traditional rice parboiling boiler was provided.
- The developed technology was piloted at M/S Russel Auto Rice Mill, Kaliakoir, Gazipur.
- The piloted technology was demonstrated before rice millers from different corner of the country
- Completion report submitted

Team Member (Working Scientist), GIZ, Mar. 2007-Jul. 2007. Worked as Team Member (Working Scientist) for the project Estimation of Energy Efficiency of the Existing Rice parboiling Systems in Bangladesh. His major accomplishments were:

- Developed a survey questionnaire and more than 30 rice mills were chosen based on different kind rice parboiling boiler currently used.
- Different types of rice parboiling boilers were assessed and find out the gap for further improvement.
- Completion report submitted

Team Member (Working Scientist), MOA/GOB, 2001-2004. Worked as Team Member (Working Scientist) for the project Popularization of BRRI Developed Agricultural Machinery Project (PAMP). His major accomplishments were:

- Improved agricultural machinery for mechanized cultivation and postharvest processing of rice (Weeder, Reaper, thresher, winnower, lost cost dryer etc.)
- Conducted extensive farmers training for increased use of modern machinery in agricultural operations.
- Facilitated custom hiring system of agricultural machinery at rural
- Facilitated entrepreneurship development in agricultural machinery business at rural level
- Trained local manufacturer of agricultural machinery towards make a sustainable supply system of agri-machinery business.

Working Scientist, DFID, 2001-2003. Worked as Working Scientist for the project Benefits of Improved Rice Husk Combustion Efficiency. His major accomplishments were:

- Conducted a mini survey of rice mill (20 no.) from different corner of Bangladesh.
- Developed an improved rice parboiling boiler and demonstrated at M/S Nonia Auto Rice mill, Bilashpur, Gazipur.
- Improved Existing rice husk briquette machine with collaboration of TERI, India.
- Existing capacity of rice husk briquette machinery manufacturer was assessed.
- Completion report submitted

Professional Experience

- July 2016 to till date, Associate Professor, Bangabandhu Sheikh Mujibur Rahman Agricultural University
- Jul 2012 to Jun 2016, Assistant Professor, Bangabandhu Sheikh Mujibur Rahman Agricultural University
- Jan 2007 to Jun 2012, Senior Scientific Officer, Bangladesh Rice Research Institute (BRRI)
- Aug 1998 to Jan 2007, Scientific Officer, Bangladesh Rice Research Institute (BRRI)

