





# SEMI-ANNUAL REPORT (OCTOBER 2022-MARCH 2023)



Cereal Systems Initiative for South Asia- Mechanization and Extension Activity (CSISA–MEA)







## **Report and Activity Details**

Submitted by: The International Maize and Wheat Improvement Center (CIMMYT)

Grant amount: USD 21,000,000

Project duration: October 1, 2019 to September 30, 2024

Report period: October 1, 2022 to March 31, 2023

Has this project been granted an extension? No

**Project staff:** A list of project staff can be found in Annex 2.

Chief of Party: Owen Duncan Calvert

**Title**: Chief of Party, Feed the Future Bangladesh Cereal Systems Initiative for South Asia Mechanization Extension Activity (CSISA–MEA)

Mobile phone: +880-1730799775

Email: <u>o.calvert@cgiar.org</u>

Mailing address: CIMMYT International, House 10/B. Road 53. Gulshan-2. Dhaka, 1213, Bangladesh

**Contributors**: PVL Bharathi, Zaheedul Islam Chowdhury, Jonathan Colton, Hera Lal Nath, Khandakar Shafiqul Islam, Moksedul Alam Arafat, Zakaria Hasan, Nur-A-Mahajabin Khan, Kafil Uddin, Saiful Islam, Nilufar Sultana, Owen Calvert, Timothy Krupnik, Timothy Russell.

Editor: Frances Hunt

Cover design: Nur-A-Mahajabin Khan

Date submitted: March 31, 2023

#### Disclaimer:

This document was made possible through support provided by the U.S. Agency for International Development. The opinions expressed herein are those of the author(s) and do not necessarily reflect the views of USAID.

## Table of Contents

Acronyms and abbreviations	6
Executive Summary	8
Introduction	
Area of operations	13
Activity staffing	14
Visitors to CSISA–MEA activities	15
Achievements during the reporting period	
Intermediate Result 1: Competitiveness and efficiency of domestic and priva led agricultural machinery manufacturing boosted	te sector- 20
Developing the manufacturing capacity of small- and medium-scale agriculture-based engineering SMEs	light 20
Support for ABLE SMEs	21
Supporting ABLE SMES to supply parts to lead firms	
Supporting ABLE SMEs supply parts to dealers - keeping the wheels of agriculture turning Supporting ABLE SMEs to gain access to quality raw materials	23
ABLE Engagement for stage 2 support	25
Provision of technical support to stage 2 ABLE SMEs	
Machinery service centers	28
Climate-smart factories	29
Service provision through light engineering business associations	
CSISA–MEA participation at the US Trade Show. Dhaka	
Facilitating the development, testing and marketing of new agricultural machinery te	chnology
· · · · · · · · · · · · · · · · · · ·	
Jute fiber extracting machine	33
Garlic clove planter	35
Red onlons	
Plastic recycling	
Research at Georgia Tech	37
Developing financial services for ABLE SMEs, dealers and MSPs	
Facilitating access to finance for ABLE SMEs	38
How the finance was used by ABLE SMEs	
Facilitating access to financial for dealers and MSPs	
Intermediate result 2: Enhanced institutional capacity for agricultural mecho through the development of skilled and youth workforces	inization 41
Technical skill training for ABLE company staff and management	41
ABLE enterprise training in the Zone of Influence and Bogura	43
Workforce training in machining skills	43
Training provided to the foundry workforce by foundries	
Innovative hands-on 'basic foundry skills' training to women in Bogura	
Zone of Resilience	ЛЕ

Machining skills training for ABLE staff4	5
Foundry skills training to ABLE staff4	6
Advanced technical and business-related training to ABLE management of ZOI and ZOR4	6
Gender Equality and Social Inclusion (GESI)	<b>6</b> 6 7
Recognizing women's contribution to agri-food systems	/
The impact of training provided over the last three years	9
In-focus story	U
From helper to skilled machine worker: the motivational journey of Shumik Sarker	0
Intermediate Result 3: Enhance farmer access to mechanization and other crop production and marketing services with particular emphasis on remote and underserved markets	1
Agricultural machinery sales to machinery service providers	1
Bringing agricultural mechanization to the Bangladesh Hill Tracts – Bandarban District in the ZOR5	3
Agricultural machinery marketing events5	4
In-focus Story	8
Fodder chopper: a women-friendly technology	8
Women-led manufacturing and engineering behind fodder chopper production 5	8
Supporting the Department of Agricultural Extension to promote new agricultural mechanization technology	0
Supporting MSPs to maintain and use agricultural machinery	1
Rice transplanter business development activities6	2
In-focus story	5
Farmer adapting technology to meet local circumstances6	5
New dealerships6	6
Commission agents	6
Facilitating access to finance for MSPs6	7
Machinery market creation events through partnerships with USAID and other donor-funded activities	<b>7</b> 7
Trade fairs6	8
Challenges – Covid–19, Ukraine–Russia war, and extreme weather events	8
What impact has this current financial crisis had on the light engineering sector?	9
Annex I: Detailed information about Activity implementing partners	0
Annex 2: CSISA–MEA staff overview	2

## List of Tables

Table I: Number of ABLE SMEs partnering with CSISA–MEA	19
Table 2: Value of Sales (USD) by ABLES SME facilitated by CSISA–MEA	23
Table 3: Total finance obtained by ABLE enterprises from FSI facilitated by CSISA–MEA	36
Table 4: Value of loans facilitated by field office since October 1 2023	36
Table 5: Breakdown of loans given to ABLE SMEs in Bogura and interest rate paid for each loan	37
Table 6: Total value of investments made by ABLE SMEs facilitated by CSISA-MEA	38
Table 7: Finance obtained by dealers and MSPs facilitated by CSISA–MEA from FSI	38
Table 8: Number of workforce members trained by CSISA field offices	39
Table 9: Workforce training presented by gender and age group of those trained	40
Table 10: Number and value of machines sold to MSPs	49
Table 11: No. of machines sold by field office and gender of purchaser	50
Table 12: Number of farmers buying agricultural machinery services disaggregated by gender	50

## List of Figures

Figure 1: Location and size of ABLE SME hubs where CSISA–MEA and the USAID ZOI and ZOR work I3

## Acronyms and abbreviations

ABLE agriculture-based light engineering	
ADO Agriculture Development Officer	
AFP axial flow pump	
BARI Bangladesh Agricultural Research Institute	
BAU Bangladesh Agricultural University	
BCSIR Bangladesh Council of Scientific and Industrial Research	
BDO business development officer	
BDT Bangladesh <i>taka</i>	
BEIOA Bangladesh Light Engineering Owners Association	
BITAC Bangladesh Industrial and Technical Assistance Center	
BRAC Bangladesh Rural Advancement Committee	
BRRI Bangladesh Rice Research Institute	
BSP business service provider	
CSISA-MEA Cereal Systems Initiative in South Asia – Mechanization Extensi	on Activity
CSISA-MI Cereal Systems Initiative in South Asia – Mechanization and Irri	igation ,
CA conservation agriculture	•
CAD computer-aided design	
CIMMYT The International Maize and Wheat Improvement Center	
CH combine harvester	
CNC computer numerical control	
DAE Department of Agriculture Extension	
EOI Expression of Interest	
FAO Food and Agriculture Organization	
FDMN forcibly displaced Myanmar nationals	
FFD Farmer's Field Day	
FSI financial services institution	
Georgia Tech Georgia Institute of Technology	
GUK Gram Unnayan Karma (Village Development Karma)	
HAO Humanitarian Assistance Officer	
HYV high yield variety	
iDE International Development Enterprise	
IDLC Industrial Development Leasing Company	
iDQA Internal Data Quality Assessment	
INGO international non-governmental organization	
IPDC Industrial Promotion and Development Company	
IR intermediate results	
IT information technology	
JICA Japan International Cooperation Agency	
JVA joint venture agreement	
KMP Krishi Machine Porichiti (Introduction to Agricultural Machines)	
LAN Livestock and Nutrition Activity	
LE light engineering	
LLA local level agreement	
LPIN Livestock Production for Improved Nutrition	
MFI micro finance institution	
MEL monitoring, evaluation and learning	
MDO Machinery Development Officer	
MSA market systems analysis	
MSME micro, small and medium enterprises	
MSF medium-sized factories	
MSP machinery solution provider	
NARS National Agriculture Research Station	

NGO	non-governmental organization
OHS	Occupational Health and Security
OMD	Officer Market Development
NRE	New Rifat Engineering
PAC	Practical Action Consulting
PPE	personal protective equipment
PSE	private sector enterprise
PTOS	power tiller-operated seeder
RDA	Rural Development Academy
RRF	Rural Reconstruction Foundation
RT	rice transplanter
SAAO	Sub Assistant Agriculture Officer
SME	small and medium enterprises
SMS	short message service
SPE	special purpose entity
SPV	special purpose vehicle
TML	The Metal (Pvt.) Limited
TMSS	Thengamara Mohila Sabuj Sangha
тот	Training of Trainers
TSP	training service provider
TVET	technical and vocational education training
US	United States
USA	United States of America
USAID	United States Agency for International Development
USD	United States dollar
USG	United States Government
WFP	World Food Program
ZOI	Zone of Influence
ZOR	Zone of Resilience
2WT	two-wheel tractor
4WT	four-wheel tractor

## **Executive Summary**



This report covers the six-month period from October 1, 2022 to March 31, 2023.

The USAID Feed the Future Bangladesh Cereal Systems Initiative for South Asia – Mechanization Extension Activity (CSISA–MEA) operates in the Feed the Future Zone of Influence (ZOI) in south-west Bangladesh and the Feed the Future Zone of Resilience (ZOR) in the Rohingya refugee crisis-impacted Cox's Bazar region in south-east Bangladesh. It also operates in Bogura town in north-western Bangladesh. Bogura district is the main center for the light engineering

industry outside of Dhaka and, as such, is a major producer of and market for agricultural machine parts and agricultural machines that are used or made nationally including in the ZOI and ZOR.

The Activity aims to support the mechanization of agriculture in Bangladesh by developing the capacity of the private sector to develop, manufacture and market innovative, climate-smart technologies, which will enable the country's farmers to mechanize their agricultural production and increase their resilience to climate change. Through this it will achieve the core objective of enhancing agricultural resilience through the development of agriculture-based light engineering (ABLE) small and medium enterprises (SMEs) and develop a youth and gender-inclusive workforce with a special emphasis on crisis affected areas of Bangladesh. This core objective will be achieved through three intermediate results:

**Intermediate result I**: The competitiveness and efficiency of domestic and private sector-led agricultural machinery manufacturing boosted.

Since the beginning of the Activity, CSISA-MEA has supported 507 ABLE SMEs to develop and expand their businesses through the provision of training for staff, technical advice, and access to finance. This builds on the 156 ABLE SMEs supported in the first three years of the Activity. In the six months since October 1, 2023, the Activity signed agreements with 351 ABLE SMEs (147 ABLE SMEs in the ZOI (Jashore/Faridpur region), 95 in Bogura, and an impressive 109 in the ZOR (Cox's Bazar/Bandarban region) and Chattogram region). This is out of a total of 422 who responded to a call for expressions of interest (EOIs) published in national and regional newspapers and other media.

During Year 2, a key lesson learned about how best to support ABLE SMEs was that it was difficult to provide all enterprises with detailed support and that not all of them wanted that level of support. In Year 3 therefore, the support to ABLE SMEs was divided into two stages. In the first stage, all ABLE SMEs participate in basic machinery manufacturing and business management skills training and are supported with product marketing. In the second stage, those with the capacity and interest in further developing and expanding their businesses receive more intense business development support including technical and marketing support. In Year 4, following an open and rigorous selection process, the Activity signed joint venture agreements (JVAs) with 51 ABLE SMEs to take them into a second stage of their development. Of these, 23 are in the ZOI (Jashore and Faridpur region), six in the ZoR (Cox's Bazar and Chattogram regions), and 28 in Bogura. These ABLE SMEs join the 16 ABLE SMEs who signed JVAs with the Activity in 2022, bringing the total number of ABLE SMEs entering this second stage of their development to 62.

In Year 3 the Activity provided support for ABLE SMEs partnering with CSISA–MEA to supply spare parts to lead firms for some of the newest technologies to enter the agricultural machinery market in Bangladesh, including combine harvesters and rice transplanters. Although results from this activity were mixed, with lead firms failing to provide firm orders for parts, more success was achieved with

regional lead firms such as Janata Engineering and RK Metal. A positive result was that with CSISA– MEA technical support many ABLE SMEs learnt how to make the high-quality spare parts needed for these machines. As a result, this activity has been expanded to include the smaller lead firms, and to date, Janata Engineering, The Metal (Pvt.) Limited (The Metal), RK Metal, Alim Industries, and Uttaron Engineering are working with 26 ABLE SMEs to source spare parts. It also became clear in Year 3 that the market for these parts for the out-of-warranty period of servicing was through dealers. The result was that when the Activity facilitated meetings between ABLE SMEs and dealers, the SMEs could offer spare parts that matched imported parts for quality and cost, which resulted in substantial sales.

In Year 3, the business links created between dealers and ABLE SMEs through these meetings resulted in sales worth USD 969,372. In the first six months of this reporting year, these visits and linkage meetings have resulted in sales of spare parts and agricultural machines by ABLE SMEs worth USD 872,244 (USD 465,601 in Bogura, USD 357,073 in the ZOI (greater Jashore and Faridpur), and USD 4,571 in the ZOR (Cox's Bazar and Bandarban districts).

The CSISA-MEA Year 3 annual report described the visits to light engineering companies and government training institutions arranged by the Activity for stage 2 ABLE SMEs to see modern machinery such as induction furnaces and computer-controlled manufacturing equipment. Due to this and the technical support, links to machinery suppliers and access to finance facilitated by the Activity OMDs have started to generate visible results. This is despite the impact of the Covid-19 epidemic and Ukraine-Russia war on the economy in Bangladesh and the light engineering sector (see challenges section, below).

Stage 2 partner ABLE SMEs have installed a range of mechanized equipment, including induction furnaces, shot blast casting cleaning equipment, heat treatment ovens, and computer-controlled lathes, mills, sheet metal-bending equipment, plasma cutters, and metal rolling equipment. These investments have drastically improved manufacturing efficiency and the work environment. Further, it has been calculated that the induction furnaces installed at four Bogura-based ABLE SMEs will eliminate annually the emission of 3,200 MT of carbon dioxide ( $CO_2$ ).

In addition to installing new manufacturing machinery, the Activity has facilitated the design and expansion of new manufacturing premises for four ABLE SMEs that will not only allow for more efficient manufacturing processes but will also install features such as raised roof spaces to provide better ventilation and light. It is also anticipated that a potential partnership with International Finance Corporation will result in the installation of roof-top solar power generation

The equipment described above is expensive, and for smaller ABLE enterprises their level of manufacturing through-put would not be large enough to justify the investment. During the last six months, two businesses have started to provide services to other ABLE enterprises. Janata Engineering (in Chuadanga) uses the excess capacity of its CNC-guided machinery to provide CNC-guided metal cutting, bending and rolling services to other light engineering businesses. By contrast Zihad Cutting, Bending and Rolling Workshop (Jashore) has established a business that is solely based on the provision of metal cutting, bending, and rolling services for ABLE enterprises and updated technology.

Meetings with Bangladesh Engineering Industry Owners Association (BEIOA) have resulted in an agreement to support the association to enable their members to gain access to training, digitized business processes, metal heat treatment services, and financing services. They also will be supported to raise taxation issues with the government of Bangladesh.

Engineering support from Activity partner Georgia Institute of Technology (Georgia Tech) has resulted in the design and testing of a jute decorticator that strips jute fiber from jute stems without breaking the stem pith, known as the jute stick, an onion seedling transplanter and a garlic clove planter. The jute decorticator is now being manufactured by two ABLE SMEs. All this investment in manufacturing and equipment requires finance. During its first three years, the Activity facilitated loans from 12 FSIs for 42 ABLE SMEs, 5 dealers and 38 MSPs worth USD 1,433,039. During the first six months of Year 4, the Activity has facilitated loans from 10 FSIs for 20 ABLE SMEs worth USD1,322,476, loans for six dealers worth USD195,952, and for two MSPs worth USD 400, totaling USD1,518,828. Since the start of the Activity to March 31, 2023, the Activity has facilitated loans from 22 different FSIs for 62 ABLE SMEs, 11 dealers, and 40 MSPs, totaling USD2,951,867

**Intermediate result 2**: Institutional capacity for agricultural mechanization through the development of a skilled and youth workforce enhanced.

