



FONDATION



Sustainable Soil Management Component (SSMC) of OCP Foundation's Agricultural Development Project in Bangladesh – Stage 1



Monthly Report (May 2017)

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Acronyms and Abbreviations

APS	Ammonium, Phosphorus, and Sulfur
ARS	Agriculture Research Stations
BADC	Bangladesh Agricultural Development Corporation
BARI	Bangladesh Agricultural Research Institute
BRI	Bangladesh Rice Research Institute
DAE	Department of Agricultural Extension
FC	Field Coordinator
GAP	Good Agricultural Practice
GOB	Government of Bangladesh
ICARDA	International Center for Agricultural Research in the Dry Areas
IFDC	International Fertilizer Development Center
IPM	Integrated Pest Management
kg	kilogram
MLTS	Multi-Location Testing Sites
NPS	Nitrogen, Phosphate, and Sulfur
OCP	Office Chérifien des Phosphates
OFRD	On-Farm Research Division
SAAOs	Sub-Assistant Agriculture Officer
SRDI	Soil Resource Development Institute
SSMC	Sustainable Soil Management Component
TSP	Triple Superphosphate
UAO	Upazila Agriculture Officer

Sustainable Soil Management Component (SSMC) of OCP Foundation's Agricultural Development Project in Bangladesh – Stage 1

Monthly Report (May 2017)

Introduction

The OCP Foundation signed an agreement with the International Fertilizer Development Center (IFDC) for implementation of the Sustainable Soil Management Component (SSMC) of OCP Foundation's Agricultural Development Project in Bangladesh – Stage 1 for a period of three years, from January 2017 to December 2019. SSMC will address many of the increasing, serious soil fertility concerns of the northern districts of Bangladesh while also helping farmers enhance crop productivity and profitability through the implementation of improved soil management methods in the overall context of market-sensitive good agricultural practices (GAPs).

The **goal** of SSMC Stage 1 is **sustainable management of soil to enhance yields and farmers' incomes under resilient production systems**, which contributes to the overall goal of OCP Foundation's Agricultural Development Project in Bangladesh.

The **objectives** of the project are to:

1. Evaluate the role of secondary and micronutrients, including the application of different compound fertilizers, on crop productivity as affected by soil acidity.
2. Promote balanced plant nutrient and GAP solutions for improving crop productivity, crop profitability, and soil fertility through extension workers and agro-input retailers.

OCP Foundation's comprehensive project also includes input from OCP Foundation and the International Center for Agricultural Research in the Dry Areas (ICARDA). The overall objective of this agricultural development project is "sustainable management of soil to enhance yields and farmers' incomes under resilient production system in Bangladesh, resulting in food and nutrition security, improved health. and livelihoods." The project includes the SSMC in addition to monitoring and capacity building inputs by OCP Foundation and work related to the promotion of GAPs, entrepreneurship, and farmer organization by ICARDA. The project targets rice, maize, potato, pulses, and to a lesser extent, wheat crops.

SSMC is implemented together with the Government of Bangladesh (GOB) counterparts – Bangladesh Agricultural Research Institute (BARI), Bangladesh Rice Research Institute (BRRI), Department of Agricultural Extension (DAE), and Soil Resource Development Institute (SRDI). Additionally, agro-input retailers will be involved to promote balanced plant nutrient and GAP solutions for improving crop productivity, crop profitability, and soil fertility. The primary approach of the project for IFDC is to conduct trials with BRRI and BARI and field extension activities with DAE.

SSMC is being implemented in 12 *upazilas* (sub-districts) of the targeted districts of Kurigram, Nilphamari, and Dinajpur in the Rangpur division and the districts of Bogra, Chapai Noawabganj, and Natore in the Rajshahi division (Figure 1).¹ The contract was signed and SSMC activities began in January 2017. This monthly report shows the progress achieved in May 2017.

¹ The upazilas were selected based on certain criteria: (1) a higher percentage of cultivable land; (2) growth of at least two major crops; (3) a relatively low soil pH level; (4) more progressive farmers; and (5) ease of access to the upazilas for project activity implementation.

