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CEREAL SYSTEMS INITIATIVE FOR SOUTH ASIA-MECHANIZATION AND EXTENSION ACTIVITY (CSISA-MEA)

October 2020- September 2021

USAID FROM THE AMERICAN PEOPLE

CSISA-MEA

CIMMYT MR International Maize and Wheat Improvement Center

iDE

Georgia Tech

Report and Activity Details

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Acronyms and abbreviations

ABLE	Agriculture-based Light Engineering
ADO	Agriculture Development Officer
ASA	Association for Social Advancement
BARI	Bangladesh Agricultural Research Institute
BAU	Bangladesh Agricultural University
BEIOA	Bangladesh Light Engineering Owners Association
BITAC	Bangladesh Industrial and Technical Assistance Center
BRAC	Bangladesh Rural Advancement Committee
CSISA-MEA	Cereal Systems Initiative in South Asia – Mechanization Extension Activity
CSISA-MI	Cereal Systems Initiative in South Asia - Mechanization and Irrigation
CAD	Computer-aided Design
CIMMYT	The International Maize and Wheat Improvement Center
CNC	Computerized Numerical Control
DAE	Department of Agriculture Extension
EoI	Expression of Interest
FSI	Financial Services Institution
FtF	Feed the Future
GT	Georgia Institute of Technology
iDE	International Development Enterprise
IDLC	Industrial Development Leasing Company
iDQA	Internal Data Quality Assessment
IPDC	Industrial Promotion and Development Company
IT	Information Technology
JCF	Jagoroni Chakra Foundation
JVA	Joint Venture Agreement
LE	Light Engineering
LLA	Local Level Agreement
LSP	Local Service Provider
LPIN	Livestock Production for Improved Nutrition
MFI	Micro Finance Institution
MCH	Medium Combine Harvester
MEL	Monitoring, Evaluation and Learning
MSME	Micro, Small and Medium Enterprises
MSP	Machinery Solution Provider
NBFI	Non-bank Financial Institution
NGO	Non-governmental Organization
NRE	New Rifat Engineering
OHS	Occupational Health & Safety
PPE	Personal Protective Equipment
PTOS	Power Tiller-operated Seeder
RDC	Rice and Diversified Crops Activity

RRF	Rural Reconstruction Foundation
RT	Rice Transplanter
SHED	Society for Health Extension and Development
SME	Small and Medium Enterprises
SMS	Short Message Service
TML	The Metal (Pvt.) Limited
TMSS	Thengamara Mohila Sabuj Sangha
TOT	Training of Trainers
US	United States
USA	United States of America
USAID	United States Agency for International Development
USG	United States Government
ZoI	Zone of Influence
ZoR	Zone of Resilience

Executive Summary

This report covers the second year of the USAID-supported Feed the Future Bangladesh Cereal Systems Initiative for South Asia – Mechanization and Extension (CSISA-MEA) Activity, covering the year from 1 October 2020 to 30 September 2021. CSISA-MEA supports the scale-appropriate mechanization of agriculture in Bangladesh by developing the capacity of the country's private sector to develop, manufacture and market innovative new agricultural mechanization technologies. Although the activity was considerably constrained and challenged by the Covid-19 pandemic, which led to restrictions in travel, meeting sizes and training activities during in Bangladesh and late April 2021–September in Bangladesh in 2021 (118 days of lock-down were enforced in Bangladesh), it completed a number of significant interventions, and achieved a substantial amount of its targets, in many cases exceeding them (see Annex I).

A major achievement for the Activity was an award given by USAID to CSISA-MEA in June 2021 for the "outstanding collaboration" between CSISA-MEA and the Livestock Production and Improved Nutrition (LPIN), another USAID supported Activity in Bangladesh implemented by ACDI/VOCA. The collaboration focused on expanding markets for new mechanized fodder chopping technologies in the Feed the Future (FtF Zone of Resilience, or ZoR) by facilitating business expansion and demand creation for improved fodder choppers that are safer to operate than conventional models, and which are made by two manufacturing firms, Janata Engineering and RK Metal, both based in the FtF Zone of Influence (ZoR. According to USAID, this "…contributed to increased and efficient livestock production through mechanization in the host communities impacted by the influx of Rohingya refugees".

Partnering with the private sector to accelerate access to appropriate agricultural machinery. During the reporting period, the Activity initiated and signed agreements with 13 companies (including two banks) and an international NGO. These agreements were designed as 'Joint Venture Agreements' supporting markets and manufacture of new agricultural machinery, provision of financial services, expansion of machinery and spare parts dealerships, and to initiate machine and spare parts manufacture in the ZoR and ZOI. The activities included in these JVAs are as follows:

- Four agreements (with Alim Industries Limited, Abedin Equipment Limited, The Metal (Pvt) Ltd (TML) and ACI Motors Limited) focused on market expansion for harvesting equipment, with a focus on companies providing training and after sales services for combine harvester mechanics and drivers.
- Two agreements (with Abedin Equipment and TML) provide necessary after-sales services and training in rice transplanter machine operations, rice seedling production for rice transplanters, and demand creation and awareness raising among farmers focused on the use of rice transplanters.

- Three agreements (with TML, Janata Engineering and RK Metal) cover the establishment of new machinery dealerships in under-served areas of the FtF ZoR and ZoI.
- Through these agreements, two lead firms (TML and ACI Motors) are now working with a range of agriculture-based light engineering (ABLE) small and medium enterprises (SMEs) that were selected and trained to produce necessary spare parts for combine harvesters and tractor attachments, the sales of which have grown considerably in the reporting period.
- Under an innovative JVA, BRAC Bank Limited, worked during the reporting period to develop systems for financing agricultural machinery manufacturing and marketing. Similarly, IDLC Finance Limited entered into a JVA with the Activity to support ABLE SMEs with training to develop their capacity in financial management and business planning, both of which are crucial for SMEs to demonstrate their solvency when applying for loans to support their businesses.
- Another JVA was signed with Bhalo Social Enterprises, which is now working to identify and engage potential machinery solution providers (MSPs, who are machinery owners who offer farm machinery services to farmers on an affordable fee-for-services basis) as input provision agents. As part of this work, MSPs are gaining additional training in advising farmers on how to make efficient use of appropriate inputs. At the time of writing, a similar JVA is being developed with iFarmer Limited.
- Three agreements were signed with lead firms (TML, Abedin and Alim) that covered training for their mechanics to develop their current skills set and expand their expertise into the efficient servicing of mini-combine harvesters. In turn, these trainings assisted these lead facilitated the mechanics to train combine harvester operators and local, independent mechanics on how to use, operate, repair and maintain combines that are increasingly popular in Bangladesh.
- A new JVA was signed with a lead firm (Janata Engineering) that covered enhancement of its machinery manufacturing capacity through training its workforce in modern technology and Occupational Health & Safety (OHS).
- Agreements were signed with three regional seed companies (Konika Seed Company, Ali Seed Farms, Uzirpur Organic Multipurpose Cooperative Society Limited (UOMCSL) in Jashore, and INSAF Agro Ltd in Faridpur), to support them to train growers of rice seedlings for rice transplanters, and to encourage the use of rice transplanters.

Partnering with 104 agriculture-based light engineering (ABLE) enterprises. Of 104 ABLE enterprises the Activity engaged with during the reporting period, 85 have signed agreements with CSISA-MEA and have 53 received workforce and business management training. Following the signing of the agreements, 5 "kick-off" meetings were held to explain CSISA-MEA's activities and its role in providing support to ABLE SMEs to develop their capacity to expand their businesses. The remaining 22 will begin formal engagements from October 2021 forward.

To achieve these outcomes, the Activity published a request for expressions of interest, identifying an additional 70 ABLE enterprises in the ZoI and 40 in the ZoR as possible partners.

This will bring the total of partner ABLE enterprises to 214 by the end of the Activity's third year. ABLE enterprises were supported to prepare business plans, extend business networks with dealers, and with technical support for the manufacture of spare parts that are new to them. The Activity has worked to their improve access to raw materials, including steel of known, guaranteed quality, that is necessary for the production of quality spare parts and machinery.

A lesson learned was that it was not possible to provide all the trained ABLE enterprises with the technical and business support needed to develop their businesses, as many were not ready to receive this type of support. From the start of the next financial year, CSISA-MEA will therefore take a more structured approach to developing ABLE enterprises. The first step will be to provide all ABLE enterprise partners with workforce and business management training. Enterprises who show an interest in developing their businesses will progress to a second tier, where technical engineering and business development support will be provided through formal cost-sharing agreements.

An example how CSISA-MEA has made links among small and large, 'lead firms' in the agricultural machinery industry in Bangladesh is demonstrated by the FY2021 JVAs signed with ACI Motors and TML, two of the largest agricultural machinery importers in Bangladesh. These agreements supported ACI and TML to identify light engineering workshops in Bogura and Jashore with the capacity to manufacture spare parts for combine harvesters and other agricultural machinery. With consistent technical support from CSISA-MEA, and laboratory-based quality testing of the parts produced, TML has placed orders with three smaller ABLE enterprises for gearbox covers, pulleys for combine harvesters, and brake drums and weights for four-wheel tractors (4WTs). Another 11 ABLE enterprises produced prototypes of 51 spare parts for quality testing by ACI Motors. These arrangements are helping these ABLE SMEs to grow their businesses, contributing to both agricultural and workforce development through partnerships with the private sector.

Access to smart finance for improved services. Businesses cannot develop and expand their capacity to manufacture agricultural equipment and spare parts without financial investment, either from their own savings or from financial institutions providing loans. A key activity in this reporting period has therefore been to improve access to finance for ABLE enterprises. First, CSISA-MEA developed systems for assessing the credit worthiness of ABLE SMEs and then linked them with banks interested providing loans to enterprises with the best credit worthiness assessments. As a consequence, the Activity facilitated the disbursement of 23 loans worth USD 547,294 through seven financial institutions (BRAC Bank, IDLC, IPDC, Jamuna Bank, Janata Bank, Agrani Bank and MIDAS) to 13 partner ABLE enterprises and by two financial institutions (BRAC MFI and VPKA Foundation) and to two machinery dealers and six machinery solution providers (the latter for machinery purchases to commence or enhance their businesses).

Transformative training for ABLE enterprises. Thengamara Mohila Sabuj Sangha (TMSS) in Bogura and Rural Reconstruction Foundation (RRF) in Jashore are partner NGOs of CSISA-MEA. These NGOs are qualified in workforce training, and for this reason, the Activity partnered with them to facilitate training for 102 staff from 37 ABLE enterprises in metal working skills. These staff went on to subsequently trained 251 of their co-workers. The Activity took an innovative private sector-led approach to provide foundry skills training to 120 workers in 18 foundry ABLE enterprises, with one of the foundries hiring a consultant to develop training manuals, which were reviewed for quality and improved by CSISA-MEA engineers, who also prepared PowerPoint presentations for the trainers. Training was provided for 30 women foundry workers on spare parts and machinery painting skills and OHS. CSISA-MEA also engaged international NGO BRAC, to provide soft skills training to nine senior management staff from three lead firms, and 12 owners of ABLE enterprise owners at the BRAC Centre, Faridpur.

Georgia Institute of Technology (Georgia Tech) is a core partner in CSISA-MEA. The Institute provided ABLE enterprise and CSISA-MEA engineers with advanced manufacturing design training, delivered live on Zoom from Georgia, Atlanta, USA. The engineers then facilitated ABLE enterprises to manufacture new spare parts and machines, for which CSISA-MEA has identified new markets. These include parts for combine harvesters, rice transplanters and tractors. An agreement is also under development with Lincoln Electric, a USA-based multinational manufacturing equipment company, following their initial interactions with Georgia Tech. Through this partnership, Lincoln Electric trainers in the United States will use virtual welding training equipment, videos and manuals to train remotely youth employed in Bangladesh's light engineering sector in advanced welding skills.

JVAs with lead firms (Alim Industries, Abedin Equipment, TML, ACI Motors and Janata Engineering) resulted in training for 30 company engineers, 310 mechanics and combine harvester owners/operators in the ZoI, in how to operate and maintain combines. As a result, 236 combine harvesters within the ZoI, and 222 combine harvesters in other parts of Bangladesh received pre-season servicing. In Cox's Bazar, ZoI-based lead firms Janata Engineering and RK Metal trained 28 mechanics in how to operate, repair and maintain combine harvesters, reapers and rice transplanters. The mechanics passed on their new skills to 13 owners of reapers, combine harvesters, rice transplanters and fodder choppers. In the ZoI, two Dhaka-based lead firms (Abedin Equipment and TML) and four ZoI-based seed companies provided training to a total of 211 rice transplanter owners, MSPs considering buying a rice transplanter, and mechanics, in how to maintain and operate rice transplanters, including how to raise seedlings for planting by rice transplanters. Also in the ZoI, four regional seed companies conducted 35 (eight rice transplanter, 25 fodder chopper and two reaper) demonstrations of their machines to a total of 433 participants, generating interest from 35 attendees in purchasing the machines. In the ZoR, companies and dealers conducted 26 (8 rice transplanter, 11 combine, and 7 fodder chopper) demonstrations of the machines they sell. Two of the demonstrations were in collaboration with LPIN. The total of 638 attendees generated 85 interested potential customers.

Action into impact. A CSISA-MEA impact survey showed that during the reporting period, a total of 41,148 farmers (13% woman) purchased mechanized land preparation, irrigation and harvesting services from a total of 1,514 machinery solution providers (MSPs) (22 irrigation, 1,286 power tiller-operated seeders, 81 combine harvesters, 117 reapers and eight rice transplanters). These services covered 13,642 ha, representing 93% of the Activity's annual target. Activities supported through CSISA-MEA agreements with companies resulted in 193 MSPs purchasing a total of 110 combine harvesters, 51 reapers, 13 rice transplanters, 14 fodder choppers, one mini combine harvester and four PTOS. After subtraction of government subsidies, these purchases were worth USD 1,779,235.

Development of new machinery: During the reporting period, CSISA-MEA, the manufacturing firm RK Metal, and international NGO Practical Action signed agreements to develop and jute fiber extraction machines. Through these agreements, four machinery manufacturers have made prototypes of a modified version of the *Aashkol* jute fiber-extracting machine that these companies already sell. Students at Georgia Tech have also made an machine that can extract fiber without breaking the jute stem – the resulting jute stick is used in horticulture crops and by particle board manufacturers. This machine has been successfully tested by RK Metal in Faridpur.

Collaboration with USAID's implementing partners to boost impact: CSISA-MEA collaborated with the USAID FtF Bangladesh Rice and Diversified Crops Activity (RDC) on activities related to combine harvester use and demand creation. The Activity has taken a lead in facilitating training for mechanics and combine operators, through agreements with lead firms selling combine harvesters. RDC conversely assisted machinery firms with financial support for advertising combine harvesters to increase sales. Through JVAs with lead firms and seed companies, CSISA-MEA facilitated the maintenance, use and marketing of rice transplanters. This included a collaboration with the Government of Bangladesh Department of Agriculture Extension (DAE) to provide training for farmers and MSPs in raising rice seedlings for planting using rice transplanters.

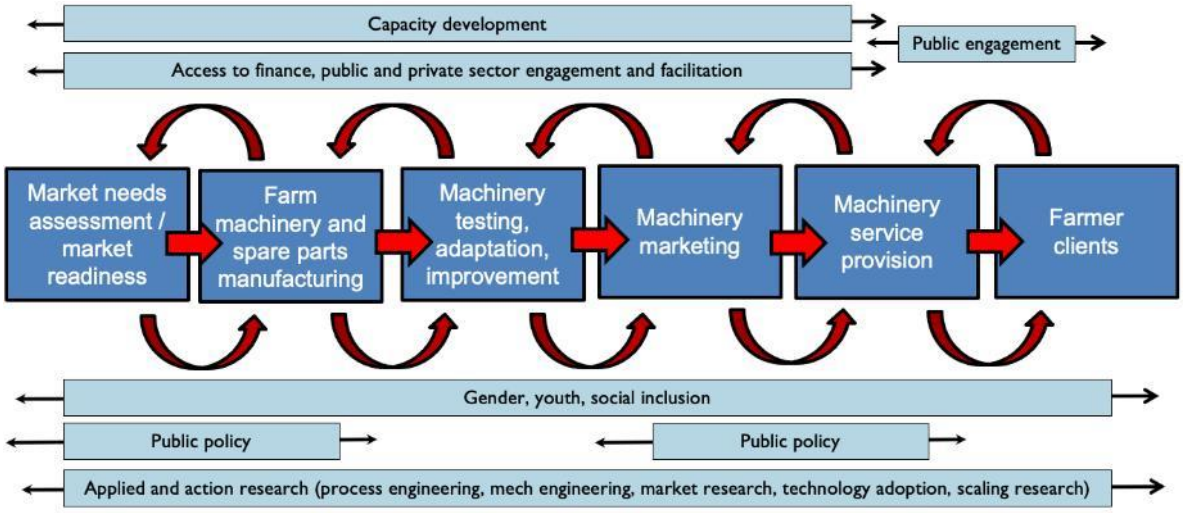
Above: Mini-combine harvesters are increasing in popularity in the Feed the Future Zone of Bangladesh. CSISA-MEA works to assure appropriate after sales services and training for combine operators through private sector partnerships. *Photo credit: Abdul Momin.*

Introduction and background

The USAID Feed the Future (FtF) Bangladesh Cereal Systems Initiatives for South Asia - Mechanization Extension Activity (CSISA-MEA) is a five-year development activity which started in October 2019. The activity is implemented by a consortium of partners consisting of the International Maize and Wheat Improvement Center (CIMMYT), International Development Enterprises (iDE) and Georgia Institute of Technology (Georgia Tech). CIMMYT is the lead partner. This report covers the work and achievements of the second year of the Activity, from 1 October 2020 to 30 September 2021.

CSISA-MEA supports the mechanization of agriculture in Bangladesh by developing the capacity of the country's private sector to develop, manufacture and market innovative new agricultural mechanization technology. This support contributes to the mechanization of agricultural production in Bangladesh by saving farmers' costs incurred from hiring labor, and relieving them of time-consuming and arduous crop production activities. The Activity is a continuation and expansion of the work initiated by the USAID-financed CSISA Mechanization and Irrigation (CSISA-MI) Activity that resulted in private sector investments worth USD 6.9 million. Private sector companies entered into agreements with CSISA-MI and sold 3,757 planting, harvesting and irrigating machines to 3,474 rural entrepreneurs. These became commonly known as local service providers (LSPs) or 'machinery solutions providers' (MSPs) who used these machines to sell planting, irrigation and harvesting services to a total of 308,000 farmers in the ZoI covering 135,000 ha. CSISA-MI was implemented by the International Maize and Wheat Improvement Center (CIMMYT) in partnership with International Development Enterprises (iDE) and a range of private and public sector partners. CSISA-MI started in 2013 and supported the private sector to import and market planting and harvesting machinery. Both investments are part of the wider Cereal Systems Initiative for South Asia (CSISA) program that has been supported by USAID in Bangladesh and Nepal, and by the Bill and Melinda Gates Foundation (BMGF) in India, since 2009. CSISA-MI initially began as a co-investment in this program, and has since matured into CSISA-MEA.