Since the start of the Activity in October 2019 to the end of this reporting period on 31 March 2023, the Activity has facilitated the training of 1,698 workforce staff members (including 151 ABLE SME managers training in Activity year 3) from 295 ABLE SMEs. This is 37% of the estimated 800 businesses manufacturing and 70 foundries working in the agriculture based light engineering sector in Bangladesh<sup>1</sup>

In year 4 of CSISA–MEA, the Activity provided 280 members 129 machinery manufacturing and foundry enterprises in Bogura, the ZOI, and the ZOR. Of these 280 trainees, a total of 120 men were trained in machining skills, 40 men in foundry skills, and 80 women in machining and foundry skills from 100 ABLE SMEs in Bogura and the ZOI. In the ZOR, a total of 40 men from 29 ABLE SMEs were trained in machining skills. Of the workforce trained 29% were women and 71% were youth younger than 29 years old. The training comprised 72 to 78 hours of theory and practical sessions altogether in machining skills training and 42 hours of practical cum theory in foundry skills training.

The success of this year's training program was based on key lessons learnt from the Activity's first three years of implementation. These included:

- 1. The need to understand the constraints impacting on the number of women potentially available and able to work in the manufacturing of agriculture machinery. The Activity responded by contracting a consultant to conduct Gender Equality and Social Inclusion (GESI) awareness-raising among the light engineering value chain actors, with a resulting set of recommendations for improved gender inclusion in the sector.
- 2. Employers of women workers realized a great untapped potential for women to perform certain technical skill operations, resulting in training in light engineering skills that give women higher wages.
- 3. Planning and review meetings with training service providers (TSPs) provided input, invaluable to enabling the Activity to identify the areas needing improvement. This resulted in part in the contacting of ABLE SMEs with advanced foundry and machine manufacturing skills to train other members of the ABLE SME workforce with support from the Activity's two main TSPs, RRF and GUK. This approach is developing an industry lead training capacity that will give the program sustainability after the Activity closes.
- 4. The impactful experience of providing training through BITAC under the Ministry of Industries in the ZOR in Year 3 has encouraged the Activity to expand the collaboration and signing of contracts with BITAC's regional offices in the ZOI.

**Intermediate result 3**: Access for farmers to agricultural machinery, production, and marketing services improved.

In the first six months of activity year 4 the CSISA–MEA team facilitated sales to MSPs of agricultural machinery worth USD1,209,175 (338 machines) of which 21 (6%) were purchased by women. Of the value of the sales, 76% was spent purchasing 77 combine harvesters (this figure is not the true value

<sup>&</sup>lt;sup>1</sup> Alam, M. M., Khan M. I. N., Saha C. K., Rahman A., Bhuyian M. G. K.,

Manufacturing of agricultural machinery in Bangladesh: Opportunities and

Constraints, AgricEngInt: CIGR Journal Open access at <u>http://www.cigrjournal.org</u>, Vol. 19, No. 1 June, 2017.

of the machines sold but their value after government subsidies have been deducted from their price). This was achieved through several events, described in detail below. These were implemented through partnerships with a wide range of government agencies and the private sector. In the ZOI, lead firms TML, ACI, Alim Industries, Janata Engineering, RK Metal, and Abedin Equipment sold 238 items of machinery worth USD812,817, and in the ZOR lead firms Abedin Equipment, ACI Motors, TML, SQ trading, and Bangla Mark sold 100 machines worth USD396,358.

Some of these sales were to MSPs that established business before the reporting period, but others were sales to the 226 new MSPs created in the ZOI during this reporting period, bringing the total since the start of the Activity to 728. Of these, 391 own small machines (PTOS, reapers, rice transplanters, fodder choppers, and axial flow pumps) and 337 own combine harvesters. Of the small machine owning MSPs, 95% have farming as their primary source of income, compared to 30% of the combine harvester owners.

During this reporting period 54,959 farmers bought machinery services worth USD494,631 from the 728 MSPs businesses established as a result of support given by the Activity since the start of CSISA–MEA.

The Activity partnered with lead firms and the government's Department of Agriculture Extension (DAE) to promote the use of combine harvesters, rice transplanters, and fodder choppers. Demand creation events included traditional demonstrations and farmers meetings as well as roadshows.

Knowledge of how to use and maintain agricultural machinery is often lacking by MSPs when they buy new machinery and by the mechanics who are needed to maintain and repair it. This is particularly true of the newest agricultural machinery to be introduced by the Activity: combine harvesters. To ensure these valuable machines function well and are able to work through a season without mechanical failure, the Activity partnered with the main lead firms importing combine harvesters and rice transplanters – TML, ACI Motors, and Abedin Equipment – to facilitate the training of 58 MSPs in the use and maintenance of combine harvesters and rice transplanters.

## Bringing agricultural mechanization to the Bangladesh Hill Tracts – Bandarban District in the ZOR

Following a request from USAID, CSISA–MEA began work in the hill tract district of Bandarban in 2022. The introduction of new agricultural mechanization technology to this district of hills and valleys presented a new technical challenge. To identify the technologies required, the Activity first commissioned in October 2022 a study of farming systems and current level of mechanization. It showed a very low level of mechanization, with valley-bottom agriculture dominated by transplanted monsoon and irrigated dry season rice, and hillsides either under forest or planted with rainfed upland rice. Cashew nuts and some horticultural crops were also grown at higher altitudes on hillsides. Livestock production is also an important activity, and along with other parts of Bangladesh, fodder production and processing are a particular challenge for women, who have the responsibility of cutting fodder by hand. It was considered that rice transplanters and reapers (for lowland crops) and mini power tillers, power weeders, and reapers (for hillside farming, cashew nut and horticultural crops) would find a ready market.

The activity, facilitated through government and private sector partners marketing events for rice transplanters, reapers, and fodder choppers with the result that five rice transplanters, three reapers, and four fodder choppers have been sold to MSPs in the last three months.

Government support for this activity has been very important. The Hill Tracts Minister, Bir Bahadur Ushwe Sing, MP, strongly endorsed the USAID sponsored agricultural mechanization program in the Hill Tracks Bandarban district at a farmer field day held in Bandarban Sadar on February 21, 2023.

## Partnerships with USAID activities and donor funded projects

Fodder chopper demand creation events in the ZOI and ZOR were largely carried out in partnership with the USAID Feed the Future Bangladesh Livestock and Nutrition Activity (LAN). In the ZOI, a partnership with the USAID Feed the Future Bangladesh Horticulture, Fruits, and Non-Food Crops Activity to promote the use of jute fiber decorticators has also been initiated.

## Visitors

## **USAID** visit to Jashore region

Joe Lessard, Deputy Director, Office of Economic Growth, accompanied by Kevin Fath, ADO, John Labord, ADO, and other officials from USAID, visited CSISA–MEA Jashore-facilitated agricultural mechanization and agricultural machinery manufacturing activities (March 12, 2023).

## Honorable Secretary, Ministry of Agriculture visit to Jashore

Wahida Akhtar, Honorable Secretary, Ministry of Agriculture, Government of Bangladesh, with Dr. Shaikh Mohammad Bokhtiar, Executive Chairman, BARC, Dr. Debasish Sarker, Director General, BARI, and Badal Chandra Biswas, Director General, DAE, attended a workshop organized by CSISA–MEA/BARI on smart agriculture, at the Regional Agricultural Research Station, Jashore (March 11, 2023).

## Project Director, DAE Farm Mechanization project visit to Cox's Bazar

CSISA-MEA Cox's Bazar team organized an experience-sharing workshop on rice transplanter use, at Grace Cox's Smart Hotel, Cox's Bazar (February 9, 2023). Tareq Mahmudul Islam, Project Director of the Farm Mechanization project, DAE, was chief guest.

## Director General, BITAC inaugurated the Y4 Workforce Training at Chattogram

CSISA–MEA facilitates workforce skill development training through a partnership with Bangladesh Industrial Technical Assistance Center (BITAC) in Chattogram. The Honorable Director General of BITAC, Anwar Hossain Chowdhury, inaugurated the training of the first batch of 20 metal workers, at BITAC, Chattogram (March I, 2033).

## The Honorable Hill Tracts Minister visit to Bandarban District

In partnership with DAE and private sector partners, the Activity facilitated a Farmers Field Day in Bandarban Sadar (February 21, 2023), attended by the Honorable Hill Tracts Minister, Bir Bahadur Ushwe Sing, MP, as chief guest.

### Introduction

This semi-annual report covers the six months from October 1, 2022 to March 31, 2023.

The United States Agency for International Development (USAID) Feed the Future Bangladesh Cereal Systems Initiatives for South Asia – Mechanization Extension Activity (CSISA–MEA) is a five-year development Activity that started in October 2019. It is implemented by The International Maize and Wheat Improvement Center (CIMMYT) in partnership with International Development Enterprises (iDE) and Georgia Institute of Technology (Georgia Tech). More information about the Activity's partners is provided in Annex I. The Activity aims to support the mechanization of agriculture in Bangladesh by developing the capacity of the private sector to develop, manufacture and market innovative, climate-smart technologies that will enable the country's farmers to mechanize their agricultural production and increase their resilience to climate change. Through this it will achieve the core objective of enhancing agricultural resilience, through the development of ABLE SMEs and of a youth and gender-inclusive workforce with a special focus on the Rohingya refugee crisis-affected areas of Cox's Bazar and Bandarban districts. This will be achieved through three intermediate results:

- Intermediate result I: Boost the competitiveness and efficiency of domestic and private sector-led agricultural machinery manufacturing.
- Intermediate result 2: Enhance the institutional capacity for agricultural mechanization through the development of a skilled and youth workforce.
- Intermediate result 3: Improve access for farmers to agricultural machinery, production, and marketing services.

By achieving these objectives, the Activity will, by the end of this phase in 2024, have enabled 200,000 farmers to gain access to new agricultural mechanization technology, encouraged agriculture-related businesses to secure USD7.7 million worth of new investments, facilitated the provision of USD3 million worth of finance to actors along the agricultural mechanization value chain, and raised the skills of 2000 members of the country's light engineering workforce.

**Private sector engagement.** CSISA–MEA addresses constraints to the smooth functioning of agricultural machinery market systems by facilitating partnerships between actors in the agricultural machinery value chain. It does not engage directly in interventions but rather assumes a market facilitation role by funding activities, facilitating linkages to other organizations such as the DAE and national research institutions and universities, and by providing technical expertise. Costs and activities are rationally shared between partners and, wherever possible, confined to the provision of technical support.

CSISA-MEA places a strong emphasis on supporting the light engineering industry by facilitating training in manufacturing and managerial skills, manufacturing systems design, links to markets, and access to finance. This is in addition to facilitating the introduction of agricultural mechanization technology by the private sector to the Feed the Future ZOI and the Rohingya crisis-impacted ZOR.

### Area of operations

CSISA-MEA maintains field offices in locations across Bangladesh, crucial to USAID's activities and the light engineering and agricultural machinery manufacturing industries.

Khulna and Dhaka divisions (greater Jashore and greater Faridpur regions). This is where the main light engineering hubs in the Feed the Future ZOI are based. They constitute a major area for the commercial production of 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 increasing rapidly.

**Bogura district.** This is the main light engineering center outside Dhaka and is also where many machine manufacturing enterprises in the Feed the Future 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 and Bandarban districts.** These districts are close to the Rohingya refugee camps and make up the USAID ZOR. Being remote from the major commercial centers in northern and central Bangladesh, they have not attracted significant commercial interest in terms of the manufacture and marketing of agricultural machinery.



## Figure 1: Location and size of ABLE SME hubs where CSISA-MEA and the USAID ZOI and ZOR work

\*ABLE – agriculture-based light engineering. CSISA–MEA – Cereal Systems Initiative in South Asia – Mechanization Extension Activity. FDMN – forcibly displaced Myanmar nationals. ZOI – Zone of Influence. ZOR – Zone of Resilience.

## Activity staffing

Annex 2 presents an Activity staff overview.

The Activity currently employs 70 full-time members of staff, of which 17 are based in the Dhaka office and 53 in field offices; four are shared with other programs. In addition, the Activity hires two home-based international consultants who provide technical advice and report-writing and editing services.

Georgia Tech provides Professor Dr. Jonathon Colton as technical lead on the engineering aspects of the Activity. Prof. Colton supervises Georgia Tech postgraduate engineering students who design machinery and conduct studies for the Activity as part of their thesis research.

The administration and financial management support for the Activity is provided by a pool of staff, who also support all programs implemented by CIMMYT and iDE.

During the reporting period, the Activity recruited a field office coordinator, three field office-based engineers, two agriculture development officers and two market development officers. For the Dhaka offices, the Activity recruited a team leader and a technical specialist for the iDE office and in October 2022 Nilufar Sultana was appointed as the new CSISA–MEA Project Manager and AKM Saiful Islam was appointed as the new CSISA–MEA MEL Coordinator.

## Visitors to CSISA-MEA activities

During the reporting period, the Activity welcomed visitors from the Government of Bangladesh, USAID, and public and private sector partners.

## Zone Of Resilience

## Hill Tracts Minister, MP: visit to Farmers Field Day, Banderban district

As part of CSISA-MEA's Year 4 working strategy in the hill tracts district of Bandarban and in partnership with DAE and private sector partners, the Activity facilitated a Farmers Field Day in Bandarban Sadar (February 21, 2023) attended by approximately 400 farmers. The field day was attended by Chittagong Hill Tracts Affairs Minister, Bir Bahadur Ushwe Sing, MP, as chief guest, who strongly endorsed the USAID-sponsored agricultural mechanization program in the Hill Tracts Bandarban district. CSISA partner ACI Motors sold a combined harvester, a rice transplanter, and two power tillers at the event.



**Above**: Hill Tracts Affairs Minister, Bir Bahadur Ushwe Sing (center) attending a rice transplanter demonstration facilitated by CSISA–MEA, Bandarban Sadar, February 21, 2023. Photo credit: Saiful Islam, Vehicle Operator, CSISA–MEA, Cox's Bazar

## BITAC Director General: inauguration of the Year 4 workforce training, Chattogram

In Chattogram, CSISA–MEA facilitates workforce skill development training through a partnership with Bangladesh Industrial Technical Assistance Center (BITAC). On March I, 2023, the Honorable Director General of BITAC, Anwar Hossain Chowdhury, inaugurated the training of the first batch of 20 metal workers, at BITAC, Chattogram. Mr. Chowdhury acknowledged the collaboration between CSISA–MEA and BITAC and stated his intention to visit CSISA–MEA activities in the coming months.



**Above**: inauguration of the first batch of CSISA–MEA's workforce training in partnership with BITAC. March 1, 2023. Photo credit: Shahabuddin Shihab, MDO, Cox's Bazar

## Project Director, DAE Farm Mechanization project: visit to Cox's Bazar

The CSISA-MEA Cox's Bazar team organized an experience-sharing workshop on mechanized rice transplanters at Grace Cox's Smart Hotel, Cox's Bazar (February 9, 2023). Tareq Mahmudul Islam, Project Director, Farm Mechanization project, DAE, was chief guest. Twenty-three rice transplanter MSPs attended and shared their professional experience. Mr. Islam expressed his appreciation of the progress of mechanization in the Cox's Bazar district and the collaboration between CSISA-MEA and DAE.

## **Zone of Influence**

## Honorable Secretary, Ministry of Agriculture: visit to Jashore

On March 11, 2023, Wahida Akhtar, Honorable Secretary, Ministry of Agriculture, Government of Bangladesh along with Dr. Shaikh Mohammad Bokhtiar, Executive Chairman, BARC, Dr. Debasish Sarker, Director General, BARI, and Kbd. Badal Chandra Biswas, Director General, DAE, attended a workshop organized by CSISA–MEA/BARI on smart agriculture at the Regional Agricultural Research Station, Jashore. Ms. Akhtar visited booths hosted by CSISA–MEA private sector partners and observed the various machines and spare parts they produce locally. CSISA–MEA representatives

outlined the various R&D collaboration activities with BARI, and the Honorable Secretary expressed her pleasure at the extent to which CSISA–MEA and BARI collaborate on promoting agricultural mechanization.



**Above:** Honorable Secretary, Ministry of Agriculture, Wahida Akhtar, discussing with Ole Ullah, owner of CSISA–MEA partner Janata Engineering machine and spare parts produced by his company, Jashore. March 11, 2023. Photo credit: Harun-Or-Rashid, Jashore

## USAID team: visit to Jashore region

On March 12, 2023, Joe Lessard and Kevin Fath, Agriculture Development Officer, John Laborde, Agriculture Development Officer and other officials from USAID visited agricultural mechanization activities facilitated by CSISA–MEA Jashore. In Chadpara, Rakhalgachi, Kaliganj and Jhenaidah, they viewed a range of agricultural machinery including combine harvesters and rice transplanters and discussed with MSPs the economic benefits gained from providing machinery services.