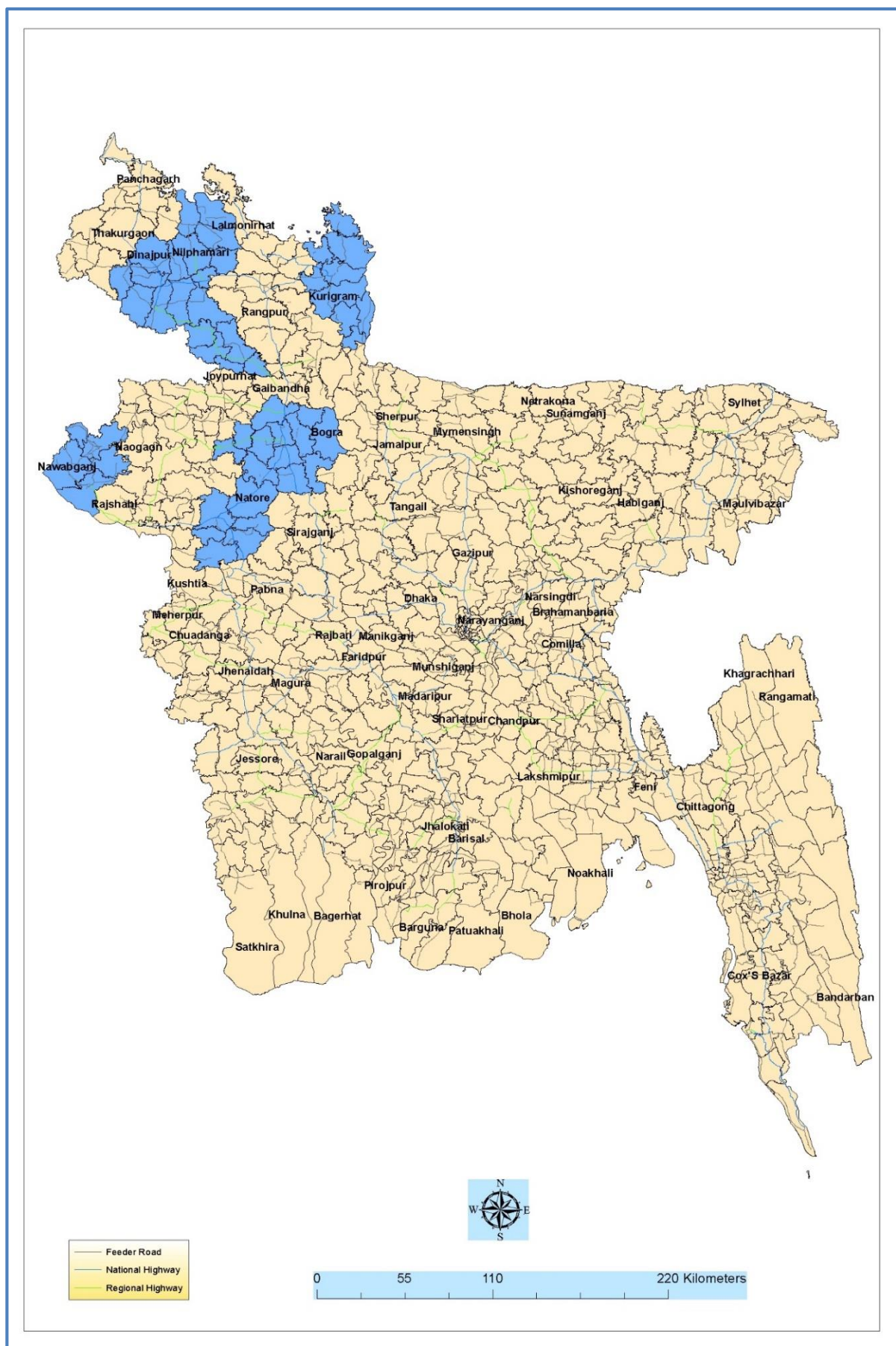


Figure 1. SSMC Project Locations

Technical Program Activities

As per the annual Work Plan, major technical activities conducted during the reporting month included the following, which are linked to cropping seasons and deliverables and aimed at achieving the project goal.

Baseline Survey

During the reporting month, the Deputy Director of IFDC Asia has sent the preliminary draft report to OCP Foundation for their review. The SSMC activity has also focused on arranging a Power Point presentation on the baseline survey report in the Ministry of Agriculture. The main features of this presentation are provided below.

