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Commercialization of Oilseeds and Pulses Stakeholder Consultation Workshops

Final Report

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ASM Mahbubur Rahman Khan, Nasreen Sultana,
Rezaul Karim Siddique, Subrata Kumar Kundu, and Shamim Ahmed



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CONTENTS Acronyms iii

Acknowledgments.....	v
1 Introduction.....	1
1.1 Overview of Stakeholder Consultation Workshops.....	1
1.2 Program Format and Participation.....	1
1.3 Organization of Report.....	2
2 Barishal District.....	3
2.1 Production Experiences.....	3
2.2 Oilseeds and Pulses Supply-Side Issues.....	3
2.3 Policy Perspective on Oilseeds and Pulses Production and Commercialization Issues	4
2.4 Marketing of Oilseeds and Pulses.....	6
2.5 Concluding Findings.....	7
3 Cox's Bazar District.....	9
3.1 Production Experiences.....	9
3.2 Oilseeds and Pulses: Supply-Side Issues.....	9
3.3 Policy Perspective.....	10
3.4 Concluding Findings.....	12
4 Dhaka District.....	14
4.1 Production Experiences.....	14
4.2 Marketing of Oilseeds and Pulses.....	14
4.3 Policy Perspective on Oilseeds and Pulses.....	15
4.4 Concluding Findings.....	19
5 Jashore District.....	20
5.1 Production Experiences.....	20
5.2 Oilseeds and Pulses Supply-Side Issues.....	21
5.3 Oilseeds and Pulses Supply-Side Issues.....	22
5.4 Policy Perspective on Oilseeds and Pulses.....	22
5.5 Concluding Findings.....	25
6 Khulna District.....	27
6.1 Production Experiences.....	27
6.2 Oilseeds and Pulses Supply-Side Issues.....	28
6.3 Marketing of Oilseeds and Pulses.....	29

6.4	Policy Perspective	30
6.5	Concluding Findings	33
7	Conclusions	34
	References	39
	Appendix 1: Invitation.....	40
	Appendix 2: Workshop Program	41

LIST OF TABLES

Table 1.1	Commercialization of Oilseeds and Pulses workshop agenda.....	1
Table 1.2	Commercialization of Oilseeds and Pulses district workshop participation, by stakeholder category.....	2

ACRONYMS

ACI	Advanced Chemical Industries
AEO	Agricultural Extension Officer
APSU	Agricultural Policy Support Unit
BADC	Bangladesh Agricultural Development Corporation
BARC	Bangladesh Agricultural Research Council
BARI	Bangladesh Agricultural Research Institute
BDT	Bangladeshi Taka
BINA	Bangladesh Institute of Nuclear Agriculture
BNA	Bangladesh Nutrition Activity
BRDB	Bangladesh Rural Development Board
BRDC	Bangladesh Rural Development Cooperation
BRRI	Bangladesh Rice Research Institute
BSMRAU	Bangabandhu Sheikh Mujibur Rahman Agricultural University
CIMMYT	International Maize and Wheat Improvement Center
CSO	Chief Scientific Officer
DAE	Department of Agricultural Extension
DD	Deputy Director
DDC	Democratic Development Centre
DRD	Deputy Research Director
GOB	Government of Bangladesh
HYV	High yielding variety
IFPRI	International Food Policy Research Institute
Kg	Kilogram
KSC	Konika Seed Company
LC	Letter of Credit
LTS	Lal Teer Seed Limited
MoU	Memorandum of understanding

MRT	Mister Rafique Tuhin
MT	Metric ton
NCPL	Northern Consumers Product Limited
NGO	Non-governmental organization
ORC	Oilseeds Research Centre
PSO	Principal Scientific Officer
RDC	Rice and Diversified Crops
SME	Small and medium enterprise
SSO	Senior Scientific Officer
UAO	Upazila Agriculture Officer
USAID	United States Agency for International Development
UVTO	Upazila Vocational Training Officer
UWA	University of Western Australia
ZOI	Zone of Influence
ZOR	Zone of Resilience

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1 INTRODUCTION

1.1 Overview of Stakeholder Consultation Workshops

On September 18, 2020, USAID requested IFPRI to conduct 15 stakeholder consultations on three thematic areas across five districts in the Feed the Future Zone of Influence (ZOI) and Zone of Resilience (ZOR): Barishal, Cox’s Bazar, Dhaka, Jashore, and Khulna. The thematic areas are: (1) Increased Access to Finance, (2) Commercialization of Oilseeds and Pulses, and (3) Commercialization of Agricultural Research and Biotechnology. IFPRI agreed to conduct these stakeholder consultations and, on October 21, 2020, USAID approved IFPRI’s Commercialization of Oilseeds and Pulses concept note.

1.2 Program Format and Participation

The Commercialization of Oilseeds and Pulses virtual stakeholder consultation workshops were conducted from November 29-December 3, 2020, co-moderated by Dr. A.S.M. Mahbubur Rahman Khan, Dr. Nasreen Sultana, Mr. Rezaul Karim Siddique, and Mr. Subrata Kumar Kundu.

Each of the five “Commercialization of Oilseeds and Pulses” stakeholder consultation workshops were approximately two hours long. **Table 1.1** provides the workshop agenda, which illustrates a briefing on the Zoom technical functionalities (e.g., mute, raise hand, using the chat box), followed by welcome remarks, an overview presentation by the two technical moderators, approximately 1.5-hour breakout sessions (two technical moderators per breakout session), and concluding remarks from the technical moderators. **Appendix 2** provides the designed workshop agenda that was projected during the workshops.

Table 1.1 Commercialization of Oilseeds and Pulses workshop agenda

Time (BDT)		Topics
9:20	9:35	Introduction to Zoom Functionalities
9:35	9:40	Welcome/Introductory Remarks by USAID and IFPRI
9:40	9:48	Overview Presentation and Objectives of the Consultation
9:50	11:25	Discussion with Stakeholders [Breakout Room Format]
11:25	11:30	Concluding Remarks

Between late October and early November 2020, IFPRI and Feed the Future activities nominated potential stakeholders who were familiar or involved with commercialization of oilseeds and pulses, interested and available to participate, and had sufficient digital literacy to participate effectively in a Zoom consultation.

Table 1.2 presents the total participant numbers for the “Commercialization of Oilseeds and Pulses” stakeholder consultation workshops, by the 10 stakeholder categories proposed by USAID. **Appendix 1** features the Bangla and English invitation letters that were sent to the nominated stakeholders.

Table 1.2 Commercialization of Oilseeds and Pulses district workshop participation, by stakeholder category

Stakeholder Categories	District Workshops					Total
	Barishal	Cox's Bazar	Dhaka	Jashore	Khulna	
Academia	0	0	1	0	1	2
Value Chain Actors	27	9	6	20	16	78
CSOs	0	0	0	0	0	0
Donor/Donor-Funded Activities	17	11	16	37	9	90
Government	22	15	28	17	12	94
Judiciary	0	0	0	0	0	0
Media	0	0	1	2	0	3
NGOs	4	3	3	6	7	23
Private Sector	8	3	16	6	10	43
Financial Institutions	0	0	0	0	1	1
Total	78	41	70	88	56	334

Note: Participant numbers exclude workshop facilitators, including IFPRI, Green Ink, The Right Kind, and the technical moderators.

1.3 Organization of Report

This report is organized into six sections. Section 1 presents the objectives of the stakeholder consultation workshops, the program format and participation by district and overall, and the structure of this report. Given the geographic differences in oilseeds and pulses production and commercialization, the remaining five sections are divided by district. As such, Sections 2 through 6 present a comprehensive overview of the deliberations from Barishal, Cox's Bazar, Dhaka, Jashore, and Khulna to ensure that the status, challenges, and opportunities pertaining to the commercialization of oilseeds and pulses in each district are adequately captured. Please note that the findings presented in this report reflect the discussions from the workshops as they took place. The authors have sought to remain objective in presenting this information. Section 7 concludes with a summary of the key findings.

Participant names have been excluded from the report to protect their confidentiality; instead, organizations and designations are presented to convey the participants' perspectives.

2 BARISHAL DISTRICT

USAID organized the stakeholder consultation workshop on the commercialization of oilseeds and pulses for Barishal district, which IFPRI facilitated, on November 29, 2020. This section captures the deliberations from that virtual session.

Among pulses, the major crops produced in Barishal district are mungbean, lentils, and grass pea. The district accounts for 60 percent of Bangladesh's total production of mungbean. The consultation workshop began by assessing the oilseeds and pulses production practices in Barishal district and the district-specific challenges associated with production.

2.1 Production Experiences

A farmer who cultivates mungbean stated that while he does not have problems with the price and marketing, mungbean productivity is low due to rain, flooding, and the crop's vulnerability to viruses and pests. Another farmer stated that the high cost of labor deters farmers from producing oilseeds and pulses. Furthermore, two farmers indicated that pests and diseases destroy their oilseeds and pulses crops, which is another practical deterrent.

A farmer from Bhola asserted that he cultivates mustard—a type of oilseed. His mustard and groundnut crops have been damaged by early rains and flooding. He also mentioned that he received training to cultivate mungbean by the Bangladesh Agricultural Research Institute (BARI). Although machinery is needed to harvest mungbean, the participant indicated that this is not available, which raises labor costs. Another farmer stated that he cultivates *BARI Mustard-9* and *BARI Mustard-14*, which he collected from other farmers and the Upazila City Union. *BARI-14* has better yield and is less vulnerable to infestation. He stated that if the aman crops could mature faster, it would be better. In addition, another farmer stated that he cultivates sunflowers, which is profitable but is susceptible to parrot attacks. He added that he has seen a machine to prevent these attacks.

Another farmer who cultivates pulses listed a few barriers that he regularly faces during cultivation: farmers do not receive seeds on time, insects harm the crops, and flooding delays or damages the harvest. Furthermore, he stated that the available pesticides are not effective in preventing crop infestation. Next, a separate farmer stated that the farmers in his area are reluctant to cultivate pulses as the untimeliness of the rainy season has been destroying these crops for the last five years. He explained his experiences in the following way. He cultivated lentils, the seeds for which he received from the government's trial seed project on a one-acre plot. This yielded only 160 kilograms (kg) of pulse grains. Another farmer attested that his primary issue in cultivating groundnuts is the seed quality.

2.2 Oilseeds and Pulses Supply-Side Issues

During the Barishal district stakeholder consultation workshop, the participants discussed the types of oilseeds and pulses that millers, traders, and processors supply; where these oilseeds and pulses are purchased; how the oilseeds and pulses are processed; and key supply-side issues related to commercializing oilseeds and pulses.

A proprietor from SACO Enterprise in Barguna stated that mungbean cultivation has increased in Barguna because of its high commercial value. Before mungbeans, farmers cultivated green peas; however, due to a certain disease associated with green peas, mungbeans grew in popularity. Additionally, the cultivation of sunflower and sesame has increased in Barguna. He started working with *BARI-6* about five years ago because of its high productivity, market demand, relative resistance to crop diseases and infestation, and ease in harvesting. Nevertheless, he observed that most farmers continue to cultivate the same crop varieties despite the resilient characteristics of the more modern varieties. As such, hybrid crops like *BARI-6* are low in demand, and therefore, the production rate is also low. This participant advised that the farmers often have to pay half the harvest to the workers to harvest mung lentils. If harvesting could be executed via machines, farmers' labor and costs would decrease.

A miller from Hatkhola said that he has an oil mill and collects oilseeds from the government via the City Union. However, he has been receiving a lower quantity of seed in recent times, which is affecting him financially. Another participant has a pulse processing machine. Since he is not receiving pulses from the government now, the machine is left unused, and as a result, some machine parts have become unusable. A proprietor from Prantojon Agro Enterprises also highlighted some of the problems he has observed while operating his mungbean processing mill. For example, since many farmers do not know which pesticide to use for which pests, pesticide sellers take advantage by selling them expensive pesticides rather than the correct, cheaper ones for profit. He also noted that most farmers do not have access to the weather forecasting services and often do not know when heavy rains or floods should be expected. On problems with processing, he said that due to climate change, farmers only get three months of uninterrupted sunshine. He tried using dryers, but it affected the quality, and, in turn, the price dropped. To exacerbate this situation, the demand of mung lentil dropped considerably amid COVID-19, which is often purchased for social occasions.

2.3 Policy Perspective on Oilseeds and Pulses Production and Commercialization Issues

The technical moderators gleaned insights from district-level government officials on the demand- and supply-side issues related to oilseeds and pulses in Barishal district. Specifically, the discussion focused on disentangling the government's potential role in mediating these issues moving forward, and how the national agricultural research institutes, such as the Bangladesh Agricultural Research Institute (BARI), Department of Agricultural Extension (DAE), and Bangladesh Rural Development Cooperation (BRDC), play a role in improving the situation in this district.