Publications

- Talaei, A.; Oni, O.; Ahiduzzaman, M.; Roychaudhuri, P.S.; Rutherford, J.; Kumar, A. Assessment of the impacts of process-level energy efficiency improvement on the greenhouse gas mitigation potential in the petroleum refining sector. *Energy*, 2020, 191, 116243. *IF = 5.747*
- Ahiduzzaman, M.; Aminul Islam, A. K. M.; Sadrul Islam, A.K.M. Recovery of Biochar Fuel from Boiler Waste of Rice Mill. *J. Agril. Engg (IEB)*, 2019, 42/AE(4), 55-60.
- Islam, S.; Huda, M. D.; Bhuiyan, M.G.K.; Hossain, M. A.; Paul, H.; Ahiduzzaman, M. Prospect of rice straw biomass briquette production: an alternative source of energy. *J. Agril. Engg (IEB)*, 2019, 42/AE(3), 79-86.
- Ali, S. M. Y.; Hossain, M. M.; Zakaria, M.; Hoque, M. A.; Ahiduzzaman, M. Postharvest Losses of Mangoes at Different Stages from Harvesting to Consumption. *Int. J. Bus. Soc. Sci. Res.*, 2019, 7(4), 21-26.
- Katta, A. K.; Davis, M.; Subramanyam, V.; Dar, A. F.; Mondal, M. A. H.; Ahiduzzaman, M.; Kumar, A. Assessment of energy demand-based greenhouse gas mitigation options for Canada's oil sands. *Journal of Cleaner Production*, 2019, 241, 118306. *IF = 6.397*
- Talaei, A.; Pier, D.; Iyer, A. V.; Ahiduzzaman, M.; Kumar, A. Assessment of long-term energy efficiency improvement and greenhouse gas emissions mitigation options for the cement industry. *Energy*, 2019, 170, 1051-1066. *IF = 5.747*
- Davis, M.; Ahiduzzaman, M.; Kumar, A. How to model a complex national energy system? Developing an integrated energy systems framework for long-term energy and emissions analysis. *Int. J. Global Warming*, 2019, Vol. 17, No. 1, 23-58. *IF = 1.042*
- Bonyad, M.; Shafique, H.U.; Mondal, M.A.H.; Subramanyam, V.; Kumar, A.; Ahiduzzaman, M. The development of a framework for the assessment of energy demand-based greenhouse gas mitigation options for the agriculture sector. *Transactions of the ASABE*, 2018, 2018, 61(3): 763-796. (doi: 10.13031/trans.12506).
- Davis, M.; Ahiduzzaman, M.; Kumar, A. How will Canada's greenhouse gas emissions change by 2050? A disaggregated analysis of past and future greenhouse gas emissions using bottom-up energy modelling and Sankey diagrams. *Applied Energy*, 2018, 220, 754-786. *IF = 7.182*
- Ahiduzzaman, M.; Sadrul Islam, A.K.M. Assessment of Rice Husk Briquette Fuel Use as an Alternative Source of Woodfuel. *International Journal of Renewable Energy Research*, 2016, 6(4), 1601-1611. *IF=0.897*
- Ahiduzzaman, M.; Sadrul Islam, A.K.M. Evaluation of Characteristics of Activated Carbon from Rice Husk Impregnated with Zinc Chloride and Phosphoric Acid. *American Journal of Physical Chemistry*, 2016, 5(5), 94-98.

- Ahiduzzaman, M.;Sadrul Islam, A.K.M. Preparation of porous bio-char and activated carbon from rice husk by leaching ash and chemical activation. *SpringerPlus*, 2016, 5, 1248. *IF= 0.982*.
- Ahiduzzaman, M.; Islam, A.K.M.S. 2011. Greenhouse gas emission and renewable energy sources for sustainable development in Bangladesh. *Renewable and Sustainable Energy Reviews*, 5, 4659– 4666. *IF=8.050*
- Ahiduzzaman, M. & Sadrul Islam, A.K.M. 2009. Energy Utilization and Environmental Aspects of Rice Processing Industries in Bangladesh. *Energies*(2):134-147. *IF=2.262*
- Islam, S., Rahman, S.M., Rahman, M.A., Quasem, M. A., Huda, M. D., Islam, A.K.M. S., Ahiduzzaman, M., Bhuiyan, M.G.K. and Hossen, M. A. 2009. Mechanized Rice Cultivation in Bangladesh: Past Experiences and Future Potentials. *Agricultural Mechanization in Asia, Africa and Latin America (AMA)*. Vol. 40(1): 36-40.
- A.K.M. S. Islam, M. A. Rahman, R. I. Sarker, M. Ahiduzzaman and M. A. Baqui. 2001. Energy Audit for Rice Production under Power Tiller and Bullock Farming Systems in Bangladesh. *Online J. Biological Sciences* 1(9): 873-876.

Languages

English (fluent), Bengali (native)

Name: Dr. Md Abdur Rashid

Position: National Irrigation System Specialist

Key Qualifications

Dr Rashid has more than 40 years of experience in the field of irrigation and water management, rural development, water saving technologies. He is experienced in designing, planning, managing, and evaluating projects, baseline, assessment and project implementing in the field for increasing crop production in Bangladesh. His MS and PhD thesis, research articles and journal papers of different journals related to irrigation water management, crop production, groundwater management, water quality, solar pump irrigation and others. He also successfully performed research work on solar pump irrigation at Bangladesh Rice Research Institute (BRRI). He installed, tested and evaluated the performance of solar pump for energy output, discharge and irrigation coverage in different seasons. He also investigated multiple use and economic performance of solar pump. He developed water saving technologies for rice irrigation. Once he led the Irrigation and Water Management Division of BRRI. He also worked for different donor agencies and worked as a Consultant in various Donor Funded Projects. He has experience working in multi-organizational and interdisciplinary team. He has provided advisory services, assessments and evaluations, and recommendations to DAE and donors on water management, irrigation, technologies in the field for increasing food production in Bangladesh.