At SMR Agro Engineering foundry at Kanitola, Jashore, the USAID team observed foundry processes using the newly install induction furnace, as well as the manufacturing and market linkages that the partnership with CSISA–MEA has created for the foundry's locally fabricated machines and spare parts. The team expressed its particular pleasure with the work the Activity is doing to improve workplace safety, the advice it has provided on improving factory ventilation, and the installation of rooftop solar panels.



**Above**: USAID representatives visiting CSISA–MEA in Jashore to view agricultural machinery – here, a combine harvester – and hearing from farmers about the benefits of agricultural mechanization, CSISA Jashore hub. March 12, 2023. Photo credit: Md. Enamul Haque, ADO, CSISA–MEA, Jashore

## Achievements during the reporting period

The introduction of semi-dwarf, photo-insensitive, fertilizer response and disease resistant rice and wheat varieties with the accompanying increased use of fertilizer and pesticides created the Green Revolution of the late 1960s and 1970s. This led to a dramatic increase in crop yields, allowing Bangladesh to remain almost rice self-sufficient since independence in 1971 despite a more than three-fold increase in the population. Accompanying this there has been a quiet 'agricultural mechanization revolution' starting with the introduction of power tillers and tube well pumps followed by mechanized threshers and maize shellers. The introduction of more complex machinery – first, four-wheel tractors and more recently combine harvesters and rice transplanters – has further mechanized the country's crop production. The manufacture of machines such as threshers and spare parts for imported machines such as diesel engines, tractors and now combine harvesters has created a light engineering sector in regional cities at the center of major agricultural production zones.

Bangladesh's light engineering sector currently comprises about 40,000 SMEs, located in 34 light engineering clusters in 18 districts of the country, with major clusters in Dhaka, Chattogram, Narayanganj, Bogura, Jessore, Gazipur and Kishorganj. The majority of companies have less than a hundred employees. As of 2018, the total domestic market size was estimated to be USD12 billion. While local production has been gradually increasing, these SMEs meet only 30% of total demand<sup>2</sup>. Of these there are about 70 foundries, 800 agricultural machinery manufacturing industries and workshops, 1500 spare parts manufacturing workshops, and about 20,000 repair and maintenance workshops engaged in agricultural machinery sub-sector of the light engineering industry<sup>3</sup>.

Generally speaking, most ABLE enterprise staff have had no formal skills training, while their use of outdated machinery coupled with low workforce skills tends to result in the manufacture of suboptimal quality machines and parts, which provide low levels of productivity. Taken altogether, this makes it difficult for the ABLE sector to compete with imported machines and parts in terms of both quality and price.

As agricultural mechanization expands and the machines used become more sophisticated, the development of the light engineering sector into one with more advanced skills and more efficient manufacturing technology would allow it to compete with imports and expand. This would create decent employment, particularly for women and youth, and support the transformation of the sector into one that is export-oriented. At the same time, it would provide Bangladesh with a light engineering sector able to supply machinery service providers with agricultural mechanization technology, which can be used to provide farming communities with labor- and cost-saving mechanization services.

The Activity objectives therefore are divided into three intermediate results (IRs):

## IRI: Competitiveness and efficiency of domestic and private sector-led agricultural machinery manufacturing boosted

This will be achieved by facilitating the adoption of efficient machinery and spare parts manufacturing processes and improving links between manufacturing and marketing value chain actors.

## **IR2:** Enhanced institutional capacity for agricultural mechanization through the development of a skilled and youth workforce

<sup>&</sup>lt;sup>2</sup> Bangladesh Development Investment Authority (BIDA), Light Engineering Industries, <u>https://bida.gov.bd/light-engineering</u>, June 2021.

<sup>&</sup>lt;sup>3</sup> Alam, M. M., Khan M. I. N., Saha C. K., Rahman A., Bhuyian M. G. K., Manufacturing of agricultural machinery in Bangladesh: Opportunities and Constraints, AgricEngInt: CIGR Journal open access at <u>http://www.cigrjournal.org</u>, Vol. 19, No. 1, June, 2017.

This will be achieved by facilitating the development of the skills required by the agriculture-based light engineering sector to manufacture quality and competitively priced machinery and spare parts.

## **IR3: Enhance farmer access to mechanization and other crop production and marketing services, with particular emphasis on remote and underserved markets**

This will be achieved by facilitating the development of a machinery service provider sector so that it has access to the labor- and cost-saving agricultural machinery technology that farmers need.

The following sections report on the progress made with implementing activities under each Intermediate Result.

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

# Intermediate result I



Initially the Activity aimed to provide all ABLE SMEs who signed collaboration agreements with CSISA– MEA with access to technical, training, and market and financial services. However, it became clear during the implementation of the Activity in Year 2 that to provide this level of support to all ABLE SMEs partnering with CSISA–MEA would not be possible, given Activity staffing levels. Further, not all ABLE SMEs wanted to or were capable of using this support. It was therefore decided at the start of Year 3 to provide, as a first stage in the development of ABLE SMEs, access to training, market links, and financial services. Over the course of a year of support, it would become clear which ABLE SMEs would benefit most from more intense technical support and these would be selected for a second stage of development, which would be based on cost-sharing agreements.

Implementing this second stage of light engineering business development involves:

- I. conducting a detailed analysis of selected ABLE SMEs' capacity and commitment;
- 2. preparing a program of support that will stimulate the growth of the enterprise;
- 3. providing technical assistance for the identification and implementation of appropriate investments in new equipment, improved factory layout to improve production processes, expansion into new machinery and spare parts markets and, to finance all these investments, improved access to finance; and
- 4. providing training in key business skills such as inventory control, keeping financial records, customer relations, marketing, and human resource management.

Developing the manufacturing capacity of small- and medium-scale agriculture-based light engineering SMEs

The Activity supported the development of 156 ABLE SMEs through the provision of training for staff, technical advice, and access to finance. In the six months since October 1, 2022, the Activity signed agreements with 351 ABLE SMEs. This is out of a total of 422 who responded to a call for expressions of interest (EOIs) published in national and regional newspapers and other media.

The total number of ABLE SMEs supported since the start of the activity in October 2019 is now 507.

Field	Activity year				Total
Offices	2019–20	2020–21	2021–22	2022–23 6 months	
Bogura	22	19	11	95	147
Jashore	15	9	16	87	127
Faridpur		9	13	60	82
Cox's Bazar			42	109	151
Total	37	37	82	351	507

Table 1: Number of ABLE SMEs partnering with CSISA-MEA

Following the signing of consent letters, CSISA–MEA field office teams organized 11 kickoff meetings to present to the selected ABLE SMEs the activities designed to support them in expanding their business. The ABLE SMEs also shared the challenges they faced and their ideas for strengthening the light engineering sector.



**Above**: a kickoff workshop facilitated by CSISA–MEA attended by ABLE SME owners at DESHA TARC Trainin and Resource Center, Kushtia, December 2022. Photo credit: Abul Khayer, ADO, CSISA–MEA, Faridpur

## Support for ABLE SMEs

During the reporting period, for the 321 of the 351 ABLE SMEs that signed agreements, the CSISA-MEA teams facilitated activities to provide them with basic business development support (112 in Bogura, 71 in Jashore, 29 in Faridpur, and 109 in the ZOR). This covered identifying business opportunities to manufacture agriculture spare parts and machines; facilitating linkages between ABLE SMEs and dealers, finance institutions, government-enlisted vendors, local raw material suppliers and heat treatment service providers; inventory system development; online market promotion; and basic skill enhancement.

### Supporting ABLE SMES to supply parts to lead firms

Many relatively simple machines with easy-to-manufacture spare parts are manufactured in Bangladesh, but more complex machines (such as engines, tractors, and combine harvesters) and their spare parts are imported by lead firm machinery marketing companies. Importing parts can take time and be very expensive and manufacturing them in Bangladesh would make them readily available and ensure that repairs to machines are completed rapidly, making them available for rehires as soon as possible and at the same time giving MSPs and farmers the confidence to invest in them in the first place.

During the reporting period, CSISA–MEA identified two constraints to enable ABLE SMEs to take advantage of this potential market opportunity. Firstly, their capacity to produce spare parts is often limited because this requires special skills, equipment, and high-quality raw materials, which most ABLE SMEs do not have access to. Secondly, ABLE SMEs with the potential to learn how to make these parts and invest in the required equipment usually have limited links to the lead firms seeking a supplier. In Year 3, the Activity identified ABLE SMEs interested in supplying parts to lead firms and organized linkage meetings between them to identify the parts required. CSISA–MEA then selected ABLE SMEs with the most potential and facilitated the appropriate technical support (and in some cases training) to enable them to make prototype parts for the lead firms.

Results were mixed. Prototype parts were made for lead firms ACI Motors and The Metal, and for regional companies Janata Engineering and RK Metal. ACI Motors, although expressing appreciation of the prototype parts, did not place any orders. The Metal purchased a limited number. However, the two regionally based companies also participating in this program, Janata Engineering and RK Metal, placed larger orders.

In the first six months of this reporting year, Janata Engineering, The Metal, RK Metal, Alim Industries, and Uttaron Engineering have been working with 26 ABLE SMEs to source spare parts. The lead firms provided the SMEs with information about the parts they need, negotiated prices, provided the basis for evaluating the quality of parts from prototypes, and identified when the parts should be delivered. The lead firms will provide technical backstopping, including standard specifications, drawing, design, pattern and dice development support, and in some cases provide heat treatment services to ensure high quality parts are produced. The CSISA–MEA team is supporting this process by organizing meetings between lead firm representatives and ABLE SMEs and visits by lead firms to see SME workshops, and for ABLE SMEs to visit lead firm stores and offices. The SMEs are in the process of delivering prototypes to the lead firms. In addition, SmartMek, a company that provides machinery service nationwide, has joined the program to support the ABLE SMES that supply spare parts to lead firms, and to improve and standardize their packaging and branding.



**Above:** Engineer Md. Shahnawaz Shaon (center) supporting Yakub Engineering Workshop, Monihar, Jashore to manufacture 200 seed metering parts for PTOS machines ordered by lead firm Janata Engineering. Photo credit: Md. Khalekuzzaman,

**Above:** The Metal delivering sample spare parts to a Kustia-based ABLE SME for it to manufacture prototypes. Photo credit: Apurba Dubey, OMD, CSISA–MEA, Faridpur

In the ZOI, the CSISA–MEA Jashore team facilitated meetings between 14 ABLE SMEs (based in Jashore, Khulna, Kushtia, Faridpur and Meherpur) and lead firms, resulting in seven of these ABLE SMEs supplying 3500 spare parts to the lead firms. In Bogura, The Metal and Alim Industries have ordered samples from the six ABLE SMEs, of which five have delivered 18 prototypes. Also, in Bogura, the Activity team has facilitated links between six ABLE SMEs and a new lead firm, Uttaran Engineering. This company assembles and imports various types of agricultural machines and expects to strengthen its parts supply chain by contracting out the manufacture of parts to ABLE SMEs. Currently, three ABLE SMEs in Bogura are manufacturing prototypes for Uttaran Engineering.

To date in activity Year 4, ABLE SMEs in the ZOI and Bogura have sold spare parts to lead firms and dealers worth USD115,714.

## Supporting ABLE SMEs supply parts to dealers - keeping the wheels of agriculture turning

In Year 3 of the Activity, it was found that facilitating improved market access by holding meetings between ABLE SMEs and dealers was a highly successful way of generating new business for all the actors in the agricultural mechanization value chain. The unique geographic position that CSISA–MEA occupies also means that it is able to facilitate business links between regions of Bangladesh that would normally have operated in isolation. A major activity for CSISA–MEA has therefore been to bring together dealers, agricultural machinery and spare parts manufacturers from all the working areas of the Activity - the ZOR, ZOI, and Bogura to find new suppliers for dealers and markets for agricultural machinery.

In the ZOR, the CSISA–MEA Cox's Bazar and CSISA–MEA Bogura teams jointly organized eight dealers based in Cox's Bazar, Bandarban and Chattogram districts to meet Bogura-based ABLE SMEs (RF Tota, Al-Madina, Haque Metal, Rony Engineering works, Rahmania Engineering Workshop, and Moazzem Engineering) in each of two visits. The meetings discussed product quality requirements, product price, and delivery modality and resulted in six ZOR dealers developing business relationships with three Bogura-based ABLE SMEs (Khokon Engineering Workshop, M/S RF Tota Engineering Workshop and Rahmania Engineering Workshop).



**Above**: dealers from the ZOR visiting the Al-Madina foundry, one of three ABLE SMEs who have built business relationships with ZOR dealers as a result of their visit to Bogura. Photo credit: Bablu Miah, OMD, CSISA–MEA, Bogura

As of March 2023, 18 ABLE SME in Bogura have received orders from 84 dealers in the ZOI and ZOR for agricultural machines (centrifugal irrigation pumps, rice threshers, and maize shellers) and spare parts (pulleys, hubs, piston liners, pistons, chain covers, pinions, impellers, and tube wells).

In Jashore and Faridpur, the Activity teams facilitated 16 deal-making meetings between 30 ABLEs and 51 dealers. After these events, 18 ABLEs sold a wide range of small agricultural machines and spare parts to 43 dealers.



**Spare parts**: sprocket, roller trunk, tension bolt, combine harvester shaft Idler, pulley, feed roller, pinion set, body of fodder chopper, chain cover, power sprocket, PTOS seed meter, thresher pulley, flange, centrifugal pump delivery pipe, yoke, PTOS shaft, U-bolt, hitch pin, 4WT skid adjuster and oil filter, fish feed machine filter, piston liner.

**Small agriculture machines**: centrifugal pump, fodder chopper, thresher, spice grinder, maize seller, oil and feed mill.

**Above:** a typical 'across the table' meeting facilitated by CSISA-MEA in order to broker deals between ABLE SMEs and dealers. Photo credit: Md. Khalekuzzaman, OMD, CSISA-MEA, Jashore

**Above:** The huge range of parts and machines that ABLE SMEs in the ZOI now make for dealers.

In Year 3 of the Activity, meetings which facilitated business links between dealers and ABLE SMEs resulted in sales worth USD969,372. In the first six months of this reporting year these visits and linkage meetings have resulted in sales of spare parts and agricultural machines by ABLE SMEs worth USD872,244 (USD465,601 in Bogura, USD357,073 in the ZOI (greater Jashore and Faridpur) and USD4,571 in the ZoR (Cox's Bazar and Bandarban districts).

Field	Activity year			Total	
Offices	2019–20	2020–21	2021–22	2022–23 6 months	
Bogura	-	-	508,554	465,601	974,155
Cox's Bazar	-	-	-	4,571	4,571
Faridpur	-	-	-	25,498	25,498
Jashore		-	460,817	331,575	792,392
Total	-	-	969,372	827,245	1,796,616

## Table 2: Value of sales (USDs) by ABLE SMEs facilitated by CSISA-MEA

## Supporting ABLE SMEs to gain access to quality raw materials

A study commission by the Activity from the consulting company Inspira in 2022 showed that due to the high import taxes and duties on imported metals, the bulk of metal raw materials used by the light engineering industry in Bangladesh are obtained from shipbreaking operations in Chattogram. However, at the point of purchase, the composition of this metal is unknown, and this leads to reduced quality of the finished parts, reducing their desirability in the marketplace. The report also showed that if ABLE SMEs were to purchase metals direct from Chattogram ship breaking companies in large volumes, then they would obtain better prices and higher quality metals than when they purchase metal through metal dealers.

Following this study, the CSISA–MEA Dhaka marketing team assessed the scrap metal market in Chattogram and Dholaikhal, Dhaka, and shared the market information they acquired, especially sources of quality raw materials, with the ABLE SMEs through linkage meetings. These meetings helped the ABLEs to link with sources of quality raw materials and decide what parts or machines can be manufactured as per their capacity and market demand. The findings from the raw materials scoping study in Chattogram show future potential for developing a 'direct distribution model', where the raw materials suppliers in Chattogram will be directly connected with CSISA–MEA-supported ABLE SMEs as a way of offering them quality raw materials at a competitive market price. As a result, the CSISA–MEA team organized meetings between ABLE SMEs and Chattogram ship-breaking companies with the result that four ABLE SMEs purchased metals directly from the ship-breaking companies, cutting out the metal dealers.