As the CSISA-MI Activity progressed, a number of light engineering companies began to copy and manufacture some of the machinery imported by other companies the Activity supported. As this process of copying and manufacturing progressed, it became clear that with technical and managerial support to the light engineering industry in Bangladesh, many machines and their spare parts could be manufactured in the country. As a result, CSISA-MEA was planned with a strong emphasis on supporting the light engineering industry with manufacturing and managerial skills training, manufacturing systems design, links to markets, and access to finance. To support CSISA-MEA partners to facilitate these, Georgia Tech joined the Activity as a partner. Thus, in contrast to CSISA-MI, CSISA-MEA works across the full length of the mechanization value chain, from manufacture through marketing to provision of machinery services to farmers. To further support farmers in the Rohingya crisis-impacted Cox's Bazar district, CSISA-MEA is supporting the private sector to introduce agricultural mechanization technology into the USAID ZoR.



Above: *Activities planned along the agricultural machinery value chain*

CSISA-MEA's Core Objective is to enhance agricultural resilience through the development of agricultural machinery light engineering companies and to develop a youth and gender-inclusive workforce, with a special focus on the crisis-affected areas of Bangladesh. This is achieved through three Intermediate Results (IRs):

IR 1: Competitiveness and efficiency of domestic and private sector-led agricultural machinery manufacturing boosted.

IR 2: Institutional capacity for agricultural mechanization through the development of skilled and youth workforce enhanced.

IR 3: Farmers' access to agricultural production and marketing services improved.

1.2 The CSISA-MEA private sector engagement approach

From 2013 to 2019, CSISA-MEA's predecessor CSISA-MI created a demand for new labor-saving agricultural machinery by directly implementing a program of promotional events, where the use and business value of new technology (power tiller operated seeders, axial flow pumps, and reapers) which were cooperatively demonstrated to farmers with the private secor. At these events, prospective customers were actively linked to local dealers selling the machines, who had already attended awareness and demand creation events. After purchase, new owners were trained in the use and maintenance of the machines and in business management, facilitated by the Activity and key lead firm private sector partners. The Activity supported these lead firms through joint venture agreements (JVAs) to facilitate imports and sales, and through cost-sharing in the development of advertising and promotional materials, including videos and posters. Importantly, the primary method used by CSISA-MI to attract private sector investment was the provision and communication of data on machinery performance and potential for business sales. These were generated through action research

conducted by the Activity in partnership with the private sector and Bangladesh Agricultural Research Institute (BARI).

CSISA-MEA continues with this market systems development approach, by working to support companies or institutions to provide training, technical advice, financial services, and business skills. The Activity works to broaden the market systems which support agricultural mechanization and machinery manufacturing, by facilitating links between market actors and technical advisers. Interventions implemented by the private sector with CSISA-MEA support should be innovative, new and readily scalable. Costs and activities are rationally shared between partners and, wherever possible, confined to the provision of technical support. CSISA-MEA does not engage directly in interventions but rather plays a market facilitation role by funding interventions, facilitating linkages to other organizations (such as the Department of Agricultural Extension (DAE)and national agricultural research institutions and universities) and the provision of technical expertise. In principle, this approach means that by the time the Activity comes to an end, any activities implemented by its partner companies should continue to be supported because they make good business sense and generate revenues on a sustainable basis.

To this end, CSISA-MEA continues to rely on the use of JVAs with lead firms. The selection of partner lead firms follows an open and transparent process involving publication of requests for expression of interest in national and local media, followed by a selection process conducted by a proposal evaluation committee and finally activity and budget negotiations with the selected companies. The Activity has also been actively facilitating collaboration between private and public sector actors, and encouraging private sector partners to participate in training and demonstration events organized by the DAE, with the expectation that this will lead to lasting working relationships between regional company representatives and district level DAE staff. Similarly, discussions with the Bangladesh Agricultural University (BAU) and BARI about collaboration to develop new agricultural machinery technology have focused on how this could be done in partnership with the private sector.

Activity partners

Building upon the expertise and lessons learned from CSISA-MI, the following partnerships have been developed to implement the Activity:

CIMMYT
International Maize and Wheat Improvement Center

The International Maize and Wheat Improvement Center (also known as *Centro Internacional de Mejoramiento de Maíz y Trigo*, or CIMMYT by its Spanish acronym) is the Activity's prime. In addition to being responsible for the overall strategy, administration and financial management of the Activity, and for employing field staff with agricultural development and engineering skills, CIMMYT is also responsible for reporting to the donor on progress of the

Activity, lessons learned through its implementation, and its impact. For this it employs a Monitoring, Evaluation and Learning (MEL) team that collects monitoring data and conducts surveys to evaluate Activity progress, and conducts internal data quality assessments (iDQA) to ensure the data reported to USAID is accurate. CIMMYT is also responsible for maintaining and administering field offices (see below for their locations). From these offices, CIMMYT and iDE field staff supervise the training and technical support given to the light engineering sector, to MSPs and machinery dealers, and to farmers.

International Development Enterprises (iDE) was a partner in the implementation of the CSISA-MI Activity and is a key implementation partner for CSISA-MEA. iDE's main responsibility is to collaborate in the design and implement market-driven interventions in partnership with private sector firms. Within CSISA-MEA, iDE plays a pivotal role in facilitating partnerships between small and medium enterprises (SMEs) in the light engineering sector and larger firms. These partnerships focus on proving process, technology and market improvements, and in leading the access to finance component with a range of national and international partners.

Georgia Institute of Technology (Georgia Tech) is CSISA-MEA's core engineering adviser and educational partner. In the USA, Georgia Tech provides a technology-focused education to undergraduate and graduate students in fields ranging from engineering, computing and sciences to business, design and the liberal arts. Within CSISA-MEA, Georgia Tech is leading efforts in the mechanization and industrialization activities. Specifically, Georgia Tech has been providing consultative services to CSISA-MEA for the design of training for light engineering SMEs, technical support with the manufacture of machines and parts produced by partner SME in the light engineering sector and for the design of new types of agricultural machines.

Activity Staffing: The Activity currently employs 58 staff; 21 are based in the Dhaka office and 37 in field offices, and five are internationally recruited staff. The Activity also engages Eight consultants on short-term assignments. The composition of the leadership team includes the Chief of Party, the Project Manager, a Field Team and Private Sector Engagement lead,

two Systems Agronomists, an Agricultural Innovation Scientist, a Supply Chain Expert, a Monitoring and Evaluation team, and a range of supportive positions.

Georgia Tech provides Professor Dr. Jonathan Colton as technical lead on the engineering aspects of the Activity. Georgia Tech postgraduate and undergraduate Mechanical Engineering students, supervised by Professor Colton, design machinery and manufacturing processes and conduct studies for the Activity as part of their thesis research and course work. The administration and financial management support for the Activity is provided by a pool of staff that supports all programs implemented by CIMMYT and iDE. Annex II presents the CSISA-MEA key staffing matrix.

Area of operations

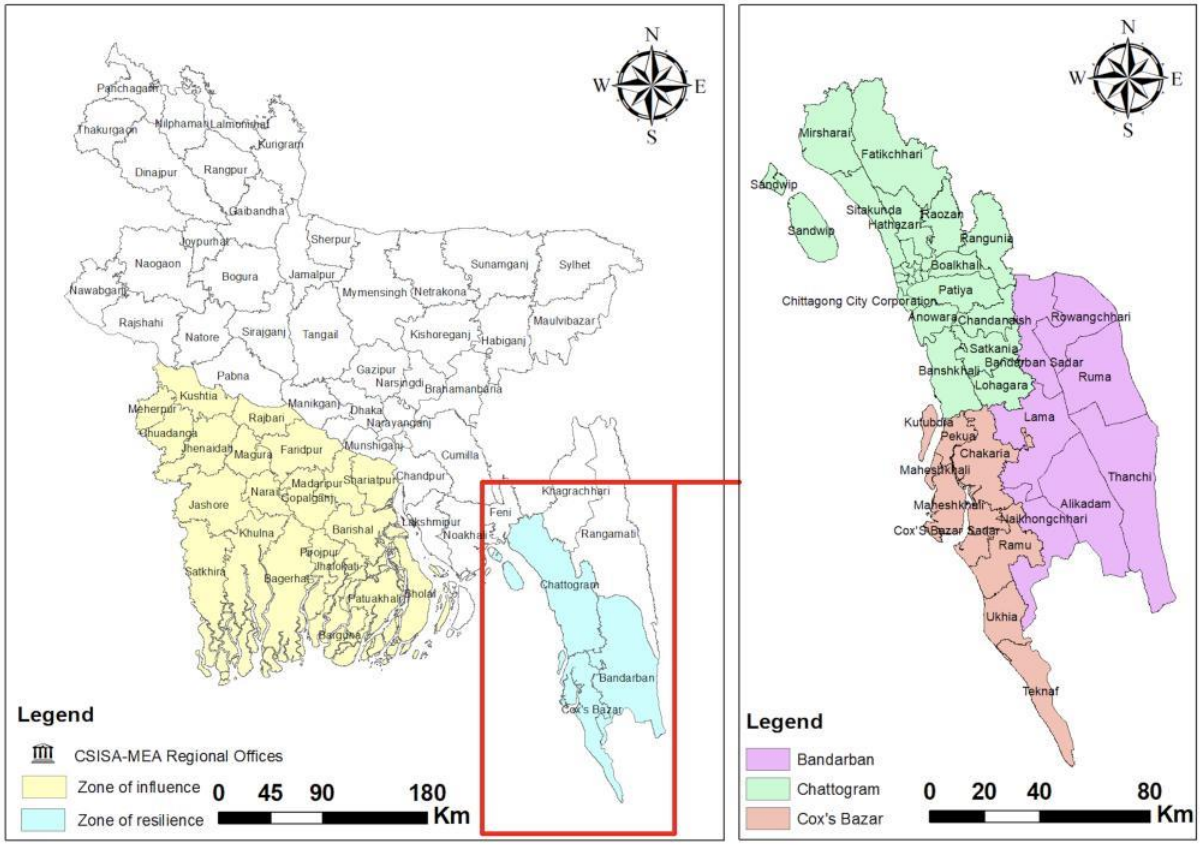
CSISA-MEA maintains field offices in locations across Bangladesh that are crucial for USAID's activities and also for the light engineering and manufacturing industry.

Khulna and Dhaka Divisions (greater Jashore and Faridpur): This is where the main light engineering hubs in the FtF ZoI are based. This is a major area for the commercial production of fine grain rice, vegetables, jute, pulses, maize and wheat, and where adoption of agricultural machinery technology such as tractors, powered tillers, combine harvesters, two-wheeled tractor planters, reapers and threshers is rising rapidly. There is also a growing interest in this zone in new resource and labor saving farm machinery technologies, including rice transplanters. As this market for agricultural machinery grows, it attracts more companies to market their machines in these areas. By contrast, coastal districts in the south and Barisal Division in the east of the ZoI – where commercial production of crops is less intense – have been exposed to far less machinery marketing, resulting in farmers having less access to new agricultural machinery technologies. Providing companies with support to expand their operations into these districts has become a focus of some of the CSISA-MEA interventions.

Bogura district: This is the main light engineering center outside Dhaka. It is also where many machine manufacturing enterprises in the FtF zone obtain parts and components for the machines they make. Equally, many machine manufacturing enterprises in Bogura obtain parts from machine manufacturers in the ZoI.

Cox's Bazar district: This is close to the farming community supplying farm produce to the Rohingya refugee camps. Being remote from the major commercial centers in northern and central Bangladesh and having limited agricultural resources, the district has not attracted major commercial interest in terms of the manufacture and marketing of agricultural machinery. As the reporting year progressed, greater emphasis was given to the introduction of agricultural machinery technology in the ZoR. This has, to date, mainly been led by the ZoI-based agricultural machinery manufacturing companies, Janata Engineering and RK Metal. and by the Dhaka-based lead firms, ACI Motors, Abedin Equipment Limited and TML. The Activity plans to expand this successful program into all *upazilas* of Cox's Bazar district and also into

Bandarban district. From October 2021 there will also be an emphasis on developing the capacity of ZoR- and Cartogram-based light engineering enterprises to manufacture and market agricultural machines and spare parts in the ZoR. This will be achieved in part through developing workforce skills and will result in the creation of jobs for young women and men.



Above: Map showing location of CSISA-MEA working areas and partner companies.

High-level field visits, meetings and presentations: COVID-19 travel and meeting restrictions prevented travel by Activity and USAID staff to observe CSISA-MEA activities for much of this reporting period. An easing of travel restrictions from February 2021 allowed some travel, which was again restricted after the resurgence of the epidemic from May 2021.

USAID staff were able to visit Cox's Bazar District from 22–24 March, 2021, to see CSISA-MEA activities. The visitors included Jacob Morrin, Agriculture Development Officer, Aniruddha Roy, Economic Growth Office, Motasim Billah, MEL Specialist, Program Office, and Munira Begum, Program Office.

The USAID visit locations included Samia Motors, Ramu, Cox's Bazar. Here, USAID met Mr. Sami, the owner of Samia Motors, as well as Mr. Sadid Jamil, Managing Director of TML, and Md. Ole Ullah, owner of Janata Engineering Limited (TML and Janata are both CSISA-MEA partners), MSPs and agricultural machinery mechanics. They also met a representative from BRAC Bank, which provides finance to small business and farmers for the purchase of farm

machinery. In Dulahazara Uttarpara, Chakaria *upazila*, visitors observed a demonstration by TML of rice being transplanted using a rice transplanter, and met rice transplanter service providers, as well as women who raise rice seedlings for farmers who use rice transplanter services. They also observed TML proving training to MSPs on the operation, maintenance and repair of rice transplanters.

Above: A machinery service provider demonstrating use of a power tiller operated seeder to USAID visitors in Cox's Bazar, March 2021. *Photo credit: Syed-Ur-Rahman*

The USAID visitors also watched demonstrations of a PTOS being used for the strip-till planting of maize, and a display of agricultural machinery, including combine harvesters, reapers, reaper-binders, mini maize shellers, fodder choppers and weeders. During this portion of the visit, USAID also met with DAE staff, including the District Director and DAE extension staff, and dairy farmer associations, where CSISA-MEA and the USAID FtF Bangladesh LIPIN Activity are collaborating to introduce fodder chopping machinery, in partnership with FtF ZoI-based machinery manufacturing companies.

Regular meetings with and presentations to USAID: In addition to field visits, the Activity maintained a consistent schedule of online meetings to brief USAID on progress during the reporting period. Between 26 October of 2020 and 20 September 2021, CSISA-MEA participated in 30 meetings with USAID including general weekly updates, during which presentations on activities were presented, data quality assessments, and group meetings with USAID Implementing Partners in Bangladesh.

Achievements during the reporting period

Annex I presents results achieved against targets for Activity Year 1 and Activity Year 2. It shows that targets for most indicators are being met and many far exceed expectations. Stand-out achievements have been the sale of machinery, facilitating access to finance for potential service providers, and the number of light engineering workforce trained. The Activity has also surpassed targets for supporting training and business development activities for women and youth. Details on progress in each Intermediate Result area are presented below.

Spotlight on collaboration with USAID Implementing partners

USAID | BANGLADESH
FROM THE AMERICAN PEOPLE

Award for Collaboration

This Certificate is presented to

CIMMYT and ACDI/VOCA, the Implementing Partners of Cereal Systems Initiative for South Asia Mechanization Extension Activity (CSISA-MEA) and Livestock Production for Improved Nutrition (LPIN) Activity

"For their outstanding collaboration that contributed to increased and efficient livestock production through mechanization in the host communities impacted by the influx of Rohingya refugees"

June 17, 2021

Derrick S. Brown, Mission Director

Above: A major achievement was an award given by USAID to CSISA-MEA in June 2021 for outstanding collaboration between CSISA-MEA and LPIN.

A major achievement for the Activity was an award given by USAID to CSISA-MEA in June 2021 for the "outstanding collaboration" between CSISA-MEA and the Livestock Production and Improved Nutrition (LPIN), another USAID supported Activity in Bangladesh implemented by ACDI/VOCA. The collaboration focused on expanding markets for new mechanized fodder chopping technologies in the FtF ZoR) by facilitating business expansion and demand creation for improved fodder choppers that are safer to operate than conventional models, and which are made by two manufacturing firms, Janata Engineering and RK Metal, both based in the FtF Zone of Influence (ZoR. According to USAID, this "…contributed to increased and efficient livestock production through mechanization in the host communities impacted by the influx of Rohingya refugees".

IR 1: Competitiveness and efficiency of domestic and private sector-led agricultural machinery manufacturing boosted

Intermediate Result 1

Intervention 1.1 Developing the manufacturing capacity of agriculture-based light engineering small and medium scale enterprises

Bangladesh's light engineering sector is dominated by an extensive number of SMEs concentrated in industrial hubs in Bogura, Jashore and Dhaka. Their main business involves repairing machines, fabricating parts, and manufacturing small, simple machines, often copied from imported machines or from designs developed by government institutions. CSISA-MEA collaborates with agriculture-based light engineering (ABLE) enterprises to develop their competitiveness and efficiency in the manufacturing, assembly, use and servicing of agricultural machinery. The more improvements SMEs make to their manufacturing capacity, the greater the access of the region's farmers will be to quality machines and services. For most ABLE enterprises, their most critical constraints are access to markets for new products, technical training, reasonably priced and quality raw materials, and affordable finance. One of their core requirements is access to appropriate information about how to manufacture machines and parts, and the equipment required to make them.

The specific objectives of the collaboration between CSISA-MEA and partner ABLE enterprises under IR 1 are to:

1. Provide support for preparing periodic business plans and mentorship.
2. Provide access to market information especially about opportunities to manufacture new types of machines, machine parts or spare parts.
3. Facilitate access to new markets for the existing portfolio of machines and parts sold by ABLE enterprises and/or to access new types of machinery to manufacture or produce

parts for popular machineries. This may involve CSISA-MEA facilitating partnerships with national and international lead firms.