Mr. Rashid has more than 35 years of experience as government professional and he holds the position of Chief Scientific Officer and Head, Principal Scientific Officer, Senior Scientific Officer and Scientific Officer respectively in Irrigation and Water Management Division of Bangladesh Rice Research Institute (BRRI). Mr. Rashid has strong experience in advising governmental ministries on agricultural irrigation and water management technology and best practices. He has liaised with and advised various government ministries relating to agriculture, irrigation and water management.

Education

Ph.D., Groundwater Management, Bangladesh Agricultural University, 2006

M.Sc., Irrigation and Water Management, Silsoe College (UK), 1992

B.Sc., Agricultural Engineering (Hons), Bangladesh Agricultural University, 1978

Professional Experience

Engineer (Consultant), Karnaphuli Water Supply Project -Phase-2 (KWSP-2)” of Chittagong WASA under Ministry of LGRD, Jan. 2020-Apr. 2020. Worked as Engineer (Consultant) for In-depth monitoring of the Karnaphuli Water Supply Project Phase-2 (KWSP-2) of Chittagong WASA under Ministry of LGRD. He performed the following tasks:

- Assist Team Leader and closely work with other team members
- Review & examine present project related information/documents
- Visit and in-depth monitor of infrastructure developed and underdeveloped in the project area
- Examine and review the tender documents as per existing procurement rules
- Determine whether satisfactory progress is being made
- Assist Team Leader to conduct KII, FGD and individual survey in the project area
- Will attend local level workshop to hold discussion with stakeholders and beneficiaries
- Prepare inception report including study design, approach and methodology
- Assist Team Leader to prepare Draft, Draft Final and Final Report at the end of assignment.

Consultant (Agri- Engineer), Bangladesh Agricultural Research Council (BARC), Ministry of Agriculture, Jul. 2019-Oct. 2019. Worked as a Consultant (Agri- Engineer) for finalizing the Project Completion Report (PCR) in the National Agricultural Technology Project Phase-2 (NATP-2) under Bangladesh Agricultural Research Council (BARC) of the Ministry of Agriculture. He performed the following tasks:

- Review and finalization of Project Completion Report (PCR) of CRG NATP-2
- Arrange the review of PCR of CRG sub-projects
- Develop appropriateness of PCR of CRG sub-projects as per instructions and guidelines of BARC
- Develop and arrange printing of the technology fact sheet of each research sub-projects
- Evaluate the on-going research activities of PBRG sub-projects related to Agri-Engg, Crops, Forest, Planning & Evaluation and Agri-Economics
- Any other related task assigned by the Director, PIU-BARC.

Agricultural Engineer, Department of Agricultural Extension (DAE), May 2019-Jun. 2019. Worked as an Agricultural Engineer for conducting baseline survey of the Enhancing Crop Production Through Extension of Solar Energy and Modern Water Saving Technologies Pilot Project, under Department of Agricultural Extension (DAE), where he performed the following tasks:

- Responsible for all issues related to irrigation and water management especially solar irrigation pump, buried pipe irrigation system, drip irrigation, dug well etc.
- Review of literature and assist Team Leader in developing study instruments and sampling strategy
- Assist management in recruitment of field staffs and provide training. Attend pre-testing and do field visit to ensure quality of field data
- Collect, compile and process the data on land use, irrigation management, irrigation practices, hydraulic structure and other rural infrastructure
- Participation in meeting with client and assist Team Leader in preparation of all reports.