- The Deputy Director of IFDC Asia has presented the findings of baseline survey report in the Ministry of Agriculture on May 04, 2017. The survey report is structured into i) a profile of 400 selected farmers, ii) soil fertility management, iii) agronomic practices, and iv) conclusions and recommendations. The Honorable Minister of Agriculture, GOB; IFDC Senior Consultant; two Additional Secretaries and Joint Secretary; Agri-input Section of the Ministry of Agriculture; Chairman, Bangladesh Agricultural Development Corporation (BADC); Director General, BRRI; Director, SRDI; all the Focal Points from BARI, BRRI, Soil Resource Development Institute (SRDI), and DAE; and other Ministry officials attended the presentation. Including IFDC staff, 17 officials attended the event. The approved proceedings of the meeting are attached.
- After the presentation, the participants took part in the discussion. A summary of all the suggestions and comments is provided below in order of priority.
 - Honorable Minister has suggested including spice crops such as onion, garlic, chili, and *Aus* rice in the SSMC project.
 - The Minister has further suggested to take initiative for incorporating potassium (K) fertilizers in any kind of compound (mixed) fertilizer as our soils are deficient in K and almost all crops need K for better growth of crops. She also draw the attention of issues such as i) inclusion of nitrogen, phosphorus, and potassium (NPK) and other secondary and micronutrients in compound/mixed fertilizers, ii) include 2-3 types of mixed fertilizers using micronutrients for rice, vegetables, and fruits, iii) she very strongly recommended that, in the future, *Aus* should be encouraged and emphasized particularly on development of improved varieties,

fertilizer management, and direct seeding in-line. She also requested IFDC to take initiative on development of short duration improved varieties of *Aus* in collaboration with Research Institutes through donor's support. Finally, she thanked IFDC for conducting this valuable study. She also emphasized the need for conducting soil tests on geological and soil fertility changes after every earthquake and natural disaster.

- IFDC Senior Consultant Dr. A M M Shawkat Ali, mentioned that in the current context, the overriding need for sustainable soil management should be seen as an essential part of sustainable agriculture as embodied in the United Nations (UN) Sustainable Development Goals (SDGs). Goal two of the SDGs specifically refers to sustainable agriculture, which the GOB is committed to achieve. Viewed in this context, the results of the baseline survey, being conducted under the SSMC by IFDC, will assist Bangladesh in her efforts to achieve the SDG goal on agriculture sustainability. He also provided importance on effective motivational techniques regarding soil acidity conception and reclamation.
- Chairman, BADC informed that OCP Company, Morocco ensured that they will include K in different categories of compound/mixed fertilizers. They already developed Triple Superphosphate Boron (TSP B) and TSP Zinc (Zn) compound fertilizers. Use of these types of fertilizer should be encouraged among farmers.

Participation in the Steering Committee Meeting

- Deputy Director of IFDC Asia and Focal Points of BRRI, BARI, SRDI, and DAE attended the first Steering Committee meeting of the SSMC project in Morocco at OCP Headquarters on May 08, 2017.
- After attending the Steering Committee meeting of the OCP Foundation and visiting other institutions in Morocco, Deputy Director of IFDC Asia and Focal Points of BRRI, BARI, SRDI, and DAE returned to Bangladesh on May 13, 2017. They met Dr. James Scott Angle, President and CEO of IFDC during their visit to the Symposia organized by OCP Group at the Hassan Mohammad University of OCP Group in Morocco. They also visited the largest phosphate mine stock of OCP Group and an environment friendly TSP manufacturing plant at Morocco.

Farmers Training Program

- In the reporting month, four batches of farmers' trainings were conducted with 119 men and women *Aman* farmers attending the program. The trainings were conducted at Nilphamari Sadar, Dinajpur Sadar, Shahjahanpur, and Nageswari upazilas under Nilphamari, Dinajpur, Bogra, and Kurigram districts respectively. Of the 119 trained

farmers 16 (13 percent) were women. Of the trained farmers, 112 were progressive (94 percent) *Aman* farmers.² Four *Aman* demonstration farmers who were selected earlier also attended the training programs. In addition, eight agro-input retailers were also present. Modules followed during training programs include PowerPoint and oral presentations, group discussions in a participatory approach, and practical demonstrations on identification techniques of adulterated fertilizers. The number of farmers who attended the program are presented in the following Table.

Sl. #	District	Upazila	Total		
			Male	Female	Total
1	Nilphamari	Sadar	26	3	29
2	Dinajpur	Sadar	26	4	30
3	Bogra	Shahjahanpur	26	4	30
4	Kurigram	Nageswari	25	5	30
Grand Total			103	16	119

- The deputy director/district training officer/additional deputy director, the respective upazila agriculture officers and sub assistant agriculture officers of Department of Agricultural Extension (DAE), SSMC field coordinator (FC), and senior staff of SSMC were present in the training programs as resource persons.
- For the SSMC farmer training program, four colored leaflets (six pages; English and Bangla versions) were developed for rice (T. *Aman* and *Boro*) and potato crops. Two hundred copies of color leaflets for rice crops (Transplanted *Aman* and *Boro*) were printed for SSMC farmers training programs. To create awareness among the farmers on GAPs for rice, leaflets (two pages; Bangla version) have been distributed among the trainee farmers and Sub-Assistant Agriculture Officers (SAAOs). The leaflets on rice and potato are included (three pages; English version) in Appendix 2.
- Two technical handouts on *Aman* crop (Bangla) distributed among the trainee farmers and SAAOs in the farmers' training programs.