A government representative revealed that the total cultivable land under mungbean in Barishal Sadar upazila is approximately, 5,200 hectares, most of which is under *BARI-6* cultivation and is complemented by smaller quantities of BINA mungbean and some traditional lentil varieties. She attested that the government holds seminars, provides highly productive seeds, and promotes highly productive crops like *BARI-6* to farmers.

Bangladesh imports most of the country's oilseeds and pulses, which costs approximately BDT 16 crore (US\$1.9 million) annually, the technical moderators solicited feedback on how to reduce Bangladesh's reliance on oilseeds and pulses imports.

The Executive Director of the Democratic Development Centre (DDC) stated that the government will disburse 70-80 metric tons (MT) of oilseeds and pulses in Barishal, which represents 25 percent of the requirement. The total production of seeds is decided by the Seed Promotion Committee, which is comprised of the DAE, BARI, and the Bangladesh Agricultural Development Corporation (BADC). From there, the seeds are disseminated nationwide. He mentioned that 200 MT of mungbeans are produced in Barishal but it is allocated according to the committee's decision. The seeds are sold at the rate of BDT 85 per kg to the farmers. They supply the seeds to various government-oriented revitalising plans as well.

The DAE Deputy Director of Barishal indicated that *BARI-6* mungbeans and similar crops will be expanded given their massive potential in the district. However, the crops are frequently affected by early floods in early April or mid-March. Although *BARI-6* mungbeans mature in 60 days, which is short-duration, these weather-related hazards have caused many farmers to harvest only once per year. As a result, the farmers are reluctant to expand *BARI-6* cultivation. He asserted that production would increase greatly if the crops could be protected from flooding. To this end, he said that if researchers could develop a shorter-duration and/or submergence-tolerant variety of *BARI-6*, this would be more conducive to Barishal Sadar upazila.

The DAE Deputy Director further stated that 4,000 hectares of land in Barishal is under mustard oil cultivation. The production could be higher, but natural calamities and untimely rainfall often delay the Aman paddy harvest. As a result, farmers miss the optimal seeding period for mustard. Without this restriction, there is an opportunity to expand mustard oil cultivation. Regarding sunflowers, the sunflower prices must be controlled to ensure that the farmers get a fair price.

The DAE Deputy Director in Patuakhali stated that his district produces 55 percent of the nation's mung lentil, which is considered highly profitable. However, most farmers consider mung lentil as a secondary crop to other crops they cultivate, such as rice, which has lower value but is less risky to produce. He requested USAID and IFPRI to find a way to tackle these hurdles so that they could get agricultural mechanization to change this trend.

The Deputy Director, DAE, Pirojpur showed the district-level oilseeds and pulses statistics: BARI and BINA (4,860 hectares), *Lentil Felon (Desi Liver Bean)* (7 hectares), peanut (52 hectares), sunflower (132 hectares), mustard oil (133 hectares), and sesame (10 hectares). He also indicated that a lack of high-quality seed is a challenge. Additionally, he claimed that there is a huge potential for sunflower seeds in Pirojpur, but the sunflower high-grade seeds cost BDT 1,000-1,350 per kg, which is too high for many farmers.

An Agricultural Extension Officer (AEO) in Barishal added that mung bean, sesame, soybean, green pea, and other oilseeds and pulses are being cultivated in Hijla, Barishal. However, due to the late harvest of aman paddy, most of the land remains uncultivated during the winter season. The farmers also prefer to cultivate soybean as it is much more profitable.

The Principal Scientific Officer (PSO), BARI, Patuakhali introduced new data about his area. He stated that the cultivation of mustard oil and sesame has decreased due to climate change, which delays the harvest. Sunflowers are a good alternative, including *BARI Sunflower-1* and *BARI Sunflower-2*, which have generated significant yields. He claimed that labor costs, climate change, and the lack of proper marketing represent key barriers among farmers.

“Farmers could use machines, as BARI has made thresher and seeder machines, along with other tools, available to them. Also, farmers should know the benefits of their crops,” he advised. He also added the sunflower seeds are expensive, a price lower than BDT 60 per kg incurs a loss to the farmers; so, often the processors import their necessary number of sunflower seeds. He asked if USAID, the government, or other organizations could help mediate between farmers and processors on these issues.

The PSO reiterated that the geography of the district, which is mostly medium-high lands, causes water from the rainy season to remain even after the harvest. This submergence issue affects the crop productivity.

He stated that there is no shortage of mungbean seeds, and that 95 percent of the farmers now have BARI seeds, which are still productive. When asked about grass peas, he replied that it was largely cultivated before, but due to the rain the crops were frequently lost, and thus, mungbean has replaced it.

Next, the Regional Market System Development Officer of the USAID-funded Bangladesh Nutrition Activity (BNA) project stated that the farmers usually use seed-broadcasting method without adding any sort of fertilizers. They only use pesticides for pod bearers. He added that the mung bean farmers can work with processors like BD Food and Pran to get a better market price as these companies process the crops into snacks. In such cases, farmers can get BDT 30-40 per kg and the price rises depending on the season and the demand.

2.4 Marketing of Oilseeds and Pulses

During the Barishal virtual workshop, participants shared their views on how market prices can be managed and how fair prices can be ensured for farmers.

A Market Systems Manager from ACDI/VOCA agreed with the problems mentioned by the DAE Deputy Director of Barishal and shared a practical solution. He stated that if sunflower farmers could be linked with sunflower oil processing companies, both parties would benefit. This would also ensure proper market pricing. He pointed out that sunflower seeds cost a farmer BDT 600-700 per kg, which is very expensive for a farmer. More farmers may consider cultivating sunflowers if the prices were lowered. He referred to a collaboration between ACDI/VOCA's Rice and Diversified Crops (RDC) project and Northern Consumers Product Limited (NPCL), which was formed to ensure better sunflower market prices for farmers in Patuakhali and Barguna districts in Barishal division.

The demand for imported seeds is very high; processors like NPCL and Grameen Euglena are importing 30,000 MT to process in country every year. Mung lentil also has great potential as an export commodity, as it is used as sprouts in Japan; however, the government restricts the export of pulses. If this restriction is lifted, they can get marketing access at the international

level. He further added that even though the production of oilseeds and pulses is not meeting the domestic requirements now, the problem can be solved with the use of machines, proper cultivating methods, and a coordinated strategy among farmers in areas suitable for oilseeds and pulses production to boost cultivation.

ACDI/VOCA's Market Systems Manager summarized the opportunities and challenges. He agreed with the farmers about the problems but claimed that they have been missing out in utilizing existing technologies and machineries. Currently, various machines and tools are available to farmers. Under the RDC project, collaborations with companies like ACI have supported farmers, who have received bio-fertilisers to enhance productivity.

In the marketing aspect, he stated that Grameen Euglena could not export pulses to Japan last year due to some policy issue implemented by the government. However, sprouts and mung beans are in international demand. The Team Lead - Core Market Systems, ACDI/VOCA stated that more processor points for mung beans in Barishal should be established, as Barishal produces 60 percent of the total mungbean production in Bangladesh. He stated that ACDI/VOCA has partnered with Prantojon Agro Enterprises and SACO Enterprise alongside Amrita Consumer Food Products Ltd., who seemed to be the only processors in Barishal. If more mungbeans could be processed in Barishal and in other locations, it might be helpful for the farmer.

Speaking of oilseeds, a representative from Talukdar Oil Mill revealed that his mill needs one truck of mustard oil every week, which he collects from Shirajganj, Manikganj, and Madaripur. Regarding the high price of sunflower seeds, the Regional Sales Manager, BRAC Seeds claimed that their high-grade seeds product has 45 percent oil and produces nearly 8 tons of grains when cultivated on 1 *bigha* of land (that is, 33 decimals). Plus, the seeds were imported from India on Letter of Credit (LC), which increased the price. BRAC Seeds and BARI are collaborating on a research trial on sunflower cultivation. Depending on the outcome of the trial, they would launch the seeds in the market. He presented some barriers he has observed: the farmers are not well adept in taking care of the seeds and in using pesticides, which hamper the production of the crop. As such, he suggested that farmers should attend training sessions because the selection of farmers is critical for proper production.

The Managing Director, Alim Industries sells farming machines, such as dryers, seeders, thrashers, crop cutters, among others, to dealers and NGOs, either directly or through government schemes. The machine prices range from BDT 55,000-65,000. He added that they also conduct demonstrations to teach the farmers how to use their agro-machines.

The General Manager, Alim Industries stated that there are still some areas where the market is underdeveloped. Due to the remoteness of some areas and underdeveloped transportation paths, they are currently unable to reach a large number of rural farmers.

2.5 Concluding Findings

- Intensifying the use of agro-machineries of farmers is recommended.
- Barishal has potential in sunflower and sesame cultivation, and farmers are interested in sunflower production. Sunflower, in particular, is considered a viable alternative since the

production of mustard, sesame, and groundnuts has been more (adversely) affected by untimely rainfall and flooding in recent times compared to sunflowers.

- As parrots cause major damage to sunflowers at maturity stage, cluster production or large-area production of sunflower could minimize the damage by parrot.
- Natural calamities, climate change, low seed quality, and the use of long-duration varieties inhibit the cultivation of oilseeds and pulses in Barishal.
- A market channel connecting farmers and processors can boost oilseeds and pulses cultivation as it will help ensure proper pricing of the harvest.
- Untimely rain and flooding hamper the productivity of oilseeds and pulses, delays harvest time, and often damages these crops.
- Farmers do not use anything other than broadcasting and a pesticide for crop intruders. Thus, fertilizers and advanced methods can be used to increase production.
- The lack of proper sunshine hampers the quality and quantity of pulse production; there is scope for using machines to fix this issue.
- Groundnuts are being largely produced in Barishal but are not used as edible oil. There may be an opportunity to utilize groundnuts as an edible oil.

3 COX'S BAZAR DISTRICT

USAID organized the stakeholder consultation workshop on the commercialization of oilseeds and pulses for Cox's Bazar district, which IFPRI facilitated, on November 30, 2020. This section captures the deliberations from that virtual session.

3.1 Production Experiences

Farmers discussed their experiences cultivating oilseeds and pulses in Cox's Bazar. Most agricultural activities are concentrated in Chakaria, Sadar, and Ramu upazilas. Farmers in Maheshkhali, Kutubdia, and Pekua upazillas have been engaged in salt production for long, and because of high salinity, fallow lands are not suitable for crop production because of soil and water salinity. Ukhia and Teknaf are hilly and forested areas. In the early season (January-February) watermelon is grown in some areas of Teknaf.

A farmer stated that he mainly cultivates cowpeas in large quantities and French beans alongside mustard and groundnut in the highlands. He collects seeds from the government or the local seed dealers. Another farmer said that the market price of oilseeds is BDT 100 per kg, and if he bought from another farmer, the price ranges from BDT 70-80 per kg. In the case of early rain, he does not have the necessary means to save his produced seeds. He usually buys seeds from the Lal Teer Seed Limited (LTS) at the local market. He mentioned that LTS also provides cowpea seeds; however, if the weather is suitable, farmers can produce their own. During the consultation, a separate farmer added that if cowpea seeds are properly cared for, it is unlikely to fall prey to diseases or insect attacks. One of the farmers stated that cowpea seeds cost at least BDT 80 per kg in the market, which is BDT 20 higher than their selling price. They normally sell at BDT 60 per kg of these seeds to the local market or some seed dealers.

A farmer in Ramu upazila asserted that he could not cultivate many crops since he farms in the lowlands; as a result, he focuses on paddy and grass. He also cultivates a low amount of black grams, mostly for domestic consumption. Another farmer shared that most farmers in Ramu upazila are not interested in cultivating oilseeds and pulses. He cultivates groundnuts and cowpeas with potatoes. He can harvest cowpeas after a month of harvesting potatoes. Regarding marketing and selling cowpeas, he mentioned that the government regulates who sells seeds. He sells the groundnuts and cowpeas, making a profit of BDT 5-10 per kg.

3.2 Oilseeds and Pulses: Supply-Side Issues

The technical moderators solicited feedback from market actors involved in oilseeds and pulses on how to regulate market prices for harvest, as well as to ensure that farmers receive a fair price.