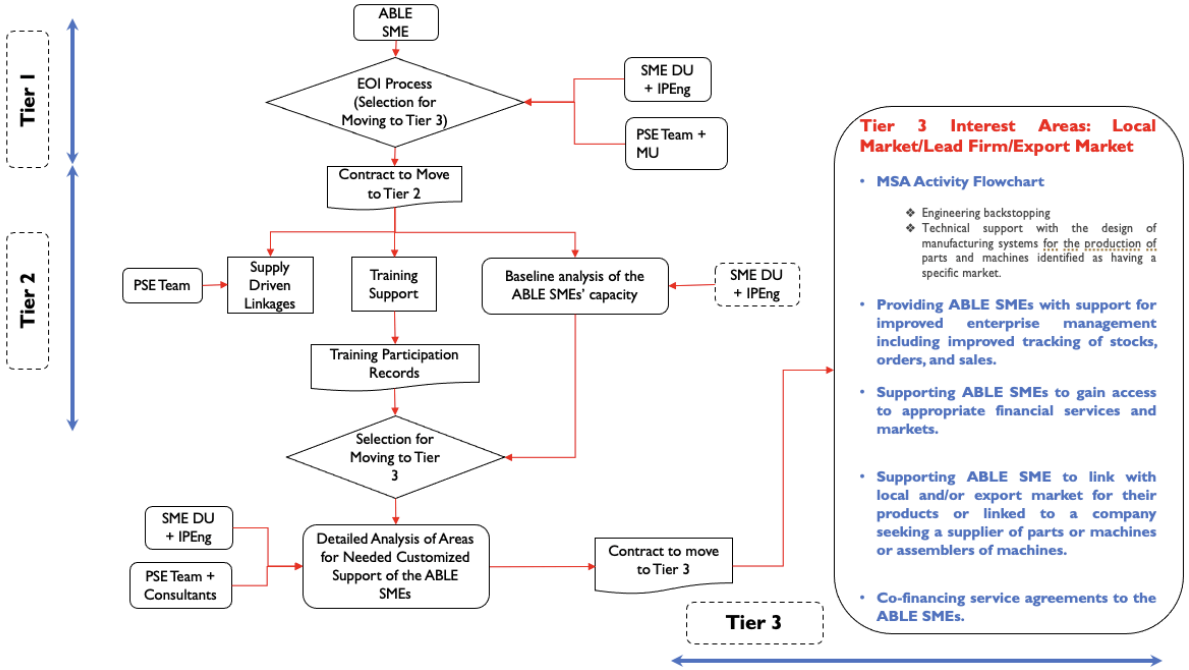
4. Provide technical support for the design, introduction and development of more efficient machine manufacturing processes including advice on which equipment ABLE SMEs should purchase, and training them to use it.
5. Develop the technical skills of the ABLE SME workforce, including provision of Occupational Health and Safety training.
6. Develop the business and financial management skills of ABLE SME managers.
7. Link ABLE SMEs to other support services, including financial services.

Developing partnerships with ABLE enterprises*:* In the first two years of CSISA-MEA, the Activity applied a customized approach to all ABLE enterprises with which it partnered. An important lesson learned from implementing this approach, however, is that it did not sufficiently recognize that the low capacity of the majority of ABLE enterprises would not allow them all to utilize the technical support CSISA-MEA could provide. It also did not consider the insufficient understanding of the level of commitment to CSISA-MEA required by ABLE enterprise owners and managers, if they were to benefit fully from the Activity's support.

Building on these lessons, towards the end of Year 2 (FY2021), CSISA-MEA developed a new approach to ABLE enterprise engagement that involves first raising the knowledge and skills of the workforces of all the ABLE enterprises partnering with CSISA-MEA. The Activity will then provide customized support to those ABLE enterprises who show a strong commitment to investing in their development. This is based on a detailed analysis of the ABLE SMEs' capacity, and their commitment to a program of market and company growth. From this, the Activity customizes the support needed for each selected ABLE enterprise. To provide this support, CSISA-MEA signs a JVA with each participating ABLE enterprise, which covers cost-sharing. It then provides technical assistance for interventions, which can include the identification of appropriate investments in new equipment, improved factory layout to improve production processes, and expansion into new machinery and spare parts markets (see Annex III for more details).

This 'tier-based' process allows the Activity to assess the commitment of the ABLE enterprises and gives CSISA-MEA staff more time to design and implement customized support for the strongly committed ABLE enterprises. This process is presented in the figure below.

During the second year of CSISA-MEA, the Activity developed alliances with 104 ABLE enterprises. The COVID-19 pandemic delayed the signing of agreements with all of them; so far, agreements have been signed with 85 ABLE enterprises.



Above: CSISA-MEA's improved three-stage ABLE engagement approach

Above: The owner of Sarker Enterprises Mr. Md. Saiduzzaman Sarker Ziku, signing an agreement with CSISA-MEA, Sherpur, Bogura, September 2021. *Photo credit: Arif Rahman*

Following the signing of these agreements, field office teams in Bogura, Faridpur and Jashore held five meetings (one in Faridpur, two Bogura, one in Jashore and one in Kustia) with 53 ABLE SME partners (24 from Khulna division and 29 from Bogura district) to explain in detail

CSISA-MEA's activities and their role in supporting ABLE SMEs to develop the capacity to expand their businesses.

Above: (Left) CSISA-MEA Inaugural Workshop with ABLE SMEs, Kushtia, September 2021. *Photo credit: Md. Hafijur Rahman.* (Right) Inauguration workshop, Momo Inn, Bogura, 17 September 2021. *Photo: Arif Rahman*

Following the publication of a request for expressions of interest in partnering with CSISA-MEA, the Activity collected primary data on a total of 70 more potential ABLE enterprise partners in Jashore, Faridpur and Bogura, and a total of 40 in Cox's Bazar and Bandarban districts. These will be added to the existing network of ABLE enterprises in Year 3 of the Activity. In Jashore, these activities will result in considerable geographic expansion out of Jashore town into ABLE enterprises hubs in Kustia, Khulna and Satkhira districts. By the end of Year 3, CSISA-MEA expects to be partnering with 214 ABLE SMEs from the Jashore, Faridpur, Bogura and Cox's Bazaar light engineering hubs.

Above: Mohammad Ali of Mohammad Ali Engineering learning how to measure metal hardness using files, Jashore. *Photo: Arif Rahman*

The pictures below illustrate the type of technical support given to ABLE enterprises by the Activity's teams of engineers and market development officers, supported technically by industrial process engineers from Georgia Tech. The tools that ABLE enterprises currently use are old and have not been calibrated recently, and the resulting measurements are not accurate, reducing the ability of the business to make quality machines and parts. During the reporting period, CSISA-MEA engineers introduced 15 ABLE enterprises to new tools and techniques, including precision gauge blocks, surface finish comparators, and hardness testing files.

Supporting ABLE enterprises with technical advice

New Rifat Engineering (NRE) workshop

To meet a demand for combine harvester and rice transplanter spare parts, NRE expanded into manufacturing planting fingers and cylinder sleeves for rice transplanters, and cutter bar assemblies for combine harvester. To support them produce these parts, CSISA-MEA provided training, via video calls live from Georgia Tech, and prototyped dies. As a result, NRE made combine harvester cutting bars for 8 MSPs and 100 rice transplanter fingers. ACI Motors has now placed an order for 300 rice transplanter fingers.

Above: Workshop of CSISA-MEA partner firm, New Rifat Engineering selling cutting units for combine harvesters, Jashore, October 2021. *Photo credit: Md. Khalequzzaman*

Designing manufacturing processes for spare parts with Shilpi Metal.

A foundry and machining workshop, Shilpi received 3 parts from TML for prototype manufacturing but the measuring instruments it uses could not ensure accurate dimensions. With technical support for pattern-making, instruments calibration and appropriate machining processes, Shilpi Metal was enabled to manufacture the prototype. They have and received orders from TML as a result.

Above: CSISA-MEA supports Shilpi Metal Foundry make weights for 4WT by showing them how to calibrate their measuring instruments using a gauge block. 2 September, 2021. *Photo credit: Shahabuddin Shihab*

Mohammad Ali Engineering

This workshop received CSISA-MEA support for the fabrication of a roller crank pin, a fast-moving combine harvester spare part. The motion of the blade bar creates high frictional force and was resulting in them breaking frequently. The CSISA-MEA team developed drawings and an exploded view of the assembly, a parts list, bill of materials, materials route sheet, process flowchart and cost model. Mohammad Ali Engineering is now in the process of adapting its engineering processes to improve manufacturing using the technical information provided.

Above: Mohammad Ali Engineering purchased radial drill to improve production, Jashore, *Photo credit: Md. Khalekuzzaman*

Latif Engineering Workshop

This workshop supplies fodder chopper machines to dealers and farmers in the FtF zone. CSISA-MEA analyzed the entire chopper machine production process and prepared a bill of materials, process flow chart and cost of manufacturing for Latif Engineering. This has enabled the firm to understand the importance of efficient machine set-up for reducing operation time and labor costs, and to increase quality, production and company profit.

Above: *Fodder choppers ready for delivery to dealers in the FtF Zone, Jashore, 17 December 2020. Photo credit: Md. Hafijur Rahman*

Improved access to raw materials and metallurgical testing: Most raw materials used by ABLE enterprises originate from scrap metal produced by the Bangladesh ship-breaking industry. The quality and price of this material, particularly of steel, varies considerably, making it difficult for small firms to make parts and machines of consistent price and quality. To assist ABLE enterprises to access steel of known and guaranteed quality, CSISA-MEA initiated a study to gain a better understanding of the supply chain for metal in Bangladesh and to try and develop a system that will supply raw materials with a certified quality. With this objective, raw materials markets in Dholaikhal and Jatrabari, Dhaka, were inspected during the reporting period to gather information about the kinds of material available, and their country of origin and their costs. The next step will be to determine the composition of the metals, currently listed only as mild steel, and stainless steel graded as A, B, C and D, rather than internationally recognized metal grading standards, such as the SAE steel grades. To do this, Activity engineers have been provided with portable hardness testing equipment.

Above: *Activity staff supporting ABLES in the testing of metal quality of combine harvester spare parts imported by ACI as a benchmark for domestic production of spare parts. Dimensions, hardness and surface finishing were measured and compared between domestically made prototypes with the original parts. Photo credit: Md. Khalekuzzaman.*

This simple, low cost equipment allows for on-site analysis, rather than expensive and time-consuming laboratory analysis (full details can be found in the on semi-Annual Report 2020-21).

Linking ABLE SMEs and machinery and spare parts dealers: As part of its implementation strategy, CSISA-MEA facilitates business linkages meetings to facilitate connections between ABLE enterprises and dealers. This is done with the objective of enabling agricultural machinery and related spare parts dealers to obtain equipment and spares from local ABLE SMEs rather than from Dhaka or beyond. By doing so, their transactions costs can be reduced while at the same time boosting competitiveness and facilitating access to markets for smaller firms. Five linkage meetings between ABLE enterprises and dealers were held in Bogura and Jashore region, with a total of 60 participants, during the reporting period. Through these meetings, it was agreed with ABLE enterprises and dealers to create a business relationship among themselves so that dealers can buy spare parts and machineries from Jashore and Bogura-based ABLE enterprises. Further updates on the outcomes of these agreements will be provided in the forthcoming FY2022 semi-Annual Report.

Above: *Engineer Ashah providing a technical design of a pulley at M/S Shoron Engineering Workshop, BSCIC, Bogura. Photo credit: Ali Hayder Rumel, OMD, Bogura.*

Supporting light engineering associations to support association members: Supporting light engineering associations to improve the services they provide to their members can be an effective way of developing a self-financing and sustainable way of providing light engineering enterprises with access to information on business and market development, capacity building, quality standards and raw materials testing, and the improvement of health and safety

standards. These associations can also act as a conduit for members to take policy-related concerns to the government. In January 2021, the CSISA-MEA Jashore field office organized a meeting with the Jashore chapter of the Bangladesh Light Engineering Industry Owners Association (BEIOA) to support it to improve the services it gives to members (details on the meeting and outcomes can be found in the on semi-Annual Report 2021). The onset of COVID-19 lockdowns across Bangladesh for much of the second half of the reporting period unfortunately slowed progress in terms of interactions with BEIOA. Renewed emphasis has been placed on this collaboration as part of the FY2022 annual work plan. As such, further updates on the outcomes of these agreements will be provided in the forthcoming FY2022 semi-Annual Report.

Facilitating the development, testing and marketing of new agricultural machinery technology

Jute fiber extraction machinery: Bangladesh is the world's second largest producer of jute, producing 1.54 million t annually, worth USD 101 million. Within Bangladesh the biggest production area is the Faridpur region in the FtF ZoI. Jute fiber is extracted by submerging jute stems in water for around two weeks (a rotting process called retting). After this the fibers can be pulled away, leaving bundles of fiber and the pith, known as the jute stick. Jute sticks are widely used as fuel, fencing, and as supports for climbing plants. They are also utilized as a raw material in the production of particle board. The extraction of jute fiber is a very labor-intensive process requiring considerable amounts of both family and hired labor.

Introducing machinery that can extract the fiber from jute would therefore reduce labor costs and increase profits for jute farmers. CSISA-MEA partnered in the reporting period with Practical Action Consulting (PAC), Bangladesh to support machinery manufacturing companies to design, test and market jute fiber extraction machines. PAC has supported similar work in the past, re-engineering an imported machine that was given the name *Aashkol* (see below). In earlier PAC activities, four firms (TML, Nasim Engineering, Tahura Engineering and RK Metal) produced a number of these machines which were well-received by farmers who recognized their effectiveness in reducing the time and labor required for jute fiber extraction. However, the *Aashkol* breaks the jute sticks in the fiber extraction process, representing a loss of income generation potential for farmers who could otherwise sell sticks. In response, CSISA-MEA is currently considering two options for resolving this problem: developing a market for the broken jute sticks (chips) in the particle board industry, and producing an engineering design for a machine that extracts jute fiber without breaking the jute sticks. The latter is preferable given pollution concerns associated with particle board production, and also because of the engineering solutions and potential to create a new group of mechanized jute service providers as entrepreneurs in Bangladesh. As such, CSISA-MEA as focused most attention in the reporting period on pursuing that option.

Above: Aashkol machine extracting jute fibers from the jute stem during a marketing/training event, Gaibandha, September 2021. *Photo credit: Arifur Rahman*

In partnership with CSISA-MEA, during the reporting period the Activity worked with four companies (TML, Nasim Engineering, Tahura and RK Metal) to make improvements in the Aashkol machine design. These included better modularity, additional speed, better power transmission and greater horsepower. The agreement also supported the four companies to train farmers and service providers in the use of the Aashkol machine. The companies held a total of 24 marketing events that reached a total of 806 participants, 93% of whom were farmers (25% women) and 7% local service providers.

The Activity also performed a study to analyze the potential to market the chips produced from broken jute sticks, which are currently regarded as having no value. A previous study showed that the labor saved by the Aashkol machine was made worthless by the sticks breaking; the new study, which is in the process of completion at the time of writing, is intended to provide an improved comparison. Jute chips can be used for particle board manufacture, charcoal, cooking briquettes, animal fodder, ink and in cosmetics. This is a multi-dimensional activity, but the first step is to determine whether the Aashkol machine produces chips that are acceptable to particle board manufacturers as the largest market option.

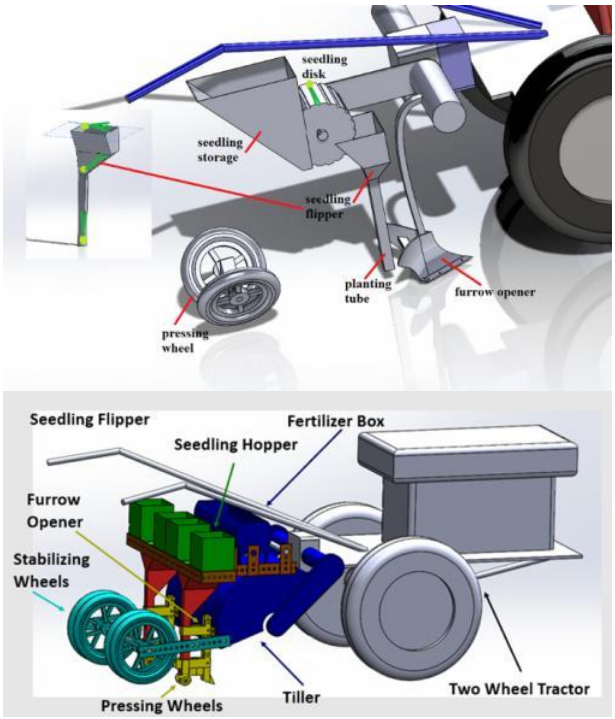
Above: (Right) Georgia Tech jute fiber extraction machine. This innovation, facilitated by CSISA-MEA, was successfully tested at RK Metal, Faridpur, September 2021. *Photo credit: Abdul Mabud*
(Left): Georgia Tech jute fiber extraction machine being modified at RK Metal, Faridpur, under supervision of CSISA-MEA engineer, September 2021. *Photo credit: Dipankar Kumar*

The second part of the activity involved the design and production of a by the Activity and a group of Mechanical Engineering undergraduate students from Georgia Tech of a machine that will strip the jute fiber without breaking the sticks. The Activity facilitated the shipping of this prototype machine to Bangladesh where it was successfully tested by RK Metal, Faridpur. A test performance matrix is being used to identify the optimal processing conditions. RK Metal is now designing a second version of the machine with technical support from the Activity. TML and Janata Engineering have also expressed interest in developing and manufacturing the machine. CSISA-MEA will also work with BARI and BJRI on its development, as well as partnering with the new FtF Bangladesh Horticulture, Fruits, and Non-Food Crops Activity to ensure any improvements are market appropriate.

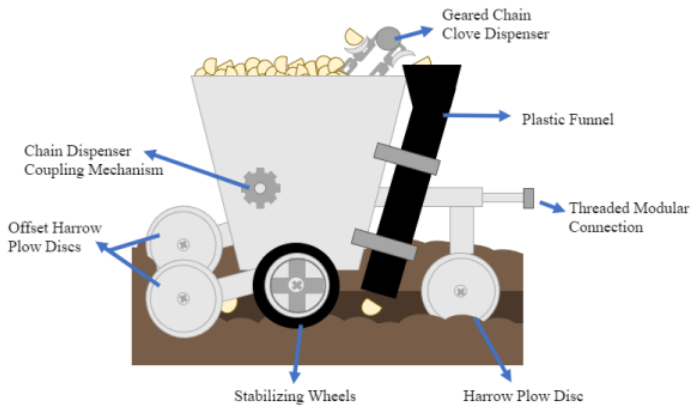
The results of the work done the Activity were presented to government and private sector partners at an online workshop (29 September, 2021). The workshop was reported in two major national newspaper where they mentioned about USAID and CSISA-MEA's initiatives on mechanization, including The Business Standard; The Dhaka Tribune.

Onion and garlic planters and harvesters: Although vegetable crops are high value, they require considerable amounts of increasingly expensive labor to produce and market. Onion and garlic are two of the most important vegetable crops produced in the FtF ZoI, with large production zones in Faridpur and Rajbari, in particular. Quantitative surveys which the Activity conducted during the reporting in the onion- and garlic-growing area of the greater Faridpur region show that farmers spend almost 38% of their gross income on hiring labor for onion production, almost half of which is needed to pay for seedling transplanting.