**Above**: assessing the availability of quality raw materials at a Chattogram ship breaker's warehouse. Photo credit: Jotirmoy Mazumdar, Field Coordinator, CSISA–MEA, Cox's Bazar

#### ABLE Engagement for stage 2 support

During the reporting period, the CSISA–MEA team signed joint venture agreements (JVAs) with 51 ABLE SMEs to take them into a second stage of their development. Of these, 23 are in the ZOI (Jashore and Faridpur region) and 28 in Bogura. A further six in the ZOR (Cox's Bazar and Chattogram region) are due to be signed shortly. These ABLE SMEs join the 11 ABLE SMEs who signed JVAs with the Activity in 2022, bringing the total number of ABLE SMEs entering this second stage of development to 62.



**Above:** Md. Mamunur Rashid (left), owner of second stage ABLE SME M.M. Engineering, of Ramu, Cox's Bazaar, showing his CSISA–MEA partner certificate with CSISA–MEA, ZOR engineer Md. Shahabuddin Shihab (right) in front of the M.M. Engineering company signboard. Photo credit: Anwar Hossain, OMD, CSISA–MEA, Cox's Bazar

## Provision of technical support to stage 2 ABLE SMEs

In this reporting period, the Activity supported 23 ABLE SMEs, enabling them to invest USD1,519,133 in new equipment and manufacturing facilities, through provision of access to technical advice and financial services. As a result of this support since the start of the Activity, 72 ABLE SMEs have invested USD3,172,852 following technical and financial support facilitated by the Activity. These investments and the subsequent improvements in production efficiency and working environment would not have happened without the technical and facilitating support provided by CSISA–MEA.

The CSISA-MEA Year 3 annual report described the visits to light engineering companies and government training institutions arranged by the Activity for stage 2 ABLE SMEs to see modern machinery such as induction furnaces and computer-controlled manufacturing equipment. These visits and the accompanying technical support, along with links to machinery suppliers and access to finance facilitated by the Activity, have started to generate visible results.

A study of the impact of the Covid–19 pandemic and Ukraine–Russia war (see below, challenges section) on the Bangladesh economy, showed that as a consequence of these global issues the resulting financial crisis in Bangladesh led to a shortage of foreign exchange, an increased reluctance by banks to lend to small risky businesses such as ABLE enterprises, and frequent electricity supply outages. These factors all had an impact on the ability of ABLE enterprises to install and operate new machinery. Despite these challenges remarkable progress has been made by the ABLE SMEs.

**Induction furnaces.** Foundries in the light engineering sector mainly use coal fired cupola (blast) furnaces to melt metal. An alternative is the electrically powered induction furnace, which is less polluting than the cupola (blast) furnace and also allows for better control of the chemical composition of metals. In addition, induction furnaces can be used for steel and aluminum, expanding the materials that these foundries can cast. By not burning coal in cupola blast furnaces, it has been calculated that the four Bogura-based induction furnaces will annually eliminate between them the emission of 3200 MT of carbon dioxide ( $CO_2$ ).



**Above:** A newly installed induction furnace at one of CSISA–MEA's lead firms, SMR Agro Engineering, Jashore. Photo credit: Abdul Momin, photographer, Dhaka

Induction furnaces have recently been installed by SMR Agro Engineering (Jashore), Reza (Bogura), Al-Madina Metal Works (Bogura), and A Rahman (Bogura). Others such as Kamal Metal Works are currently installing machines.

**Shot blasting equipment** has been installed by Al-Madina Metal Works (Bogura) and Reza Engineers (Bogura). This is used to clean castings of sand and slag automatically, eliminating the need for manual cleaning with wire brushes, chisels and hammers, thus reducing time and drudgery.

**Heat treatment ovens** are also being installed at Al-Madina and Reza Engineering to improve the hardness and strength of parts after they have been cast. This is an essential operation to ensure quality parts.

**Computer-controlled manufacturing machinery and equipment** is being installed by Rony Engineering Workshop (Bogura), Reza Engineers (Bogura), Al-Madina Metal Works (Bogura), Kamal Metal Works (Bogura), A. Rahman (Bogura), and Janata Engineering (Chuadanga). These include computer-guided lathes, mills, sheet metal bending equipment, plasma cutters and metal-rolling equipment. The mills and lathes will be used primarily to fabricate aluminum patterns (dice) for casting. These will be more durable, accurate and reproducible than wooden patterns, which will translate into higher quality parts made more efficiently. Rony Engineering Workshop, Reza Engineers, and Al-Madina Metal Works (Bogura) purchased and installed five CNC lathes and milling machines from Haas, a USA company. To operate the machines, these three enterprises have contracted five trained and skilled designers and CNC machine operators using contacts provided by CSISA–MEA.

**Before and after installation** of a CNC mill at Rony Engineering Workshops, Bogura. The contrast between the new and old machine and working environment is striking.

## Before





After

**Above:** Rony Engineering Workshop operating their old milling machine a year ago. Photo credit: Ali Haydar Rumel, OMD, CSISA– MEA, Bogura **Above:** A CNC mill recently installed by Rony Engineering Workshop. Photo credit: Fazlul Karim, Machinery Development Officer, CSISA–MEA, Bogura

The table below shows the ABLE SMEs who have purchased new machinery and the types of machine purchased:

Name of ABLE	Location	Name of machineries
Reza Engineering Workshop	Bogura	2 induction furnaces, 1 CNC vertical milling machine, and 1 CNC lathe machine.
Al-Madina Metal Works	Bogura	I CNC vertical milling machine, I shot blaster machine, and 2 induction furnaces
Rony Engineering Workshop	Bogura	I CNC vertical milling
Shahin Engineering Workshop	Faridpur	I liner boring machine
3 Star Engineering Workshop	Jashore	I modern lathe machine
Abdur Rahman Foundry	Jashore	7 modern lathe machines
Alamgir Engineering Workshop	Jashore	I shaper machine
Kalam Engineering workshop	Jashore	I lathe machine and I tap drill

In addition, as mentioned below, the Activity also provided technical advice to lead firms Janata Engineering and RK Metal to support their purchase of new capital machinery for their production lines. RK Metal purchased a more efficient power grinder, MIG welder, and plasma cutter, and Janata Engineering purchased a CNC plasma cutter, a power press, a forging press, a semi-automated shaper, a lathe, an efficient drill, a sheet rolling machine, and a hydraulic press sheet metal bending machine. These have increased their production efficiency and, as is shown below, in the case of Janata Engineering allowed the company to earn an income from providing machinery services to other ABLE SMEs.

### Machinery service centers

The equipment described above is expensive and for smaller ABLE enterprises their manufacturing throughput would not be large enough to justify the investment. However, they often need the use of a machine to make high quality, accurately produced machine parts. One solution to this is for

businesses owning this type of equipment is to provide services for using this machinery to smaller businesses.

In the Year 3 annual report the Activity reported on two organizations in Bogura (BITAC and Wohab Engineering Workshop) and two in Jashore (BITAC and KIAM Metal) who provide metal heat treatment services to ABLE SMEs enabling them to produce high quality parts for combine harvesters and reapers. In Jashore, two foundries (Mofiz Pattern and Akbar Pattern Works) provide ABLE SMEs with mold pattern production services.

During the last six months, two other businesses joined these organizations to provide services to other ABLE SMEs. Janata Engineering (Chuadanga) used the excess capacity of its CNC-guided machinery to CNC-guided metal cutting, bending, and rolling services to other light engineering businesses. In Jashore, Zihad Cutting, Bending and Rolling Workshop, in contrast to other service providers, has established a business with the sole objective of providing other ABLE enterprises with the same services.



**Above**: a CNC plasma cutter installed at Janata Engineering, Chuadanga. Photo credit: Abdul Kader, Machinery Development Officer (MDO), CSISA–MEA, Jashore

**Above**: equipment in use at Zihad, Cutting, Bending and Rolling Workshop, Jashore. Photo credit: Md. Khalekuzzaman, Officer Market Development (OMD), CSISA–MEA, Jashore

#### Climate-smart factories

An important activity started during this reporting period has been Climate Smart Manufacturing and Factory Design. RK Metal has broken ground with a new factory in Faridpur district that it intends to make environmentally smart. CSISA–MEA is also supporting Islam Engineering Workshop, Kushtia, to develop a climate-smart factory, with features such as natural ventilation and solar panels. As with the RK Metal factory design, CSISA–MEA engineers are supporting Islam Engineering to design a factory with machines placed in a logical sequence to facilitate efficient manufacturing, and facilities for the staff including male and female washrooms, prayer room and restroom. The Activity will engage an architect's practice to provide input into the design of climate-smart factories, and a solar energy consultant to assist ABLEs enterprises install solar panels, with the intention that solar panels will reduce the carbon footprint of their factories and their dependence on the electric grid.

Other ABLE SMEs have been modifying and extending existing premises to make them more efficient workplaces. The Al-Medina and Reza foundries in Bogura are good examples of the dramatic changes that the adoption of new factory designs and manufacturing equipment have made to the work environment of CSISA–MEA partners.



**Above:** CSISA–MEA partner Al-Madina Foundry, Bogura, taken in March 2022 before refurbishment. Photo credit: Jonathan Colton, Georgia Tech, Atlanta, USA



**Above:** CSISA–MEA partner Al-Madina foundry after refurbishment. Note the increased natural lighting from installation of large windows, increased ventilation from raised open roof, and large wall fans. The two newly installed low pollution electric induction furnaces (left) replace the smoke-generating coke-fired cupola furnace. Photo credit: Asha Jannatul Ferdous, MDO, CSISA–MEA, Bogura

#### Award of ISO certification

As part of training organized by CSISA–MEA in 2022, participating ABLE SME managers were provided with information about the importance of securing International Standards Organization (ISO) registration and the process to obtain it. In Year 4, the Activity followed this up by providing support and advice to those ABLE SMEs who decided to apply for registration. As a result, during this reporting

period, three Bogura-based ABLE SMEs partnering with CSISA–MEA – Al-Medina Metal Works, Rony Engineering Workshop, and Reza Engineers – were awarded ISO certificates for Quality Management Systems (9001), Environmental Management Systems (14001) and Occupational Health and Safety Management Systems (45001). These independently awarded registrations are important, as they indicate to foreign and domestic customers that the holder has demonstrated commitment to achieving international standards, making it easier to compete in global export markets.



**Above:** ISO 14001, 9001, and 45001 certificates, secured by Reza Engineering, Bogura, with the support of CSISA–MEA. During the reporting period, three ABLE SMEs partnering with CSISA–MEA achieved these internationally recognized standards. Photo credit: Fazlul Karim, MDO, CSISA–MEA, Bogura

## Service provision through light engineering business associations

The Bangladesh Engineering Industry Owners Association (BEIOA) has 4000 SME members engaged in the production and marketing of light engineering products. A major role of the association is to act as a conduit for members to share their policy-related concerns with government and private sector institutions. In Year 4, the CSISA–MEA team in Jashore organized meetings with the association branches in Jashore and Kushtia to support them to identify and select new, improved support services for their members. It was agreed during these meetings that there should be:

- 1. week-long training for foundry ABLE SMEs, conducted by a national/overseas expert;
- 2. a discussion with National Board of Revenue about VAT/TAX issues;
- 3. support for BEIOA to introduce digitization of business processes, including digitized inventory management for its members;
- 4. assistance for BEIOA to help its members to gain access to heat treatment and testing services from government service centers such as BITAC and Jashore University of Science and Technology (JUST); and
- 5. assistance for Association members to be linked to FSIs, national-level fairs and private partners, in order to meet the market demand and financial requirements.

Based on these discussions, a JVA was signed between BEIOA, Jashore and CSISA–MEA, through which the CSISA–MEA Jashore team will support the Association to improve the provision of services to its members.

## CSISA-MEA participation at the US Trade Show, Dhaka

This annual U.S. Trade Show, co-sponsored by the American Chamber of Commerce in Bangladesh (AmCham) and the United States Embassy in Bangladesh (October 27–29, 2022, Dhaka) welcomed 50 organizations from development agencies, academia and the private sector. At this premier trade event, which aims to introduce Bangladesh business to American goods and services, the CSISA–MEA booth demonstrated a welding simulator, provided by the U.S. welding equipment manufacturing company Lincoln Electric. Arun Ventakataraman (U.S. Assistant Secretary of Commerce for Global Markets, and Director General of the U.S. and Foreign Commercial Service) and U.S. Ambassador Peter Haas visited the iDE and CSISA–MEA booths.



**Above:** U.S. Ambassador Peter Haas explaining the work of CSISA–MEA to Arun Ventakataraman, U.S. Assistant Secretary of Commerce for Global Markets, and Director General of the U.S. and Foreign Commercial Service, at the U.S. Trade Show, Dhaka, October 2022. Photo credit: Mahajabin Khan, Communications Coordinator, CSISA– MEA, Dhaka **Above:** the CSISA–MEA team at the U.S. Trade Show, October 2022.

Photo credit: Maher Chowdhury, Specialist – Communications & Knowledge Management, CIMMYT, Dhaka

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

#### Jute fiber extracting machine



**Above:** the CSISA–MEA/BARI-designed jute fiber decorticator that produces whole sticks, built and sold by RK Metal (Faridpur). Photo credit: Pronob Ghosh, Marketing Officer, RK Metal, Faridpur

Jute is the 'golden fiber of Bangladesh', marketing of which is undergoing a rejuvenation due to the growing global demand for natural fibers to replace synthetic fibers In 2020, CSISA–MEA partnered with Practical Action Consulting Bangladesh (PAC) to support machinery manufacturers to design, test, and market the Aashkol, a jute fiber extraction machine which PAC had re-engineered from an imported machine. During Year 3 the Activity facilitated partnerships between BARI and two agricultural machinery manufacturers, RK Metal and Kamal Machine Tools, to further improve upon the original design and to manufacture and market the Aashkol machine. This led to the sale of 25 Aashkol machines in the lead-up to the 2022 jute harvesting season.

A secondary product of jute fiber extraction is the jute sticks which are made from the dried pith of the jute stem. The sticks have a wide range of uses including as supports for horticultural crops and fencing material. They also have a substantial market as the fiber used in the production of particle board. Although the Aashkol extracts high quality fiber very efficiently, it also chops the sticks into chips, a less valuable product.



**Above:** demonstration of the CSISA–MEA/BARI-designed jute fiber decorticator that produces whole sticks, built and sold by Kamal Machine Tools (Bogura). Photo credit: Jonathan Colton, Georgia Tech, Atlanta, USA

In Year 4, Georgia Tech and CSISA–MEA engineers have been continuing the collaboration with BARI and the two ABLE SMEs (RK Metal and Kamal Machine Tools) to design and manufacture a jute fiber extraction machine that extracts jute fiber without breaking the sticks. The new machines are anticipated to sell quite well during the upcoming jute harvest season. However, the through-put of these machines is lower than the Aashkol machine, and so design modifications will continue to be developed in order to address this.

In addition to partnerships with engineers at BARI, the Activity is developing a working relationship with Bangladesh Jute Research Institute (BJRI). As the principal institution responsible for jute research both nationally and internationally, BJRI is very interested in supporting the mechanization of jute production. In relation to this, BJRI's Director General, Dr. Md. Abdul Awal, and other directors from BJRI came to Faridpur to see the Activity's work. They observed the use of a PTOS for planting jute, a reaper for jute harvesting, and jute fiber extractors.



**Above:** Dr. Md. Abdul Awal, Director General, BJRI, and other BJRI directors viewing CSISA–MEA's collaborative mechanized jute production, in this case a PTOS machine used for sowing Jute. Faridpur. Photo credit: Alamgir Hossain, MDO, CSISA–MEA, Faridpur

#### Garlic clove planter

Garlic is another of Bangladesh's valuable agricultural products, with an annual production of over 500,000 t. In the ZOI, the Faridpur region is a major garlic production zone. Garlic clove transplanting is a manual and labor-intensive operation that can be easily automated; however, although machines for planting garlic cloves are readily available internationally, this is not the case in Bangladesh. To evaluate these machines under the crop production conditions found in Bangladesh, the Activity obtained three different imported types: manual, self-propelled, and a four-wheel tractor-operated machine. The self-propelled machine was identified as the most promising.

Bangladesh garlic cloves are smaller (although more pungent) than those cultivated in other countries. Consequently, on the international model, the size of the cup used to pick up and drop the cloves into the planting furrow was too big for the garlic cloves used in Bangladesh. The Faridpur team selected and installed a smaller cup after conducting field tests of different sized cups at the Spices Research Center in Faridpur. The device was recently displayed and demonstrated by Engineer Kaniz Tamanna to guests at a workshop on Smart Agriculture Implementation, organized by BARI at the Regional Agricultural Research Station, Jashore. Guests included the Secretary of Agriculture, Ministry of Agriculture.