A representative from ACDI/VOCA, suggested that the fertilizers produced by BARI and BINA are good choices to aid groundnut cultivation in Chakaria. Trichoderma is a bio-fertiliser that is promoted by ACDI/VOCA, which can be used to increase groundnut production by 30 percent. More processing points are necessary and collaborations with large-scale private organizations like Pran Food Limited can ensure a mutually beneficial market value.

A representative from International Maize and Wheat Improvement Centre (CIMMYT) stressed how oilseeds and pulses cultivation can be increased. He mentioned that relay cropping and zero tilling methods can be used after the rice harvest. During the aman harvest period, 26 percent of the land becomes free, which is where lentils can be introduced since it does not require much irrigation or reapers. A combined harvester can be used to increase production.

Another representative from CIMMYT's Grain Mechanization project discussed the use of mechanical tools in increasing oilseed and pulses cultivation. He stated that the use of mechanical tools like reapers and combined harvesters can be used to grow mustard. He further added: "If we can use rice transplanters and seeders, which we plan to introduce the farmers, the cultivators can harvest three crops a year."

3.3 Policy Perspective

Government officials from Cox's Bazar provided their inputs on how the government may improve the commercialization of oilseeds and pulses in the district.

An Upazila Agriculture Officer (UAO) stated that farmers mostly cultivate cowpeas from the old seeds that they have already produced. Under the government's allotted seed subsidies and seed demonstration programs, farmers receive *BARI Cowpea-1* seeds. These seeds are provided by BARI, but BARI normally does not sell this type of seed.

This UAO further stated that the farmers of Ramu mainly cultivate mustard for household use. In addition, there is a trend of consuming mustard as a vegetable in Ramu. He asserted that in Chakaria upazila, mustard is cultivated at a large-scale. A Senior Additional Director, BADC, Cox's Bazar added that they only produce the seeds for rice crops in Cox's Bazar. All other seeds are sourced from Feni and other districts. They receive oilseeds and pulses from government programs. These seeds are usually different varieties of BARI seeds and pulses.

Later, a DAE Deputy Director showed a statistical report on oilseed and pulses cultivation in Cox's Bazar. "*BARI Mustard-14*, *BARI Mustard-17*, and *BINA Mustard-10* are cultivated on 450 hectares of land; local groundnuts are produced on 350 hectares, and cowpea on 1,200 hectares." Regarding whether oilseeds and pulses may be cultivated in the uncultivated area of Cox's Bazar, this participant identified multiple barriers: (1) the weather in Cox's Bazar is not suitable for oilseeds and pulses; (2) they are risky crops; (3) November is the best period for mustard harvest, but only 50-60 percent of rice crops is harvested by that point due to untimely rain, and as such, farmers do not have enough time to cultivate oilseed crops even with all the free land; (4) farmers' traditional methods are insufficient and hamper productivity. Furthermore, the DAE Deputy Director added that there is only one processing mill available for mustard in Chakaria. For increased production, more processing points are necessary.

In response to the oilseed and pulses market demands, the DAE Deputy Director said that products are mainly consumed locally and circulate through the market from farmer to dealer to processors, finally reaching the consumers. A Deputy Director, Horticulture, DAE, Cox's Bazar supported the other DAE Deputy Director's statement.

After the rice harvest, mustard takes three to four weeks to sprout. To address this, a BARI representative stated, "We train farmers on mustard cultivation, but they are reluctant as they

prefer traditional varieties and methods. To solve this problem, we have released *BARI Mustard-14* and *BARI Mustard-17*, in which the sprout will be out in mid-November.”

A Production Scientific Officer, Bangladesh Institute of Nuclear Agriculture (BINA) stated that BINA has introduced *BINA Groundnut-4* in Chakaria five to seven years ago, and recently introduced *BINA Mustard-9* in Cox’s Bazar. He advised that the use of the relay cropping method can be one of the remedies to fight off the issues caused by untimely rain.

The Deputy Research Director (DRD), Agricultural Policy Support Unit (APSU), Ministry of Agriculture (MoA) advised that the government must prioritize the research and development of suitable oilseed and pulses species, as the country is importing 60-70 percent of the necessary oilseeds and pulses. “If a suitable short-term and resilient rice crop variety can be developed, there is significant scope to expand oilseeds and pulses.”

A representative of the Bangladesh Civil Service, member of 27th Agricultural Cadre who is currently doing a PhD at Sher-E-Bangla Agricultural University (SAU), noted that SAU recently introduced a new oilseed *perilla*, which is very suitable for coastal regions as it is resilient in rainy settings. They have already produced a variety of this crop, which can produce 1.5 tons of oil per hectare. Moreover, the crop matures in 100 days, of which only 70 days are allotted to the field. It has 51 percent omega-3 fatty acid content and is priced at BDT 2,500-3,000. It can be harvested from mid-July to October, which fits with Cox’s Bazar’s climate and cropping pattern. It can be processed even in the traditional oilseed processing methods. The government recognized the *perilla* variety three years ago and is undergoing further trials.

A Deputy Director, Horticulture, DAE explained from his own experience that under the former deputy director and government officers’ efforts, *BARI Mustard-14* and *BARI Mustard-15* were being cultivated in Chakaria and Moheshkhali. Since then, these cultivation fields have expanded tremendously, as farmers grow mustard before the boro paddy crop. Besides that, he said that there is a large-scale cultivation of cowpeas and groundnuts in the area. The DAE Deputy Director attested that black grams are not generally cultivated in Cox’s Bazar.

A UAO came forward to clarify that they have 11 active government demonstration programs. The oilseed, pulses, and spices seed development projects are overpowered by cowpea and groundnut cultivation. This is because these two crops are highly popular and are widely cultivated. He also mentioned that the government sells these seeds to the farmers and, thus, other oilseeds and pulses are not prioritized. Most local farmers gather seeds from their own cultivated crops. He added that there are problems with irrigation, as mustard needs to be cultivated with the relaying method. Furthermore, farmers prefer cultivating potatoes and French bean due to their higher local demand. Regarding market opportunities, this participant stated that the farmers and the consumers in his upazila prefer the three seeded groundnuts and are reluctant to change this tradition. They are still using the same version of *BARI Cowpea-1* even though the government has conducted demonstration programs for many more oilseed and pulses species in line with the BARI and BINA series of hybrid seeds. These pulses and oilseeds are mainly consumed as snacks, which ensures a good market for the farmers.

A Senior Addition Director, BADC, Cox’s Bazar asserted that the oilseeds and pulses seeds they receive are mainly decided by the government programs for demonstration. Additionally, he

said that they also collect the seeds from different 'contract houses'. So far, he is yet to receive any sort of demands from the farmers.

A Senior Scientific Officer, Amphan Division, BARI, Cox's Bazar pointed out that three crops are mainly cultivated here: among oilseeds, groundnut and mustard; and among pulses, cowpeas. Farmers cultivate groundnut twice a year: (1) initially before planting short-term aman paddy, and (2) at a smaller scale, after the harvest of aman crops. The groundnuts planted later are harvested before maturing, which by tradition, is boiled with a bit of salt and is then sent to the market. This has additional value among tourists. Moreover, he stated that the total cultivable area in Cox's Bazar is about 90,000 hectares, which only has 20,000 hectares of oilseed and pulses.

This participant stated that there are only three upazilas currently in Cox's Bazar where oilseeds are cultivated at a large scale: (1) Sadar, (2) Chakaria, and (3) Ramu. Meanwhile, Teknaf and Ukhia upazilas are forest areas. Furthermore, Maheshkhali, Pekua, and Kutubdia farmers cultivate salt, which makes the land unsuitable for crop cultivation.

The oil cake is sourced from Charakia where the only oil processor machine is situated. The Senior Scientific Officer added, "Most of the necessities that we need here is imported from other districts, which is a problem that we government officials also face." A participating UAO pointed out that many farmers work on leased lands for six months, where they cannot plan for oilseed and pulses cultivation. He also added that sometimes tenant farmers claim the land that they have leased in, which is why large farmers who own the land do not grant year-long leases. In this case, the farmers can only cultivate Aman in the first six months and boro in the latter—oilseeds and pulses are not an option within this land tenure arrangement.

3.4 Concluding Findings

- In Cox' bazar, the weather is not very suitable for oilseed and pulses cultivation; untimely rain and flood, in particular, often damage these crops.
- Lentil cultivation is expanding in this region.
- In and around Cox's Bazar city, only a single oilseed and pulses processing unit appears to exist.
- A significant portion of post-harvest work in the production oilseeds and pulses are handled by women.
- Fertilisers from BINA and BARI alongside bio-fertilizer Trichoderma might increase production significantly (by almost 30 percent).
- There is a lack of pollination experts.
- There is little use of agro-machines.
- The seed prices are high; on the other hand, the expected amount of harvest yield is uncertain.
- Only rice seeds are being produced in this region; other types of seeds need to be brought from other districts.
- Research on and production of more insect/pest-resistant varieties is necessary.
- Methods like relay cropping and zero-tilling are recommended.

- The market channels and agricultural methods are underdeveloped. If these restrictions are lifted, the production can increase significantly.
- Major oilseed and pulse crops here are cowpeas, groundnut, and mustard.
- Groundnut is consumed as a snack and is popular due to its special variety—that is, three seed groundnuts.
- Black grams and mungbeans are cultivated in a very small amount, whereas French bean is consumed as pulses.
- Sadar, Chakaria, and Ramu are the only potential areas for oilseeds and pulses as other sub-districts are unsuitable due to having forest-type areas or for being employed in the cultivation of salt.
- Farmers are reluctant to cultivate most oilseeds and pulses due to not having proper linkages alongside cultivating profitable crops like potatoes.
- Machineries are seldom in use.
- Many farmers work on leased lands for 6 months; thus, their production options are constrained based on this arrangement. As a result, tenant farmers cannot accommodate the production of oilseeds or pulses.

4 DHAKA DISTRICT

USAID organized the stakeholder consultation workshop on the commercialization of oilseeds and pulses for Dhaka district, which IFPRI facilitated, on December 1, 2020. This section captures the deliberations from that virtual session.

Nearly half (48.3 percent) of the net cropped area is covered exclusively by rice. The most dominant cropping pattern is Boro–Fallow–T. Aman. The second largest area is covered by single boro cropping pattern.¹

4.1 Production Experiences

Agricultural value chain actors in Dhaka provided their input on whether they produce oilseeds and pulses; and if so, how much do they produce, where they collect seeds for growing oilseeds and pulses; and any relevant challenges associated with the production of these crops.

Mr. Osman Khan, a farmer, shared that he cultivates mustard and corn on one acre of land. He acquired a packet of seeds from the government office, from which he produced more seeds. He sold about 100 kg of oilseeds to other farmers as seeds this year. Currently, he is limited to the local market, but he aspires to expand his production.

4.2 Marketing of Oilseeds and Pulses

Market system actors—from USAID-funded activities to private sector organizations—chimed in on how to boost commercialization of oilseeds and pulses in Dhaka and beyond.

A representative from the Bangladesh Nutrition Activity (BNA), Abt Associates shared that the IFPRI-PRSSP Chief of Party stated last year at a workshop that rice crops can be used as food for both humans and animal feed. With this context, he asked how oilseeds and pulses can achieve similar dual benefits. The technical moderators replied that both the shell and the grain of pulses can be productive. Moreover, soybean is already being used for human and animal consumption. In the case of oilseeds, it is used to make oil cake—coarse residue obtained after oil is removed from various oilseeds, rich in protein and minerals and valuable as poultry and other animal feed—which increases the land's fertility. The BNA representative added that from a conversation with the farmers of Patuakhali, he learned that they do not prefer cultivating sunflowers due to the lack of processing points or processors.

The Chief of Party of the USAID-funded RDC activity implemented by ACDI/VOCA stated that the USAID activity works through private companies. He asserted that one of the main reasons behind the indifference of the private sector is that they do not have sole proprietorship of the product. RDC has been trying to integrate sesame seeds in the cropping pattern. He also mentioned that BARI has already developed a sunflower variety that will not be destroyed in rain.

¹ Parvin et al. (2017)

4.3 Policy Perspective on Oilseeds and Pulses

The government plays a key role in influencing oilseeds and pulses production, marketing, and commercial practices. The technical moderators encouraged participating government officials to discuss the challenges and opportunities regarding oilseeds and pulses.

A UAO from Savar stated that DAE has supplied seeds, agro-machines, and helped the farmers obtain licenses as they planned to establish farmers as seed dealers. The UAO referred to a local farmer who is active in the local market, but they cannot provide him with enough facilities to become a large-scale seed dealer.