Agricultural Engineer, IMED, DAE, Jan. 2019-Apr. 2019. Worked as an Agricultural Engineer for conducting in-depth monitoring of a project titled “Year-Round Fruit Production for Nutrition Improvement Project (1st Revised),” under Implementation Monitoring and Evaluation Division (IMED) of Department of Agricultural Extension (DAE) where he performed the following tasks:

- Assist Team Leader and closely work with other team members, liaise with all the stakeholders including the PIU officials in operating and managing the assignment
- Review and examine present project related information/documents

- Monitor demonstration pots, farm house, constructed/under construction roads, bridge, office building, training center, dormitory, boundary wall, nursery shed, guard shed, solar drip irrigation, irrigation infrastructure, drainage system etc. in the project area
- Examine and review the tender documents as per existing procurement rules
- Determine whether satisfactory progress is being made
- Attend local level workshop in any of the project area to hold discussion with stakeholders and beneficiaries
- Prepare inception report, including study design, approach and methodology, workplan
- Assist Team Leader to prepare draft, draft final and final report at the end of assignment.

Department of Agricultural Extension (DAE), Jan. 2016-Jun. 2016. Worked as Agricultural Engineer for conducting baseline survey of the Agricultural Support for Smallholders in South-Western Region of Bangladesh Project (ASSRBP) under Department of Agricultural Extension (DAE) where he performed the following tasks:

- Responsible for all issues related to irrigation and water management
- Review of literature and assist Team Leader in development study instruments and sampling strategy
- Collect, compile and process the data on land use, irrigation management, irrigation practices, hydraulic structure and other rural infrastructure
- Participation in meeting with client and assist Team Leader in preparation of all reports.

Chief Scientific Officer and Head, Principal Scientific Officer, Senior Scientific Officer and Scientific Officer, Irrigation and Water Management Division, Bangladesh Rice Research Institute (BRRI). Nov. 1980-Jan. 2015. Held the position of Chief Scientific Officer and Head, Principal Scientific Officer, Senior Scientific Officer and Scientific Officer respectively in Irrigation and Water Management Division of BRRI. He has more than 35 years of experience in the field of irrigation and water management, developed and disseminated water saving technologies for rice irrigation, prepared different research projects and plans and implemented in the field for increasing food production in Bangladesh. Out of which 5 years' experience as a Head of Irrigation and Water Management Division of Bangladesh Rice Research Institute and performed administrative and technical supervision of divisional research activities and staff. He has experience working in multi-organizational and interdisciplinary team. Specific activities and accomplishments are as follows:

- Experienced in reviewing and evaluating research project proposals. Project completion reports, MS and PhD thesis, research articles and journal papers of different journals related to irrigation water management, crop production, groundwater management, Water quality, solar pump irrigation and others
- Experienced in installation of DTW/STW and their construction details
- Worked as the Chairman of Estimation Evaluation Committee for all construction work of BRRI
- Work experience in agricultural /irrigation water management project, funded by government of Bangladesh and development partners like World Bank, Asian Development Bank, FAO, USAID and others
- Experienced as Principal Investigator of more than seven research projects having increased food production target in Bangladesh
- Experienced in managing financial accounts and expenditure documents of different project activities
- Capable to lead formulation, implementation, monitoring and evaluation of irrigation and water management projects
- Performed as an expert member of irrigation water management in many workshops, arranged by different government organizations in Bangladesh
- Experienced in providing policy advisory support services and engage with high ranking government officials, international development organizations and donor community
- Supervised thesis works of MS/PhD students of different universities

- Proven capacity in preparing training module and conduct training of water users, pump drivers, field level officers and farmers on efficient water use for crop production
- Experienced in working with grass root level workers, national and international NGOs as project partners
- Carried out a lot of investigations in unfavorable situations (salt affected, arsenic contaminated and poor groundwater bearing aquifer situation) to find out fresh groundwater and was successful in many cases
- Experienced in production of research reports and presented papers in different countries