In response, CSISA-MEA is obtaining examples of commercially available machinery with appropriate specifications and will support research institutes and the Faridpur-based company RK Metal to test them. The second part of this activity concerns the design, prototyping and testing of planting equipment. These topics were the subjects for two Georgia Tech undergraduate Mechanical Engineering student teams during the spring of 2021. Students worked on identifying potential options for machinery as part of their capstone classes. Their resulting conceptual designs are shown below. The garlic planter worked under preliminary test conditions, but it was determined that the procurement and testing of a commercial machine was more technically feasible and economically viable, and so the Georgia Tech garlic planter was dropped. On the other hand, the Georgia Tech onion seedling transplanter does not have a commercial competitor, so a post-graduate student, supported by an undergraduate student are continuing work on this machine.



Above: (left) Designs for an onion seedling transplanter developed by students at Georgia Technical Institute, Atlanta, USA, as part of their capstone courses and in collaboration with CSISA-MEA (right): Prototype of the designed onion planter produced by students.



Above: An early version of the conceptual design for a garlic clove planter developed by students at Georgia Tech, Atlanta, USA

Ultimately this work will benefit from in-country engineering collaboration and testing within Bangladesh. At the time of writing, Bangladesh has just lifted the mandatory 14-day quarantine for travelers arriving in country. The Activity is now investigating if and how staff from Georgia Tech and students could potentially visit Bangladesh to collaborate on these topics with private companies and with BARI in the near future. Updates will be provided in the FY2022 semi-Annual Report.

Intervention 1.2 Developing the manufacturing capacity of lead firms

Because of challenging bureaucratic procedures and import processes, spare parts are often slow to arrive in Bangladesh. This frequently results in delays to repairing agricultural machinery, reducing the number of days that machines are available to provide planting and harvesting services to farmers. This in turn delays planting and harvesting, having knock-on effects which reduces the yield of many crops. In addition, imported spare parts are not

subject to import duty exemptions as are complete agricultural machines; as such, their costs can be exorbitantly high, rendering them unattractive for many firms to import, despite their importance.

With the right technical support and training, Bangladesh's ABLE SMEs should be able to manufacture many of these spare parts and at least a portion of the agricultural machinery that is currently imported. This includes parts for tractors and engines, as well as for more recently introduced machines such as combine harvesters and reapers.

Above: CSISA-MEA Jashore team facilitated Local Service Provider Mr. Ayenuddin, Pepul Baria, Jhenaidah to link with New Refat Engineering Workshop, Jashore for fabricating conveyor augers as crucial spare parts for combine harvesters. This part pushes rice or wheat straw through the machine after it is cut from the field, and helps to facilitate the separation of grain from straw. NRE, Jashore, October 2021. *Photo credit: Md. Khalequzzaman.*

Large firms importing agricultural machinery in to Bangladesh are aware of this problem and want to find suppliers in Bangladesh who can provide parts faster and at a reduced cost, but with a quality and price comparative to imported parts and machinery. However, these firms also require firm assurances of quality manufacturing. This is where the Activity plays a strong role. In this reporting period, CSISA-MEA has signed service JVAs with ACI Motors and TML – two of the largest agricultural machinery importers in Bangladesh – to support them to identify light engineering workshops in Bogura and Jashore with the capacity to manufacture spare parts for combine harvesters and other machinery. ABLE SMEs selected by the lead firms will then negotiate a deal with the lead firms to provide the parts. CSISA-MEA considers this the first step in a process that will result in ABLE SMEs being able to first manufacture

high quality, cost-competitive spare parts, then manufacture machine components and eventually whole machines, such as combine harvesters.

In Focus:

Supporting foundries through technical capacity building support

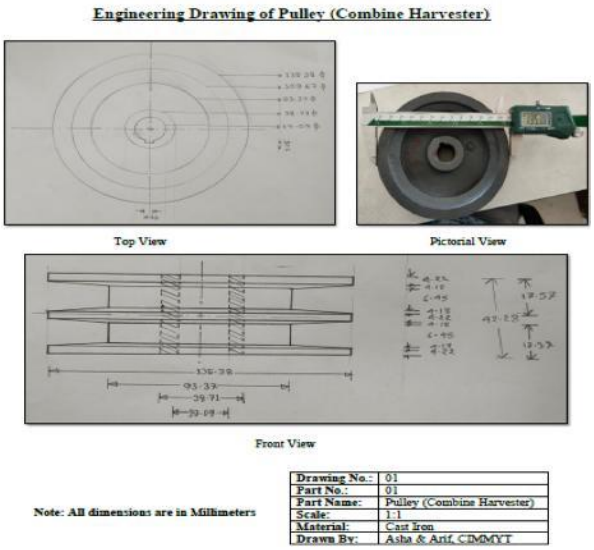
CSISA-MEA facilitates foundry training builds the foundry engineering industry is thriving amid various challenges but they now need more land, easy loans, technical and capacity building support to position themselves for the next phase of growth and fight off cheap imports. USAID funded mechanization project is assisting this sector by helping them to defeat these challenges. USAID mechanization Extension Activity has initiated training for foundry workers in Jashore and Bogura. A total 120 workforce staff received this training during the reporting period. More than 50% trainees are youth and they have 2-15 years work experience in this sector, although they barely have any formal technical training. Through training efforts facilitated by the Activity, they have learned how to make improved products and avoid technical defects.

***Above*:** A practical session during foundry training in Bogura, September 2021. *Photo credit: Arifur Rahman*

Mr. Nayon (22) has been working in molding section of Abdur Rahman Foundry for six years but he did not know the properties of molding sand or how to optimize its use to finish quality products. He received the foundry training though an agreement that the Activity made with Ripon metal Industries in Jashore to extend quality trainings to other businesses. In the training curriculum, the sand quality test by sieve analysis method was totally new to him. He learnt the technique of making the mold more air permeable by maintaining the appropriate moisture content. His foundry uses the cupola furnace system for melting the metals, but here he learnt about the electric furnace. He said, "…because of this diversified knowledge, my chances of longer-term employability will increase".

To initiate the activity with TML, CSISA-MEA supported seven ABLE enterprises (4 from Bogura, 3 from Jashore) to visit the TML warehouse near Dhaka to examine the spare parts that TML imports from India. This facilitated an understanding of the type of spare parts and requisite quality that a company like TML would like to have made locally. ABLE enterprise staff identified 13 TML combine harvester and four-wheel tractor spare parts that they

considered they could make, with the right combination of demand and technical guidance. TML provided sample parts to initiate the manufacturing process. It also arranged quality inspection, field testing, and metal composition and hardness testing of the prototype parts the enterprises produced. TML then placed orders with two ABLE enterprises from Bogura (A. Rahman Metal and Soron Engineering) and one from Jashore (Mohammad Ali Engineering Workshop) for gearbox covers, combine harvester pulleys, and four-wheel tractor brake drums and weights.



Above: (Right): Technical assistance, Rahat Engineering, Bogura, 2 April 2021. *Photo credit: Azahar Uddin*. (Left): Technical assistance, Rahat Engineering, Bogura, 21 April 2021. *Photo credit: Azahar Uddin*

As part of this activity, CSISA-MEA also facilitated linkage meetings between ACI Motors and 11 ABLE enterprises (five in Jashore, six in Bogura). ACI engineers showed samples of 51 combine harvester spare parts to ABLE enterprises, to select those they could make. The final list comprises 32 parts selected by 6 enterprises in Bogura and 19 parts by 5 enterprises in Jashore. ACI Motors has had the composition and hardness of their original spare parts tested in laboratories at BRTC and BUET to facilitate a comparison between the quality of the parts that the ABLE enterprises produce and the quality of the originals. ACI Motors has provided samples of the selected spare parts to the 11 ABLE enterprises, which have now started making the prototypes.

The CSISA-MEA team of engineers and market development officers, with support from Georgia Institute of Technology, provided technical support to ABLEs throughout the manufacturing process of the prototype spare parts that ACI Motors and TML required. This support included preparing drawings of the parts, measuring the part dimensions, hardness testing, surface finish testing, selection of raw materials, preparing machining process charts, and providing advice on appropriate heat treatment procedures.

Above: (Left) Testing hardness of original sprocket, Wohab Engineering Workshop, 26 September, 2021. *Photo Credit: Md. Khalequzzaman*. (right) Grinding a sprocket, Mohammad Ali Engineering, 26 September, 2021. *Photo credit: Shahnawaz Shaon*

Above: (Left) Owner of Latif Engineering Workshop turning the truck shaft of an ACI combine harvester in his workshop, Jashore, 16 September 2021. (Right) CSISA-MEA engineer works with the owner of New Rifat Engineering to check dimensions of combine harvester tension bolts, Jashore, September, 2021. *Photo credits: Md. Khalekuzzaman*

To further support ABLE enterprises to develop their capacity to manufacture spare parts, CSISA-MEA facilitated visits to Dhaka for 17 ABLE enterprises. During these visits, the Activity introduced them to the use of advanced (e.g. computer-aided) manufacturing equipment and metal heat treatment services. The ABLE workers visited:

1. Haque Engineering, to view its heat treatment facilities for curing steel parts.
2. Bangladesh Industrial and Technical Assistance Centre (BITAC), to view its heat treatment facilities and computerized numerical control (CNC) machines.
3. Bright Lite Corporation, to meet its team of engineers and view its CNC machine facilities.

Feedback from some of owners of the ABLE enterprises who participated in the visits indicated that: Naimun Metal commented that they had amassed a great deal of information about CNC machines and now wants to buy one. New Rifaat Engineering learned about

Above: Some of the ABLE enterprises that collaborated with CSISA-MEA in the reporting period, and that are following up after their exchange visits to Dhaka to improve their businesses.

heat treatment of metals and has expressed interest in installing a small, customized heat treatment system. In addition, Shilpi Metal found the information about heat treatment useful, and as a result intends installing a heat treatment system in its leaf spring factory. Beyond these specific commentaries, all the visiting ABLE workers expressed interest in receiving training from BITAC. Many considered it would be relatively easy to buy the advanced manufacturing equipment on display at BITAC but difficult to find qualified trainers who can train ABLE staff on the equipment's set-up and use. Facilitating access to this training will therefore be a key role for CSISA-MEA over the next Activity year.

Above: (Left) ABLE enterprise owners observe a heat treatment facility at Haque Engineering, in Dhaka, September 2021 *Photo credit: Md. Shawon.* (Right) ABLE enterprise owners observe a CNC facility at Bright Lite Corporation, Dhaka, September 2021 *Photo credit Md. Shawon*

Intervention 1.3 Supporting foreign investment in agricultural machinery manufacture and marketing

The initial intention for this intervention was to facilitate partnerships with foreign – and especially US-based – machinery companies which would result in investments in Bangladesh. Discussions with John Deere, a USA-based multinational agricultural machinery manufacturing company, led to its expressing interest in establishing machinery marketing operations in Bangladesh. To support this, CSISA-MEA is in discussions with John Deere and is working to provide information that will help it identify which of its machines it could sell in Bangladesh. CSISA-MEA will support John Deere to establish partnerships with machinery manufacturers and marketing companies, and to establish marketing activities for the machines it considers it can market competitively in the country. However, before markets can be established, the Activity has requested John Deere to collaborate in conducting a market competitiveness study for their typically higher cost, but better quality, and larger agricultural machineries. Further details on these discussions will be provided in the FY2022 semi-Annual Report.

Above: CSISA-MEA continues to explore options for John Deere's market entry to Bangladesh.

Above: CSISA-MEA is working with Lincoln Electric, a leading US welding and manufacturing company.

During the reporting period, CSISA-MEA also initiated discussions with Lincoln Electric, a leading US company that markets welding and other machinery manufacturing equipment. Following a call to Lincoln Electric's head office to enquire about the welding training materials and equipment it markets, it was discovered that they already market their equipment through ANZ, a leading company in Bangladesh that works in numerous sectors, including engineering and construction. This includes providing training on welding through its virtual training equipment, in partnership with the vocational education department of the Ministry of Education. The Activity is currently negotiating a partnership with Lincoln Electric; while formal agreements are in the process of being arranged, collaboration is already underway with Lincoln Electric set to provide virtual training on welding skills to public and private partners of CSISA-MEA in November of 2021. More details of this are given below (Intermediate Result II).

Partnering with Bangladesh-based venture capital companies: Over the last five years, a growing number of venture capital investors have established offices in Bangladesh, attracted by the opportunity of investing in one of the fastest growing economies in the world. Initially most of these investments were in the garment industry but recently companies have begun to seek other investment opportunities, including those in the light engineering and agriculture sectors. In December 2020, the USAID Mission in Bangladesh linked CSISA-MEA with Anchorless Bangladesh, a US-based early-stage venture investment fund manager that focuses on strengthening the startup ecosystem of Bangladesh. Subsequently, additional discussions have been held with other companies with similar aims as Anchoreless. These include Bangladesh Angels – another US/Bangladesh-based company – and TruValu, a Netherlands-based company, both of which represent a portfolio of venture capital investors. Another company that approached CSISA-MEA following discussions with the USAID Mission in Bangladesh is the Desh Group of Companies. This is one of the largest ready-made garment businesses in Bangladesh and is seeking to diversify operations into machinery manufacture. CSISA-MEA intends supporting these companies to identify light engineering sector enterprises and companies that, if given funds from investors to expand their businesses, have potential to be developed into major manufacturers of agricultural machinery. CSISA-MEA support will include funding to allow these companies to prepare a

Above: CSISA-MEA began work supporting Desh Group of Companies to enter into the agricultural light engineering and spare parts aggregation business during the reporting period.

pitch to present to potential investors. Further updates on the burgeoning partnership with Desh Group of Companies will be provided in the FY2022 semi-Annual Report.

Potential partnerships explored with South Asia regional companies: As part of CSISA-MEA's trade and investment facilitation efforts the Activity identified and met with a number of international companies, resulting in the likelihood of a partnership with the Indian company, Landforce. Landforce is a major agricultural machinery manufacturer specializing in planters and harvesters. Its four-wheel-tractor-drawn Happy Seeder has considerable potential for use in Bangladesh as a zero- or minimum-till planter. Landforce has showed an interest in pursuing a joint venture with an agricultural machinery company to assemble its machines in Bangladesh. In response, CSISA-MEA approached a few of its partner lead firms, using an initial information collection form provided by Landforce, to understand the capacity and interest of the Activity's lead firms. TML, RK Metal, and Janata Engineering have shown an interest in having discussions with Landforce.

Above: Landforce has expressed interest in accessing the Bangladeshi agricultural machinery markets; CSISA-MEA began supporting them with technical and market advice during the reporting period.

Intervention 1.4: Developing financial services for ABLE SMEs and agricultural machinery marketing firms

Loans for ABLE SMEs: Businesses cannot develop and expand their capacity to manufacture agricultural equipment and spare parts without financial investment, either from their own savings or from financial institutions that provide loans. A key activity in this reporting period has therefore been to improve access to finance for ABLE enterprises. First, CSISA-MEA developed systems for assessing the credit worthiness of ABLE SMEs and then linked them with banks interested providing loans to enterprises with the best credit worthiness assessments. As a consequence, the Activity facilitated the disbursement of 23 loans worth USD 547,294 through seven financial institutions (BRAC Bank, IDLC, IPDC, Jamuna Bank, Janata Bank, Agrani Bank and MIDAS) to 13 partner ABLE enterprises and by two financial institutions (BRAC MFI and VPKA Foundation) and to two machinery dealers and six machinery solution providers (the latter for machinery purchases to commence or enhance their businesses).

Above: CSISA-MEA collaborates with a range of financial institutions, but maintains strong working joint venture agreements with BRAC Bank and IDLC

The Activity also supported financial institutions to introduce novel financing systems, through partnerships signed with IDLC Finance Limited and BRAC Bank Limited. Under the agreement with IDLC, CSISA-MEA linked the company to partner ABLE enterprises which were finding it difficult to produce the financial information, paperwork and financial plans required to obtain a loan. To overcome these issues, IDLC organized workshops on Business Planning and Financial Management in Jashore, Bogura and Kushtia for a total of 43 ABLE enterprises.

Afterwards, IDLC held follow-up coaching sessions for 36 of the enterprises. Through this activity, all the participants learned about the criteria for getting a loan, preparing proper documents for loan processing, and how to manage financial transactions after getting a loan.

The JVA with BRAC Bank centers around screening low-risk clients (dealers and ABLE enterprises) before deciding on disbursement. To progress this, CSISA-MEA has shared a list of 53 ABLEs and 21 dealers with BRAC Bank. This agreement will help enhance the financial management literacy of ABLE enterprises and dealers, as well as developing a tool to assess their creditworthiness.

How loans were used

- **Expansion of business premises** to improve the efficiency of the business. One company owner said "*I bought land to make a new warehouse and install a generator. This loan helps me cope with COVID-19 losses.*"
- **Investing in staff** machine maintenance mechanics so they can improve aftersales services. **Increase sales through machinery sales events**. One company owner says, "*I never thought I'd be able to access such a big amount. I used to take out loans from local microfinance institutions, up to a maximum of 2 lakh* taka. *I'll use this money to buy some new machines and promote my business.*"
- **Finance recovery from losses incurred during the Covid-19 lockdown**. Paying staff salary, rent and utility bill arears will allow companies to start operating and generating business. One company owner says, *"COVID-19 has ruined my business. Without this loan I wouldn't be able to cope with the losses. There were so many dues – like workers' salaries, electricity bills – and the peak business season is coming, which this loan will help me buy the raw materials for."*

Above: After providing samples from lead firm ACI to M/S Uttara Metal Industries, Bogura, ABLES produces two type of a range of spare parts crucial for combine harvester operations. *Photo credit: Md. Bablu Miah.*

IR II: Enhanced institutional capacity for agricultural mechanization through the development of skilled and youth workforce

Intermediate Result II

Intervention 2.1: Providing skills training for ABLE company staff and management

In response to studies it conducted in July and August 2020, the Activity developed a training program to meet the needs of staff employed in 53 ABLE enterprises partners. As a result, during the reporting period, training service provider (TSP) trainers provided 108 hours of training for staff working in machinery manufacturing enterprises, and 42 hours of training for foundry workers. Further soft skills training was given to ABLE enterprise managers and owners to improve their communication and networking capacities.

Workforce training in machining skills: Following a competitive selection process, CSISA-MEA contracted Thangamara Mohila Sabuj Sangha (TMSS), a Bogura-based NGO, and Rural Reconstruction Foundation (RRF), a Jashore-based NGO, to implement a manufacturing skills training program for ABLE enterprise workforce. These TSPs were also provided with technical support to develop training modules for trainers and training handouts for the trainees. These are available on the CSISA website[1].

The training program was launched at workshops in Bogura (11 October, 2020) and Jashore (14 October, 2020). These introduced partner ABLE enterprises to the training service providers and the training content. The Activity's communications unit circulated a USAID-approved press release, securing coverage of the training events in a number of local and national newspapers.