A Deputy Director from DAE stated that oilseeds are cultivated on 7.24 lac hectares with the yield being 9.7 MT, and pulses are cultivated on 8.2 lac hectares, with 10.39 lac MT yield. He asserted that the local production in Bangladesh is far from meeting the local demand for pulses and oilseeds. Under the government's subsidized program, he advised that new hybrid and short-term varieties of oilseeds and pulses should be distributed among the farmers. They need to be integrated into the cropping pattern. He also added that if salinity-resistant oilseed and pulses varieties are introduced, the southern salt cultivation areas can be used to increase the production of oilseeds and pulses. The government is trying to promote mung beans now through subsidized programs and demonstrations.

The former Director General, BARI identified a few barriers for oilseeds and pulses cultivation. He said that the yields for oilseeds and pulses are less than rice crops as it requires delicate management. For groundnuts, the government is still multiplying *Dhaka-1*, which is the first generation of the hybrid crops, yet modern varieties need to be introduced. He added that farmers do not give proper attention to oilseeds and pulses as it is a short-duration crop. There is no fixed price range for oilseeds and pulses like rice crops, which is essential. Otherwise, farmers are uncertain about the price and profit. Moreover, the seeds are sometimes inaccessible in due time, so changes in the market system and government policies are important.

Furthermore, he commented on the usage of fertilizers on oilseeds and pulses crops. He said that proper usage of fertilizers is necessary for crops like groundnuts and soybeans. However, overuse may have negative effects. On the other hand, sunflowers and mustard are adaptive to fertilizers, which can boost productivity. Plus, oilseeds and pulses like lentils and grasspea can be used as relay crops between T. Aman rice and boro rice crops.

Yields for oilseeds and pulses are increasing, but Bangladesh is still paying a large amount of foreign currency to import them. The Chief Scientific Officer, BARI presented the benefits, restrictions, and market opportunities related to oilseeds and pulses. He said that they introduced *BARI Lentil 3-9* which provides large amounts of zinc and iron for the human body. *BARI Greenpea-2* can be harvested twice as the crops mature in 60 days. It can also be packaged for the year and later be sold as a vegetable. For mungbeans, they introduced *BARI Mungbean-6* and are working on *BARI Mungbean-7* (expected to enter the markets by 2025). The cowpea hybrid has 0-0.6 percent protein, making it safer for consumption compared with the previous quality that consisted of 25-28 percent harmful protein.

The Additional General Manager, Seed Distribution Division, BADC listed the distribution of oilseeds and pulses: lentil (633 MT), mungbeans (274 MT), grasspea (431 MT), green pea (23 MT), cowpea (58 MT), mustard (1,107 MT), sesame (94 MT), groundnut (281 MT), soybean (152 MT), and sunflower (3.5 MT).

The Additional General Manager stated that BADC has distributed 41 MT of *Dhaka-1 Groundnut* seeds, and testified that the Seed Promotion Committee has the authority to remove it from the distribution list. Another participant—the Director, BARI, Gazipur—stated they have introduced around 46 varieties of oilseeds, 18 varieties of mustard, 10 varieties of groundnuts, seven varieties of soybean, and three varieties of sunflower, among other crops. This distribution is in collaboration with Pran Agro Limited.

The Chief Scientific Officer, BARI reiterated that they give these seeds to the DAE for distribution. He also mentioned that they are introducing a new drought variety of sunflower seeds named *BARI Sunflower-3* which is short in length and salt resistant. This species would not fall apart in the rain and can survive in lands that contain salt. He attested that they are already promoting it via demonstrations and sourced the seeds to the DAE this year. When the moderators' asked if they are collaborating with the private sector, he answered that they have a memorandum of understanding (MoU) with Lal Teer Limited.

Another participant, the Project Director, Pulses and Oilseeds, BADC, identified some barriers: (1) oilseeds and pulses are treated as a supplementary crop, (2) farmers are using traditional or old versions of hybrid seeds, and (3) BADC is only able to provide 10 percent of the necessary seeds to the farmers while farmers are exchanging seeds amongst themselves. When the moderators asked the reasons underlying the limited involvement of the private sector in the oilseed and pulses market, the official reasoned: "The private sector mainly focuses on profit and follow a low volume high-profit rule. Except for some local companies, there is minimal private sector involvement in the oilseed market. In case of losses, the government can withstand it, but the private sector is unwilling to undergo losses.

The former DAE Director General suggested some opportunities and barriers: new and improved crop species need to replace the old ones, *BARI Mustard-18* does not fit into the farmers cropping pattern because it takes 100-105 days for harvest. There are no studies on area-based cropping patterns in response to the different atmospheres of the different regions. All the stakeholders like the government and private sector should come together to create a proper market for oilseeds and pulses.

In response to a BADC representative's earlier comment on the lack of seed supply, the former DAE Director General stated that the DAE is trying to create seed entrepreneurs through the oilseed, pulses, and spices restoration, distribution, and development project. The project focuses on promoting farmers into seed dealers via providing them the support mentioned by the UAO earlier in the discussion. He also recommended that the production of sunflower is scaled up as it is a saline-resistant crop and can be cultivated in high-salinity cultivation areas.

Regarding the Chief of Party of the RDC activity's statement about the sole proprietorship of BARI seeds series, the former DAE Director General answered that they are not currently giving exclusive rights, but any organization can form an MoU with BARI.

Next, the moderators inquired on the role of the private foundations, academies, and developers' advice in solving the discussed issues, and in particular on how the production and commercialization of oilseed and pulses can be further improved upon?

A Professor from Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU) stated that there are many short-term crops introduced by BARI and BINA. These crops can be harvested in 60-65 days. Furthermore, they are introducing *BAU Mungbeans-5*, which can be harvested in 50 days. In the commercial aspect, he emphasized on pricing from his practical experience. He stated that farmers are more inclined to produce crops that offer a good price. He advised that the agro-products should be commercialized into snacks. Doing this will create a demand and, in turn, result in an incremental increase in the market value of oilseeds and pulses. Market linkages are crucial to achieve this.

The Executive Director, Metal Agro Limited commented on ways to commercialize the oilseed and pulses crops. He mentioned that to connect the private sector with oilseed and pulses cultivation, there is a need to create profit because the private organizations will not invest in a non-profitable product. He explained that BARI mustard 14 could be cultivated after the Aman rice crop harvest as it is a short-duration crop and can grow within only a single irrigation cycle. Metal Agro Limited currently has an MoU with BARI and BINA and they are trying to introduce a new sesame variety, he said.

A representative from Pran Agro Limited identified five factors necessary for oilseeds and pulses production to flourish: (1) good quality seeds, (2) fertilizers and pesticides, (3) irrigation facilities, (4) proper training, and (5) marketing. These facilities are all provided by Pran Agro via contract farming hubs. They have 86,000 farmers under these hubs who source 6,000 MT of mungbeans, 10,000 MT of mustard 6,000-7,000 MT of groundnuts, along with smaller quantities of sunflower and sesame. They currently have an MoU with BARI for groundnuts. However, the representative also stated that *Dhaka-1*, *BARI-8*, and *BINA-4* groundnuts are not quite to their mark and thus, they are trying to introduce a new variety, *GG 20*, in collaboration with USAID. For mungbeans, they use *BARI-6*. They could consider *BAU-6 Mungbeans*, as well since its seeds are larger in size while the shells are thinner, which result in a positive benefit for the cultivators. The Pran Agro representative added that they are currently exporting to 120 countries, and the market price is high. He further added that the farmers gain from the demand and supply benefit, which hikes the price when they purchase in large quantities. However, they do not have any fixed price. The company follows a seven-day price mixer system while maintaining the general market price for purchase. In this case, the price would be either at the market price or higher price set by the mixer system.

Next, a representative from Bombay Sweets shared his experience in commercializing oilseeds and pulses products. Bombay Sweets has been working with the USAID-funded RDC project since last year and bought 84 MT of mustard locally. They are processing the mustard from a contracted mill, which is exported to 32 countries. They also launched mustard oil domestically four months ago. Currently, they supply 2 MT of mustard oil daily domestically and internationally. However, they also source it from the farmers. In North Bengal, they also provide training and input supplies to the farmers but due to not having good quality seeds for

groundnuts they are currently not applying this method in South Bengal. Bombay Sweets has its own subsidiary company to process and supply the materials, Bombay Agro Limited.

In response to opportunities for oilseeds and pulses, a representative from NAAFCO brought up two problems they are facing. First, NAAFCO is planning to export raw mung beans to Japan where it is popular as sprouts; however, government policy forbids the import of raw mungbeans. To this, from the representative from Bombay Sweets added that the government does not forbid mungbeans exports if they are processed. Secondly, the NAAFCO representative added that due to shadow cropping, the company is doubtful about the seed quality of soybeans. In response, the Project Director, Pulses and Oilseeds, BADC replied that BADC produces the soybean seeds and keeps them in modified cold storage. After bringing it out, the seed must be planted within 10-15 days. For this, BADC has conducted seminars and included them in the packet's instructions. However, some farmers still ignore it, which hampers the seed quality.

A representative from Lal Teer stated that oilseeds and pulses give lower yield while the duration makes it difficult for farmers to cultivate. As a result, farmers do not take oilseeds and pulses as mainstream crops. As such, if better quality species can be introduced and cultivated as a mainstream crop then both production and market value will increase. He further said that a BARI representative had stated that *BARI Mustard-18* has only 1.06 percent erucic acid content, which is an international achievement where even Canada has only been able to bring it down to 2 percent.

The Managing Director, Dynamic Agro Science asserted that his company is working with the USAID-funded RDC activity on sesame seeds. Sesame seeds now have a large demand in the international stage but the local sesame varieties are still sub-optimal. They currently have 7 MT of local sesame seeds and plan to conduct further research.

The Bombay Sweets representative estimated that approximately 200 MT of oilseeds and pulses are sourced domestically and sold abroad to the 1 crore Bangladeshis living abroad as the primary consumers. He asserted that they have been providing input supplies and training to 35 farmer groups in North Bengal for securing material supply. Furthermore, he mentioned that they are planning to introduce fried mungbeans in the future. At this point, the Feed the Future Team Lead asked the Bombay Sweets presenter if they are using mustard seeds for only extracting oil or for other purposes as well, and if they plan to introduce groundnut oils. Bombay Sweets does not use it yet, but they plan to do so in the future.

A representative from Metal Seed shared that they are introducing a new variety of sesame seed: *MS-5*. This new sesame seed is expected to yield crops that grow up to 4 feet, with seed pods within every 2-3 inches. Also, the seeds are black and bigger than the local sesame size, and they have a 44 percent oil content, as tested by BARI. The seed is sourced from China, but local production is ongoing. As for the local species, they are open-pollinated varieties.

A representative of BRAC Seed & Agro stated that, for mustard, they produced *BARI-14* and *Tori-7*. However, they could not keep up as their production cost was BDT 90-100 per kg of seed, whereas the government sold the same amount at BDT 75-90. They no longer process oil products; thus, mungbean production is also at risk. Currently, they only have 136 kg of mung

beans being processed. They are exporting sunflower oil commercially but the BRAC presenter mentioned that it was started under the Food Security project, which is now closed. He also pointed out that most of these products have alternatives. For instance, he mentioned that mustard oil used to be the most preferred cooking oil nationwide. Now, soybean oil has replaced it as it costs less. Consumer behavior also works as a key factor here; although consumers know that sunflower oil offers better health benefits, they are still using soybean oil.

The Pran Agro Limited representative added three challenges they face: (1) lack of suitable varieties; (2) natural hazards, which hamper seed quality and thus affect the crop quality from farmers; and (3) price fluctuation, from which both Pran Agro and the farmers are affected.

4.4 Concluding Findings

- A procurement policy is needed from the government to ensure the commercialization of oilseeds and pulses.
- A company requested that the restrictions on mungbean export are lifted so that they can commercialize it in Japan.
- Pran Agro and Bombay Sweets are collaborating with the government.
- Pran Agro stressed that marketing plays the most essential part when it comes to the benefits of the farmers. They are also using a farming hub to source their supplies domestically, train the farmers, and provide necessary facilities.
- Farmers still treat oilseeds and pulses as secondary crops.
- BARI has introduced many hybrid varieties.
- A platform to link all relevant stakeholders might bring good results.
- There is a huge potential for oilseeds and pulses in Bangladesh as the nation is currently exporting oilseed and pulse-based products abroad.
- The 1 crore Bangladeshis living abroad represent a large market for consumers of oilseeds and pulses outside the nation.
- The varieties used domestically are not up to the mark even though there are some good varieties available.
- Private sector involvement is negligible, although some companies are ramping up production using imported seeds.
- Profitability, productivity, and quality need to be upgraded for better marketing of oilseeds and pulses.
- Region-based cropping pattern selection can help find suitable crops for different districts. In this case, oilseeds and pulses have the potential to expand as preferred crops to the southern parts of the nation.
- All the stakeholders need to come together to identify and utilize the existing opportunities of oilseeds and pulses as well as rectify the restrictions.