OCP Company Fertilizer

Ministry of Agriculture, GOB has given approval to BADC delivering 800 kg compound fertilizer in favor of SSMC, IFDC. SSMC senior officials are in touch with BADC for getting the required amount of fertilizer being gifted to GOB by OCP Company. IFDC requested BADC to provide the following grades of compound fertilizer for IFDC's SSMC project:

² Progressive farmers are those who are willing to use the GAPs (such as using good quality seed, balanced doses of fertilizers, maintaining proper spacing from line to line and plant to plant, integrated pest management [IPM] practices with improved technologies, etc.), willing to establish their own demo plots, sharing their knowledge, and encouraging their neighboring farmers to use GAPs along with improved technologies.

1. TSP (TSP-Zn) 250 kg (five bags)
2. Ammonium, Phosphorus, and Sulfur (APS [19N-38P₂O₅-0-6S-1B]) 300 kg (six bags)
3. Nitrogen, Phosphate, and Sulfur (NPS [12N-45P₂O₅-0-5S-1Zn]) 250 kg (five bags)

Trials and Demonstrations

Trials

- BARI scientists submitted the non-rice (maize, potato, wheat, and lentil) trial budget break- up to SSMC, IFDC. Necessary steps for approving the budget breakup have already been taken.
- On May 29, 2017, IFDC signed an agreement with the Soil Science Division of BRRI to collaborate on conducting six on-station and on-farm trials of rice crops (*Aman* 2017 and *Boro* 2017-18). All the trials will be conducted at Rangpur.
- A meeting with chief scientific officer, On-Farm Research Division (OFRD), BARI, and senior staff of SSMC project was held at BARI, Joydebpur on May 29, 2017 to finalize locations/sites for conducting different categories of non-rice (potato, maize, lentil and wheat) crop research trials during 2017-19. Twenty-four on-station and on-farm research trials will be conducted at three different Agriculture Research Stations (ARS) and four different Multi-Location Testing Sites (MLTS). Location based trial categories are provided below.

Sl. #	Category of trial	Locations
1.	On-station trial	ARS, OFRD, BARI, Rangpur
2.	On-station trial	ARS, OFRD, BARI, Bogra
3.	On-station trial	ARS, OFRD, BARI, Dinajpur
4.	On-farm trial	MLTS, OFRD, Sadar, Dinajpur
5.	On-farm trial	MLTS, OFRD, Domar, Nilphamari
6.	On-farm trial	MLTS, OFRD, Ulipur, Kurigram
7.	On-farm trial	MLTS, OFRD, Nachole, Chapai Nababganj

Demonstration

- The SSMC FC is maintaining liaison with DAE officials, particularly with the 10 upazila agriculture officers (UAOs), regarding transplanted *Aman* demonstration site selection.
- All the deputy directors of DAE instructed the UAOs to collect required varieties of *Aman* seed from BADC or any other reliable sources for establishing trails/demo plots in the coming *Aman* season.
- The SSMC senior staff, field coordinator, and DAE officials visited the plots of the selected six *Aman* demo farmers at Nilphamari Sadar, Saidpur, Dinajpur Sadar,

Chirirbandar, Shahjahanpur, and Nageswari upazilas and found that almost all the plots were selected as per guidelines. In Nilphamari Sadar, a new demo plot has been selected by the SSMC senior staff. All the demo farmers were briefed in detail about the procedure of establishing demonstration plots, as well as their responsibilities of establishing demonstration plots at their fields.