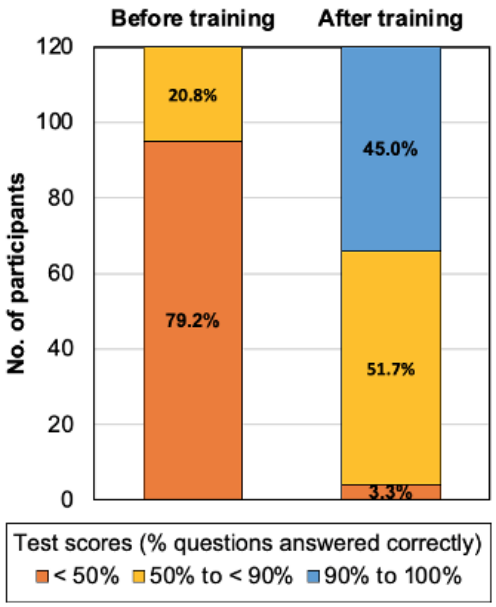
The TSPs provided theoretical and practical training for 56 staff from 22 ABLE SMEs in Bogura, and 46 staff from 15 ABLE enterprises in Jashore, from November 2020–April 2021. Training in basic machining workshop skills was held in the evening for three hours, three days a week. The Activity's aim was that this would also improve the basic manufacturing skills and

[1] https://csisa.org/wp-content/uploads/sites/2/2021/04/210117__Final-Trainees-Technical-Training-Handout_-Final-.pdf. https://csisa.org/wp-content/uploads/sites/2/2021/04/210118_Final-_Trainers-Technical-Training-Module_.pdf.

knowledge of operational OHS of the trainees' co-workers, as they went on to train their colleagues in the skills they had learned. In reporting year, a total 56 workforces were provided ToT by TMSS in Bogura, these ToT recipients provided hands on training to another 168 coworkers; at the same time 46 workforces provided ToT by RRF in Jashore and they provided hands on training to 94 coworkers.

Above: Machinery manufacturing workforce training: learning how to operate a machine Bogra, January 2021. (Left) Learning how to operate machine Jashore, January 2021. *Photo credits: Mahajabin Khan*

Machining skills training outcomes: The graph below compares the knowledge of workforce trainees before and after training. To assess this gain, the Activity a question ensured that a questionnaire with 10 multiple-choice questions was administered to all the trainees at the start of the course and immediately after it ended. Before the training, 22% of the trainees answered 50% or more of the question correctly, which increased to 83% after the training. Trainees will also be re-tested six to eight months after training to judge their ability to retain information over a longer period.



Above: Pre and post-test comparison

Machining workshop training impacts: The Activity also conducted a survey to assess the impacts of training on the work quality and changes to the lives of trainees in terms of their economic and personal circumstances. The survey showed that after training, 69% of the trainees reported an increase in their productivity at their workplace, 50% perceived an improvement in the quality of their products, and 16% of the trainees gained promotion to a better position. As noted above, follow up testing will be initiated in FY2022 to evaluate longer-term retention of training information.

Cascading of trainings to the general workforce: The 102 workers trained by the TSPs then went on to train 251 of their fellow workers, passing on the skills they had learned. Although it was anticipated that this "cascade" training would not lead to the same knowledge and skills levels that the intense TSP training provided, the results were nevertheless up to the standard that the Activity would have liked to see. The test scores showed that the ability of the workforce trained by their colleagues to answer key questions approximately doubled, but that none were able to answer more than 40% of the questions correctly afterwards. This is a useful lesson learned by the Activity, which as a result has developed a new strategy for transferring skills to the bulk of the light engineering workforce that will be implemented in FY22.

Above: Workforce trainees practicing fire extinguisher use during training, Jashore, September 2021. *Photo credit: Md. Khalequzzaman.*

Occupational health and safety training: All training covered the key principles of occupational health and safety. Each participant learned how to operate a fire extinguisher, the importance of personal protective equipment (PPE) clothing and how to use them, and how to respond to emergencies in the workplace. This included PPE for COVID-19 safety as well as for the operation of manufacturing machinery. To equip participants with the means to put into practice the OHS lessons learned, the Activity provided a set of PPE to all trainees, comprising a lab coat, welding shield, goggles, safety boots, cap or safety helmet, gloves, mask and sanitizer. For many of the workshops and foundries that participated in these trainings, this was the first time that they had been exposed to structured and more comprehensive OSH principles in an on-the-job setting.

Training provided to the foundry workforce by foundries as service providers:

To train the foundry workforce, CSISA-MEA adopted a novel way of engaging trainers. Through a competitive selection process, it partnered with six foundries – Uttara Metal Industry, Kamal Machine Tools (KMT) and Reza Engineers in Bogura, and Ripon Engineering, Wohab Engineering and Shilpi Metal Foundry in Jashore, all of which possessed relatively advanced equipment and skills, and provided the training facilities and trainers. To produce a training manual, the Activity provided also support to KMT, to hire a foundry expert from BITAC, a government Ministry of Industry training institution.

Above: Foundry training practical session, making sand molds, Reza Engineers, Bogura, 24 September, 2021. *Photo: Arifur Rahman*

CSISA-MEA technical staff and consultants reviewed and finalized the finished manual. It then engaged training experts from local training institutions, including Jashore University of Science and Technology (JUST) and BITAC, who with CSISA-MEA developed the training skills of the six foundries. CSISA-MEA staff also prepared the PowerPoint presentations the foundry staff used in theory sessions. The training started on 3 September, 2021, after the pandemic restrictions were lifted and ran until 26 September, 2021; 120 foundry workers were trained, more than 53% youth. Training outcomes were measured through 20 key indicator questions, which the Activity designed to gauge participants' level of knowledge of foundry skills learned during training. Before the course, 79% of trainees could only answer 9 or less of the 20 questions correctly. Which after the training increased to 97% who were able to answer more than 50% of the questions correctly, and 23% who could answer all 20 questions correctly.

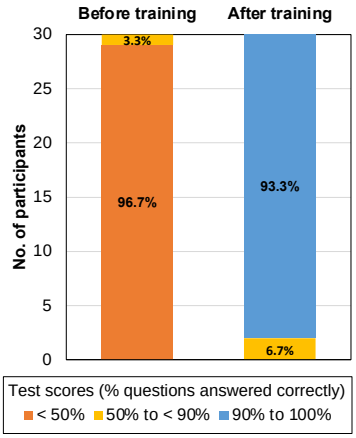
Although the short-term impact of this training was the increase in skills of the participants, the longer-term impact will be measured in the ability of light engineering enterprises to train their staff and the staff of other companies without external support. It will also be measured according to the partnerships and collaborations that this training may have provoked through the exchange of experiences and ideas between foundry workers and managers.

Providing women who work in ABLE enterprises with training to improve their skills and working conditions: Many foundries employ women, but usually in low-paid, unskilled occupations such as cleaning the work space, sorting metal, carrying coal, preparing sand molds, and painting manually with a brush. They almost always work in extremely challenging and dangerous conditions. To support these women, CSISA-MEA obtained permission from foundry owners to train 30 women in Bogura in new skills. The owners suggested the Activity provide painting techniques training, to paint parts and machines manually using a brush. However, this results in an uneven paint surface finish. Painting with a spray gun conversely gives a much smoother finish, making the product more marketable. A training program, the Activity provided participants with training in how to use a power paint sprayer and operational techniques such as mixing colors, the difference between primer and top coats and OHS in the workplace.

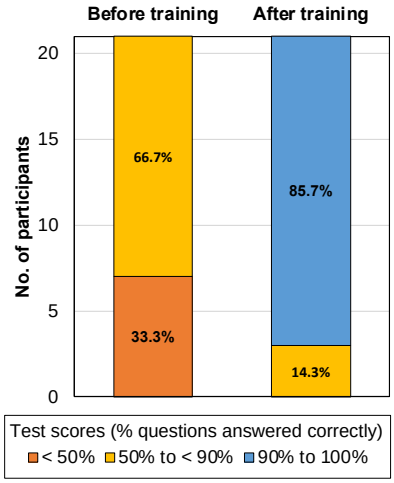
Above: Rita, a foundry worker employed by Soron Engineering Workshop, Bogura trained in spray painting skills, September, 2021.

Women's trainings: The graph to the right presents the results of pre-training and post-training test scores, assessed by questionnaire. Before the training, more than 95% of the women answered fewer than half the questions correctly. After the training however, more than 90% answered 90%–100% correctly. The results were impressive and impactful, which is motivating the Activity to continue with women-exclusive training initiatives in FY2022.

Soft skills training to lead firm and ABLE enterprise staff to grow good business management: To help its private sector partners develop their soft skills, the Activity facilitated the provision of provided soft skills training to 21 participants in two batches (September 2021). To identify the soft skills that would be useful to lead firm and ABLE enterprise staff, CSISA-MEA talked to experts in the industry and conducted a telephone survey of lead firms and ABLE enterprises. They considered that the most important soft skill they needed for good business management was Communications and Network Building. In response, the Activity facilitated a course that covered communication, network building, event organization, office management, customer handling, inventory management and record-



Above: Pre and posttest of foundry women workers training



Above: Soft skill training outputs among ABLES during the reporting period.

keeping. This was delivered to nine senior management staff from 3 lead firms, and 12 owners of ABLE enterprises, by BRAC staff at BRAC Learning Centre, Faridpur. The highly interactive, participatory practical exercises helped the participants to assess their strengths and identify areas for improvement. About 70% of the trainees came under the Activity's youth category, who seamlessly utilized the opportunity to develop their soft skills, with the aim of integrating them in their business and to use their technical skills more efficiently and effectively.

During the reporting period, CSISA-MEA also formed partnership agreements with Alim Industries, ACI Motors, TML, Abedin Equipment, RK Metal and Janata Engineering, which focused on increasing the technical skills of agricultural machinery market system actors. Three of these agreements (with Alim, ACI and Janata) include components of technical skill enhancement for company staff. More details of this work are given in the next section, under Intermediate Result 3.

Above: (Right) Participants in soft skills training, figuring out the networking issues in their job roles, Faridpur, September 2021. (Left) ABLE enterprise owners and lead firm staff making a cart with working wheels to assess their improvement areas, Faridpur, September 2021. *Photo credits: Rubel Molla, BRAC Learning Centre.*

Intervention 2.2: Skills training for lead firm staff and dealers

During this reporting period, CSISA-MEA launched a YouTube channel to support the training of ABLE and lead firm engineers, technicians and workshop staff, and featuring training videos in both Bangla and English[2]. Most importantly, a set of nine videos originally developed by trainers at Massachusetts Institute of Technology, USA, detailing important machine shop skills, has been dubbed into Bangla[3] and is used in conjunction with on-line learning activities provided by one of the training partners. These are being advertised via the Activity's communication channels, as well as provided to the workshop staff who are receiving training

[2] https://www.youtube.com/channel/UCxuHSEr2oOZweuLdW7mawsw.
[3] https://www.youtube.com/playlist?list=PLClQM5N2SXXta62ghC08Uy3j3sMjAZBzA.

facilitated by the Activity. The Activity is in the process of translating videos on welding and dubbing them into Bangla, in collaboration with Lincoln Electric, a major USA welding machinery company that sells equipment in Bangladesh. In addition, the Activity is working with Lincoln Electric to develop advanced certification programs that will build upon the basic welding training that the Activity provides. Materials, including safety and instruction posters, are being translated from English into Bangla by CSISA-MEA engineers for the Activity to provide to manufacturing companies throughout Bangladesh. The Activity is also purchasing from Lincoln Electric, virtual reality welding training equipment, VRTEX Engage. This will be used to train new and experienced engineers in a safe manner, and in a way which supports community learning, as the training activities can be projected for observation by other trainees. This equipment is portable and will be shared with manufacturers under the tutelage of Activity engineers.

***Advanced manufacturing design training*:** As the ABLE enterprises that CSISA-MEA is supporting are progressively linked to new markets and financial services, they will need advice on how to manufacture these new spare parts and machines. Many of these ABLE enterprises do not employ engineers or, if they do, the engineers do not have the necessary skills. In response, facilitated by the Activity, Georgia Tech developed a range of training materials covering topics that include manufacturing processes and facility design, the economics of manufacturing, and machinery and materials specifications, dimensions, tolerances and surface finishes. These have been used to train ABLE enterprise engineers, which CSISA-MEA has linked to Georgia Tech, to produce higher quality, interchangeable parts. The Activity has also provided a number of live lectures delivered by Georgia Technical Institute via Zoom. The topics of these lectures included manufacturing processes and facility design, process design, dimensions, tolerances, and surface finish, design for manufacturing and assembly, specifications, and economics of manufacturing. Participants were lead firms Janata Engineering, RK Metal, Alim Industries, The Metal Ltd (TML), as well BARI, Bangladesh Rice Research Institute (BRRI), BAU and BUET.

In Focus

Women lead the way: New opportunities for engagement in manufacturing

Above: Rokeya working at workshop in Bogura, September 2021, *Photo credit: Arifur Rahman*

The light engineering sector is an integral part of Bangladesh's manufacturing industry and currently fuels the country's economic growth. However, the nature of the job means hard physical labor with no fixed working times, and there are almost no women employed in the sector. Light engineering factories have traditionally been considered unsuitable for women, with just a few working in the foundries as cleaners or providing insecure day labor. Some soft skills (such as cleaning, polishing and packaging) are required, but not in micro and small enterprises. The USAID-funded Feed the Future Bangladesh CSISA Mechanization and Extension Activity explores opportunities to build women's capacity in the sector, recently training 30 young women from Bogura in various aspects of the painting trade. They have learned operational techniques, such as mixing colors, the difference between primer and topcoats, and health and safety in the workplace. To develop job creation for women in the sector, the Activity has initiated discussions with established enterprises to recruit women as painters in their workshops with all the facilities of their male workers.

Rokeya Begum (39) has been working in Uttara Metal Industries for three and half years. She used to do clearing and helped painters in painting preparation, but she was always an enthusiast. After receiving comprehensive training on how to airbrush paint, she is now practicing spray painting for an hour every day. Her employer is also happy to see her finished work. Soon he will promote her as a painter he said. Rokeya said, "I feel so happy that I have learned this technique, moreover that I enjoy this work." Rokeya's current payment is $12 per week. When she is promoted to painter her salary will be increased by 50%. Alongside training, work is underway to create a decent and safe working environment for women, such as adequate/private/safe bathrooms /safe spaces to take their breaks.

In focus

Boosting workforce confidence to establish new businesses

***Above*:** Md. Mahmudul Hasan working in his own workshop, Bogura. September 2021. *Photo credit: Azahar Uddin*

Many people in Bangladesh earn a living in the light engineering sector – however, very few feel so passionate about their work that they take the initiative to develop their skills. Md. Mahmudul Hasan (31) is an exception, and after working in the sector for the last five years has lifted his skill to the next level. Like the majority of his coworkers, he has no formal qualifications in light engineering, which he learned on the job from his mentors at Rahmania Engineering Workshop, Bogura. In 2020, Mahmudul joined a skills enhancement course provided by the USAID-funded FtF Cereal Systems Initiative for South Asia – Mechanization Extension Activity (CSISA–MEA). The training scaled up his technical knowledge and boosted his confidence in his abilities. This year, Mahmudul used his savings to buy a lathe, a drill and a small grinding machine to set up his workshop. He still works at Rahmania Engineering from morning to evening, after which he goes his workshop till midnight. His monthly income has increased by USD 130 (equivalent to a month's pay). Mahmudul's ownership of his work has created in him an enthusiasm which drives him to learn and work more. "I plan to make my workshop bigger – and work entirely for myself instead of for others. I want to enhance my skills and do the best work possible," said Mahmudul.

IR III: Farmers' access to agricultural production and marketing services improved

Intermediate Result III

Intervention 3.1: Machinery solution providers (MSPs) offer farmers a wider range of labor- and cost-saving machinery services

For MSPs to be able to provide farmers with a wide range of cost- and labor-saving machinery services, they and their farmer clients need information and training in the use and value of the technology. Everybody must make money: both farmers and MSPs alike. MSPs also need to be able to purchase the machines from dealers close to home, with affordable interest bank finance when needed. To keep the machines operating they need to know how to operate and maintain them, buy spare parts, and have access to mechanics who are available when needed and trained in the repair of these machines. When machines break down because an MSP has not been shown how to use or maintain it, or does not have access to the services of a trained mechanic and a supply of spare parts, they lie idle, denying farmers access to mechanization services and disincentivizing other, potential service providers from adopting the technology. This intervention aims to support lead firms and MSPs to address these issues. See Annex IV for details of the current status of JVA development and implementation with lead firms and FIs.

Through this intervention, CSISA-MEA has signed JVAs with six lead firms (ACI Motors, Abedin Equipment, TML, Alim Industries, Janata Engineering and RK Metal) and two financial services providers (IDLC and BRAC Bank) during the reporting period. These agreements were part of comprehensive service agreements with companies covering topics related to IR I and II, but in IR III, they mainly focus on combine harvesters and rice transplanters, and also cover smaller machines such as reapers, PTOS, and fodder choppers. The agreements include (1) technical training for mechanics and operators of the machines the firms sell, (2) pre-season maintenance of these machines, (3) demand creation and awareness campaigns on modern agricultural machinery, and (4) development of video tutorials on how to operate the machines.

As part of these agreements, within the reporting period and in the FtF ZoI, CSISA-MEA facilitated Abedin Equipment, RK Metal, Janata, TML and ACI to organize 10 rice transplanter, 25 fodder chopper and reaper, and 13 combine harvester field demonstrations, where a total of 462 farmers and 16 DAE personnel participated. This resulted in 35 orders for machines, and significant increases in demand for machinery services among farmers. In the ZoR, companies and dealers conducted a total of 26 (8 rice transplanter, 11 combine harvester, seven fodder chopper) demonstrations of the machines they sell, two of which were in collaboration with LPIN, with a total of 638 participants generating 85 interested customers.

Above: Everybody must make money: the principle of agricultural machinery services provision – both farmers and service providers must benefit. *Photo credits: CSISA-MEA staff*

These agreements resulted in 193 MSPs purchasing a total of 111 combine harvesters, 51 reapers, 13 rice transplanters, 14 fodder choppers, and for PTOS. After subtraction of government subsidies (which support combine harvesters, rice transplanters, and the PTOS only), the value of these purchases was USD 1,779,235[4]. To finance purchase beyond the rebate offered through subsidy programs, CSISA-MEA also facilitated the provision of loans from financial services providers for six MSPs, worth a total of USD 22,000. The loans were used to purchase of two combine harvesters, one rice transplanter, one reaper and one PTOS.

Training company engineers, mechanics and MSPs in the use of combine harvesters

Each of the JVAs described above have strategic components for the training of company staff, dealers, agents, mechanics, MSPs and machinery operators in machinery use and maintenance. So far under the service agreements with lead firms:

- Alim Industries trained eight of their engineers on maintaining and operating combine harvesters. These engineers then trained 50 mechanics and operators in combine harvester maintenance and repair, and developed a video tutorial for new users of the combine harvester model they sell.