**Above**: CSISA–MEA engineer Kaniz Tamanna demonstrating a garlic clove transplanter to Wahida Akter, Secretary, Ministry of Agriculture during her visit to the Regional Agricultural Research Station, Jashore. Photo credit: Harunur Rashid, ADO, CSISA–MEA, Jashore

#### Red onions

In 2022, Bangladesh produced 3.3 million t of onions, meeting the national demand of 3 million t and making the country the third largest producer of onion in the world (after India and China). The Faridpur region in the ZOI is one of the most important regions for onion production in Bangladesh. Apart from land preparation this crop is grown using only manual labor. This includes transplanting seedlings, a labor and time intensive process which CSISA–MEA studies have shown accounts for more than 40% of the labor used to produce the crop. Prof. Jonathan Colton and his post-graduate student Spencer Stubbs invented and demonstrated an onion seedling transplanter at Georgia Tech in Atlanta. The machine was shipped to Bangladesh and demonstrated at the Spices Research Center in Faridpur. The results were very encouraging, and this machine will therefore form the basis for another collaboration between CSISA–MEA and BARI, with Georgia Tech providing the lead technical support.

#### Machine modifications

Pedal drum threshers and some small capacity stationary drum threshers can thresh rice without damaging the straw. The higher capacity self-propelled threshers break up the straw when they thresh rice. In some areas of Bangladesh, notably the greater Jashore region, farmers stack rice in bundles and therefore prefer not to use threshers that break the rice straw. A small company in Bogura, Mama Vagne, has developed a self-propelled rice thresher which will thresh without breaking the straw. To do this the machine uses a component from a combine harvester, however, these parts are expensive and difficult to obtain. After a demonstration of the machine given to Prof. Colton during his recent visit, he provided a modification to the machine to reduce its cost and complexity.


**Above**: Prof. Jon Colton, CSISA–MEA's technical lead, suggesting changes to a thresher made by Bonorupa Engineering Workshop that will make manufacture of the machine easier and less expensive. Photo credit: Md. Shahabuddin Shihab, MDO, CSISA–MEA, Cox's Bazar

#### Plastic recycling

Only 31% of the 977,000 t of plastic consumed in Bangladesh in 2020 was recycled; the rest ended up in landfill sites or worse, polluting land and waterways<sup>4</sup>. CSISA–MEA is working with Kushtia Plastics, which makes polymer films and injection molded plastic products almost entirely from recycled plastics. To make the film, women grind up plastic scrap, and then wash it and lay it on the ground to dry. During a visit to the factory by a group of ABLE enterprises and Prof. Colton, one of the ABLE enterprise owners identified the manual washing step as inefficient and pure drudgery. He offered to design and fabricate a machine to accomplish the washing step, thereby saving labor and water, and freeing up the women to perform more skilled tasks.

#### Research at Georgia Tech

Prof. Jonathan Colton continues to work with graduate students on CSISA–MEA projects in Atlanta, with two papers published in archival journals. One paper entitled "The Design of a Mechanized Onion Transplanter for Bangladesh with Functional Testing" is published in 'agriculture' journal <u>https://www.mdpi.com/2077-0472/12/11/1790</u> and discusses the onion transplanter mentioned above. The second paper, "Analysis of Manufacturing Methods and Die Design for Rice Transplanter Claws and Combine Harvester Blades in Bangladesh" is published in 'Machines' <u>https://www.mdpi.com/2075-1702/11/2/219</u>, and reports on the design of manufacturing processes for the production of combine harvester cutter blades and rice transplanter claws that can be used by ABLE SMEs.

<sup>&</sup>lt;sup>4</sup> Meeting Bangladesh's plastic challenge through multisectoral approaches, World Bank, 23 December 2021.

#### Developing financial services for ABLE SMEs, dealers and MSPs

The total value of loans facilitated for ABLE SMEs, dealers and MSPs in this reporting period to total USD 1,533,411 bring the total facilitated since the start of the Activity to USD 2,972,543. These loans were facilitated from a total of 22 different FSIs for 62 ABLE SMEs, 11 dealers, and 40 MSPs.

Facilitating access to finance for ABLE SMEs

The Activity teams facilitated meetings between FSI representatives and ABLE SMEs either in the Activity offices or through visits to ABLE SME workshops. During its first three years, these meetings resulted in 12 FSIs providing loans to 42 ABLE SMEs worth USD 1,337,059, and to five dealers and 38 MSPs worth a total of USD 1,433,039. During the first six months of Year 4, the Activity has facilitated loans from 10 FSIs for 20 ABLE SMEs worth USD 1,322,476 bringing the total number of ABLE SMEs benefiting from loans facilitated by the Activity to 62 and the total value of loans to USD 2,659,535.

Table 3: Total finance	e obtained by ABLE	enterprises from FS	I facilitated b	y CSISA-MEA
------------------------	--------------------	---------------------	-----------------	-------------

	Activity year							
	19-20	20-21	21-22	2022-2023 6 months	Total			
Amount in USD		462,941	874,118	1,322,476	2,659,535			
Number of ABLE SMEs		12	30	20	62			

Table 4: Valu	e of loans	facilitated	bv field	office s	ince Octobe	er I 23
rable it raid		Jacintated	<i>b</i> , neid			

Field Office	Number of ABLE SMEs	Value of loan (USD)
Bogura	6	726,286
Jashore	14	596,190
Total	20	1,322,476

An interesting lesson learned from this activity was that the interest rate offered by FSIs to SMEs varies widely, with most not receiving loans at the 4% rate specified by the Bank of Bangladesh SME support program. This problem is well-illustrated in the table below, which shows the loans provided to 14 CSISA–MEA partner ABLE SMEs in Bogura and the interest rates that have been applied to their loans. The table also shows that two of the ABLE SMEs who received loans thanks to facilitation efforts by the Activity are owned by women.

Name of ABLE	Name of FI	Interest rate (%)	Amount (USD)	Remarks
Makka Foundry	BRAC Bank	7	28,571	
Rony Engineering	BRAC Bank	4	28,571	Government-subsidized interest rate
Raju Engineering Workshop	BRAC Bank	3.5	6,667	Government-subsidized interest rate
Belal Engineering Workshop	GUK	12	2,857	Woman owner
Ridwan Machineries	Prime Bank	7	9,524	
New Borsha	IDLC	9	47,619	
Sony Trade & Engineering	IPDC	7	23,810	
Sharif Engineering Workshop	United Finance	5	23,810	
Popular Machineries	BRAC Bank	4	9,524	Woman owner/government- subsidized interest rate
Tota Engineering Workshop	BRAC Bank	4	9,524	Government subsidized interest rate
Reza Engineers	IPDC	7	38,095	
Khokon Engineering Workshop	GUK	12	2,857	
Mithila Enterprise	BRAC Bank	7	9,524	
Rahmania Engineering Workshop	DBBL	8	19,048	

Table 5: Breakdown of loans given to ABLE SMEs in Bogura and interest rate paid for each loan

The interest rates applied are determined by the size of the loan given and the level of risk of default determined by the FSI. A new activity in Year 4 of the Activity is to ensure that more of the partnering ABLE enterprises access the 4% interest rate provided through the Bank of Bangladesh–SME stimulus package.

#### How the finance was used by ABLE SMEs

Based on the technical support provided by the Activity, ABLE SMEs invested USD1,519,133 in manufacturing machinery and improved business premises. This will improve both the efficiency of their manufacturing processes and the quality of the products they make. These investments, as well as using finance to operate the enterprises, have been made against a background of the Covid–19 epidemic and the Ukraine–Russia war, which together have created a national financial crisis. See the challenges section below for more details about the impact of the financial crisis on the light engineering sector.

These investments were made with the loans facilitated by the Activity from FSIs as well as other sources of finance such as family, informal finance and savings. The amount invested will thus most likely be more than the loan itself.

#### Table 6: Total value of investments made by ABLE SMEs facilitated by CSISA-MEA

		Total			
	19-20 20-		21-22	22-23 6 months	
Amount in USD		558,506	1,095,213	1,519,133	3,172,852
Number of ABLE SMEs		13	36	23	72

Facilitating access to financial for dealers and MSPs

By facilitating visits to dealer showrooms by FSI managers, CSISA–MEA facilitated loans for six dealers worth a total of USD 195,952. Similarly, the Activity also facilitated loans to two MSPs totaling USD 400 through group meetings often also attended by lead firm representatives and dealers. More details of loans given to MSPs are presented in the description below of IR3 activities.

#### Table 7: Finance obtained by dealers and MSPs facilitated by CSISA-MEA from FSIs

		Total						
	2019–20	2020–21	2021–22	2022–23 (six months)				
		Dealers						
Number of dealers		2	3	6	11			
Value of Ioan (USDs)		23–529	49,412	195,952	268,894			
MSPs								
Number of MSPs	12	6	20	2	40			
Value of Ioan (USDs)	7810	20,667	15,239	400	44,115			



**Above**: a CSISA-MEA-facilitated meeting between a dealer and a BRAC Bank representative to negotiate a loan. Photo credit: Anwar Hossain, OMD, Cox's Bazar

**Above**: a CSISA–MEA-facilitated visit by a BRAC bank representative to an ABLE SME workshop, as part of negotiating a loan. Photo credit: Anwar Hossain, OMD, Cox's Bazar

Intermediate result 2: Enhanced institutional capacity for agricultural mechanization through the development of skilled and youth workforces

## Intermediate Result II



#### Technical skill training for ABLE company staff and management

The light engineering sector in Bangladesh is largely composed of many thousands of small workshops that employ a workforce (mainly composed of young men) who have learned their skills from older workers in the same workshop. Poor practices and skills are passed from generation to generation, resulting in low quality work and making it difficult for the light engineering sector to compete with imported parts and machines. To address this issue, a major focus of the Activity has been on improving workforce skills for ABLE SME partners.

Since the start of the Activity in October 2019 to the end of this reporting period on 31 March 2023, the Activity has facilitated the training of 1698 workforce staff members (including 151 ABLE SME managers training in Activity Year 3) from 295 ABLE SMEs. This is 37% of the estimated 800 businesses manufacturing and 70 foundries working in the agriculture-based light engineering sector in Bangladesh.<sup>5</sup>

CSISA field		Total			
office	19-20	2020–21	2021–22	2022–23 6 months	
Bogura	-	312	475	140	927
Jashore	-	200	160	60	420
Faridpur	-	-	20	40	60
Cox's Bazar	-	-	100	40	140
Total	-	512	755	280	1547

#### Table 8: Number of workforce members trained by CSISA field offices

<sup>5</sup> Alam, M. M., Khan M. I. N., Saha C. K., Rahman A., Bhuyian M. G. K.,

Manufacturing of agricultural machinery in Bangladesh: Opportunities and

Constraints, AgricEngInt: CIGR Journal Open access at <u>http://www.cigrjournal.org</u>, Vol. 19, No. 1 June, 2017.

In Year 4 of CSISA–MEA, the Activity provided training for 280 members of 129 machinery manufacturing and foundry enterprises in Bogura, the ZOI, and the ZOR. In the ZOI and Bogura, 120 men were trained in machining skills, 40 men in foundry skills and 80 women in machining and foundry skills. These workforce staff were from 100 ABLE SMEs. In the ZOR, 40 men from 29 ABLE SMEs were trained in machining skills. Of the workforce trained in the first six months of Activity Year 4, 29% were women and 71% were youth younger than 29 years old. The training comprised 72 to 78 hours of theory and practical sessions altogether in machining skills training and 42 hours of practicals and theory in foundry skills training.

Total		Activ	ity year		Total	% of total
disaggregated by gender and age group	2019–20	2020–21	2021–22	2022–23 6 months		trained
Total (female + male)		512	755	280	1547	
Male		481	618	200	1299	84
Female		31	137	80	248	16
Age 15-29		260	407	98	865	56
Male		249	389	138	776	50
Female		П	18	9	38	3
Age 30+		252	348	122	722	47
Male		232	229	62	523	34
Female		20	119	71	210	14

Table 9: Workforce training pres	ented by gender and	age group of those trained
----------------------------------	---------------------	----------------------------

Table 9 shows that 16% of the workforce trained since the start of the Activity within age groups only 3% of the under 29 year olds were women compared with 14% in the 30+ age group. This may be because many women choosing employment in the foundry business are single women without the resources needed to support their families

Some of the lessons learnt from the implementation of this training program during the last six months are:

- 1. The Activity realized that it did not have a good understanding of the constraints for women working in the manufacturing of agriculture machinery. To address the issues they face, and to plan a more inclusive training program and work plan, CSISA-MEA conducted a study on 'gender equity and social inclusion' (GESI).
- 2. Employers of women workers realized that there was potential for women to perform certain technical skill operations if given appropriate training. As a result of CSISA raising awareness among employers, the latter have facilitated training for women in skills additional to the 'machine gun spraying' technique training provided in the previous year. The section on women training (below) reports the details.
- 3. The Activity identified the need for additional support after training. To do this, it has been suggested a training and subscription model for the ABLEs receiving advanced technical support should be introduced. Details are presented in the respective sections of this report.
- 4. Following the excellent training provided by BITAC in Year 3 under the Ministry of Industries in the ZOR, the Activity is expanding the collaboration through the signing of a new agreement with BITAC enabling it to provide training in the ZOI.
- 5. Initial planning and review meetings with TSPs helped a lot in identifying the areas of improvement and following a uniform delivery across different batches.

#### ABLE enterprise training in the Zone of Influence and Bogura

#### Workforce training in machining skills

In the reporting year and following a competitive selection process, the Activity contracted NGO training providers Gram Unnayan Karma (GUK) in Bogura and Rural Reconstruction Foundation (RRF) in Jashore to conduct the training of ABLE SME staff. In Faridpur, Kushtia and Chuadanga towns, the Activity empowered private sector partners (Bangla Engineering Works in Faridpur, Kushtia Engineering Works in Kushtia, and Janata Engineering in Chuadanga) to provide a 72-hour training curriculum for the ABLE staff. Practical sessions were conducted by staff who understand the light engineering business and senior skilled technicians in these enterprises. Theoretical classes were given by experts from government polytechnic institutes and BITAC. The Activity assisted the TSPs in sourcing expertise from across these institutes.



**Above**: CSISA–MEA-facilitated training provided by Kustia Engineering Workshop, for workforce staff learning to be skilled drill operators, Kustia. Photo credit: Md. Shariful Islam, MDO, CSISA–MEA, Faridpur

From January to March 2023, the Activity trained 300 workers from a total of 91 ABLEs in Bogura, Jashore, Faridpur, Kustia and Chuadanga with two-thirds trained in Bogura. Of these, 60 (20%) were women and 201 (67%) were youth. After the training, participants enthusiastically manufactured different agricultural machine spare parts including PTOS chains, pinions and bevel sticks, and fodder chopper lock spindles and straight pinions.



#### Machining skills training outcomes

The Activity conducted survey based on answers to pre- and post-training questionnaires, comprising 10 multiple-choice questions, with results showing that almost all the trainees (98%) could answer more than 60% of questions correctly.

#### Occupational health and safety training

All of the above training included occupational health and safety (OHS) training. Each participant learned how to operate a fire extinguisher, the importance of personal protective equipment and how to use it, and how to respond to emergencies in the workplace.

For many of the participating workshops and

foundries, this was the first time that they had been exposed to OHS training. As part of its work, CSISA–MEA provided OHS posters, which the workshop management displayed, encouraging the workforce to continue following good OHS practices.

#### Training provided to the foundry workforce by foundries

In Year 4, CSISA–MEA contracted GUK in Bogura to train foundry workers. To do this, GUK worked with leading foundry SMEs, using their practical skills and foundries to train the workforces of other ABLE SMEs. This approach empowered both GUK and the foundries to emerge as vocational training providers, enabling them to sustain it as a business after the Activity withdraws its training support to the industry. In this reporting period, through GUK, CSISA–MEA has continued to work with the same three leading foundries (Uttara Metal Industry, Kamal Machine Tools and Reza Engineers in Bogura), which provided skills training in the previous two years. In addition, this year, two more foundries, (Raja Foundry and Rosy Metal) were added to the list of foundry skills trainers. From January to March 2023, 40 foundry workers in Bogura engaged in training facilitated by CSISA–MEA, and in Jashore the Activity has also contracted leading foundry Shilpi Metal to train 20 foundry workers over the next six-month period.