Training Received

- Field Survey, Bangkok, Thailand, INWEPF Japanese Committee in 2011
- Field Survey, Ifugaon, Philippines, INWEPF Japanese Committee in 2010
- Project development and management, BARC, Dhaka, BARC in 2009
- Financial Management and Public Procurement, BIAM Foundation Dhaka, Ministry of Agriculture in 2009
- Administrative and financial management, BARD, Comilla, BARC in 2008
- Project cycle management, RDA, Bogra, IRRI-PETRRRA in 2002
- Problem-based technology generation for rainfed lowland rice environments, BRRI, IRRI in 1997
- Computer application in irrigation and water management, IPSA, Gazipur, CDP project in 1993
- Short course in Dbase III plus, Dhaka, BRRI in 1991
- English language course, British Council, Dhaka, ODA in 1990
- Research planning and evaluation, BRRI, BARC in 1990
- Rice production, applied research, communication and administration, BRRI, IRRI in 1989
- Irrigation and water management for rice production, BRRI, IDRC in 1986
- Soil fertility, BRRI, BARC in 1986
- Irrigation Water Management and Rice Production, IRRI, Philippines, IRRI in 1981

Languages

English (fluent), Bengali (native)

ANNEX 20: CONFLICT OF INTEREST AND NON-DISCLOSURE FORMS

Name:	Loretta Byrnes
Title:	Consultant
Organization:	ME&A, Inc.
Evaluation Position:	Team Leader (BMEL S021)
Evaluation Award Number: (or RFTOP or other appropriate instrument number)	GS-10F-154BA (ORDER NO. 72038819M00001)
Project(s) Evaluated: (Include project name(s), implementer name(s) and award number(s), if applicable)	Final Performance Evaluation of the Cereal Systems Initiative for South Asia-Mechanization and Irrigation (CSISA-MI) Activity Phase 1
I have real or potential conflict of interest to disclose:	☐ YES ☒ NO ☐ NOT APPLICABLE
If yes answered above, I disclose the following facts: <i>Real or potential conflicts of interest may include, but are not limited to:</i> 1. Close family member who is an employee of the DoS operating unit managing the project(s) being evaluated or the implementing organization(s) whose project(s) are being evaluated. 2. Financial interest that is direct, or is significant though indirect, in the implementing organization(s) whose projects are being evaluated or in the outcome of the evaluation. 3. Current or previous direct or significant though indirect experience with the project(s) being evaluated, including involvement in the project design or previous iterations of the project. 4. Current or previous work experience or seeking employment with the DoS operating unit managing the evaluation or the implementing organization(s) whose project(s) are being evaluated. 5. Current or previous work experience with an organization that may be seen as an industry competitor with the implementing organization(s) whose project(s) are being evaluated. 6. Preconceived ideas toward individuals, groups, organizations, or objectives of the particular projects and organizations being evaluated that could bias the evaluation.	
Signature:	Loretta Byrnes 
Date:	May 6th 2020

AN AGREEMENT BETWEEN

Loretta Byrnes

(Name of Individual - Printed or typed)

AND THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

1. Intending to be legally bound, I hereby accept the obligations contained in this agreement in consideration of my being granted access to sensitive data. As used in this Agreement, sensitive data is marked or unmarked "sensitive but unclassified information" (SBU), including oral communications, that meets the standards set by Office of Management and Budget (OMB) Circular A-130 Appendix 3 and the U.S. Agency for International Development (USAID) Automated Directives System (ADS.) I understand that any data or systems of records protected from unauthorized disclosure by the provisions of Title 5, United States Code Sections 552 (often referred to as "The Freedom of Information Act") and 552a ("The Privacy Act") is/are sensitive data. In addition, other categories of information, including but not limited to medical, personnel, financial, investigatory, visa, law enforcement or other information which, if released, could result in harm or unfair treatment to any individual or group, or could have a negative impact upon individual privacy, federal programs, or foreign relations is sensitive data. The term includes data whose improper use or disclosure could adversely affect the ability of the Agency to accomplish its mission, as well as proprietary data and information received through privileged sources or procurement sensitive or source selection information, as those terms are defined by the Federal Acquisition Regulations.