[4] The lead firms could not identify which specific machines sold were attributable to the partnership with CSISA-MEA, and so the calculations are for the machines bought by CSISA-MEA-supported MSPs.

- Abedin Equipment trained 100 mechanics and operators, developing their skills in repairing and maintaining Abedin's combine harvesters, and developed a video tutorial for new users of its combine harvester.
- TML trained 150 combine harvester operators and mechanics on operation and maintenance of the machinery, and also developed a video training module for combine harvester operators/mechanics.
- ACI Motors developed training programs for technical and business capacity enhancement of combine harvester MSPs, machine operators and mechanics. To provide this training, ACI Motors have trained 10 of their engineers. They in turn trained 20 MSPs, 20 operators, and 56 mechanics of combine harvesters.
- RK Metal conducted operational and business capacity building training for 44 MSPs and 20 mechanics.
- Janata Engineering trained 12 of their staff on the operation and maintenance of the machineries they market, and 14 Janata staff on OHS and environmental awareness.
- In Cox's Bazar within the ZoR, both the ZoI-based Janata Engineering and RK Metal trained 28 mechanics in the maintenance, repair and use of combine harvesters, reapers and rice trans planters. These trained mechanics then went on to train 13 owners of reapers, combine harvesters, rice trans planters and fodder choppers.

Above: (Left-right) As part of its JVA with CSISA-MEA, ACI Motors provided mechanics training to MSPs , Cox's Bazar. October 2021. *Photo credits: Mahajabin Khan*

Pre-season service campaigns for combine harvesters: A component of the JVA signed with TML was the pre-season servicing of combine harvesters across the FtF zone. Based on learnings from CSISA in Nepal, which popularized the concept of mobile mechanic services, this involved the hiring of a van to provide a mobile mechanic services for servicing the combine harvesters sold by TML. The agreement with TML envisaged this would result in the servicing of 40 machines. However, seeing that this activity greatly increased the reputation of the company and the income it earned from selling spare parts, TML used its own funds to expand the program, first within the FtF ZoI and then to the rest of Bangladesh. This has so far resulted in 186 combine harvesters being serviced in the FtF zone (Jashore, Faridpur, Magura, Kushtia, Jhenaidah, Meherpur, Barisal, Madaripur and Bhola) and 222 combine harvesters serviced in the rest of Bangladesh. These are good examples of how supporting a company to pioneer a new approach can rapidly result in its adoption on a national scale.

Above: An example of pre-season combine harvester servicing in action. *Photo credit: Abdul Momin*

Farmers suffer when they are unable to access machinery services at crucial harvest times, and without an assured service, adoption is unlikely to proliferate in a sustained (or sustainable) manner. Abedin Equipment has also, through their agreement with the Activity, completed *pre-season* machinery servicing of 50 of the combine harvesters. These first-of-a-kind in Bangladesh *pre-season* servicing activities ensured that the combine harvesters and their operators were fully prepared for the next harvest, helping to ensure farmers gained access to these harvesting services

Linking value chain actors: lead firms, dealers, MSPs and farmers: In Faridpur, CSISA-MEA facilitated meetings organized by TML that brought together wheat farmers with MSPs who had bought their combine harvester. These meetings resulted in three combine owners securing work worth a total of USD 9,750 for harvesting 60 ha of wheat. As a new venture, MSPs with CSISA-MEA support also started to provide combine and rice transplanter services during the spring *aus* rice season. This rice crop is grown after dry season crops such as wheat or maize, and is usually either direct sown or transplanted in April, then harvested in mid-August. Rice transplanter services were provided by 9 MSPs to 47 planters, to plant 11.5 ha of *aus*. During the reporting period, combine harvester services were provided by 42 MSPs to 499 farmers, to harvest 4,178 ha of *aus* rice.

In Cox's Bazar district, the CSISA-MEA field office facilitated 15 Farmer Field Days, with the participation of DAE, lead firms and dealers. Four of these events demonstrated the use of combine harvesters, four demonstrated the reaper, six the rice transplanter, and one the fodder chopper machine, to a total of 490 participants, including 36 women. Also in Cox's Bazar district, DAE and CSISA-MEA together organized, in partnership with ACI Motors, three Farmers' Field Days on combine harvester use. The Activity linked Abedin Equipment, ACI Motors, TML and RK Metal with machinery dealers, spare parts shop owners, local mechanics and MSPs through nine linkage meetings, participated in by 162 market actors. These meetings gave the lead firms the opportunity to present their machinery products, services and business strategies.

Above: Farmers linkage with CH LSP, Mr. Farukh Hossain at Trimohini, Keshobpur, Jashore for access to harvesting business on August, 2021. Photo credit: Apurba Dubey

It is now common practice for farmers wanting services of machines such as combine harvesters and tractors to hire these as a group through a booking agent. The agent then contacts an MSP, puts them in touch with farmers who booked services, and arranges payment for the MSP. For this, the agent charges commission. During the reporting period, CSISA-MEA linked MSPs with four commission agents in the Jashore region. The commission agents earned BDT 90,200 (USD 1,061) from MSPs who covered 76 ha of land during the *aman*, *boro* and *aus* rice, and wheat harvest seasons.

Above: (Left) Demonstration of the ACI Motors- marketed Yanmar combine harvester to farmers, Sadar *upazila*, Cox's Bazar, 28 April 2021. *Photo credit***:** Ashraful Alam (Right) Demonstration of the ACI Motors- marketed Yanmar combine harvester to farmers, Sadar *upazila*, Cox's Bazar, 28 April 2021. *Photo credit***:** Jotirmoy Mazumdar

Facilitating the growth of rice transplanting by machinery service providers: In order to encourage the expansion of rice transplanter sales and use, CSISA-MEA signed agreements with Dhaka-based Abedin Equipment Limited and TML, and with four regional seed companies – Konika Seed Company Limited, Ali Farms and UOMCSL in Jashore, and INSAF Agro Limited in Faridpur. The agreements will support these companies to increase rice transplanter sales and provide training to MSPs in (1) production of rice seedlings which will be planted using rice transplanters, and (2) rice transplanter use and maintenance.

Above: Some of the companies the Activity collaborates with on rice seedling production training for mechanical transplanting.

Above: Stages of mechanical rice transplanting in Bangladesh. Photo credit: CSISA-MEA staff

Under these agreements, Abedin Equipment trained 23 potential rice transplanter MSPs on rice transplanter operation and rice seedling raising. TML trained 88 potential rice transplanter MSPs on rice transplanter operation and maintenance, and 55 seedling entrepreneurs (32 of whom were women) on seedling raising. The four regional seed companies have provided training to 47 company staff and MSPs at 3 training events, on rice seedling production for planting using a rice transplater, and rice transplanter use, operation and maintenance. This training was the repeated for 130 farmers and MSPs at 13 events.

To further raise awareness of the use and benefits of rice transplanters and cultivating rice seedlings for rice transplanters, the seed companies established 89 demonstrations on a total of 39 ha and conducted 50 Farmers' Field

Day events attended by a total of 534 participants. This was largely done in collaboration with DAE, which assisted in gathering farmers for events. To further raise awareness of rice transplanter use, the seed companies conducted 46 roadshow events (which displayed rice transplanters in villages) and 195 meetings with a total of 1,950 farmers. This resulted in 21 orders being placed with lead firms for rice transplanters, a relatively new technology in the ZoI. Konika Seed Company also trained 20 mechanics in rice transplanter maintenance and helped 3 rice transplanted owners to get their machines ready for the rice transplanting season. All three companies in greater Jashore produced short video clips on rice transplanter use and showed these at 230 rice transplanter promotion events attended by a total of 2,623 farmers. The companies also produced 28,000 leaflets, 7,500 posters and 165 signboards for use at the promotional events, demonstrations and Farmer Field Days.

Above: INSAF seed company arranging women's groups to produce rice seedlings for mechanical transplanting during the reporting period. 2021. *Photo credit: CSISA-MEA staff.*

Above: (Left) Members of the UOMCSL cooperative distributing leaflets, Narail, 22 September 2021. *Photo credits: Md. Shomon.* (Right) Prospective business owners watching a video promoting mechanical rice transplanting promotion by UOMCSL, Narail, 25 September 2021. *Photo credit: Md. Shomon.*

CSISA-MEA also supported the four seed companies to show DAE technical teams how to raise seedlings using the mat nursery method. DAE then conducted demonstrations on the use of rice transplanters in Narail, Satkhira, Jashore, Jhenaidah, Chuadanga and Meherpur districts on 41 ha of rice by 19 rice transplanter MSPs as part of their "synchronized" rice cultivation program.

In Cox's Bazar, TML trained 12 farmers (2 of whom were women) in rice seedling raising to plant out with rice transplanters. It also conducted training for a total of 20 MSPs in two events, in the use and maintenance of rice transplanters. Abedin Equipment provided 11 MSPs with training in seedling raising and rice transplanter use and maintenance.

***Above*:** Operation, maintenance and primary troubleshooting training delivered by TML to rice transplanter MSPs, Ulubonia, Chakaria, Cox's Bazar, 31 August–1 September. *Photo credit: Mosharof Hossain*

In Focus:

CSISA-MEA boosted the use of Ag. machinery by providing mechanic training through private company in the less served area of Cox's Bazar

***Above*:** Md Nurul repairing reaper. *Photo credit: Alamgir Hossain.*

Frequent machine failure, along with inadequate and delayed machine servicing and troubleshooting, causes delays in planting and harvesting and makes growing crops such as rice and wheat increasingly expensive and vulnerable in Bangladesh. This is also a major hinder of efficient agricultural mechanization in Bangladesh as there are usually not enough trained mechanics for troubleshooting when needed. However, during the reporting period, CSISA-MEA helped to facilitate private-sector led training by Janata Engineering to boost the skills of the local mechanics on reapers, rice transplanters and fodder choppers.

Md. Nurul Hossain (45), is a local mechanic of Dulahazra, Chakaria, Cox's Bazar, who had basic knowledge about power tillers, irrigation pumps, diesel engines and theshers. After getting training from Janata Engineering on these new machines, he can now repair them with skill, increasing his business revenue as he is the only capable mechanic in his area. After receiving this training, he has repaired three rice transplanters, four reapers and three choppers. He said, " *This training has opened-up a huge possibility of using more machines in my area as machinery owners can find me for troubleshooting."*

Supporting women and youth develop rice seedling production businesses: With CSISA-MEA's support, MSPs in Faridpur identified 10 young farmers (2 of whom were women) interested in starting a business raising rice seedlings to sell to rice transplanter MSPs and farmers. CSISA-MEA The Activity arranged for an expert from USAID FtF Bangladesh Rice and Diversified Crops activity (RDC) to give these young farmers training in the mat method of rice seedling production.

Above: Rice seedling raising training for young rice seedling entrepreneurs, Faridpur, January 2021. *Photo: Md. Abdul Mabud*

Participating in the training program alongside the 10 young farmers were MSPs, DAE extension staff, and also representatives from three lead firms that are partnering with CSISA-MEA. To ensure the rice seedling producers had a market for their seedlings, this training was followed by three meetings with farmers and rice transplanter MSPs, where seedling prices and quality were negotiated. Three of the seedling growers found a market for sufficient seedlings to plant 60 ha of rice and others sufficient for planting a total of 6 ha.

In Cox's Bazar district, CSISA-MEA also facilitated training by Abedin Equipment and TML on rice seedling raising for 25 entrepreneurs, and in collaboration with DAE, training for 67 farmers, including 13 women, 11 youth and 9 who were both women and youth. To assist them to find buyers for the seedlings, the Cox's Bazar field office held four meetings bringing together rice transplanter owners, farmers and seedling raising entrepreneurs, to facilitate negotiations between seedling growers and seedling buyers. These meetings resulted in the trained farmers obtaining orders for seedlings to plant 35 ha of rice, of which 32 ha was planted by rice transplanters. Seedlings sufficient to plant 1 hectare were sold for between USD 108 and USD 145. One woman sold seedlings to plant 2.4 ha of rice worth USD 260. The Cox's Bazar team also provided nine DAE extension staff members with training in mat nursery rice seedling raising technology.

Developing financial services for machinery service providers and dealers: Currently, and in the absence of governmental subsidies, Bangladesh's farm machinery marketing lead firms generally provide buyers with credit worth at least 70% of the value of the machine when they purchase tractors, power tillers, and also combine harvesters. However, it is often difficult for these firms to collect the outstanding debt. This makes it challenging for them to finance business development and expansion, which in turn limits the number of machines that can be sold to MSPs.

In response to this constraint, CSISA-MEA has sought to encourage financial services institutions (FSIs), including banks, but also non-bank financial institutions (NBFIs) and micro-finance institutions, to lend to machinery purchasers. During this reporting period, the Activity signed a JVA with BRAC Bank that supports the bank to establish systems which will allow them to finance agricultural machinery purchases profitably. At the same time, the CSISA-MEA field office teams have used their local contacts with FSIs to bring them into the agricultural machinery financing business. During the reporting period, six MSPs obtained loans worth USD 25,529. In addition, CSISA-MEA facilitated the provision of loans to two machinery dealers from Janata Bank and IDLC worth a total of USD 23,530.

Loans disbursed to machinery services providers by year

Type of machine	Financial service provider	Activity Year 1		Activity Year 2	
		Number of machines	Total value of loans (USD)	Number of machines	Total value of loans (USD)
Combine harvester	BRAC MFI	1	4,706		
	Krishi Bank			1	18,824
	JCF			1	1,176
	ASA	1	941		
	VPKA			1	3529
Power tiller operated seeder	BRAC MFI	3	1,176	1	353
	Grameen Bank	1	24		
	ASA	1	235		
	Wave Foundation	1	447		
Reaper	BRAC MFI	1	587	1	1,176
	Grameen Bank	1	353		
Rice transplanter	BRAC MFI			1	471
	Wave Foundation	1	588		
	Agrani Bank Ltd	1	588		
Total			*9,645*		*25,529*

Above: Ms. Chandni Begum receiving loan documents from VPKA for her purchase of a combine harvester from The Metal Limited, Rajbari, April 2021. *Photo credit*: Rowshan Anis

In particular, it is worth noting that one stand-out MSP (Ms. Chandni Begum) received a loan of USD 3,529 to enable her to purchase a combine harvester and operate it as a service provision business. The Activity is assisting Mrs. Begum with technical support and to link her to farmer-clients in Rabari.

Intervention 3.2: Machinery service providers are able to provide farmers with a wide range of income generating services in addition to machinery services

During the first phase of the Activity, CSISA-MI provided support to 3,474 MSPs to initiate businesses supporting farmers as clients. In the first two years of CSISA-MEA, a further 234 MSPs were supported to establish a machinery service business. Further details are provided comprehensively, as shown below. Importantly, the Activity's emphasis on types of machinery has shifted over the years; this is a reflection of increased focus on harvesting and rice transplanting equipment popularized in governmental initiatives.

Agricultural machinery purchased by Machinery Service Providers in CSISA-MI (2013-19) and CSISA-MEA (2019-21)

Machine name	CSISA-MI	CSISA-MEA		
		Year 1	Year 2	
	2013–19	2019–20	Oct 2020-Sep 2021	Total
Combine harvester		11	110	121
Reaper	889	9	51	949
PTOS	1,848	22	4	1,874
Rice transplanter		6	13	19
Fodder chopper			14	14
Axial flow pump	1,017			1,017
Bed planter	3			3
Total machines	*3,757*	*48*	*192*	*3,921*
Total number of MSPs	*3,474*	*48*	*186*	*3,708*

Supporting stacked services: The businesses managed by these MSPs focus primarily on the provision of machinery services, with several people owning more than one machine. Each MSP typically provides machinery services to between 50 and 100 farmers. These farmers could be given a wide range of other services if MSPs were linked with lead firms and dealers who offer farmers services.

Above: CSISA-MEA launched collaborations with Bhalo Social Enterprises during the reporting period.

For instance, if an MSP is providing planting services, they could also sell the farmers the seed they are planting, or if they are harvesting a crop, they could also link farmers to companies wanting to buy the crop. This would considerably broaden their business base and provide them with more income and, at the same time, increase the services farmers can access.

Bhalo Social Enterprises is one of the first private aggregators in Bangladesh to attempt to offer a full range of inputs, farming services and credit facilities for

farmers through logistics hubs, and sales and service staff. Under an agreement signed with CSISA-MEA, it will collaborate with a number of agents/partner retail outlets and MSPs for inputs and farming services delivery. So far under this agreement, Bhalo has interviewed 80 combine harvester, rice transplanter, reaper and PTOS MSPs in greater Jashore to assess their capacity to provide the services that Bhalo offers farmers. Of these 80 MSPs, 29 have expressed interest in becoming commission agents for Bhalo providing additional inputs to farmers. These MSPs have been shortlisted for further filtering.

Above: A new partnership with iFarmer will assist machinery service providers in also providing access to appropriate inputs and agronomic advice to farmers.

Through the Activity's contacts at USAID, a second firm, iFarmer, was identified which uses a similar model and would be interested in working with CSISA-MEA. iFarmer is a farming focused company registered in Bangladesh that links agricultural producers and processors with finance, inputs, advisors and markets, using technology and data-enabled platforms. CSISA-MEA and iFarmer are working towards an agreement to (1) collaborate to develop and expand services provided by MSPs, (2) develop the capacity of MSPs to provide a wide range of services to farmers, and (3) provide better access to finance for registered MSPs. Particular emphasis will be given to supporting the development of businesses managed by women and/or youth. Further details on this burgeoning collaboration will be provided in the FY2022 semi-Annual Report.

Above: Machinery service providers in Cox's bazar have taken the initiative to advertise their services through signboards in their communities. *Photo credit: TJ Krupnik*

Direct support to MSPs to facilitate machinery service marketing events: CSISA-MEA links MSPs offering machinery services to farmers seeking their services. During the reporting period, CSISA-MEA facilitated 28 meetings by MSPs (2 held by combine harvester owners, and 26 by rice transplanter owners) in the FtF ZoI and ZoR. In most of these meetings, MSPs demonstrated the use of these machines. The meetings engaged a total 614 participants comprising farmers, MSPs and DAE staff.

In Cox's Bazar in the first half of the reporting period, CSISA-MEA supported the creation of 95 MSPs able to provide farmers with a wide range of income-generating services in addition to machinery options. CSISA-MEA

has continued to support these MSPs, facilitating the creation of demand for their services through a range of activities, including organizing method demonstrations, business expansion meetings, Farmer Field Days, awareness campaigns, and introducing the commission agent model to MSPs. During the reporting period, 10 women and two youth entrepreneurs provided rice seedling services to rice transplanter MSPs and rice-growing communities. The MSPs are now distributing promotional materials and placing advertising in communities to expand their service business, we well as engaging commission agents to sell their services. In Cox's Bazar, CSISA-MEA also facilitated the promotion of buying and selling second-hand machines/parts through MSP networks. It started up groups on digital platforms, such as IMO and Facebook, to facilitate virtual promotion, marketing new and second-hand machinery, and spare parts sales for dealers, mechanics, MSPs and farmers.