#### Providing women with training to improve their skills and working conditions

Continuing the training support provided to women in previous years, between January and March 2023 the Activity trained 60 women in three specialized skills. Possession of these skills could give women a better chance of obtaining a higher paid job. In this reporting period, 'drilling' was added as an additional skill providing women with the opportunity to work in metal machining workshops.





post-training, all participants could answer at least 60% of the questions correctly, confirming that they had gained a good understanding of the skills taught.

#### Innovative hands-on 'basic foundry skills' training to women in Bogura

The foundry sector of Bogura engages around 350 women, mostly employed as cleaners earning USD40–50 per month. In 2022, CSISA–MEA trained a third of these women in three skills (sand preparation, mold making, and core making), with the result that about half of those trained gained better skilled jobs, increasing their salaries by 20%.

Encouraged by this experience, the Activity provided more women with training in the same three core foundry work skills. The course consisted of six hours of theory and 75 hours of practical training, spread over 25 days. With CSISA–MEA's motivation, three leading foundries stepped forward to train 20 of their unskilled women workers, after which 10 of those trained were employed in jobs which put their newly learned skills to work. This new employment increased their salaries by 25%–30%. The Activity expects that this experience will result in a gradual mindset shift by foundry owners, resulting in more women being employed in higher paid skilled jobs.



**Above**: skills training facilitated by CSISA–MEA for women foundry workers in Bogura. Photo credit: Arifur Rahman, MDO, CSISA–MEA, Bogura

#### **ABLE** enterprise training in Zone of Resilience

#### Machining skills training for ABLE staff

During the reporting period, the Activity signed agreements with 109 ABLE SMEs in the ZOR to train the workforce in basic machining skills in a 48-hour training program conducted by the Ministry of Industry through its BITAC's Director General, Anwar Hussain Choudhary, inaugurated the training. Two residential training sessions, each lasting 10 days, have been provided to a total of 40 workers from 29 ABLE SMEs in Cox's Bazar, Chattogram and Bandarban districts.



The post-training test results showed a great improvement in trainees' knowledge, with almost all trainees able to answer at least 60% of the questions correctly.

#### Foundry skills training to ABLE staff

In Year 4, in addition to the 'Basic Machining Skills' training, the Activity will provide 'Basic Foundry Skills' for ABLE SMEs. As in the ZOI, this will be delivered through a partnership with a foundry enterprise, in this case Titas Moulding & Engineering, a leading foundry in Chattogram. This will deliver training to 60 foundry workers.

Advanced technical and business-related training to ABLE management of ZOI and ZOR

In the third year of the Activity, CSISA–MEA provided a three-day management training course to all partnering ABLE SMEs. A lesson learned from that experience was that there is a need for a more intense capacity-building support for ABLE SME managers and senior staff. As a result, the Activity has changed its managers and senior staff. As a result, the Activity has changed its designing the training needs of the ABLE SMEs moving to an advanced technical support stage. This will help them to obtain training and customized support through business service providers (BSPs). Accordingly, ABLE SMEs will receive training and business and technical support from these BSPs, which will be funded by the Activity. The expectation is that SMEs finding the services provided by the BSPs useful, they will be prepared subsequently to purchase these services and thus continue to have access to business and technical training after the Activity ends. CSISA–MEA's next step in this regard is to put out a call for EOIs and to select competitive business providers.

#### Gender Equality and Social Inclusion (GESI)

#### GESI study

As a first step towards addressing gender integration, during this reporting period CSISA–MEA conducted a pilot study in the Activity's manufacturing ABLE workspaces to understand the constraints and barriers facing women wanting skilled work in the industry. The Activity engaged Insights, a gender-oriented professional organization based in Dhaka. They collected information through a series of interviews using qualitative survey techniques. The survey was conducted in the 14 districts where CSISA–MEA is working with ABLE SMEs. The qualitative study conducted 12 focus group discussions, 16 key informant interviews, and seven in-depth interviews. The survey team interviewed male and female members of the workforce and their family members, as well as ABLE SMEs and lead firm owners and managers, TSPs, trainers, and the CSISA–MEA team. Specifically, the study was designed to identify and analyze the GESI gaps in CSISA–MEA partner organizations, especially in the machinery manufacturing sector, and to formulate an action plan to address the gaps in a positive way.

Some of the recommendations from the study have already been implemented by the Activity; below is a list of the main recommendations:

- ✓ GESI sensitization for the workforce, ABLE owners, and all the direct beneficiaries and stakeholder of CSISA–MEA will help challenging their own thinking and perceptions about GESI; and identifying opportunities and benefit of inclusions.
- ✓ CSISA-MEA could support vocational skills and capacity building for the women who are currently working in the ABLE sector.

- ✓ Cross-learning visits to foundries and machine workshops where women are actively involved in skilled work may be arranged by the Activity.
- ✓ As the concept of GESI in ABLEs is new to the partners, there seems to be limited knowledge and information about GESI; thus, processes such as hackathons, issue analysis, role play may be organized to fill these gaps.
- ✓ CSISA-MEA should consider designing an apprenticeships program for women working in the light engineering sector and provide support for its implementation The Activity would then document successes and experiences and share these with government and donors as the basis for advocating government and donor support for apprenticeship programs for women.
- ✓ The inclusion of life-skills and literacy in vocational training programs is a key factor to participant success. Without investments in life-skills and literacy, professional advancement will remain elusive for many low-income women and other excluded groups.
- ✓ Building partnerships with community-based organizations (CBOs) and local NGOs for social mobilization and communications and leverage social changes that affect empowerment of women and the marginalized groups. CBOs and local NGOs could take a role in complementing programs, and are instrumental in providing services such as childcare referral services.
- ✓ CSISA–MEA may consider collaboration with the USAID-funded Agriculture Policy Link program in Bangladesh to leverage advocacy initiatives. A more comprehensive analysis of the existing policies from a GESI perspective needs to be undertaken, so that ABLE sub-sector objectives are aligned with national development goals that emphasize not only GESI but also pro-poor growth.

#### GESI sessions in workforce training:

In Year 4, the Activity introduced a two-hour session into the workforce training curriculum and the TSPs provided this session to all the training batches hiring highly competent gender experts. CSISA– MEA prepared a gender session module, which was reviewed and used by the gender experts delivering the sessions.

Before starting the sessions on gender, one of the Associate Directors from iDE, Farhana Afroz, conducted a one-day Trainer of Trainer (TOT) for the CSISA–MEA team, TSPs and their trainers including gender trainers.

The gender sessions covered GESI and gender-based violence (GBV) topics such as gender discrimination, gender relations and the roles of men and women imposed by society, causes and types of violence against women (family, community and workplace), discrimination against women and sexual harassment in the workplace, the employer's responsibility in gender equality in the workplace, and contributions to gender sensitivity among workers group.

#### Recognizing women's contribution to agri-food systems

In the ZOR, CSISA–MEA in collaboration with the USAID Feed the Future Bangladesh Livestock and Nutrition (LAN) Activity organized a meeting on International Women's Day, March 8, to celebrate the contribution women make in agriculture. The event included presentations by women's group leaders and was attended by 15 women and 10 men. There was strong community engagement in the event, with women participants motivated and empowered by being the focus of the meeting.

In Bogura, 28 women workers from four ABLE SMEs joined a rally led by several government departments and non-government organizations to celebrate International Women's Day.



**Above**: women workers from CSISA–MEA ABLE SMEs participating in an International Women's Day rally, Bogura, March 8, 2023. Photo credit: Arifur Rahman, MDO, CSISA–MEA, Bogura

CSISA-MEA observed International Women's Day in Faridpur, with woman MSPs and woman who have rice seedling raising businesses. Poli Rani Malo, Director, RK Metal, delivered a motivational address to the women participants, outlining her success and contribution to agricultural machinery manufacturing.



**Above**: CSISA–MEA trainees, including MSPs and seedling entrepreneurs, participating in International Women's Day, Faridpur, March 8, 2023. Photo credit: Zasim Uddin, ADO, CSISA–MEA, CIMMYT, Faridpur

#### The impact of training provided over the last three years

**Initiating agricultural machinery manufacture in the ZOR**. With a high level of confidence obtained through the Activity's technical support and training, an ABLE in ZOR whose workforce received training last year is now manufacturing power threshers and fodder choppers, which was totally new to them.

**Increased wages of women workers in foundries**. Trained women for skilled work employment who received an average wage increase of 25%–30%.

**Private sector development as training service providers**. The ABLE SMEs who collaborated with CSISA–MEA to provide training to other ABLE SMEs with no prior experience are now able to use their best employees as master trainers. Also, they have improved their facilities to create professional training environments.

**Confidence boosts among emerging TSPs.** Service providers such as GUK and Kushtia Engineering Works have just recently begun collaborating with the Activity, a relationship which has increased their professional self-esteem. This, along with the technical support that the CSISA-MEA team provides, motivates emerging TSPs to develop their business planning with greater confidence. GUK and Kushtia have expressed a wish to continue as TSPs as a long-term strand to their business and to contribute to strengthening the sector nationally. The next step for them could be to attract new customers from the public and private sectors.

**New training services infrastructure developed by lead firms**. Janata Engineering has had a vision of establishing a training unit within their business for some time, and after being contracted by CSISA–MEA to use the Activity's staff and facilities for training, it realized this could be done. As a result, Janata has established a training unit within the company: the Janata Research and Training Centre.



**Above**: workforce from Jashore region, completing training at the Janata Engineering training center in Chuadanga on March 15, 2023. Janata Engineering is a CSISA lead firm and through its association with the Activity has realized its vision of establishing a training unit. They wear Janata Engineering t-shirts and CSISA–MEA caps. Photo credit: Md. Hafijur Rahman, MDO, CSISA–MEA, Jashore

**Impact of management training.** Around 15 ABLE SME owners who participated in training provided by BARI in Year 3 have provided OHS kits for their workers and installed safety equipment in their workplaces. Some ABLE SMEs (such as Kushtia Engineering Works, Kushtia) have changed

their workshop layout, thereby increasing their productivity through more organized and efficient manufacturing systems..



**Above**: Shumik Sarker, CSISA–MEA graduate trainee, making a shaft for a machine that shells maize, in Sherpur, Bogura. Photo credit: Arifur Rahman, MDO, CSISA–MEA, Bogura

Shumik Sarker had to leave his studies and start work at Sarkar Agro and Multiple Works in Sherpur, Bogura, when the Covid–19 pandemic meant a loss of income for his family. With no prior knowledge of machinery operation, he struggled to keep up with the demands of the job. However, his dedication and hard work caught the attention of his employer, who selected Shumik to participate in a machining skills training program provided by CSISA–MEA training service providers.

Shumik is a quick learner and took on board all the knowledge he encountered, learning about precision measurement techniques, operational health and safety, drilling, grinding and lathe operation and maintenance, and welding. His newfound expertise enabled him to start carrying out machine operations such as drilling and grinding, and he even became adept at manufacturing monitoring. With these new skills, Shumik's monthly salary increased from USD720 to USD1160, making supporting his family no longer a struggle.

Shumik Sarker's inspiring journey from basic helper to skilled machine worker provides a reminder of the power of quality training, coupled with individual determination and hard work. His success story is a testament to the importance of training programs such as those offered by CSISA–MEA training service providers, which provide valuable skills and knowledge to those who need them most.

Intermediate Result 3: Enhance farmer access to mechanization and other crop production and marketing services with particular emphasis on remote and underserved markets

### Intermediate result III



#### Agricultural machinery sales tmachinery service providers

In the first six months of Year 4, the CSISA–MEA team facilitated the sale to MSPs of agricultural machinery worth USD1,209,175 (this figure is not the true value of the machines sold but the value of the machines after government subsidies have been deducted from their price). This was achieved through a wide range of events to be described in detail below. These were implemented through partnerships with a wide range of government agencies and the private sector. In the ZOI, lead firms TML, ACI, Alim Industries, Janata Engineering, RK Metal, and Abedin Equipment sold 238 items of machinery worth USD812,817. In the ZOR, lead firms Abedin Equipment, ACI Motors, TML, SQ trading, and Bangla Mark sold 100 machines worth USD 396,358. See details in the tables below.

No. of machines sold between October 2022 to March 2023								
Field office	Fodder chopper	Combine harvester	PTOS	Reaper	Rice transplanter	Total		
Cox's Bazar	18	26	7	21	28	100		
Faridpur	-	19	106		5	130		
Jashore	2	32	68	4	2	108		
Total	20	77	181	25	35	338		
Value of sales (USD)	5,431	921,319	212,914	9,314	60,196	1,209,175		

#### Table 10: number and value of machines sold to MSPs

Of the USD1,209,175 spent on machines, 76% was spent on combine harvesters. Of the 338 machines sold, 21 (6%) were purchased by women (see Table 11).

No. of machines sold by field office/gender, October 2022 to March 2023								
Field office/gender	Fodder chopper	Combine harvester	PTOS	Reaper	Rice transplanter	Total		
Cox's Bazar	18	26	7	21	28	100		
Female	3	2			3	8		
Male	15	24	7	21	25	92		
Faridpur		19	106		5	130		
Female		I	7			8		
Male		18	99		5	122		
Jashore	2	32	68	4	2	108		
Female	2	I	2			5		
Male		31	66	4	2	103		
Total	20	77	181	25	35	338		

#### Table 11: No. of machines sold by field office and gender of purchaser

These sales, some to existing but others to new MSPs, created in the ZOI and ZOR a total of 226 new MSPs – 68 combine harvester, 4 rice transplanter, five reaper, 163 PTOS, and two fodder chopper service providers – bringing the total formed since the start of the Activity to 728 MSPs. Of these, 391 are owners of small machines (PTOS, reapers, rice transplanters, fodder choppers, and axial flow pumps) and 337 are combine harvester owners. Of the small machine-owning MSPs, 95% have farming as their primary source of income. The high cost of combine harvesters normally means that the businesses owning them have machinery service provision as just one of their income-earning activities. Thus only 30% of the combine harvester owners have farming as their main source of income. Farmers hiring combine harvester services (as with all the other machinery they hire) benefit from the savings in time, household labor and cost that these machines provide. Most farmers hire at least four types of machinery service every year: power tiller for land preparation, irrigation pump, threshing, and rice milling services.

During this reporting period, 54,959 farmers bought machinery services worth a total of USD 494,631 from the 728 MSPs businesses established as a result of support given by the Activity since the start of CSISA–MEA. The data below in Table 12 shows that 17% of the 134,998 farmers who have bought agricultural machinery services from MSPs supported by CSISA–MEA since start of the Activity were women.

Farmers buying machinery services	19-20	20-21	21-22	22-23 (6 months)	Total	% of total
Male	33,459	35,873	42,535	46,922	111,867	83%
disFemale	9,552	5,275	8,304	8,037	23,131	17%
Total	43,011	41,148	50,839	54,959	134,998	

#### Table 12: Number of farmers buying agricultural machinery services disaggregated by gender



**Above**: 'Receiving the key' – a new MSP accepting delivery of a combine harvester from The Metal at Chakaria, Cox's Bazar. Photo credit: S. M. Alamgir Hossain, OMD, CSISA–MEA, Chakaria, Cox's Bazar

### Bringing agricultural mechanization to the Bangladesh Hill Tracts – Bandarban District in the ZOR

Following a request from USAID, in 2022 CSISA-MEA started work in the hill tract district of Bandarban. Introducing new agricultural mechanization technology to this district of hills and valleys presented a new technical challenge for the Activity, which, to identify which technologies would be required, commissioned a study of farming systems and current level of mechanization was commissioned in October 2022. It showed a very low level of mechanization, with valley bottom agriculture dominated by manually transplanted, monsoon and irrigated dry season rice, and hillsides either under forest or planted with rainfed, upland rice. Cashew nuts and some horticultural crops were also grown at higher altitudes on the hillsides. Livestock production is also an important activity, and, along with other parts of Bangladesh, fodder production and processing are a particular challenge for women, who have the responsibility of cutting fodder by hand. Land preparation of lowland rice crops was done using power tillers, rice crops were irrigated using low-lift diesel pumps, and crops were threshed using motor powered threshers. Hillside crops, including upland rice, were cultivated by hand.

The Activity concluded that the area of lowland rice that could be harvested with combine harvesters was insufficient to justify investments in marketing combine harvesters; however, smaller machines such as rice transplanters and reapers (for lowland crops) and mini power tillers, power weeders and reapers (for hillside farming, cashew nuts, and horticultural crops) were thought likely to find a ready market. It was also considered that the introduction of motor-powered crop sprayers and cashew nut processors would improve cashew nut production.