Other Activities

- After completion of the orientation programs of UAOs and SAAOs of DAE, six UAOs of Dinajpur Sadar, Chirirbandar, Nilphamari Sadar, Saidpur, Kurigram Sadar, and Nageswari shared their orientation experiences with respective deputy directors of DAE. The deputy directors instructed all the UAOs to follow the guidelines provided by SSMC-IFDC.
- SSMC senior staff discussed with the district heads of Dinajpur, Nilphamari, and Kurigram DAE offices and UAOs of the Nilphamari Sadar, Dinajpur Sadar, Saidpur, Shahjahanpur, and Nageswari upazilas about SSMC activities in detail. They highlighted the role of DAE field staff in successfully establishing demonstration plots, organizing farmer training programs, and expanding the message of GAPs among farmers during the 2017 *Aman* season.
- FC of SSMC attended one DAE SAAO's conference at Natore Sadar. He briefed them about the progress of demonstration plot selection activities and farmers' training schedule.
- FC of SSMC monitored the demonstration sites with concerned SAAOs and exchanged views with demo farmers at Gomostapur and Nachole upazilas under Chapai Noawabganj district. All the *Aman* demo sites monitored by the FC, SSMC.
- Translation of the Training Manual from Bangla to English is under progress. Senior staff of SSMC are involved with this activity.

Photographs of SSMC Activities



Appendix 1. Draft Minutes of Baseline Survey Report Presentation Program

Honorable Agriculture Minister, High Officials of Ministry of Agriculture, Head of the Research Institutes, Focal Points of SSMC, OCP project, IFDC Senior Consultant, and Deputy Director of IFDC Asia at the presentation of the baseline survey report of SSMC held on May 04, 2017 in the Ministry of Agriculture.



SSMC team members in a steering committee meeting in Morocco.



SSMC team members visit a TSP factory.



Male and female farmers participated in a training program at Nageswari on May 25.



Speech by the DAE official in a farmers training program at Nilphamari Sadar on May 22.

Proceedings of the IFDC Presentation on the Baseline Survey Findings of Sustainable Soil Fertility Management Component (SSMC) of OCP Foundation's Agricultural Development Project held on May 04, 2017

The presentation was held in the Conference Room of the Ministry of Agriculture on May 04, 2017 at 10:30 am. The Honorable Minister, Begum Matia Chowdhury, MP and Minister of Agriculture graced the occasion as the Chief Guest. Other members participated in the presentation is provided in Appendix 1.

Presentation

Initiating discussion, the Honorable Minister requested to make the presentation. Ms. Ishrat Jahan, Deputy Director of International Fertilizer Development Center (IFDC) Asia Region made a PowerPoint (PP) presentation of the baseline report. The report was prepared under the leadership of Dr. A M M Shawkat Ali, Former Advisor to the Caretaker Government and Permanent Secretary to the Government of Bangladesh. The survey report is structured into i) profile of 400 selected sample farmers, ii) soil fertility management, iii) agronomic practices and iv) conclusions and recommendations. The project is funded by OCP Foundation for a period of three years and the locations are 12 upazilas in six districts of Rangpur and Rajshahi Division. The selected crops are Aman, Boro, Potato, Lentil, Maize and Wheat. The PP presentation is attached in Appendix 2.

After the presentation Dr. A M M Shawkat Ali highlighted that Bangladesh is committed to achieve Sustainable Development Goal (SDG). Without Sustainable Soil Management increased food production cannot be achieved. So, SSMC, OCP project can play a positive role in building awareness about soil management and self-sufficiency in food production. He also provided importance on effective motivational techniques regarding acidity conception and reclamation. Due to pricing policy of phosphate and potassium fertilizers by the government their uses increased considerably. Secondary and micronutrient fertilizer uses have also increased.

Recommendations

After presentation, the participants took part in the discussion. A summary of all the suggestions and comments are provided below in order of priority.

Honorable Minister of Agriculture

- The Honorable Minister suggested to include spices crops such as onion, garlic, chili and Aus rice in the SSMC project.
- The Minister further raised the importance for incorporating potassium (K) fertilizers in any kind of compound (mixed) fertilizer as our soils are deficient in K and almost all crops need K for better growth.
- She also drew attention on the issues such as i) inclusion of nitrogen, phosphate and potassium (NPK) and other secondary and micronutrients in compound/mixed fertilizers; and ii) manufacturing of mixed fertilizers using micro nutrients for rice, vegetables and fruits and other crops.
- The Honorable Minister also said that in future Aus should be encouraged and emphasized particularly on development of improved varieties, fertilizer management and direct seeding in line.
- Priority should be given on research about any negative effect of plant growth regulator (PGR) on orchards and human health.
- Finally she thanked IFDC for conducting this valuable study.