Linking the MSP network developed with support from CSISA-MEA with the combine harvester fleet service model: With the increase in purchase subsidy offered by the Government of Bangladesh for agricultural machinery, entrepreneurs are emerging who own a fleet of machines, such as combine harvesters and tractors. In Jashore and Faridpur, CSISA-MEA facilitated combine harvester fleet owners to meet established MSPs capable of operating combines. Through these meetings, combine harvester fleet owners and MSPs developed a business arrangement through which the MSPs earned a commission from the machinery owners for arranging with farmers for their land to be prepared by tractors or their crops to be harvested using a combine harvester. The MSP typically earn USD 40–50 per ha for providing this service.

***Above*:** Demonstration of the ACI Motors-marketed Yanmar combine harvester to farmers, Sadar *upazila*, Cox's Bazar, 28 April 2021. *Photo credit*: Jotirmoy Mazumdar.

MSPs act as machinery sales agents: In Jashore, CSISA-MEA facilitated seven meetings between machinery marketing lead firms Abedin Equipment Ltd, RK Metal and TML and MSPs, mechanics and spare parts shop owners, with the objective of the lead firms engaging the MSPs as commission agents for machinery sales. These meetings resulted in a total of 95 MSPs, mechanics and spare parts shop owners being engaged as commission agents.

MSPs act as marketing agents for secondhand machinery companies: The CSISA-MEA Jashore and Faridpur field offices facilitated MSP access to the second-hand machinery market. They achieved this by linking 41 members of 4 MSP network groups and seven mechanics with seven second-hand agricultural machine marketing companies. During the reporting period, MSPs sold 12 diesel engines and 1 two-wheel tractor for a total of BDT 91,900 (USD 1,081).

Development of MSP networks: By working together in groups, participating in regular meetings and networking using Facebook and messenger groups, MSPs can exchange information about technology and new markets. One group, for instance, worked together to provide combine harvester services in Bagerhat district, an area underserved by agricultural machinery services. In this way, the machines owned by MSPs are fully utilized and MSPs maximize their earning opportunities.

Intervention 3.3: Machinery service providers have improved access to machines from company sales in underserved coastal districts of Bangladesh including Cox's Bazar

Expanding dealerships into areas currently poorly served by the major machinery companies: There is a tendency among lead firms to focus their agricultural machinery sales in areas where machine sales are already high and where cropping systems are already intensive and well linked to markets, meaning that even though business potential might exist in a different area, because few machines have sold there, the firm is not willing to establish a dealership and initiate marketing activities.

In response, CSISA-MEA supports companies in the risk of opening dealerships and conducting machinery marketing activities in less well served areas, by sharing some of the costs they incur in setting up dealerships and conducting marketing exercises. In this reporting period, the Activity has signed agreements with two regional companies (RK Metal and Janata Engineering) to assist them expand their dealership network within the FtF ZoI. As a result, RK Metal established six new dealerships in Faridpur and Barisal divisions and three in Cox's Bazar. RK Metal provided these dealers with branding material as a part of its promotional activities under the JVA with CSISA-MEA. Under this agreement RK Metal has also conducted technical and marketing capacity development training for six of these dealers.

As part of its agreement with CSISA-MEA to establish dealerships and promote its machines in underserved parts of the ZoI and ZoR, RK Metal also organized road shows in six ZoI districts (Faridpur, Rajbari, Sariatpur, Barishal, Patuakhali & Bhola) (9–13 September, 2021), and in Cox's Bazar district (14–18 September, 2021).

Its team decorated a vehicle and moved between districts, distributing leaflets with information about the machines they sell. In the photograph below is the wife and husband team who own and manage RK Metal and who led this road show marketing campaign. The road show allowed RK Metal to distribute information about labor-saving machinery such as fodder choppers and multi-crop threshers, which potential customers in remoter parts of the ZoI and the ZoR would not otherwise be aware of or have the opportunity to buy.

Above: RK Metal road show team, Faridpur, 9 September, 2021. *Photo credit Dipankar Ghos*

Above: Potential customers of RK Metal-developed agricultural machineries, receiving information about their use and price at an RK Metal mobile road show, Rajbari, 10 September 2021. *Photo credit: Dipankar Ghos*

CSISA-MEA partner Janata Engineering also established 16 new dealers in different parts of Narail, Jhenaidah, Magura, Kustia and Chuadanga through three linkage events. In Cox's Bazar, Janata reached agreements with two entirely new dealers to market its machines.

Above: Right: Samia Motors (dealer of TML and RK Metal): microphone advertising campaign, Ramu, Cox's Bazar, March, 2021. *Photo credit: Md. Mosharof Hossain.* Left: Bismillah Machinery Store (ACI Motors, Janata Engineering and RK Metal): microphone advertising campaign, Cox's Bazar Sadar, March, 2021. *Photo credit: Md. Anwar Hossain*

MSP fodder chopping service provision in Cox's Bazar: To reduce wastage and improve the digestibility of fodder grass and straw for cattle, it needs to be cut into small pieces, work which is normally done by women using a sickle-type knife held tightly to the ground with their feet. This is a very laborious activity, occupying women of cattle-owning farming households for at least an hour each day that they could use for more remunerative activities Mechanical fodder choppers, many of which are powered by electric motors, are relatively low cost (USD 420–660, averaging USD 438), costing a small amount to hire, but saving women many hours of tedious work. In Cox's Bazar, CSISA-MEA partnered with the FtF LPIN Activity and supported local dealers to encourage the use of fodder choppers produced by ZoI-based company, RK Metal at four marketing events. To date, Cox Bazar dealers have sold 14 fodder choppers as a result of this activity.

Above: Cattle owners use a fodder chopper for the first time during an RK Metal fodder chopper marketing event in Cox's Bazar district, June 2021. *Photo credit: Anowar Hossain*

Above: ACI providing training on combine harvesters, September 2021. *Photo credit: Abdul Momin*

Improving inventory management system for farm machinery dealers: With an efficient inventory management system in place, machinery dealers will run a more efficient business, resulting in satisfied customers and increased sales. CSUSA-MEA plans to work with dealers to develop an inventory management system to reduce the average stock-holding time in stores and the time taken to obtain stock from suppliers. During the reporting period, the Activity implemented Knowledge Attitude and Practices (KAP) study, to understand existing dealer practices. A total of 25 dealers (22 from Jashore, three from Cox's Bazar) were interviewed. The results showed that most dealers do not have inventory management systems in place. Some conversely have somewhat formal tracking systems with register books, which are also used to keep track of sales and customer transactions.

Many dealers believe that the current size of their business is too small for a formal inventory management system to be worth the investment and do not consider it a significant problem or priority. Most can see and count their machine stock easily and so do not want a formal tracking system. In contrast, for spare parts which can number in the hundreds, dealers believe there are too many to track. Nearly all of the dealers interviewed do not have access to or use a laptop but many now have smart phones.

Despite these barriers, dealers are willing to invest in something that will help them grow their territory, increase sales, and meet customer demand better. They recognized that a digital option would be able to handle this easier, as well as allowing them to maintain better

stock management, and order and sales management system, and through this enhance record-keeping security. Some also expressed the opinion that an app-based system could be potentially more convenient than a paper-based system because it "can fit in your pocket." These opportunities will be pursued by the Activity in the next reporting period, and detailed in the FY22 semi-Annual Report.

Intervention 3.4: Farmers gain improved access to machinery services through creation of rural entrepreneurship and employment opportunities

Youth and women to work as a commission agents for lead firms: CSISA-MEA field office staff have also been active in linking agricultural machinery lead firms seeking entrepreneurs to work for them as sales agents with women and youth interested in this type of work. At a meeting in Faridpur between ACI Motors, ACI dealer Mozumder Machineries, and 10 youth entrepreneurs (including one woman), the ACI representative and dealer signed an agreement to become commission agents for the entrepreneurs, who would then sell combine harvesters, reapers and rice transplanters for ACI. One group member, Ranu Begum, arranged for the sale of three tractor-mounted rotavators and earning a handsome commission.

In Focus:

Husband-wife business partnerships help to build machinery markets in Bangladesh

***Above*:** Motaleb and Kulsum working together in Cox's Bazar, March 2021. *Photo credit: S.M Alamgir Hossain*

For the first time in her life, Kulsum Akter (30) earned USD 130 in the last monsoon *aman* rice cultivation season after selling the rice seedlings she grew for mechanical rice transplanters. Two years ago, Kulsum's husband Md. Abdul Motaleb bought a rice transplanter with a government subsidy from the Department of Agricultural Extension (DAE). While he invested USD 5,000 in the machine, his skills In operating it were sub-par. With the facilitation of Feed the Future CSISA Mechanization and Extension Activity, Motaleb was trained on mechanized rice transplanter operation by a private company, the Metal Pvt. Ltd. Kulsum was in turn trained on special techniques for growing seedlings so they can be used a rice transplanting machine. The Activity then provided technical and business guidance to this husband and wife duo, enabling them to embark on a strong business venture. Key training topics included growing mat-type seedlings for machines, business management, cost-benefit analysis, product promotion, and business expansion concepts. Md. Motaleb went on to provide mechanical transplanting services to other farmers in the locality.

Meanwhile, Kulsum was inspired to take the lead in preparing seedlings as a business venture to sell them to farmers using mechanical rice transplanters. Kulsum invested USD 100 in the last *aman* season, and end of the season she earned USD 230 by selling the seedlings only within one month. This success has encouraged her to prepare seedlings for many more farmers during the winter rice production season. "The rice transplanter operation training and seedling making training was a gift for us. I am trying to engage more women in this business, and I am an optimist about that," says Kulsum. The Mechanization and Extension Activity aims to create more than 100 women entrepreneurs like Kulsum who will work as service providers for mechanization.

Communications and outreach

CSISA-MEA has used SMS messaging, messenger groups, social media, blogs and newspapers to communicate the activities and achievements of the Activity to a wide audience. These are detailed below.

- CSISA-MEA sends weekly SMS messages to ABLE SMEs on a range of subjects, including COVID-19 awareness, safety measures in the workshop, and how to acquire loans. In this reporting period, CSISA-MEA sent 18 messages to workers and owners of 54 ABLE SMEs. SMS messaging also facilitated sharing the YouTube link with SMEs, to facilitate their access to tutorials on machine tool operations.
- CSISA-MEA published articles on the CIMMYT international website on International Rural Women's day and International Women's Day. *Women find a role in Bangladesh's mechanization sector* presents the success of the country's women in agriculture mechanization. See Power steering and Women in agricultural mechanization
- CSISA-MEA published articles on the CIMMYT international website on new mechanized solutions for fodder chopping. *Partnership for mechanization bolsters economic prosperity in host communities near Rohingya refugee camps in Bangladesh.* Seem the link on New Solutions for Chopping Fodder
- USAID/Bangladesh held a virtual meeting with journalists from Bangladesh's prominent print and electronic media (10 February, 2021) to present CSISA-MEA's work, in particular how the Activity supports the work of the Government of Bangladesh to facilitate the mechanization of agriculture in Bangladesh. John Smith-Sreen, Director, Office of Economic Growth, USAID/Bangladesh with Aniruddha Hom Roy, Private Sector Advisor, USAID/Bangladesh and Timothy Russell, CIMMYT Technical Advisor led the discussion with ten journalists from Bangladesh's print and electronic media. Links to coverage of the activity are as follows: (print media) The Business Standard; The Daily Star; The Financial Express; Banik Barta; (electronic media) Jamuna TV
- A video published on World Youth Skill Day 2021 focused on how CSISA-MEA provides technical capacity building support to the light engineering workforce in Bangladesh. World Youth Skill Day 2021
- A webinar on "Jute Mechanization - The Need and Ways Forward" held on 29th September 2021 by USAID funded Feed the Future Bangladesh Cereal Systems Initiative for South Asia- mechanization Extension Activity (CSISA-MEA), in collaboration with Practical Action Consulting. Several national media representatives took part in this event and the discussion was covered by two leading newspapers. The following are links to coverage of the activity: The Business Standard; The Dhaka Tribune.
- CSISA-MEA activities have been published several times on the USAID Bangladesh official Facebook page: World Youth Skill Day; Fodder Chopper; Woman in LE workshop; World Youth Skill Day

Lessons learned during the reporting period

Key operational lessons learned during the reporting period are described in this section of the report.

Firstly, ABLE SMEs find it difficult to identify markets for their products or even which products are in greatest demand for manufacturing. At the same time, lead firms which market complex imported machines (such as combine harvesters and tractors) find it difficult to find manufacturers able to supply them with spare parts. CSISA-MEA has responded by harnessing this challenge as an opportunity by facilitating JVAs which support lead firms to identify ABLE SMEs capable of making and supplying the spare parts they need. This has initiated a process that not only will resolve this issue in the short-term, but which is also anticipated lead to systemic change that will remain after the Activity ends.

Above: Emphasis on parts manufacturing and coordinating linkages between SMEs and larger machinery firms through JVAs are a crucial part of CSISA-MEA activities. *Photo credit: Abdul Momin*

Secondly, the Activity has identified a large market for relatively simple machinery, such as the fodder choppers currently made by FtF ZoI machinery manufacturers, in the Cox's Bazar FtF ZoR. Partnerships brokered by CSISA-MEA with these manufacturers have enabled them to enter the Cox's Bazar FtF ZoR market – which was also facilitated by partnerships with LPIN – benefiting farmers in the ZoR and creating employment in the manufacturing industry in the ZoI.

Thirdly, financial service institutions (FSIs) have historically been reluctant to provide ABLE SMEs with loans, while ABLE SMEs in turn were reluctant to seek finance from formal FSIs. The result is that the ABLE SME sector has not expanded as rapidly as it could have, and machinery and spare parts have been imported instead of being manufactured in Bangladesh. This results in the loss of employment opportunities for rural youth. Supporting FSIs to identify ABLE SME clients suitable for loans by using a selection criteria developed by the

Activity has proved to be an effective way of breaking this negative cycle of under-investment. In the last six months, credit worth almost a quarter of million dollars has been provided to ABLE SMEs. Ensuring access to appropriate financial offering for SMEs is an important part of CSISA-MEA's work to achieve sustainability when the Activity closes.

Finally, supporting activities that encourage governmental partners, an specifically the DAE, to collaborate with the private sector has improved the impact of activities for both parties. For instance, in the past, DAE had largely provided machinery to farmers without linking farmers to mechanics, with the result that many machines were under-used, either because the recipient did not know how to use the machine or because it broke down. At the same time, the private sector found it difficult to market machines without support for marketing events where machines are demonstrated to farmers and potential customers.

CSISA-MEA fills this gap – which has become even more important, given increased subsidization of machinery – and facilitates communication between these actors, so that by inviting the private sector to participate in DAE events, machines have been sold to service providers, hand-in-hand with training in how to use them and links to lead firm trained mechanics. As a result, DAE has been able to show increased adoption of the technology they promote, the private sector has increased sales, and the machines are correctly used and well-maintained. Crucially, this has led to a cultural change from the bottom-up, with DAE field officers actively seeking and requesting the support of private machinery dealers and mechanics in their regular awareness raising work among farmers.

Challenges encountered during the reporting period

COVID-19: The COVID-19 pandemic presented the Activity with its biggest challenge to date. Restrictions and 118 days of lockdown in the second half of the reporting period prevented free movement of staff to supervise activities, meet with beneficiaries and potential partners, network with stakeholders, and conduct monitoring and evaluation activities. Staff attended office on a rotational basis and all meetings were moved to virtual platforms. The Activity continued to remain appropriately cautious in engagement with partners in any way other than through virtual meetings. Several key staff in Bangladesh experienced COVID-19 infection, although have now recovered. A number of staff lost family members, which took a toll on their ability to work effectively. Offices opened up in only under strict COVID protocols.

Even after lockdown was eased, COVID-19 safety precautions still restricted the size of training programs. Training in machinery manufacturing skills, for example, planned for batches of 20 trainees, had to be reduced to 10 (including trainers) to facilitate social distancing, severely reducing the number of ABLE SME staff, MSPs and farmers who could be trained. In addition, the Activity's target enterprises largely lack access to and knowledge of how to use digital communication systems, limiting CSISA-MEA's ability to provide online remote training and their scope to access social media for product marketing. Nevertheless, a combination of COVID-19 restrictions easing and Activity staff adopting social media and

telephone-based means of communicating and training to some degree, meant that CSISA-MEA was nonetheless able to implement a large part of its planned activities.

The COVID-19 pandemic also slowed demand for machinery at many dealer points, as potential customers decided to wait for the crisis to be resolved before making investments. Importing companies also complained of delays at ports causing significant supply problems. These factors resulted in companies not having the finance to buy more imports or imported machines not arriving on time. As a result, implementation of activity programs with lead firms has been constrained in many cases by lack of machines to sell to customers.

However, although COVID-19 regulations restricted travel and visits to partners and beneficiaries, alternative ways (largely involving the use of information technology such as Zoom meetings and social media sites) allowed CSISA-MEA to continue to implement many, but certainly not all, of its activities. Field staff became very inventive when presented with this challenge. For instance, the Activity communications unit used the phone and social media to source the information and pictures they needed to communicate the Activity's achievements to partners, funders and other stakeholders, from ABLE SME owners, MSPs and farmers, who were encouraged to send CSISA-MEA's field staff photographs of the results of Activity interventions such as training. This has shown that in some cases implementation of programs could be done almost as efficiently via telephone and social media sites than through direct interaction with market system actors, and that this might become the preferred approach for many activities after the COVID-19 crisis ends. The COVID-19 crisis has also forced researchers and the Activity MEL team to identify methods to obtain information without interviewing respondents directly. CSISA-MEA has successfully conducted telephone surveys, and this is likely to be the preferred survey method after the COVID-19 crisis ends.

Effective and self-financing training models: CSISA-MEA's program for training ABLE SMEs is currently fully financed by the Activity and is implemented by two NGOs. However, this is dependent on external funding which may not be available after the Activity ends. Although finding a way to finance this training program by the ABLE SMEs and the training participants remains a key strategic goal of the Activity, in actuality, it has been extremely challenging. Firstly, ABLE SMEs are reluctant to pay for training. Training for light engineering workers has always been given free by the government, donors, or other non-market systems oriented development organizations. In addition, typical workforce staff earnings are not enough to enable them to pay for training. In addition, the management of ABLE SMEs see little value in training their staff, either because they believe they can train them themselves or because they fear that trained staff will leave for other more remunerative employment with another workshop or foundry. In response, CSISA-MEA is developing a business case for ABLE SMEs, demonstrating the benefits of investing in training. It will then develop systems to stimulate the private sector to pay training fees in the future. Further updates on this process will be provided in the FY22 semi-Annual Report.