The Activity has organized marketing events for rice transplanters, reapers and fodder choppers, facilitated through government and private sector partners. This technology was readily accepted by

farmers and five rice transplanters, three reapers and four fodder choppers have been purchased by local businesses to sell services to farmers in the three months from December to March.

Government support for this activity has been very important. The Hill Tracts Minister, Bir Bahadur Ushwe Sing, MP, strongly endorsed the USAID-sponsored agricultural mechanization program in the Hill Tracks Bandarban district at a Farmers Field Day held in Bandarban Sadar (February 21, 2023) attended by an estimated 400 farmers.

In addition to this high-profile event CSISA–MEA team supported the DAE to conduct five district level workshops in Bandarban district. These district and *upazila*-level workshops led by the DAE were organized to review progress made with mechanization programs at divisional level. Representatives from the public sector, private sectors, National Agricultural Research Stations (NARS), and financial institutions were present at these workshops.

During the reporting period, CSISA-MEA conducted a Farmers Field Day (FFD) on rice harvesting using a mechanized reaper at Bandarban Sadar, where a total of 70 participants took part. In the meeting, DD, *Upazila* Area Officers, Sub Assistant Agriculture Officers (SAAOs) from DAE, and DC and Magistrate of Bandarban district were present and discussed the importance of mechanization and cost benefit analysis of manual harvesting and mechanized harvesting using a reaper.

#### Agricultural machinery marketing events

A study conducted in Year 3 to determine the extent of constraints to the adoption of new agricultural machinery technology showed that many farmers lacked knowledge of and information about new agricultural technology such as combine harvesters and rice transplanters, and that this was constraining the adoption of new agricultural mechanization technology. To address this, the current support that CSISA–MEA gives to both the government and the private sector was expanded to provide farmers with information about new agricultural mechanization technology through demonstrations, field days and marketing events.

In the ZOI, the Activity has largely been facilitating the introduction of new agricultural machinery technology through partnerships with three lead firms: ACI Motors, The Metal, and Abedin Equipment. This work has mainly supported the marketing of combine harvesters and rice transplanters. To build on this work and widen the number of partners and agricultural machinery technology promoted, the Activity published a request for expressions of interest in partnering with CSISA–MEA to market new forms of agricultural machinery technology. This identified a number of new and innovative partners. From an initial 21 EOIs, 12 proposals were identified as having potential to provide interesting partnerships, from ACI Motors, Janata Engineering, GSM Engineering, SmartMek, Abedin Equipment, LightCastle Partners (financial inclusion), RK Metal, The Metal, Alim Industries Ltd., Fosol Agribusiness Ltd., SQ Agriculture, and Uttaron Engineering. From these, joint venture agreements (JVAs) have been signed with Janata Engineering, GSM Engineering, Alim Industries, ACI Motors, The Metal, LightCastle and SmartMek.

In the ZOR, the CSISA–MEA Cox's Bazar team has facilitated partnerships with SQ Agriculture and BanglaMark to market new agricultural machinery technology. These agreements have already resulted in the sale of 50 agricultural machines, including rice transplanters, during the reporting period.



**Above**: delivery of 14 rice transplanters from CSISA partner Banglamark, for customers in the ZOR. Photo credit: Photo credit: Jotirmoy Mazumdar Mithu, Field Coordinator, CSISA–MEA, Cox's Bazar

In the ZOI, lead firms in partnership with CSISA–MEA designed several machine marketing and promotional activities which they implemented under the Year 4 JVAs. These promotional activities machinery sales events include distribution of sales promotional materials such as festoons, leaflets, brochures, product demonstrations, social media marketing on Facebook and YouTube, roadshows, and wall painting. The following activities are now planned for implementation before the end of this Activity year:

- I. Janata Engineering to conduct 10 field demonstrations and 20 awareness-raising sessions
- 2. Alim Industries to conduct 20 demand-creation activities, 10 field demonstrations and online market promotion
- 3. The Metal to conduct 25 demand-creation events
- 4. GSM Engineering to conduct 10 promotional activities
- 5. ACI Motors to conduct 15 promotional activities
- 6. RK Metal to conduct 20 promotional activities.

In greater Faridpur, RK Metal continued to conduct the roadshows they initiated with Activity support in Year 3 of the Activity. These roadshows are designed to advertise in remoter parts of the ZOI the agricultural machinery they manufacture and sell.



**Above**: CSISA lead firm RK Metal's sales promotion team and the roadshow they take to more remote areas of the ZOI to promote their agriculture machines, greater Faridpur, October 2022. Photo credit: Md. Rowshon Anis, OMD, CSISA–MEA, Faridpur.

In greater Faridpur, Kustia-based CSISA–MEA partner GSM Engineering conducted two fodder chopper demonstrations in collaboration with the USAID Feed the Future Bangladesh Livestock and Nutrition activity (LAN), and two reaper and two thresher demonstrations.



**Above**: a demonstration of a mechanized fodder chopper given by CSISA–MEA partner GSM Engineering, attended by smallholder farmers, Kushtia. Photo credit: Abul Khayer, ADO, CSISA–MEA, Faridpur

In the ZOR, eight lead firms and 20 dealers are currently working in partnership with CSISA–MEA to sell agricultural machinery. In the second quarter of Year 4 as a result of the Activity's marketing and promotion support, dealers conducted successful sales campaigns which included miking campaigns and roadshows. The MSPs have conducted business expansion meetings to identify scope for machinery services-based business, and lead firms partnering with the Activity have announced promotional offers that will attract customers for the machines that are covered by the government subsidy programs.



**Above**: CSISA–MEA promotional campaigns, including leaflet distrubution and advertising using miked vans, supporting machinery dealers in the ZOR to market agricultural machines. Photo credit: Mosharaf Hossain, OMD, CSISA–MEA, Cox's Bazar



**Above**: a poster provided to MSPs as part of CSISA–MEA's marketing support on display in an input retailer's shop and contributing to the promotion of their services, Cox's Bazar Sadar. Photo credit: Md. Abdur Razzak, ADO, CSISA–MEA, Cox's Bazar

#### In-focus Story Fodder chopper: a women-friendly technology

Simple machines can often save farmers, particularly women, enormous amounts of time. The fodder chopper is one such machine. Cows like to eat their fodder cut into small pieces as it makes it easier for them to digest and results in less waste, but this can mean that women need to spend several hours a day cutting grass by hand to feed their cows. This same work can be done in minutes with a small, USD400 diesel or an electric fodder chopper. For women from cattle-owning families, mechanization transforms part of their daily work.



Women-led manufacturing and engineering behind fodder chopper production



Photo: Engineer Kaniz Tamanna (left) and Poli Rani (right) with RK Metal's electric fodder chopper at the RK Metal factory, Faridpur region. Photo credit: Mahajabin Khan, Communications Coordinator, CSISA–MEA

Poli Rani is Director of RK Metal, a CSISA–MEA lead firm based in the Faridpur region of the ZOI. RK Metal is a leading producer of electric engine powered fodder choppers, selling around 100 each year for USD380 each. They are very popular with women as starting them is only a matter of turning

on a switch, and as the blades are covered by a shield they are safer to use than other makes which do not have the blades covered.

Poli says, "Many women who tend to cows use the fodder chopper, which is particularly helpful for those with many animals to feed."

Kaniz Tamanna, an Agriculture Engineer working for CSISA–MEA in Faridpur, has supported Poli Rani to improve the design of the fodder chopper blades, making them more efficient. She is well aware that rural women start their day early and find it difficult to relax or spend quality time with their children or for themselves. Cutting fodder for cattle is just one of their time-consuming tasks. It has therefore been very satisfying for her to have had the opportunity to work on improving the fodder chopper design.

"The fodder chopper makes it easier for rural women to care for their livestock," she said, "and frees up time for self-care and family bonding."

#### The fodder chopper not only cuts fodder and time - it raises income



**Above**: Salma with her electric fodder chopper manufactured by CSISA–MEA lead firm, RK Metal. Photo credit: Mahajabin Khan, Communications Coordinator, CSISA–MEA

Salma Begum used to spend half an hour each day cutting fodder by hand for her cow and after seeing a fodder chopper at work, decided to buy one. The time saved meant she could tend to more cattle, and she now has eight cows providing her with a monthly income of USD 400. She also earns USD 40 a month from providing a fodder chopping service to her neighbors. "If I'd kept on cutting fodder by hand, I'd never have been able to get into this position, because it takes half an hour to chop enough for one cow, as well as being backbreaking," Salma stated. "The financial freedom I've achieved is beyond words."

### Supporting the Department of Agricultural Extension to promote new agricultural mechanization technology

In both the ZOI and ZOR the CSISA–MEA field teams have been supporting DAE to implement its "synchronized cultivation" program. The objective of this program is to persuade neighboring farmers to all follow the same cropping pattern and use varieties and planting times that are similar. Having large blocks of land ready for planting and harvesting at roughly the same time allows farmers to use machinery such as rice transplanters and combine harvesters more efficiently. In the last six months, CSISA–MEA has supported this program by linking DAE with MSPs who own rice transplanters and who are seeking customers for their services, and companies and dealers in the market for selling rice transplanters. The Activity has also provided DAE field staff with training in seedling raising for use with rice transplanters and in rice transplanter use and maintenance.

In the ZOI in Khulna Division, 12 rice transplanter-owning MSPs planted 223 hectares in 11 farmers' blocks in 11 *upazilas*. This involved CSISA staff participating in DAE-organized field days and providing training to DAE staff, MSPs and farmers in raising seedlings in trays on plastic sheets for use with rice transplanters.

In the greater Faridpur region of the ZOI, the CSISA–MEA team supported the DAE to conduct five rice transplanter field days. Senior government officials attended these field days, including a member of parliament, as well as a total of 200 lead farmers and private sector representatives who were able to find potential customers for the rice transplanters.

In the ZOR, the CSISA–MEA team took a slightly different approach. There, following meetings with DAE and NARS staff, it was decided that DAE staff needed training in rice seedling raising and in the use and maintenance of rice transplanters. As a result, training was provided to 14 Upazila Agriculture Officers and 40 SAAOs on how to raise rice seedlings for transplanting with rice transplanters. Following this training the DAE staff went on to conduct two synchronized rice cultivation demonstrations totaling 40 hectares of rice.



**Above**: a Farmers Field Day organized by CSISA-MEA to demonstrate the efficiencies of the mechanized reaper in the ZOR. Photo credit: Shahabuddin Shihab, MDO, Cox's Bazar

**Above**: a Farmers Field Day organized by CSISA-MEA to demonstrate the efficiencies of the combine harvester in the ZOR. Photo credit: Jotirmoy, Field Coordinator, Cox's Bazar

Also in the ZOR, the CSISA–MEA team organized two experience-sharing workshops on rice transplanter and combine harvester use, to enable MSPs and private and public sector partners to share practical knowledge and experience between rice transplanter MSP businesses. This included where there was a demand for rice transplanter services and areas of improvement in various technical and business-related issues. The workshops were attended by a total of 44 rice transplanter and

combine harvester MSPs, local dealers, eight lead firm representatives, three Upazila Area Officers, the DAE District Director for Cox's Bazar, and the Project Director from the Farm Mechanization Project, Tareq Mahmudul Islam.

In addition to working collaboratively with the government extension services, the Activity has worked with government research institutes to support them in testing new rice production technology. In the ZOR, this included collaboration with the Bangladesh Rice Research Institute (BRRI) Strengthening Farm Machinery Research Activity for Mechanized Rice Cultivation project, involving testing (on-station and in farmers' fields) a seed sowing machine to place seed, soil and fertilizer on trays to raise seedlings. This machine ensures the even distribution of seeds on the seed tray to create evenly spaced seedlings, so that an even number of seedlings are transplanted at each planting point (that is, each hill). For the on-farm testing, BRRI provided their most recent fine-grained seed, for rice varieties BRRI dhan 89 and 100.



**Above**: CSISA-MEA trainees using a seed sowing machine to prepare seedlings for planting with a mechanized rice transplanter, at Ramu, Cox's Bazar Sadar. Photo credit: Shahabuddin Shihab, MDO, CSISA-MEA, Cox's Bazar

#### Supporting MSPs to maintain and use agricultural machinery

To keep machines operating, MSPs need to be skilled operators and to know how to maintain them in good working order. They should also be able to buy spare parts easily and have access to mechanics trained in their repair. If a machine breaks down because an MSP has not been shown how to use or maintain it, or because they do not have access to the services of a trained mechanic and a supply of spare parts, it will lie idle instead of providing farmers with the mechanization services they require in a timely manner. This intervention aims to support lead firms and MSPs to address these issues.

In Year 4, agreements are to be signed with seven lead firms through which they will provide training to 385 combine harvester or rice transplanter operators and 230 combine harvester or rice transplanter mechanics. To date, in the first six months of Year 4, 58 MSPs and 310 farmers have been trained.

In the ZOI, the CSISA–MEA team provided operation, maintenance and troubleshooting training for 50 rice transplanter MSPs at Faridpur, Rajbari, and Kushtia.



**Above**: CSISA–MEA training in operation, maintenance and troubleshooting for rice transplanter MSPs, at Boalmari, Faridpur. Photo credit: Zasim Uddin, ADO, CSISA–MEA, Faridpur

Rice transplanter business development activities



**Above**: a business development meeting facilitated by CSISA–MEA, participated in by rice transplanter MSPs, rice farmers, and seedling growers, at Kalukhali, Rajbari. Photo credit: Abdul Mabud, ADO, CSISA–MEA, Faridpur

Every year in Bangladesh, approximately 11 million hectares of rice are transplanted by hand. This labor-intensive process takes time, delays crop establishment, and absorbs family and hired labor that could perhaps be used more productively on other income-generating activities. Sowing rice seed directly into the field instead of raising seedlings in a nursery is one solution to this issue; however, in Bangladesh, the long monsoon season and the need to sow before the flooding monsoon rains start make this option challenging. An alternative solution is to use mechanical rice transplanters to transplant seedlings raised as a 'mat' on soil-covered recycled plastic sheets or in plastic trays. It is one

of the goals of the Activity to use recycled plastics and to recycle any plastics used to soften their impact on the environment. The rice transplanters have been shown to work well, saving considerable time and cost, but the raising of seedlings, which requires training and coordination, remains a challenge.

The Activity has initiated systems for collecting broken trays and used plastic sheets. It is also encouraging farmers to experiment with alternative ways of raising seedlings using biodegradable materials (see in focus story about the use of banana leaves).

To create demand for mechanical rice transplanter services and to train farmers in how to raise seedlings for rice transplanters either for themselves or as a commercial venture, the Activity facilitated training of MSPs and farmers by both the public and the private sectors. As an example, the CSISA–MEA team assisted ACI Motors and Janata Engineering to conduct two seedling-raising training events with a total of 40 selected seedling entrepreneurs in the Jashore region, 15 of whom were women.

In the Faridpur region, the Activity supported rice transplanter MSPs in Rajbari and Faridpur to organize five workshops, at which rice transplanter-owning MSPs shared their experiences and practical knowledge of the rice transplanter service business, including demand, areas of improvement and technical issues. The workshops enabled MSPs and farmers to negotiate service charges and devise individual work plans for the next planting season. CSISA–MEA also facilitated eight training sessions in raising mat-type seedlings for mechanized rice transplantation.

In the ZOR the Activity conducted similar experience-sharing workshops, on combine harvester and rice transplanter use, with a total of 44 MSPs (21 combine harvesters and 23 rice transplanters), eight lead firm representatives, five Upazila Agriculture Officers, and the Deputy Director of Cox's Bazar district participating. The Project Director of the DAE-implemented Farm Mechanization project, Tareq Mahmudul Islam, was present in the workshop as chief guest. Among the 23 rice transplanter MSPs, 10 were new business owners with little experience of providing commercial transplantation services. All the MSPs, especially those who were experienced, shared their business plan and the good and bad aspects of their business, thereby identifying the main obstacles to rice transplanter business promotion as high machinery prices, poor after-sales service, and low operator skills.

Also in the ZOR, the private sector, DAE and CSISA–MEA worked together to conduct 15 rice transplanter demonstrations, from which potential MSPs were identified, and who submitted applications to DAE for rice transplanter purchase subsidies. CSISA–MEA partner lead firms The Metal and Abedin Equipment, in partnership with DAE and the Farm Machinery and Post-harvest Technology division of BRRI, trained 105 participants comprising MSPs, seedling growers and farmers, at Cox's Bazar Sadar and Chakoria, in rice transplanter operation, maintenance, seedling raising, and seed sowing machine use.