5 JASHORE DISTRICT

USAID organized the stakeholder consultation workshop on the commercialization of oilseeds and pulses for Jashore district, which IFPRI facilitated, on December 2, 2020. This section captures the deliberations from that virtual session.

The most dominant cropping pattern is Boro–Fallow–T. Aman, which occupies about one-third (32.3 percent) of net cropped area of the region. The second largest area (5.3 percent of net cropped area) is covered by single boro.²

In Jashore district, mustard is the most important oilseed crop, covering 55,700 hectares—that is, 7.56 percent of net cropped area. The common crop patterns observed are Mustard–Boro–T. Aman, followed by Mustard–Jute–T. Aman.³ The major crops among oilseeds produced in the region are mustard and sesame.

5.1 Production Experiences

Farmers and other agricultural value chain actors discussed their oilseeds and pulses production practices in Jashore district.

A farmer from Jashore grows mustard, sesame, and lentil. He said that lentil seedlings often die after sprouting and the yield is low. It is unclear whether this poor performance is due to the seed quality or the land. He claimed that he uses local mustard seeds and is unaware of any higher quality seeds, as the local agricultural officers are not very keen on informing about them or supplying them.

Another farmer responded that he received *BARI Rice-86* in a demonstration from RDC. He attested that the yield was good, and the rice grain was filled with zinc. However, due to the rice being a little reddish, only customers who knew about its high zinc feature would buy it. However, he is unaware of any oilseed and pulses program under the RDC project.

A third farmer chimed in to explain a viable method to relay crop mustard on aman rice crops: if the mustard is relay-cropped with aman rice crops, it needs no extra irrigation, no extra fertilizer, and the mustard saplings do not die. However, if cultivated normally, the sapling could still die even if they are provided with all the necessities. He uses *BINA Dhan-7* and *BARI Mustard-14*. The relay cropping method is more profitable as it costs less, and he could cultivate three crops by the end of the year. For lentils, he cultivates it after the aman paddy harvest, but climate change is affecting production. Due to this issue, mustard production is going up, but lentil production is declining. Finally, he mentioned an Indian brand of mustard seeds called named Bullet, which doubles the yield compared with domestic seeds, and its husk can also be used as fuel.

A participant who is a miller and farmer offered viable suggestions to the farmers. If the farmers can change the aman rice for *BINA Aus-19* or 48 rice crops, then the crop can be harvested 19

² Dewan et al. (2017)

³ Dewan et al. (2017)

days earlier than aman rice. Thus, they will have time and can cultivate mustard or pulses. To stop seed diseases, they could use seed treatments before planting the seed.

Another farmer agreed to use the same crop pattern, but instead of mustard, he cultivates lentils. However, the cultivation is not going well as the crop becomes too big in size and dies of dehydration. He contacted the nearby agricultural office, but the officials do not know how to prevent this.

5.2 Oilseeds and Pulses Supply-Side Issues

What type of challenges and opportunities do millers, traders, and processors identify in oilseeds and pulses in Jashore district? How can these experiences inform improvements in commercializing oilseeds and pulses?

Another participating miller identified some challenges that he faces as a processor of oilseeds and pulses. He buys mustard from farmers at BDT 1,800-2,000 every 40 kg (that is, BDT 45-50 per kg). Every 40 kg of oilseeds mustard produces 14 liters of oil, which are sold at BDT 135-140. Farmers have enough mustard and lentils during the harvest time, but there is a severe shortage of supply at other times. Also, he has to transport this from other districts, which costs him substantially. Sometimes they have to import oilseeds and pulses through the large-scale processors, who buy from abroad. Another miller supported the earlier miller's statement as he has also been facing similar problems.

A seed provider from Manirampur shared his field-level experiences during the discussion. He sold 200-240 kg of seeds and retailed 280-320 kg of seeds to the farmers, including *BARI Mustard-14*, *BARI Mustard-9*, and *Tori Mustard-7*. "*BARI Mustard-14* is supplied mostly by farmers, but they do not prefer it due to its 85-day maturation period. On the other hand, *Tori Mustard-7* is rarely found but is high in demand as it matures in 70-75 days," he said. When asked about the selling price, he replied, "BDT 70-75 per kg, and for the government supplied white mustard seeds, the price is BDT 75-80."

A participant identified issues that he faces as a mill owner. Specifically, the market of oilseeds and pulses is very small, and the imported materials cost less than the domestic ones. Thus, the demand for domestically produced oil and pulses are low, and the operational costs are higher than the profit made from processing. He could benefit if he could be linked with buyers and the demand for domestic products are adequate.

A small-scale trader buys mustard, lentil, and black gram from the farmers and sells it to the large-scale traders. He sells them within a week, usually at the weekly market. His net profit margin is BDT 400-500 per kg. He does not sell to the millers directly because selling to large mills usually requires giving them the credit balance benefit. He also mentioned that keeping the oilseeds and pulses for too long hampers its quality due to infestation and price fluctuations can be also a problem. Only some large farmers and large traders could stock the products, he added.

An input dealer said that the price of this year's aman harvest was good and the straws are in demand in the market. Therefore, farmers are not keen on cultivating oilseeds or pulses this

year. As an input dealer, he supplies seeds to the farmers mostly from BADC. However, most farmers have their own seed collection.

5.3 Oilseeds and Pulses Supply-Side Issues

Participants offered their insights on supply-side issues, as well as solutions for improving the market system for oilseeds and pulses.

A representative from the RDC activity identified a few critical factors involved in the oilseeds and pulses cultivation and marketing: (1) untimely changes in the weather condition often hamper the cultivation and may result in foot and root rot diseases; (2) lentils have been marketed as an uncertain crop by farmers and large-scale companies due to its long duration for cultivation; (3) there is limited private sector involvement, except for a few regional companies; and (4) prices fluctuate due to importing lentil on a seasonal period, which makes it hard for farmers to get an appropriate price during harvest. He advised that research institutes and private sector should collaborate to solve these issues. Some policy improvement is required from the government's part as well. He suggested that the government should consider clustered farming for oilseeds and pulses in other areas rather than being stuck in the existing cultivating areas.

A second RDC representative stated that they have provided a bio-fertilizer called Trichoderma to farmers, in collaboration with Konika Seed Company (KSC). This fertilizer is good for seed treatment and protects the seeds from diseases. They also provided Inoculant, another bio-fertilizer suitable for lentils, which can boost the yield by 20-30 percent.

5.4 Policy Perspective on Oilseeds and Pulses

What is the government's response to the challenges and opportunities of producing and marketing oilseeds and pulses in Jashore district, and what are the policy options for improving the situation?

An Agricultural Extension Officer (AEO), DAE, Abhaynagar stated that they supply high-yielding seeds like *BARI Mustard-14*, *BARI Lentil-8*, and *BARI Lentil-9*. However, the supply of high-grade hybrid seeds is much lower than farmers' demand. The government is trying to create small- and medium-sized enterprise (SME) seed providers/ entrepreneurs via oilseeds, pulses, and spices seed storage and development project under government subsidy. In her locality, the cultivation of lentils is lower due to its duration, which does not fit the farmers' cropping pattern. They are slowly alternating to mustard as it could be harvested between T. aman and boro rice crops.

The Deputy Director, BADC, Jashore stated that BADC has supplied 62 MT of lentil, which included *BARI Lentil-3*, *-4*, *-5*, *-6*, and *-7*, alongside *BINA-5*, *-6*, *-8*. For mustard, they supplied *BARI Mustard-9*, *-14*, and *-15*, alongside *BINA-5*. One of the technical moderators asked why BADC is still supplying *BARI Mustard-9*, which was rejected by BARI.

In response, a representative from BARI's Oilseeds Research Centre (ORC) answered, "*BARI Mustard-9* is not multiplied here." They are currently multiplying *BARI Mustard-11* and *-16* to deliver them to the BARI Headquarters as these two have no demand in Jashore. Instead, *BARI*

Mustard-14 and recently *BARI Mustard-18* are in high demand. To meet this demand, they had to obtain these varieties from Faridpur and Kushtia.

A representative from Pulses Research Centre, BADC proposed a few solutions to the problems stated by a participating farmer and AEO. The both stated that the farmers still cultivate the old versions of BARI lentil, which are *BARI Lentil-2*, -3, and -4. These hybrid species are vulnerable to foot and root rot diseases. Instead, if they used the latest hybrid species like *BARI Lentil-6*, -7, and -8, this problem is unlikely to occur. He added that these seed varieties can also negate most of the farmers' problems and thus requested the government to stop multiplying *BARI Lentil-2*, -3, -4, and instead promote *BARI Lentil-6*, -7, and especially -8. For the problem stated by the AEO, he suggested *BARI Lentil-9*, which can be harvested in 85-90 days before moving to boro rice crop cultivation. In response to the problem stated by the representative from Konika Seed Company (KSC), he stated that they are collaborating with the University of Western Australia (UWA) to crossbreed mungbean with black gram and create a single harvest mungbean variety under government funding. They are also working on an agro-machine to lower the labor cost associated with producing and processing mungbeans.

Another participant suggested that farmers can apply crop rotation and alternation to resolve the diseases, together with using upgraded hybrid seeds. They could also treat the seed before planting it. He also mentioned that the daily recommended consumption of pulses in the human body is 45 grams, of which only 12 grams are available. To resolve this deficiency, farmers, traders, and millers could attend certain training sessions. Moreover, to increase the production of pulses, there are vacant lands in Jashore, which could be brought in to cultivate pulses.

An Additional Deputy Director, DAE advised that new short-term and high yield oilseeds and pulses varieties are necessary, and they have to be integrated into the cropping pattern. "The black gram production is increasing. If we can introduce grass pea and oilseeds to fit our cropping pattern, then not only will the land fertility increase but the production of oilseeds and pulses will also rise," he said. The Seed Promotion Committee decides the seed production list according to the national requirement.

A Senior Scientific Officer (SSO), BINA revealed that both *BINA Lentil-8* and *BINA Mungbean-8* are short-term crops; the farmers can harvest them in 90-95 days and 60-75 days, respectively. With the first two harvest periods, 70-75 percent for the harvest can be done but the third harvest is always a little risky. Nevertheless, they could use the third harvest as green manure crop to improve the land quality as well. He also stated that the government is currently discouraging the cultivation of boro rice crops in some southern districts as it takes too much labor to irrigate them. Instead, the BINA Senior Scientific Officer suggested the use of *BINA Aus Dhan-19* and -21 as they are also short-duration crops. In that case, the farmers can easily harvest *BINA Lentil-8* or *BINA Mungbean-8*.

A Deputy Research Director (DRD), Agricultural Policy Support Unit (APSU) stated that agricultural centers only distribute free fertilizers and seeds during demonstrations. Farmers are still using outdated crop seeds even though new and better seeds have been discovered. BADC, BARI, and DAE, under the lead of the Ministry of Agriculture, must improve their coordination to enhance adoption of these improved varieties. Finally, proper training to cultivate

the ungraded hybrid seeds should be available to the farmers so they can properly use the seeds.

A UAO from Sadar, Jhenaidah attested that 60 percent of Jashore cultivable land follows aman and boro rice crop pattern. He suggested the use of *BARI Mustard-14* to be a better choice between the two crops. For pulses, he pointed out that the pricing of pulses fluctuates and climate change in the last few years has frequently damaged the crops. If the harvest patterns of all the farmers could be synced then the cultivation of oilseeds and pulses can be increased, he added.

A Principal Scientific Officer (PSO), Regional Agricultural Research Station, BARI stated that the hybrid species supplied from BARI are good and that the farmers are accepting them without complaints. However, he pointed out some barriers. The farmers sell the seeds after harvest and later buy anew; this makes the quality doubtful. Winter suits a lot of other crops better; thus, the farmers are forced to shift their choice of cultivation into a more profitable crop. Lastly, there is no fixed price for oilseeds and pulses. Thus, farmers have a hard time competing with imported oilseeds and pulses in price.

When asked why the farmers are not getting any benefits from the oilseeds and pulses cultivation, the PSO alluded to four factors: use of chemical fertilizers for years, lack of good quality seeds, lack of good market system, and a lack of natural fertilizers.

According to the private foundations, academies, and developers, what can be done to solve the discussed issues? How can we improve the production and commercialization of oilseed and pulses?