Providing training to the ABLE sector is limited by the shortage of skilled trainers. Most trainers need specific training themselves to be confident in using methods suitable for training low literacy adults. In particular, there is a tendency to provide lectures rather than practical demonstrations. This is a major hindrance, as technical and vocational skills training will only be effective if done using hands-on methods. CSISA-MEA staff have provided training methods for technical skills trainers, but another approach would be to engage the staff of larger companies which have a core group of highly skilled workers. Support for more theoretical issues could be provided by staff of vocational training institutes, polytechnics and institutions such as BITAC, and a more practical training program could be developed.

Apart from management staff, most ABLE SME workers are hired as day laborers. This means that companies have little interest in building their skills, while the workers' need to earn extra income in the evenings takes precedence over attending skills enhancement classes. Lead firms have a large part of their capital held in loans to their customers. Lending to agricultural machinery service providers should therefore be done by banks and not lead firms, but the financial services sector considers lending to agricultural machinery service providers very risky. This is partly because most machinery service providers do not have collateral, which FIs request before they provide loans. One way of resolving this problem is to lend to small businesses through larger businesses such as machinery dealers. This is an approach BRAC Bank with CSISA-MEA support intends to follow. Alternatively, support can be given to MFIs to lend to agricultural machinery service providers. They have done this in the past, but the interest rates they charge are very high, the amount they will lend is small, and loan repayment schedules often do not match machinery service providers income generation, which tends to be some time after machine purchase and very seasonal.

Empowering women and encouraging social inclusion: The light engineering sector and agricultural mechanization remains strongly male-dominated, with very few women either in management roles or employed in these sectors. The Activity is seeking to support women enter the agricultural machinery service provision business as enterprise owners and to support female students enter the manufacturing sector as interns with the expectation that they would be employed as engineers and managers.

Engaging youth: The image of work in the light engineering sector being manual, dirty and dangerous makes it difficult for the sector to attract educated youth, many of whom aspire to migrate from Bangladesh to earn income abroad, or to graduate into the IT sector. This makes more difficult to upgrade the capacity of ABLE SMEs – many of whom employ youth, although with generally poor contracting mechanisms (if at all) – to a level where they can effectively compete with importing companies. In response, the Activity will work with is working with ABLE sector business associations to develop videos and television programs that present to youth a more positive image and one which shows the rewards that could be gained from working in the sector. Further updates on this process will be provided in the FY22 semi-Annual Report.

Financial record-keeping: As described in this report, the majority of ABLE SMEs do not recognize the value of maintaining proper records of financial transactions. This is because they largely operate in informal manufacturing markets and with limited numbers of close clients. As a result, it is difficult for them to prove to FIs that they have a viable business and are a low risk candidate for loans. A recently-signed JVA with IDLC will support it to provide ABLE SMEs with training in financial record-keeping. More information on the outcomes of this JVA activity will be provided in the next semi-Annual Report.

Encouraging foreign and US firm investment: Attracting investments in Bangladesh-based companies by agricultural machinery companies in the United States has been challenging. Despite considerable effort by the Activity, firms do not yet consider the Bangladesh market large enough to justify the investment in time and money. Firms that the Activity has met with tend to be more interested in India, or in South East Asian country markets, many of which benefit from comparatively more favorable investment policies and reduced import tariffs. In response, the Activity is seeking other ways of attracting investments such as through Bangladesh-based venture capital companies and through South Asian companies.

Expanding businesses to Cox's Bazar: Encouraging lead firms to establish dealerships and conduct machinery promotion activities in remote coastal districts of the FtF ZoI and especially in the ZoR still remains a challenge. Few companies consider this area an important or profitable market as it is a less developed and agriculturally under-invested region. Developing a better understanding of the market size in these areas and presenting that to lead firms will be done through surveys to be commissioned over the next six months.

Above: INSAF seed facilitating an awareness raising meeting to create demand among farmers in rice transplanter services, September 2021. *Photo credit: Abdul Momin*

Annex I. CSISA-MEA Indicator Performance Tracking Table (IPTT)

2019 - 2020			2020 - 2021 (Oct'20-Sep'21)			2021-2022
Target	Achieved	Achievement %	Target	Achieved	% Achieved	Target
EG.3-2 Number of individuals participating in USG food security programs						
25,620	43,011	168	42,421	41,980	99%	54,839
EG.3.1-14 Value of new USG commitments and private sector investment leveraged by the USG to support food security and nutrition						
			620,000	662,909	107%	1,300,000
EG.3.2-24: Number of individuals in the agriculture system who have applied improved management practices or technologies with USG assistance						
25,000	43,011	172	51,613	41,148	80%	53,389
EG.3.2-25- Number of hectares under improved management practices or technologies with USG assistance						
7,143	12,235	171	14,683	13,642	93%	17,619
EG.3.2-26 Value of annual sales of farms and firms receiving USG assistance (USD)						
260,242	278,980	107	594,940	1,779,235	299%	1,700,000
EG.3.2-27: Value of agriculture-related financing accessed as a result of USG assistance						
50,000	9,647	19	300,000	547,294	182%	600,000
GNDR-2 Percentage of female participants in USG-assisted programs designed to increase access to productive economic resources						
11	22	202	11	14	127%	12%
YOUTH-3 Percentage of participants in USG-assisted programs designed to increase access to productive economic resources who are youth (15-29)						
15	18	121	15	19	142%	12%
Custom Indicator 1: Number of individuals with improved skills following completion of USG-assisted workforce development programs						
200	0	0	400	512	128%	550
Custom Indicator-2: Number of individuals with new and/or improved employment following participation in USG-assisted workforce development programs.						
240	0	0	480	390	81%	350

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Annex III: Status of JVAs with lead firms in the FtF ZoI and ZoR

Firm name	Location	Major activities	Status
The Metal (Pvt) Ltd	ZoI ZoR	• Video for users of combine harvesters • On-the-job training and in-house training for operators and mechanics of combine harvesters • Arrange metal warehouse visit for ABLE companies and Sample distribution of spare parts • Development of technical training modules for women seedling producer, MSP development program for rice transplanter and operator training program for combine harvesters • Training women seedling producer and youth for Rice transplanter service provision • Lab and field test report of the spare parts and ABLE SMEs enlisted as vendor/spare parts suppliers and qualified ABLE SMEs received selected spare parts supply orders	Signed Implementation completed
Alim Industries	ZoI	• Developing video for users of combine harvesters • Training of Trainers for in-house engineering team • Training of operators and mechanics of combine harvesters	Signed Implementation completed
Janata Engineering	ZoI ZoR	• Module development for capacity-building training for local service providers (MSPs), company staff and mechanics • Conduct capacity building of company staff and dealer selection meeting • Develop designs signboards/festoon, product catalogues and leaflets promised under the budget • Develop a video using their existing 8 video clips for promotional purpose • Capacity building training of MSPs • Technical training of mechanic, arrange roadshows and conduct method and result demonstration	Signed Implementation ongoing
Abedin Equipment	ZoI	• Develop technical and video training modules • In-house training for mechanic-cum-operators of combine harvesters for service providers • Develop technical and video training modules • Train rice transplanter service providers • Pre-season combine harvester maintenance support to service providers	Signed Implementation completed

RK Metal	ZoI ZoR	• Conduct capacity building training of dealers • Develop designs of signboards, poster, festoons and leaflets • Capacity building training of MSPs • Technical training of mechanic and technician • Linkage meeting between MSPs, mechanics and technician, dealer coordination meeting • Courtyard meetings, arrange roadshows, conduct method and result demonstration, machinery video show using local cable operators	Signed Implementation ongoing
ACI Motors	ZoI	• Capacity building of combine harvester MSPs, operators, and mechanics • Develop the training module for conducting capacity development workshops for MSPs of combine harvesters • Develop the module for conducting the technical training of drivers/operators • Develop the training manual for conducting capacity development workshops for mechanics/ operators of combine harvesters • Visit at least 10 light engineering workshops in Bogura and Jashore combined • Provide samples of imported parts to the selected light engineering workshops in Bogura and Jashore • Assess the quality of the parts replicated by these workshops • Provide hands-on technical feedback and advice to these workshops • Carry out a laboratory test of the parts for quality inspection • Get customer feedback on the ground to be able to give a green signal on the quality of the parts	Signed Implementation ongoing
BRAC Bank	ZoI ZoR	BRAC Bank has signed a joint venture agreement with CSISA-MEA on: • Promoting their existing services among ABLE SMEs and dealers from the pre-screened list provided by CSISA-MEA • • Conduct the preliminary internal assessment of the light engineering MSMEs and dealers and select a number of them, if any, that meet BRAC Bank's eligibility criteria for financing. • Process the loan applications and disburse the loans to ABLE SMEs and dealers •	Signed Loans have been disbursed to ABLE SMEs

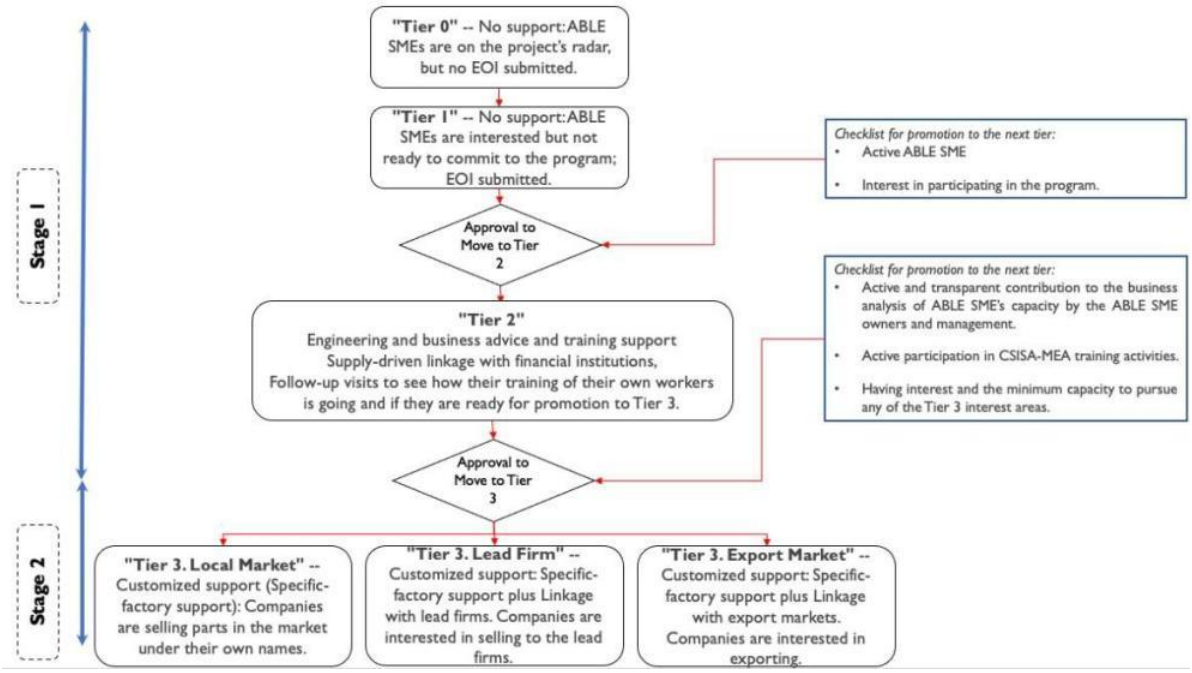
IDLC	ZoI ZoR	• Develop the training module for business planning and financial management capacity development of ABLE SMEs • Deploy in-house trainers (IDLC staff) to conduct the workshop on business planning and financial management • Develop the training module for conducting one-on-one coaching sessions with the same group of ABLE SMEs • Conduct the coaching sessions	Signed Implementation completed
Bhalo	ZoI ZoR	Bhalo proposedto become a one-stop solution for everything a farmer needs - inputs, services, finance and markets. • Under the proposed activity, Bhalo intends to partner with existing machine service providers (MSPS) in two Upazilas and strengthen their business models by adding input retail, credit/ finance and possibly sourcing of agro-produce. The MSPs or their close associates shall set up Bhalo's agent/ partner retail outlets, and expand their offering to the farmers.	Signed
iFarmer	ZoI ZoR	iFarmer proposes to: • Collaborate in the development and expansion of finance and appropriate bundled inputs services provided by machinery service providers (MSPs) to farmers. • Develop the capacity of MSPs to enable them to provide a wide range of service to farmers' particular emphasis on supporting the development of businesses managed by women and or youth.	Discussions ongoing
Practical Action Consulting	ZoI	• Through a partnership with 4 machinery manufacturing companies develop, test and market with technical support from Georgia Tech Jute fiber extraction machinery that will leave jute stick intact	Signed
Konika Seeds Ltd	ZoI	• Training MSPs and farmers in rice seedling production for rice transplanters and subsequently conduct demonstrations of the use of rice transplanters in collaboration with Abedin Equipment and TML. The ultimate aim is that they will become agents for lead firms and or run a rice transplanter fleet service model	Signed
Ali Seed Farms	ZoI	• Training MSPs and farmers in rice seedling production for rice transplanters and subsequently conduct demonstrations of the use of rice transplanters in collaboration with Abedin	Signed

		Equipment and TML. The ultimate aim is that they will become agents for lead firms and or run a rice transplanter fleet service model	
UOMCSL	ZoI	• Training MSPs and farmers in rice seedling production for rice transplanters and subsequently conduct demonstrations of the use of rice transplanters in collaboration with Abedin Equipment and TML. The ultimate aim is that they will become agents for lead firms and or run a rice transplanter fleet service model	Signed
RFL	ZoI	• Study to determine the priority machine conducive for domestic manufacturing	NDA signed; discussion on hold
IFAD Autos Ltd.	ZoI	• Study to determine the business case of second-hand tractor refurbishment • Financial advisory support to improve supply chain credit risk assessment process and reduce payment delinquencies	NDA signed; agreement under review; discussion on hold
Energypac	ZoI	• Financial advisory support to improve supply chain credit risk assessment process and reduce payment delinquencies	NDA signed; discussion on hold

Annex IV: 'Tier-Based' Process For ABLE Enterprise Engagement

In the first two years of CSISA-MEA, the activity applied a customized approach to all ABLE enterprises with which it had partnerships. This approach, however, did not sufficiently address the low capacity of the majority of ABLE small- and medium-scale enterprises (SMEs). Nor did it address the insufficient understanding of the level of commitment to CSISA-MEA support by ABLE SME owners and managers.

In Year 3 (FY 2022) the activity has adopted a new and improved approach to raise the knowledge and skills of the workforces of all the ABLE enterprises partnering with CSISA-MEA to the minimum required level through training. The Activity will then provide those ABLE enterprises who show a strong commitment to investing in their development and growth with customized support. This 'tier-based' process allows the activity to assess the commitment of the ABLE SMEs and gives the CSISA-MEA staff more time to design and implement customized support for the ABLE SMEs. Activity support to ABLE SMEs in each tier is presented in the figure below and described in the subsequent sections.



Above: Stage 1 and Stage 2 in CSISA-MEA's ABLE engagement approach

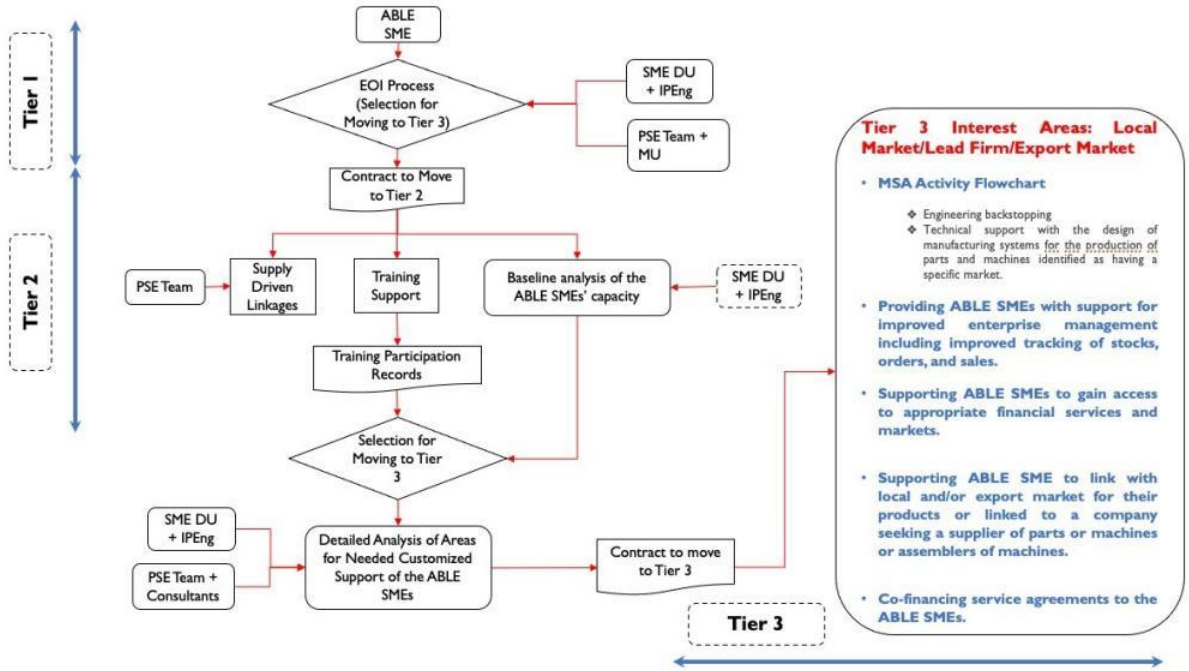
Stage 1. Prepare the SMEs for higher-level technical and business support by improving the business and technical capacity of the SME management and workforce

Following the publication of an EOI, responding ABLE enterprises who meet selection criteria are granted formal partnership agreements between their enterprise and CSISA-MEA. This

leads to the provision of business and technical training and assistance to gain access to financial services provided by financial institutions collaborating with the Activity.

Stage 2. Providing SMEs with customized support

Based on a detailed analysis of the ABLE SMEs' capacity, commitment a program of market and company growth, customized types of support needed for each ABLE enterprise are selected for the second stage. Selected ABLE enterprises sign a joint venture agreement (JVA) with CSISA-MEA in which costs are shared and the activity provides technical assistance for the identification of appropriate investments in new equipment, improved factory layout to improve production processes, and expansion into new machinery and spare parts markets. Tier 1 usually takes around two months, while Tier 2 takes approximately 4-6 months. ABLES completing this process graduate to Tier 3, which can take 12 or more months until activities articulated in the company's agreement with the Activity are completed.



Above: The process of ABLE SME selection by the Activity for Tiers 1, 2 and 3

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CEREAL SYSTEMS INITIATIVE FOR SOUTH ASIA-MECHANIZATION AND EXTENSION ACTIVITY (CSISA-MEA)

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