**Above**: farmers uprooting and transplanting rice seedlings as part of the CSISA–MEA rice transplanter demonstration at Chakoria, Cox's Bazar. Photo credit: Md. Alomgir Hossain, OMD, CSISA–MEA, Cox's Bazar

To support this training, the Activity also provided 12 sessions to a total of 121 farmers (68 women and 53 men) wishing to establish businesses to raise seedlings, for sale to farmers or MSPs transplanting rice using rice transplanters. As a result of this training, it is understood 40 MSPs mechanically transplanted seedlings on approximately 400 hectares of rice. The training also discussed the role of women and men in agriculture and the issues associated with gender-based violence.



**Above**: CSISA–MEA training on seedling raising for women entrepreneurs, Sadar, Cox's Bazar, December 25, 2022. Photo credit: Md. Abdur Razzak, ADO, Cox's Bazar

#### **In-focus story**

#### Farmer adapting technology to meet local circumstances

In the Faridpur region of Bangladesh, Mizanur Rahman (34) is a successful rice transplanter service provider and just one of the many farmers benefiting from the USAID-funded CSISA mechanization activity promoting sustainable farming practices and food security in the region.

The rice transplanter is an innovative machine that reduces the cost, labor and time required for rice farming. Seedlings are raised on a plastic sheet or seed tray to produce a mat of roots, which are then fed into the rice transplanter about 15 days after sowing. Manually transplanted rice is raised on a seed bed and pulled up when the seedlings are between 30 and 40 days old. This process damages the roots causing transplanting shock, from which the seedlings take about two weeks to recover. However, the roots of rice seedlings planted out using the mechanized transplanter are undamaged, meaning they experience very little transplanting shock and start growing immediately. Rice transplanted using a machine thus matures faster and has a 6% to 10% yield advantage over manually transplanted rice.

Mizanur provides his mechanized rice transplanting services to about 200 farmers on 40 hectares of land. This year he experimented raising seedlings on banana leaves instead of plastic trays or polythene sheeting. "One tray costs one dollar, which is not a small amount," he explains. "So I thought, as I have a banana garden, why not try with banana leaves?"

Not only did using banana leaves save Mizanur money: they are better for the environment, as they decompose within a few months. He plans to continue using banana leaves as a more sustainable and cost-effective option for raising seedlings.



**Above:** Mizanur Rahman demonstrating how he cultivates rice seedlings on banana leaves, to transplant out using a mechanized rice transplanter. Photo credit: Shahidul Islam, ADO, CSISA–MEA, CIMMYT, Faridpur



**Above**: Mizanur in a rice field transplanted using his rice transplanter. Photo credit: Mahajabin Khan, Communication: Coordinator, CSISA–MEA, CIMMYT, Dhaka

CSISA-MEA will demonstrate Mr. Rahman's banana leaf mat technique to other farmers to encourage its wider adoption. Promoting sustainable farming practices not only helps farmers save money and increase food security but also has a positive impact on the environment, making it a win-win situation for all.

#### New dealerships



**Above**: dealers and sub-dealers meeting to expand dealer networks in Cox's Bazar, facilitated by CSISA-MEA. Photo credit: Jotirmoy Mazumdar Mithu, CSISA-MEA, Cox's Bazar

In the ZOR, the Activity facilitated the establishment of 15 new dealerships for lead firms RK Metal, Alim Industries, SQ Trading, and Banglamark by arranging meetings with potential dealers and sub-dealers.

#### Commission agents

Another approach to facilitating market expansion for partner companies and the dissemination of information about new agricultural mechanization technology has been CSISA's facilitation of the recruitment of women and youth as commission-earning agents who then act as intermediary for lead firms and MSPs. Similarly, the Activity has facilitated the recruitment of MSPs as commission agents for input marketing, produce buying companies to be intermediaries between the company and FSIs and farmers.



**Above**: a CSISA meeting bringing together MSPs, farmers and commission agents to coordinate agricultural machinery services. Photo credit: Rowshon Anis, MDO, CSISA–MEA, Faridpur

During the reporting period, Activity teams based in the ZOI supported 15 combine harvester MSPs and 19 rice transplanter MSPs to find customers for their services. As a result, the MSPs charged 720 farmers USD160/ha to use combines to harvest 147 hectares of wheat, and 450 farmers USD50/ha to use rice transplanters to transplant 121 hectares of rice. The CSISA–MEA Faridpur team also facilitated MSPs to organize two meetings with farmers, commission agents and lead firms in order to capture new customers. This resulted in combine harvesters being used to harvest 202 hectares of wheat, which would previously have been done manually.

#### Facilitating access to finance for MSPs

To purchase agricultural machinery MSPs often need loans, even when the price of the machine is subsidized by Government programs. In the ZOI, to enable commission agents, MSPs and farmers to obtain finance for the purchase of agricultural machinery, CSISA–MEA arranged for them to meet FSIs VPKA and iFarmer at two meetings, resulting in two of the 25 MSPs who attended securing loans worth a total of USD400 from iFarmer. To date, the Activity has been able to facilitate access to finance from 12 different FSIs for 40 MSPs worth USD44,115.

#### Machinery market creation events through partnerships with USAID and other donorfunded activities

Facilitating collaboration between organizations and farmers supported by USAID programs and CSISA–MEA private sector partners often provides an opportunity for the Activity to substantially expand farmer access to innovative agricultural mechanization technology and to give the Activity's partners new market opportunities.

#### The USAID Feed the Future Bangladesh LAN Activity

In the ZOI, the USAID Feed the Future Bangladesh Livestock and Nutrition (LAN) Activity organized training programs on the cultivation of improved varieties of grass and how to preserve harvested grass and green maize as silage. CSISA–MEA participated in 11 of these in February and March 2023, which had a total of 219 participants. During these programs, the Activity's private sector partners Janata Engineering (Chuadanga), SMR Agro Engineering (Jashore), RK Metal (Faridpur), and GSM Engineering (Faridpur) demonstrated the use of their fodder choppers, providing them with the opportunity to secure 65 new customers.



**Above**: CSISA-MEA training farmers to prepare silage using a fodder chopper, as part of the USAID LAN Activity at Sadar, Faridpur. Photo credit: Abdul Mabud, ADO, CSISA-MEA, Faridpur

In the ZOR, LAN and CSISA–MEA jointly organized seven silage preparation training programs for cattle farmers. CSISA–MEA private sector partners demonstrated the use of fodder choppers at these events, and six were sold as a result.

#### USAID Feed the Future Bangladesh Horticulture, Fruits, and Non-Food Crops Activity

The USAID FtF Bangladesh Horticulture, Fruits, and Non-Food Crops Activity and CSISA–MEA held a workshop in November 2022 in Jashore to discuss collaboration between supporting private sector partners to market the Aashkol jute fiber extraction machine. It was agreed that the machine would be demonstrated to the 20 Horticulture, Fruits, and Non-Food Crops Activity groups existing in the ZOI.

#### Trade fairs

On February 21, 2023, the Activity participated in agricultural machinery trade fairs in Cox's Bazar organized by DAE and Department of Livestock Services. The DAE-organized fair highlighted crop production mechanization tools; the Livestock Services department presented tools related to livestock production.

On February 27 and 28, 2023 the CSISA–MEA team participated in the agricultural technology fair at Kushtia organized by DAE, Kushtia. At the CSISA–MEA booth, Al-Helal Engineering Workshop displayed more than 25 different spare parts for combine harvesters, and provided visitors with information on their manufacturing process, quality control measures and after-sales service. CSISA–MEA partners also displayed the rice transplanter machine, briefing the visitors on its technical details and advantages.

#### Challenges – Covid–19, Ukraine–Russia war, and extreme weather events

As with other industrial sectors in Bangladesh, the light engineering sector has been impacted over the last three years by Covid–19, the Ukraine–Russia war and extreme weather events. The Covid– 19 pandemic affected the economy by first causing raw material supply delays and a reduced demand. Due to travel and transport restrictions, light engineering workshops had to close, and when they reopened demand for agricultural machinery and spare parts was much reduced, resulting in employees being temporarily out of work. Just as the Bangladesh economy was recovering from the pandemic, the Ukraine–Russia war started. Current restrictions on the export of oil, steel, rare earths, cereals and oil seed from Ukraine and Russia have caused price rises of 42% for diesel<sup>6</sup> and 38% for urea<sup>7</sup> over the last six months. Reduced access to Ukrainian and Russian wheat, maize, and oil seed increased all grain prices, including rice. A result of this has been a dramatic rise in the year-on-year inflation rate, rising from 5.56% pre-Covid to a peak of 9.94% in August 2022. The inflation rate has not dropped significantly since then, standing in January 2023 at 8.57%<sup>8</sup>. The price of Minikit (the most commonly used rice variety in Bangladesh) has risen by 13% and soybean oil by 55%, compared with pre-Covid prices in late 2019<sup>9</sup>. The value of the Bangladesh taka against the U.S. dollar has declined 25% during the last 12 months and foreign exchange reserves have dropped by 49% since its peak in August 2021<sup>10</sup>.

In addition to all this, farmers were affected by five cyclones between the start of the pandemic in late 2019 and 2022. They all hit Bangladesh in either May or October, damaging rice and other crops just as the farmers were about to harvest them. The worst of these, super-cyclone Amphan, had its main impact in the ZOI and resulted in USD 130 million worth of crop losses, including an estimated loss of 600,000 t of rice<sup>11</sup>. The risk of being hit by a cyclone and losing crops just before they are due to be harvested is particularly disheartening for farmers and discourages them from investment in, among other things, agricultural machinery services and crop grain yield boosting inputs such as high yield potential varieties of seed and fertilizer. This and the rise in the price of fertilizer may result in farmers reducing the use of fertilizer which will have a detrimental impact on crop yield.

#### What impact has this current financial crisis had on the light engineering sector?

The Activity conducted a study of the impact of the current financial crisis on the operation of seven light engineering businesses based in Bogura, Jashore, and Cox's Bazar which have as the base for their business the manufacture of machinery and spare parts for the agriculture sector. The following is a summary of the results:

The decline in foreign monetary reserves has resulted in an increase in loan defaults, which has made banks more reluctant to lend to higher risk borrowers such as small- and medium-sized rural businesses. This makes it difficult for SMEs to obtain operating and investment finance. Access to foreign currency has also declined, making it difficult for light engineering SMEs to obtain the foreign currency they need to purchase new machinery and maintain the machines they already have. Further, obtaining steel for foundries has become more difficult and the cost of steel has increased, reducing the production of cast parts for machines and raising their cost. This - along with a decrease in demand for machines and spare parts, increases in electricity and diesel fuel costs, and more frequent power outages - has raised the cost of the machines and spare parts that ABLE SMEs make, and in turn led to a decline in the demand for these machines by MSPs. To compensate for this, workshop owners have reduced working hours and, in many cases, laid off staff, resulting in reduced income for the lowest paid, young semi-skilled staff. An analysis of the impact of the Covid-19 epidemic, the Ukraine-Russia war, and the current global financial crisis on USAID Feed the Future-supported countries in Africa and Asia has shown that their economies have not grown as fast as predicted before the start of the epidemic. In Bangladesh the economy is now 1% smaller, with 2.8 million more people living below the poverty line and 3.6 million extra under-nourished people than would have been the case

<sup>&</sup>lt;sup>6</sup> BBC. Bangladesh fuel prices: 'I might start begging in the street', <u>https://www.bbc.com/news/world-asia-62519139</u>, August 2022.

<sup>&</sup>lt;sup>7</sup> The Daily Star. Increase in fertilizer price: Farmers braced for a hard time,

https://www.thedailystar.net/news/bangladesh/agriculture/news/rise-fertiliser-price-farmers-bracedhard-time-3085356, 2 August 2022.

<sup>&</sup>lt;sup>8</sup> Bangladesh Bureau of Statistics data.

<sup>&</sup>lt;sup>9</sup> Light Castle Partners. Post-pandemic inflation – the world and Bangladesh,

https://www.lightcastlebd.com/insights/2022/06/post-pandemic-inflation-the-world-bangladesh/, June 2022.

<sup>&</sup>lt;sup>10</sup> Bangladesh Bank data.

<sup>&</sup>lt;sup>11</sup> Reliefweb. <u>https://reliefweb.int/report/bangladesh/counting-costs-cyclone-amphan-one-year</u>, 19 May 21.

if 2019 predictions had been realized<sup>12</sup>. This is reflected in the impact the economic crisis has had on those employed in the light engineering industry in Bangladesh. To compensate for reduced working hours and lower incomes, there are reports that families dependent on earnings from work in the light engineering sector have cut back on the number of meals they eat each day.

The work that the Activity is engaged in which focuses on supporting agricultural machinery manufacturers to increase the efficiency of their production systems by the introduction of better designed factory spaces and modern, computer-controlled machinery and improved access to markets and finance, becomes extremely important in these circumstances. This, with the other focus of the Activity – which is to ensure farmers are aware of the availability of new agricultural mechanization technology and that agricultural machinery operators are well-trained and machines are well-maintained – is also vital if agricultural production systems have the resilience to withstand any current and future economic shocks.

#### Annex I: Detailed information about Activity implementing partners



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 administration and financial management of the Activity, responsible for employing field staff with agricultural development and engineering skills. CIMMYT is also responsible for reporting to the donor on the 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, conducts surveys to evaluate Activity progress and conducts internal data quality assessments (iDQA) to ensure the data reported to USAID are accurate. CIMMYT is also responsible for maintaining and administering field offices (see below for their locations). From these offices, CIMMYT and iDE field staff design, implement and supervise the training and technical support given to lead firms, finance institutions, ABLE SMEs, machinery dealers, research institutions, MSPs and to the farmers. This work is done in partnership with the Government of Bangladesh and the private sector.



**International Development Enterprises (iDE)** was a partner in the implementation of the CSISA–MI Activity and is a key implementation partner for CSISA–MEA, where its responsibility is to design and implement marketdriven interventions in partnership with private sector firms. Within this CSISA–MEA, iDE plays a pivotal role in facilitating partnerships between SMEs and larger firms for process, technology and market improvements, and in leading the financial inclusion component with a range of national and international partners.

<sup>&</sup>lt;sup>12</sup> IFPRI. Agrilinks Events,

https://agrilinks.org/sites/default/files/media/file/IFPRI%20Agrilinks%20Crises%20%2802-09-23%29%20-%2020%20Countries-

compressed.pdf?utm\_source=USAID+Bureau+for+Resilience+and+Food+Security+%2F+Agrilinks&utm\_campa
ign=852ffb548d-

EMAIL\_CAMPAIGN\_2021\_06\_15\_07\_08\_COPY\_01&utm\_medium=email&utm\_term=0\_8f8d227958-852ffb548d-57304973, February 2023.



**Georgia Institute of Technology (Georgia Tech)** is CSISA–MEA's core engineering adviser and educational partner. Located in the USA, Georgia Tech provides a technologically focused education to undergraduate and post-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 and in the design and implementation of the apprenticeship program, as well as anchoring US-based industry collaborations.

#### Annex 2: CSISA-MEA staff overview

СІММҮТ	No. of	iDE	No. of					
Dhaka Office								
Project Leader*	1	Team Leader (currently vacant)	I					
Project Manager	I	Project Manager	I					
Lead Training Coordinator*	1	Senior Technical Specialist	I					
Training Coordinator <sup>@</sup>	I	Expert – Evidence & Analytics (currently vacant)	I					
Locally recruited consultant- Training@	I	Technical Specialist (1 position currently vacant)	2					
Market System Development Coordinator	I	Technology Advisor	I					
Communications Coordinator@	1	Program Assistant	I					
MEL Coordinator <sup>@</sup>	I							
M&E Officer@	1							
Total Dhaka office	9	Total Dhaka office	8					
Consultant – technical advice*	1							
Consultant – editor*	1							
Field Offices (Jashore, Faridpur, Cox's Bazar and Bogura)								
Field Team Manager@	4	Field Coordinator	4					
Agricultural Development Officer	10	Officer Market Development	12					
Machinery Development Officer (engineer) (2 positions currently vacant)	13							
Machinery Development Assistant (diploma engineers)	2							
MEL Officer <sup>@</sup>	3							
Locally recruited consultant – MEL Officer	1							
Administration & Finance Officer@	4							
Total field offices	37	Total field offices	16					
Total employed by CIMMYT	47	Total employed by iDE	24					

#### CSISA-MEA Staff Information (October 2022-March 2023)

# Total CSISA-MEA: 72 (47 from CIMMYT+24 from iDE+1 from GT) \*Internationally recruited staff <sup>@</sup>Position shared with other CIMMYT projects.


Cereal Systems Initiative for South Asia- Mechanization and Extension Activity (CSISA–MEA)