2. I understand and accept that by being granted access to sensitive data, special confidence and trust has been placed in me by the United States Government.

3. I acknowledge I have been given access to USAID sensitive data to facilitate the performance of duties assigned to me for compensation. I understand it is my responsibility to safeguard sensitive data disclosed to me, and to refrain from disclosing sensitive data to persons not requiring access for performance of official duties. Before disclosing sensitive data, I must determine the recipient's "need to know" or "need to access" sensitive data. I will not use any sensitive data for personal financial gain.

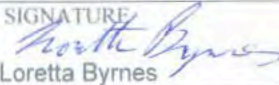
4. I have been advised that any breach of this Agreement may result in the termination of my access to sensitive data, which, if such termination effectively negates my ability to perform my assigned duties, may lead to the termination of my employment or other relationships with the Departments or Agencies that granted my access. I am aware unauthorized release or mishandling of sensitive data may be grounds for adverse action against me. In addition, I have been advised unauthorized disclosure of data protected by the Privacy Act may constitute a violation, or violations, of United States criminal law, and that Federally-affiliated workers (including some contract employees) who violate privacy safeguards may be subject to disciplinary actions, a fine up to \$5,000.00, or both.

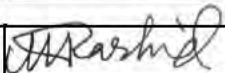
5. I understand all sensitive data to which I have access or may obtain access by signing this Agreement is now and will remain the property of, or under the control of the United States Government. I agree that I must return all sensitive data which have, or may come into my possession or for which I am responsible because of such access:

- (a) upon demand by an authorized representative of the United States Government; or
- (b) upon the conclusion of my employment or other relationship with the Department or Agency that last granted me access to sensitive data; or
- (c) upon the conclusion of my employment or other relationship that requires access to sensitive data.

Unless and until I am released in writing by an authorized representative of the United States Government, I understand that all conditions and obligations imposed upon me by this Agreement apply during the time I am granted access to sensitive data, and at all times thereafter.

6. These provisions are consistent with and do not supersede, conflict with, or otherwise alter the employee obligations, rights or liabilities created by existing statute or Executive order relating to (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule, or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive orders and statutory provisions are incorporated into this agreement and are controlling.

WITNESS		ACCEPTANCE	
THE EXECUTION OF THIS AGREEMENT WAS WITNESSED BY THE UNDERSIGNED		THE UNDERSIGNED ACCEPTED THIS AGREEMENT BEFORE ACCESSING SENSITIVE DATA OF THE UNITED STATES GOVERNMENT.	
SIGNATURE 	DATE 06 May 2020	SIGNATURE  Loretta Byrnes	DATE May 6th 2020

Name	Dr. Md Abdur Rashid
Title	Consultant
Organization	ME&A, Inc.
Evaluation Position	National Irrigation System Specialist
Evaluation Award Number (or RFTOP or other appropriate instrument number)	BMEL S021
Project(s) Evaluated(Include project name(s), implementer name(s) and award number(s), if applicable)	Final Performance Evaluation of the USAID/Bangladesh Cereal Systems Initiative for South Asia-Mechanization and Irrigation (CSISA-MI) Activity Phase 1
I have real or potential conflict of interest to disclose.	☐ Yes ☒ No N/A
If yes answered above, I disclose the following facts: <i>Real or potential conflicts of interest may include, but are not limited to:</i> 1. Close family member who is an employee of the DoS operating unit managing the project(s) being evaluated or the implementing organization(s) whose project(s) are being evaluated. 2. Financial interest that is direct, or is significant though indirect, in the implementing organization(s) whose projects are being evaluated or in the outcome of the evaluation. 3. Current or previous direct or significant though indirect experience with the project(s) being evaluated, including involvement in the project design or previous iterations of the project. 4. Current or previous work experience or seeking employment with the DoS operating unit managing the evaluation or the implementing organization(s) whose project(s) are being evaluated. 5. Current or previous work experience with an organization that may be seen as an industry competitor with the implementing organization(s) whose project(s) are being evaluated. 6. Preconceived ideas toward individuals, groups, organizations, or objectives of the particular projects and organizations being evaluated that could bias the evaluation.	
Signature	
Date	07/17/2020