A representative from Konika Seed Company (KSC) attested that he had speed-produced 6 MT of *BARI Mungbean-6*. He added that the problem they faced was the untimely climate changes, which deteriorated the seed quality. Furthermore, he advised that *BARI Mungbean-6* is harvested in two terms. If the harvest could be done in a single term, they can avoid the untimely weather changes. This could increase the yield.

A representative from Janata Engineering, asserted that the government is actively promoting the use of agro-machine to the farmers. It is possible to deliver the agro-machines to even the rural farmers if the NGOs also come forward in their support. Currently, they are supplying seeder machines and mustard oil wheels, which would allow the farmers to lessen manual labor. He also mentioned that they are working on pulses threshers as well.

A representative from chaldal.com stated that oilseeds and pulses were cultivated in large quantities previously. Sesame and lentil were cultivated in 1,000 hectares in these areas before, but due to climate change like untimely rainfall, hail rain, and flood, among other natural calamities, the farmers opted to cultivate watermelon, which is more profitable. In FY 2019-2020, the oilseeds and pulses cultivation has declined greatly. Batiaghata now cultivates sesame in 70 hectares and lentils in 105 hectares of land. Similarly, in Datok upazila, sesame is cultivated on 3 hectares. The demand for oil and pulses in Batiaghata and Datok together is 6,000 MT of pulses and 3,000 MT of oil per year, but the areas produce only 70-75 and 15-20 MT.

Regarding watermelon cultivation, they can be planted earlier than sesame, take less time, the post-harvest work is easier, and the product is profitable.

Next, a journalist from 71 TV, Jashore said that the cultivation of oilseeds and pulses has declined significantly in the last 20 years and predicts that this will continue due to farmers seeking profitability from growing other crops. He suggested that the benefits of oilseeds and pulses compared with the alternate crops should be communicated to farmers, and the government needs to take the first step in this initiative.

A representative from Janata Engineering attested that he sells 4-5 oil wheels every month. Farmers are leaning towards commercializing their products. They are currently selling stagnant and movable oil mills for BDT 0.85-1 lac and BDT 1.8-2 lac, respectively. As such, he stated that the mustard oil market is growing as people are turning back to mustard oil again.

5.5 Concluding Findings

There were several key points identified during the stakeholder consultation workshop on the commercialization of oilseeds and pulses in Jashore district, which are summarized below:

- Farmers are eager to cultivate oilseeds and pulses, but there is a lack of hybrid, high-yielding seed varieties.
- Agricultural officials attest that they cannot keep up with farmers' seed demands.
- Untimely weather changes like rain and flood hamper seeds and crops in Bangladesh.
- Policy changes are needed to commercialize oilseeds and pulses successfully. For instance, there are some old varieties of oilseeds and mustard seeds that have been rejected by BARI but are still being multiplied and supplied to farmers.
- BADC, BARI, and DAE, under the leadership of the MOA, must improve their coordination.
- Researchers are developing short-term, stress-tolerant, disease-tolerant, and high-yielding varieties. However, these varieties are not making it to farmers.
- Clustered farming is a viable suggestion.
- Crop patterns for oilseeds, pulses, and rice need to be studied as they are interrelated.
- The government and private sectors need a strong linkage to address the seed demand of the farmers.
- The government is promoting agro-machineries which is a good solution to lower labor costs and increase production.
- In the last 20 years, the oilseeds and pulses cultivation has declined greatly.
- Crop competition is turning the farmers away from oilseeds and pulses cultivation.
- Climate change is harming the oilseeds and pulses cultivation which, in turn, is discouraging farmers.
- Seed availability and seed-borne diseases are challenges faced by farmers.
- In the marketing aspect, oilseeds and pulses are losing to the imported products as they are cheaper.
- An agro-machine provider has started selling oil mills again because the people are becoming aware of mustard oil again. Currently stagnant and movable oil mills is being sold at BDT 0.85-1 lac and BDT 1.8-2 lac, respectively.

- Market linkage and coordination between the farmers, government, and private sector is crucial as the private sectors do not get quality products.
- Promoting bio-fertilizers like Inoculant and Trichoderma increase yields and prevent diseases.
- Finally, aman rice may be replaced by aus rice crops, which would enable oilseeds and pulses to fit within the cropping pattern.

6 KHULNA DISTRICT

USAID organized the stakeholder consultation workshop on the commercialization of oilseeds and pulses for Khulna district, which IFPRI facilitated, on December 3, 2020. This section captures the deliberations from that virtual session.

6.1 Production Experiences

What are the production experiences of farmers and other agricultural value chain actors in oilseeds and pulses, and what insights can be gleaned on the opportunities and challenges in this district?

A farmer from Khulna shared that they are cultivating mungbeans, sesame, and sunflowers. He stated the key problems that farmers face: not knowing the correct use of pesticides, many farmers take loans to cultivate, and they do not get adequate prices for their crops. He uses *BARI Mungbeans 1-6* and *BARI Sunflower-3*. The yield for the sunflower seeds is good: he harvested 280-300 kg of sunflowers from 50 decimal land. They have to sell the crops immediately due to the loans with the price BDT 48-50 per kg. However, if the crops could be kept for another month then the price goes up to BDT 60-70 per kg.

Another farmer attested that he cultivates *BARI Mustard-11*, which he sells at the local market for BDT 50. *BARI Mustard-11* yields around 240-280 kg of mustard in 1 *bigha* land. He mentioned that he and other farmers lack irrigation water, which is why the land remains fallow for a few months and they do not get agro-loans easily.

Another farmer complained that the *BARI Sunflower-2* and *BARI Mungbean-6* that he cultivates is often attacked by cows, but he cannot afford to put a fence around his cropland. He also mentioned that the seed demonstrations give away a small number of seeds, which is why many farmers are unable to cultivate oilseeds and pulses. The technical moderator asked, why does he not buy the seeds as they only cost BDT 80 per kg? The farmer replied that he does not buy the seeds, which cost BDT 80 per kg, because he prefers receiving it at no cost during seed demonstrations.

A farmer from Dumuria cultivates lentils and mustard, but the yield is low. He has transportation problems, irrigation problems, climate change damages the sesame, and some people release cows to their field. He said that the production of mustard is growing, but that of lentil is declining.

A farmer who cultivates sunflower, says that his crop choice is profitable. He received sunflower seeds from the agricultural office, and it has a good yield. The sunflowers have large oil content, and they get adequate price for it in the local market. He testified that most lands here have a bi-cropping pattern instead of three. In the lowland, they cultivate aman rice and boro rice, whereas they grow aman rice along with mustard, oilseeds, or pulses in the highlands.

6.2 Oilseeds and Pulses Supply-Side Issues

Participating millers, traders, and processors from Khulna district were asked about the types of oilseeds and pulses they supply, where they purchase these oilseeds and pulses and to whom, and the challenges and opportunities based on their practical experience. Their insights are summarized below.

One of the participants, a miller, has 100 farmers working on his land via contract farming. The farmers cultivate long-duration varieties of rice crops. If they are encouraged to use short-duration varieties of the crop, then they can cultivate oilseeds and harvest them before the climate affects their crops. He processes sesame and sunflowers in his mill. It would be better if farmers had a direct linkage with the processors. He has been involved with oilseeds and oil exports. He also specified that on the project with ACDI/VOCA, he got to see Mister Rafique Tuhin (MRT) Agro Product, whose oilseed refining machinery is more advanced than the domestic ones. MRT is willing to take oilseeds from the millers but the production here is unable to cope with the foreign demand for sunflower seeds. He suggested that if a few millers could cooperate then providing the supplies might be possible. Sharing from personal farming experience, he said, "Once the land's moisture dries up after the rice harvest, it is difficult to regain it even with irrigation. If he sows the mustard again in March, then untimely rain destroys the crops at the harvest period." The miller also stated that there is a demand to import expensive black sesame seeds; however, for his personal use, he prefers red sesame.

An input dealer under the RDC project provides technical support and seeds to the farmers. They are currently cultivating sunflower and maize. For sunflowers, she uses *BRAC Hysun-33*, which yields about 1,200 kg of oilseeds on 1 acre of land. She also buys *Hysun Sunflower-33* seeds at BDT 1,600 per kg. Climate change affects the farmers she works with; to mitigate these impacts, farmers are trying to sow early and harvest fast. Shilpi Arani Sharkar stated, "We have both male and female farmers here. Everyone is given equal rights and payment."

A miller from Dumuria, Khulna stated that his area does not produce enough mustard to last a year. He has more capacity, but the farmers do not produce enough mustard. He does not transport mustard from somewhere else like the other mills.

Another miller who processes sesame and mustard, mainly processes different kinds of oilseeds. However, the production of oilseeds in his area is not enough to meet the demand; therefore, he has to transport the oilseeds from elsewhere. He processes oil for others as well as for himself. Normally, he sells the processed oil at the local market. Based on his observation, cultivation of oilseeds is increasing.

Later, a miller mentioned that he processes mustard into oils, namely red-colored oil and white-colored oil. As the oil demand is increasing, he said the cultivation of mustard is also rising.

During the consultation workshop, a miller who runs a processor center, said that Batiaghata area, where he is from, was once a hub for sesame. Due to the water drainage problems, the sesame is now greatly reduced. This is mainly happening because the large lakes have been leased out and they now control the water flow of the large canals alongside the small canals connected to it. In this way, the water gets stuck in fields during the sesame harvest and

destroys the crops. He lost 7 MT of black sesame seeds to untimely rain. Once this flood happens, the salt content of the water covers the surface of the land, which makes it difficult to cultivate any other crops other than aman rice here. The miller sources grasspea, mustard, lentil, and other crop varieties from different parts of Bangladesh to keep his mill running. He undertakes huge risks in this line of business as the imported products come at a cheaper price. He bought lentils at BDT 3,500 per 40 kg, which is now priced at BDT 2,200. This is because lentil was imported from Australia and its price is cheaper.

A representative from Blue Gold provided a short overview of the water management situation. He asserted that new canals are being excavated to restore the water flow and the farmers in Batiaghata and Dumuria are starting to return to sesame cultivation again. They are also trying to promote *BARI Mustard-14* and *-15* in other areas so that they can produce three crops in the year.

6.3 Marketing of Oilseeds and Pulses

Various participants provided insights on the status of marketing in oilseeds and pulses, with contributions from the private sector and development partners.

An official from Solidaire Network commented that contract farming is critical for commercialization of oilseeds and pulses. Through contract farming, the company can gain quality products from the farmers as the conditions are predetermined, which ensures the fixed price and amount. From his own experience with contract farming, he stated, “When I worked for Jayan Group of Companies, we provided the farmers with seeds, farming advice, technical support, and the farmers needed our permission to change anything on the fields. However, in contract farming, the company will lose both the seeds and the harvest in case the yield is not good, which is why many private companies do not prefer it.” He further added that farmers now buy seeds from the seed companies rather than producing their own. However, the presence of big companies is negligent in the agriculture market.

A representative from the RDC activity, implemented by ACDI/VOCA, stated that private companies mostly acquire seeds from the open markets. They are not keen on joining risky contracts with the farmers. The private companies communicate through a middleman for grain collection. He suggested that the government, private sector, farmers, and buyers need to collaborate, and aggregators can become the link that connects them all. They can ensure that the farmers get adequate prices while their products make it to domestic and international markets.

The RDC official then stated that 40 percent of the nation’s sesame is being exported. Therefore, there is a proper market for the crop. However, in this case, post-harvest work like proper storage and taking care of the produce is crucial. There is a demand for single-shell sesame abroad and research departments can focus on that aspect, he added. Finally, he mentioned that all the shareholders need to work together to realize the commercialization of oilseeds and pulses.

6.4 Policy Perspective

What is the role in government agencies—BARI, DAE, BADC, to name a few—in addressing some of these challenges mentioned earlier in the Khulna workshop?

Some participants agreed that a direct linkage between the farmers and processors is necessary. Oilseeds and pulses cultivation in Khulna has been declining sharply. Sunflowers have potential in Khulna, but many farmers do not produce sunflowers because high-grade seeds like Hysun sunflower seeds are too expensive. If a few farmers can be trained and supplied with good quality seed from the government, it might bring good results. One participant stated that sunflowers are being cultivated in only 32 hectares of land in Khulna, which produces around 64 MT of oilseeds. According to data of sesame cultivation in the last 30 years, farmers have successfully harvested sesame in 10 years but faced losses for the remaining 20 years. Besides that, sesame is intolerant to waterlogging, which is why it cannot keep up with the crop competition. This participant concluded by stating that oil is produced throughout the year in Khulna as there are multiple mills in the region, but most of them source the oilseeds from southern regions of Bangladesh.

A representative from the Seed Division, BADC was requested by the moderators to state his opinion on sesame cultivation in Khulna region as Khulna was once well-known for it. He said that the cultivation of sesame is mostly situated in Batiaghata, Datok, and Dumuria upazilas. Early rain in late-February has been damaging the sesame seeds for the last few years, which is why farmers are reluctant to cultivate it now. The farmers there mostly use local seeds but the BADC also provides *BARI Sesame-3* and *-4* which covers 20-25 percent of the total cultivation area in these sub-districts. He also mentioned that under a government subsidized program, they are planning to distribute 20 MT of BARI Mungbean-6 to farmers residing in the region of Khulna, Bagerhat, and Satkhira during the summer and winter by the end of this year. The price of these mung beans is approximately BDT 100-108 and for mustard, the price is BDT 84-88 per kg.

The moderators asked if he knows about any collaborations with the private sector. The official answered that he did not know of any such collaborations. He testified that the quantity and the type of seeds that are supplied are decided by the Seed Promotion Committee; he usually gets an allotment which is close to the seed demand of the Khulna region.

A representative from BINA affirmed the statement about the late variety of rice crops. He said that those rice crops are dependent on rain and thus, the farmers cannot correctly plant the crops without the monsoon being in their favor. “In short-duration rice crops, if the age of the crop exceeds the saturation limit, the yield quality is diminished. If the farmers had pre-knowledge about the weather patterns only then can the short-duration rice crop be viable”, he said. He further added that BINA sesame-2 black is also a suitable option as it is somewhat waterlogging-resistant. He also mentioned that they are supplying *BINA Mungbean-8* which can be 60-70 percent harvested in the first term and 80 percent if the farmers wait a little longer. He especially mentioned *BINA Mustard-4* and *-9*, which in a demonstration yielded 320-360 kg of mustard in a salinized area. He suggested that if the farmers can use mustard as relay crops then their yield can turn better as there would be no need for extra irrigation.

The DAE Deputy Director of Khulna also shared a few words in the discussion. He agreed with the statement made by the representative from BADC's Seed Division and added that for sesame, the harvesting process is also difficult as every pod of the grain needs to be delicately picked one by one when they mature. Missing to pick a pod on time makes the crop rot. In contrast to that, *BARI Mungbean-6* is much more popular amongst the farmers as it can be harvested in 2 terms and fits Khulna's cropping pattern. For BINA mungbeans, there have been no demonstrations so far in Khulna.

Aman rice is planted and then the land is vacant for the next two turns. This is mainly due to the salinity in the land, which often does not permit boro rice crop cultivation. However, now those free lands are being used to cultivate watermelons. Land salinity, low land area, lack of irrigation water, and climate change are the four prime issues he identified. The ponds are leased to fish farmers and they do not let the farmers use the water. There is potential for *BARI Mustard-14* and sunflowers in place of boro rice here, he added. If the mustard is used as a relay crop, the yield still stands at 2 MT per hectare, but the restriction is the market channel, which suggests that sunflowers are not in demand and sets a lower selling price for the product. He suggested that if there is a storage point where farmers can get the proper price for their products, then farmers would be willing to cultivate it. For this to happen, the government and private sector need to work together.

The Deputy Director stated that farmers are using BRAC Sunflower *Hysun-33*, and the seeds are available as BRAC ensures them of seeds every year. Although it is expensive, this is offset if the production is sufficient. The DAE office links up farmers with the appropriate processors and buyers.

In response to farmers' adaptability, the Deputy Director attested that farmers tend to continue using the variety they are used to and are unwilling to change into a new variety crop. To increase the oilseed and pulses cultivation, the Deputy Director suggested that, farmers need to be trained. Also, they should be motivated to cultivate oilseeds and pulses. The price of the crops should be stable, and they could use a bed planter for sunflowers, mungbeans, and sesame to avoid climate change problems.

The Upazila Vocational Training Officer (UVTO), DAE suggested that if the farmers can be brought under a single union that links them to foreign and domestic buyers, gives them the proper necessary training, and creates storage points, oilseeds and pulses can be commercialized properly.

The Deputy Director, DAE, Satkhira said that mustard is cultivated on 12,000 hectares and 500 hectares of land in the area. He, too, agreed with the Deputy Director of Khulna about the suitability of sunflowers. However, the crops are often vulnerable to animal attacks. He suggested that if the farmers cultivated the crops in a synchronized way, then this issue can be prevented. "For mustard, they are cultivating *BARI Mustard-14*, -9, and -7 alongside *BINA Mustard-4* and -9, which are all high yielding crops. The use of *Tori-7* is slowly coming down," he said. The reason behind the sudden interest in mustard is that 60 percent of the land there has a double-crop pattern, 45 percent of which have salinity. The mustard can increase the land's fertility so the farmers can plant boro rice afterward. For pulses, he again reinforced the

same issues started earlier by the Deputy Director, DAE, Khulna, and added that they cultivate pulses in 3,000 hectares, of which 2,300 hectares are *BARI Grasspea-1*. However, with the cultivation of mustard, the DAE is trying to turn the lands of Satkhira into three crop cropping patterns. The grass pea mainly has three commercial uses: (1) human consumption, (2) production of organic fertilizer, and (3) to serve as cattle food.

A Deputy Research Director (DRD), Agricultural Policy Support Unit (APSU) suggested that the new hybrid varieties are not making it to the farmers. In the case of Khulna, he stated that sunflower irrigation has huge potential and crops should be chosen according to the climate. He also mentioned perilla seeds, which could be a good solution as it adds to health benefits and the yields are also high. He further added that BARI should research the perilla seeds and quickly distribute it to the farmers via DAE if they are beneficial.

A representative from Northern Consumer Products Limited (NCPL) attested that NCPL has worked with the RDC project on sunflowers. They worked with 2,000 farmers where they ensured sunflower seeds supplies to the farmers via contract farming. They provided *Hysun Sunflower-33* via a collaboration with BRAC. Through this, they set up a mill and released a sunflower oil product called 'Shaj.' The mill required 90 kg of sunflower seeds daily. However, only 10-15 percent of this requirement was fulfilled from local supply. Thus, NCPL had to import the rest to fill the gap. "Sunflower is a salinity loving crop and does not need much irrigation. Thus, it can be a very good crop choice to cultivate in Khulna," he said. He suggested that if the sunflower seeds can be brought in, a suitable price range then the cultivation of oilseeds will rise in the region.

He stated that the farmers in the RDC activity experienced a 20-25 percent increase in income as they got to farm 1 *bigha* land under contract farming. Besides that, the farmers used to earn BDT 1,000 every 40 kg, but this has increased to BDT 3,000 every 40 kg. Previously, no commercial companies were buying sunflowers, but now as companies like NCPL came forward, the sunflower seeds are being commercialized. NCPL buys the sunflowers locally during the harvest season and imports them when the local production is low. Sunflowers imported from Ukraine cost around BDT 1,800, which is less than other countries.

Another participant added to the discussion, "Mustard farmers can choose *BARI-14* and *-15* if they are reluctant to plant boro rice due to land salinity. They can choose *BARI Mustard-18*, which is salt-tolerant, has less erucic acid and gluconic acid, and yields 2,000 kg. However, it takes 110 days to mature. He also suggested *BARI Sunflower-2* and *-3*. He especially focused on *BARI Sunflower-2* as this particular crop seed is currently available, naturally tolerant to salt, and follows open pollination. To mitigate impacts from salinity and climate change, farmers can plant it in early winter. They could also use community cultivation to solve the animal attack problem.

For pulses, he recommended *BARI Lentil-8*, which is a salt-tolerant winter crop. However, foot and root rotting disease is a major problem hampering *BARI Lentil-8*. This problem can be solved by seed treatments before plantation.

6.5 Concluding Findings

- Clustering production system is suggested.
- Market channel development and stakeholder coordination are required for the proper production and commercialization of oilseeds and pulses.
- Oilseeds and pulses need to be integrated into the existing cropping pattern. BARI and BINA have developed many varieties for this purpose but DAE needs to motivate the farmers to use them.
- There is a lot of free land in Khulna that could be used for oilseeds and pulses cultivation.
- Agro-machines like bed planters can be used to increase the oilseed and pulses cultivation in the region.
- The government, the private sector, and the farmers need to be in a strong collaboration.
- Climate change is a crucial problem.
- Technology could be used to negate salinity.
- More research on cropping systems is necessary.
- Major oilseeds and pulses crops cultivated in Khulna are mustard, sesame, sunflower, lentil, grass pea, and mung bean.
- Most of the farmland in Khulna pursue di-crop cultivation, but due to DAE's efforts, they are shifting towards harvesting 3 crops annually. Farmers are now eager to cultivate mustard between two rice harvests.
- Due to the high salinity level in the ground, the lands remain free after aman rice. *BARI Mustard-18* and sunflower is a suitable option for plantation as they are salt resistant.
- Sesame cultivation has declined sharply due to early rain and drainage issues.
- Some areas also have water management issues.
- Blue Gold is working to excavate canals and restore the water flow. Thus, the sesame farmers are showing interest to return.
- Several processors are not getting enough crops and they are sourcing their oilseeds input from other areas.
- Pulses cultivation is treated as optional in the region. The grass pea cultivated in these areas is used for human consumption and as animal feed.
- For sunflowers, community farming is recommended to save the crops from animal attacks.
- Contract farming has also been suggested as a way to ensure proper marketing. NCPL has worked with RDC and 2,000 farmers in six districts on sunflower cultivation. They mentioned that the quality of domestically grown sunflowers is greater and has great potential to meet domestic demand.
- Creative cropping pattern is important as there are farmers with single crop plan lands.
- Post-harvest management should be focused on more; in the case of sesame, the acidity of the oil can be at high levels due to poor management and storage.
- For the waterlogging and drainage problems, the issues should be discussed with the water development board and district administration.

7 Conclusions

During each district workshop, stakeholders discussed the challenges and opportunities related to commercializing oilseeds and pulses. These discussions were used as an entry point to generate concrete suggestions on how to enhance commercialization of these crops in the Feed the Future Zone of Influence (ZOI). Based on these deliberations, several recommendations were identified across all district workshops, which are outlined below.

Introduce multiple cropping system to invigorate agricultural productivity

Stakeholders consistently advocated for replacing the single cropping system with a multiple cropping system, whereby 2-3 crops are grown to increase crop diversity and total productivity from a piece of land. This could create additional economic opportunities, reduce input costs and weed infiltration, and build soil health. Crops are prone to insect pest attacks, which reduce crop yields and increase cost of production. Adopting a 2-3 crop-based system minimizes the incidence of crop failure due to biotic agents, and narrows the space available for weeds to grow and hamper crop growth. A 2-3 crop-based cropping pattern could also help in maintaining soil fertility, provided that suitable crops such as legumes are included in the cropping system. Introducing pulses, which are leguminous crops, along with rice or potato cultivation, will enrich the soil for the next cropping cycle. Furthermore, it would help farmers to diversify risks posed by crop failure or market shocks (e.g., price instability, etc.).

Encourage Aman rice farmers to devote land to aus rice cultivation to complement oilseeds and pulses production

Since rice is the predominant crop and universally consumed food item in Bangladesh, it comes as no surprise that most farmers would choose to cultivate this crop. There are 3 major rice varieties grown in Bangladesh: aman, aus, and boro. Since independence, rice production has more than tripled, which was enabled through the development and adoption of various high yielding varieties (HYVs) of rice developed by the Bangladesh Rice Research Institute (BRRI) and Bangladesh Institute of Nuclear Agriculture (BINA), and rapid expansion of small-scale irrigation. The production seasons are as follows:

Variety	Planting Season	Harvesting Season
<i>Aus</i>	April-May	July-August
<i>Aman</i>	July-August	November-December
<i>Boro</i>	December-February	April-May

Most farmers cultivate t. aman and boro rice varieties. There is an average gap of around 60 days between the harvesting and planting of these two rice varieties, which is insufficient for oilseeds and pulses cultivation. If farmers are reluctant to apply multi-cropping, another option is to partially replace the slow growing aman rice with the faster growing aus rice. The Bangladesh Rice Research Institute (BRRI), together with other national and international research organizations, have developed new HYV that increases yields in shorter time periods compared

with traditional varieties. There is a gap of almost three months between aus and boro season, which gives farmers ample time to cultivate oilseeds and pulses on land released from aman cultivation.