AN AGREEMENT BETWEEN

Dr. Md Abdur Rashid

(Name of Individual - Printed or typed)

AND THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

1. Intending to be legally bound, I hereby accept the obligations contained in this agreement in consideration of my being granted access to sensitive data. As used in this Agreement, sensitive data is marked or unmarked "sensitive but unclassified information" (SBU), including oral communications, that meets the standards set by Office of Management and Budget (OMB) Circular A-130 Appendix 3 and the U.S. Agency for International Development (USAID) Automated Directives System (ADS.) I understand that any data or systems of records protected from unauthorized disclosure by the provisions of Title 5, United States Code Sections 552 (often referred to as "The Freedom of Information Act") and 552a ("The Privacy Act") is/are sensitive data. In addition, other categories of information, including but not limited to medical, personnel, financial, investigatory, visa, law enforcement or other information which, if released, could result in harm or unfair treatment to any individual or group, or could have a negative impact upon individual privacy, federal programs, or foreign relations is sensitive data. The term includes data whose improper use or disclosure could adversely affect the ability of the Agency to accomplish its mission, as well as proprietary data and information received through privileged sources or procurement sensitive or source selection information, as those terms are defined by the Federal Acquisition Regulations.

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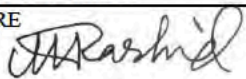
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5. I understand all sensitive data to which I have access or may obtain access by signing this Agreement is now and will remain the property of, or under the control of the United States Government. I agree that I must return all sensitive data which have, or may come into my possession or for which I am responsible because of such access:

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- (b) upon the conclusion of my employment or other relationship with the Department or Agency that last granted me access to sensitive data; or
- (c) upon the conclusion of my employment or other relationship that requires access to sensitive data.

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6. These provisions are consistent with and do not supersede, conflict with, or otherwise alter the employee obligations, rights or liabilities created by existing statute or Executive order relating to (1) classified information, (2) communications to Congress, (3) the reporting to an Inspector General of a violation of any law, rule, or regulation, or mismanagement, a gross waste of funds, an abuse of authority, or a substantial and specific danger to public health or safety, or (4) any other whistleblower protection. The definitions, requirements, obligations, rights, sanctions, and liabilities created by controlling Executive orders and statutory provisions are incorporated into this agreement and are controlling.

WITNESS		ACCEPTANCE	
THE EXECUTION OF THIS AGREEMENT WAS WITNESSED BY THE UNDERSIGNED		THE UNDERSIGNED ACCEPTED THIS AGREEMENT BEFORE ACCESSING SENSITIVE DATA OF THE UNITED STATES GOVERNMENT.	
SIGNATURE	DATE	SIGNATURE	DATE
			07/17/2020

Name	Md. Ahiduzzaman, Ph.D.
Title	Consultant
Organization	ME&A, Inc.
Evaluation Position	National Mechanization Specialist
Evaluation Award Number (or RFTOP or other appropriate instrument number)	BMEL S021
Project(s) Evaluated (Include project name(s), implementer name(s) and award number(s), if applicable)	Final Performance Evaluation of the USAID/Bangladesh Cereal Systems Initiative for South Asia-Mechanization and Irrigation (CSISA-MI) Activity Phase 1
I have real or potential conflict of interest to disclose.	☐ Yes ☒ No N/A
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Signature	
Date	07/15/2020

AN AGREEMENT BETWEEN

Md. Ahiduzzaman, Ph.D.

(Name of Individual - Printed or typed)

AND THE UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

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SIGNATURE	DATE	SIGNATURE	DATE
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