Invest in research and development for short-duration, climate-resilient varieties of oilseeds and pulses

Partially replacing t. aman with aus will create a time gap of around 60 days between rice production seasons, which can be used to cultivate oilseeds and pulses. However, if there are any delays in harvesting oilseeds and pulses, the boro rice planting will be delayed, which may disrupt the crop cycle. Given this, research organizations may work on developing crop varieties, which are both high-yielding and short-duration.

The national agricultural research institutions BARI and BINA have developed several high yielding, drought/submergence/waterlog tolerant varieties for oilseeds and pulses, but the crop gestation period is still relatively long. For instance, the BARI *Mung-6* variety of mung bean has potential for cultivation in Barishal. Specifically, the first harvest takes only 60 days, during which only about 60 percent of the pod is harvested. Harvesting the remaining 40 percent requires another month. During the second and third harvest, the crops are often susceptible to early rains in mid-March and early April. Mungbean cultivation could be expanded if a modern variety could be developed, which is quicker to mature, harvested within a short period of time, or submergence tolerant.

Untimely rainfall delays the mustard harvest and delays the sowing of the next crop, which is usually aman rice, which in turn reduces the optimal seeding period for mustard in the next cropping cycle. A short duration, water-logging tolerant variety of mustard needs to be introduced so that the farmers can successfully harvest and sell mustard seeds.

Engage relevant stakeholders to meet consumer demand for new products, from research organizations to private sector

In Bangladesh, the demand for non-soybean oil, such as mustard oil, sunflower oil, and sesame oil, is increasing among consumers. Since there is local and international demand for these oil types, farmers can take advantage of practices such as multi-cropping or relay cropping to grow oilseeds. To this end, farmers need to understand how multi-cropping works, its advantages and disadvantages and acquire good seed varieties. BADC needs to take the initiative to make the seeds more readily available to farmers and DAE may motivate them to grow these crops to further their own economic growth.

Although there is local demand for mustard oil for consumption in Cox's Bazar, Barishal, and Khulna districts, mustard production is still low in these regions, which means they have to import mustard seeds from surrounding regions to meet local demand. Similarly, demand for sunflower oil is rising, but due to the high cost of procuring seeds locally and extracting oil from them, dealers prefer to import crude sunflower oil from the international market and refine and sell them in Bangladesh as it is more financially viable. If the locally grown variety of these oilseeds are cheaper, good quality, and more readily available, processors and dealers may shift to local sourcing to meet the local demand and, in the long-term, may also lead to an

export-oriented market, which will be beneficial to the economy. Although private companies such as Pran are marketing mustard oil and sunflower seeds snacks in the international market, the contribution is very small.

Promoting public-private partnerships to meet consumer demand

BARI develops and produces breeder seeds and supplies to the Bangladesh Agricultural Development Corporation (BADC), which then multiplies seeds for farmers' use. After seeds are multiplied, BADC makes seeds available to farmers through the DAE. However, some of the higher quality seed varieties do not reach the farmers. This is where developing public-private partnerships needs to gain momentum.

At present, BRAC's seed division is working with BARI and have initiated several collaborative programs on seed multiplication and research on sunflower seeds. If their trials are successful, they plan to launch the seeds in the market. Apart from the corporations, the government is also trying to promote small- and medium-sized enterprise (SME) seed providers via oilseeds, pulses, and spices seed storage and development project under the government subsidy. There was one such farmer available from Savar during the third day of discussion who is currently multiplying mustard and maize seeds, but at present he is operating at local level only. He has already distributed over 100 kg of seed and will continue to try and expand his operations. The DAE hopes to introduce more of such entrepreneurs to extend the outreach of high-quality seeds to farmers. BARI is also collaborating with the University of Western Australia (UWA) to cross mung bean with black gram to create a single harvest mung bean variety under government funding. More such collaborations need to be undertaken by the government entities to make high quality seeds available to farmers.

In addition to making more seeds available to farmers, there must be a system in place for the end products, as well. Currently, the market system for oilseeds and pulses is not very developed. As a result, farmers often do not get fair prices for their crops, selling below the market price due to lack of proper storage facilities or repayment of loans. During the stakeholder consultations, some farmers indicated that they would have received better prices for their crops if they could sell their products after one to two weeks. There is no market linkage system in place where the farmers can sell their products directly to the processors. If the government authorities take the initiative to link farmers to seed processors and link the processors to dealers, then every party involved would get fair prices for their efforts. If the farmer makes a profit from selling oilseeds and pulses, then he would be motivated to cultivate these crops in subsequent years. Besides government, private companies such as BRAC seeds, Pran Seeds and Agro, and ACI can take the initiative to introduce farmers to mill owners who may directly purchase seeds from the farmers.

Improve access to mechanization for farmers

Manual labor, including family and hired labor, is predominantly used by farmers for cultivation of oilseeds and pulses in Bangladesh. Use of hired labor increases production costs of these products. This is particularly true for mung beans. BARI has developed several types of machines for agricultural purposes, such as threshers and seeders. Private companies such as Janata Engineering and Alim industries have also introduced other agricultural machineries

such as dryers, crop cutters, along with threshers and seeders to ease the process of harvesting for farmers.

Several factors are hindering the progress of mechanized farming in Bangladesh. To mitigate these problems, steps need to be taken at the policy making level. BARI needs to increase the output of their mechanization tools to meet the demand of farmers. Although they are cheaper than the private venture variants, they are still expensive for farmers. Easy payment options can be introduced to facilitate the purchase of these products by farmers. Also, the farmers need to have an easy access to finance specifically for agricultural machinery, such as at low interest rates, long-term loans from banks. There needs to be proper training facilities for farmers so that they can use these tools in the correct manner and get the most out of using them.

Understand barriers to farmers' adoption of modern crop seed varieties

Although many modern varieties of pulses and oilseeds have been developed to address emerging climatic and pest-related issues, many farmers are still not adopting these new varieties. While continuing to cultivate outdated varieties may seem against farmers' interest, a recurring theme during the stakeholder consultation workshops was to identify and understand the barriers that prevent farmers from adopting modern varieties.

Most farmers have a lower level of education and have been undertaking traditional farming practices for generations. The farmers have enough knowledge to cultivate crops suited to their area, yet despite the fact that high yielding varieties are now available to farmers, farmers are not adopting these improved varieties and, in turn, their crop productivity is not increasing. The likely reason for this is lack of formal training for enhancing knowledge of the farmers. Some farmers will try to learn about new crop varieties and farming practices from their local retailers, government officials, local NGO workers etc. but it is at best a conversation to try and gain some knowledge. Few farmers are trained by either government extension officials or development projects. But again, the majority are in the dark when it comes to the issue of adoption of new technologies and practices in agriculture.

Farmers need proper information on the characteristics, production and management practices of the new crops (e.g., growing season, seed rate, fertilizer application rate, insect and pest management, maturity indices, harvesting practices, growth rate, estimated yield, strengths and weaknesses, etc.). When the government distributes seeds for demonstration plots, they organize small training sessions for a handful of farmers to brief them about all the information. When these farmers cultivate these crops, it stimulates the interest of the surrounding farmers. But the seeds are no longer available and the original farmer selected for the demonstration multiplies the seed for local distribution. However, the knowledge gained on these crops is not passed on to other farmers efficiently. This leads to farmers losing interest in the crop. The government and development partners need to take the initiative to train as many farmers as possible to boost their agricultural output. To maximize the reach of training, the government can enlist private companies and development partners to carry out training programs in the field. This is a way to enhance public-private partnership in agriculture.

Trainings should not be limited to seeds and agricultural practices. Another important aspect of farming is the use of fertilizers and pesticides. The knowledge that farmers have about these products comes from other advanced farmers and retailers they purchase their products from. Farmers stated that they are often provided with products that are expensive but not suited to their needs. As with seeds, only a handful of farmers receive proper training on judicious use of fertilizers and pesticides and are aware of bio-pesticides and bio-fertilizers. Once the farmers receive a formal training and see positive results, they will be encouraged to continue to look for better prospects and other sources of knowledge.

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APPENDIX 1: INVITATION



The U.S. Government's Global Hunger & Food Security Initiative

সম্মানিত অতিথি,

ইউএসএআইডি (USAID) আয়োজিত এবং ইন্টারন্যাশনাল ফুড পলিসি রিসার্চ ইনস্টিটিউট (IFPRI) সম্মালিত ডাল এবং তৈল জাতীয় ফসলের বাণিজ্যিকীকরণ সীমিত জরিপ কর্মশালাতে অংশ নেওয়ার জন্য আপনাকে আমন্ত্রণ জানাতে পেরে আমরা আনন্দিত। এই ভার্চুয়াল কর্মশালাটি কক্সবাজারের জন্য অনুষ্ঠিত হবে আগামী ৩০ নভেম্বর, ২০২০ সকাল ৯.৩০টা থেকে ১১.৩০ টা পর্যন্ত জুম (Zoom) অনলাইন প্রাটফর্মে। উক্ত কর্মশালাটি বাংলার পরিচালিত হবে ও একই সাথে ইংরেজিতে লিখিত ব্যাখ্যাও প্রদান করা হবে। জুম মিটিং এ যোগ দেয়ার জন্য প্রয়োজনীয় তথ্য নিচে দেয়া হল।

জুম মিটিং লিঙ্ক: www.tinyurl.com/session-30NOV2020

এই কর্মশালার উদ্দেশ্য হল, ডাল এবং তৈল জাতীয় ফসলের বাণিজ্যিকীকরণ (Commercialization of Oilseeds and Pulses) বিষয়ক চ্যালেঞ্জ, সুযোগ-সুবিধা এবং সুপারিশসমূহ জানা। এই বিষয়ে আপনার মতামত অত্যন্ত মূল্যবান।

জুম কর্মশালাতে যোগদানের জন্য আমরা পরামর্শ দেব যে, আপনি এমন একটি স্থান থেকে অংশগ্রহণ করবেন যেখানে ইন্টারনেট নেটওয়ার্ক ভালো। কর্মশালা শুরু হলে আমরা আপনাকে কর্মশালাতে যোগদানের জন্য প্রয়োজনীয় সমস্ত তথ্য সরবরাহ করব।

আপনাকে অসংখ্য ধন্যবাদ এবং আমরা আশা করছি যে, আপনি আমাদের আমন্ত্রণটি গ্রহণ করবেন।

ভভেচ্ছান্তে,
আখতার আহমেদ
IFPRI বাংলাদেশ কাফি রিপ্রেজেন্টেটিভ





The U.S. Government's Global Hunger & Food Security Initiative

Dear Participant,

I am delighted to invite you to attend a virtual workshop on Commercialization of Oilseeds and Pulses, organized by USAID and facilitated by IFPRI. The virtual workshop for Cox's Bazar will be held on November 30, 2020 from 9:30-11:30 a.m. using Zoom. The workshop will be conducted in Bangla, with written interpretation provided in English. Please see the joining information below:

Zoom link: www.tinyurl.com/session-30NOV2020

The purpose of this workshop is to learn from relevant stakeholders about the challenges, opportunities, and recommendations related to Commercialization of Oilseeds and Pulses. Your inputs will be valuable for this workshop. We have also sent a calendar invite following this e-mail with the same information.


To join the Zoom workshop, we recommend that you participate in a location with good internet connectivity. Our team will contact you before the workshop to remind you of the event date and provide other details.

Thank you and we very much hope that you will accept our invitation.

Best regards,
Akhter Ahmed
IFPRI Country Representative for Bangladesh






APPENDIX 2: WORKSHOP PROGRAM


 The U.S. Government's Global Hunger & Food Security Initiative

Program

Time		Topics
9:20	9:35	Introduction to Zoom Functionalities
9:35	9:40	Welcome/Introductory Remarks from IFPRI and USAID
9:40	9:48	Overview Presentation & Objectives of the Consultation
9:50	11:15	Breakout Sessions: Discussion with Stakeholders
11:15	11:25	Return to main session and discussion
11:25	11:30	Concluding Remarks


 The U.S. Government's Global Hunger & Food Security Initiative

অনুষ্ঠান সূচী

সময়		বিষয়
৯:২০	৯:৩৫	জুম কার্যকরী গালাী পরিচিতি
৯:৩৫	৯:৪০	IFPRI এবং USAID থেকে শুভেচ্ছা বক্তব্য
৯:৪০	৯:৪৮	সংক্ষিপ্ত প্রেজেন্টেশন এবং আলোচনার উদ্দেশ্য
৯:৫০	১১:১৫	ব্লোক আউট সেশন: স্টেকহোল্ডারদের সাথে আলোচনা
১১:১৫	১১:২৫	মূল সেশনে প্রস্তাববর্তন এবং আলোচনা
১১:২৫	১১:৩০	সমাপ্তিসূচক বক্তব্য