Dr. A M M Shawkat Ali

- He pointed out that magnesium (Mg) and boron (B) fertilizer use in rice should be verified by research institutes and DAE may monitor this issue carefully.
- He pointed out that cost of crop production should be reduced through sustainable soil, crop and fertilizer management practices.
- All the local zinc fertilizer factories should come under close monitoring system. Total annual production, sales outlet and import of secondary and micro nutrient fertilizers need to be monitored by DAE regularly.
- At present all the rice and non rice crops harvest manually. This practice should be mechanized and it is the time to handle the labor scarcity during harvesting time through mechanization.
- Farmers group/club providing support to the farmers. Union Agriculture Information Centre (UAIC) need to be monitored properly and strengthened.
- Adulterated fertilizer identification techniques at the field level need to be disseminated and strengthened among the farmers
- Soil related information need to be disseminated among the farmers through motivational program by MOA.

Chairman BADC

- Mr. Md. Nasiruzzaman, Chairman, BADC informed that OCP Company, Morocco ensured including K in different categories of compound/mixed fertilizers in time. They already developed TSP-B and TSP -Zn compound fertilizers. Use of these types of fertilizer should be encouraged.
- He pointed out that mung-bean may be considered as another targeted crop in project areas.
- To reduce the production cost of different crops combined harvester should be popularized among the farmers. For purchasing combined harvester by farmer or farmers group subsidy may be increased.
- In case of non-rice crops good quality mixed fertilizer may play positive role. Quality and demand based balanced fertilizer from other country may be encouraged.

Director, SRDI

- Mr. Khandker Moyeenuddin, Director, SRDI informed that organic matter status in different parts of the country gradually increasing due to positive motivational approaches.

CSO, OFRD, BARI

Dr. ASM Mahbubur Rahman, CSO, mentioned that BRRIdhan 48 has been performing well in the northern area during Aus season. Therefore, this variety needs to be promoted there.


Additional Director, DAE

Mr. kazi Md. Shaiful Islam, Additional Director DAE, mentioned that mung bean need to be included as targeted crop in SSMC project areas.


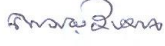


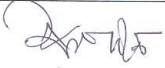






Deputy Director, Asia IFDC




Ms. Ishrat Jahan, Deputy Director of IFDC informed the Honorable Minister that all the crops will be gradually included in the SSMC project in consultation with OCP Foundation. She also confirmed that OCP Company can add potash with all the mixed fertilizers.

The meeting ended with vote of thanks from the Chair.


04.05.2018
(Md. Abubakar Siddique)
Joint Secretary
Ministry of Agriculture

International Fertilizer Development Center (IFDC) কর্তৃক বাস্তবায়নাধীন 'Sustainable Soil Fertility Management' প্রকল্পের Baseline Survey Findings এর উপর ০৪ মে ২০১৭ সকাল ১০.৩০ ঘটিকায় অনুষ্ঠিত সভায় উপস্থিত সদস্যদের তালিকাঃ

ক্রমিক নং	সদস্যদের নাম, পদবী ও সংস্থার নাম	স্বাক্ষর	যোগাযোগ নম্বর
১.	Atm Shekhar		01711523225
২.	Md. Nasiruzzaman Chairman, BADC		01556315509
৩.	Dr. Bhagya Rani Barik DG, BRRI.		01686734840
৪.	Khandker Moeenuddin Director SRDI		01917752862
৫.	DR. Gazi Md. Zainul Abidin SSO, SPDI		01712754085
৬.	Dr. ASM Mahabubul Karim SSO, BN. Farm Research Division, BARI, Gazipur		01712598035
৭.	Dr. Aminul Islam PSO, Soil Science Div. BRRI, Gazipur		01843998570
৮.	DR. MD. Omar Ali PSO, PRC, BARI Gazipur		01712-543720
৯.	Moinul Awan Soil Scientist SSMC, IFDC		01611-964314
১০.	Md. Nazim Uddin Research officer Ministry of Agriculture	 8/05/2019	01715752161
১১.	Kazi Md. Shaiful Islam DD (Extension) FSW, DAE, Khemarbari, Dhaka.		01720444344









ক্রমিক নং	সদস্যদের নাম, পদবী ও সংস্থার নাম	স্বাক্ষর	যোগাযোগ নম্বর
১২.	Md. Abubaker Siddique Joint Secretary M/o. Agriculture	 4.5.17	01957475095
১৩.	Md. Sirajul Haider Additional Secretary MOA		01973037882
১৪.	Md. Nazmul Islam Addl. Secretary MOA		
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Sustainable Soil Management Component (SSMC) of the OCP Foundation's Agricultural Development












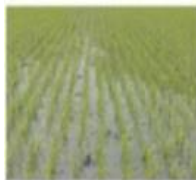




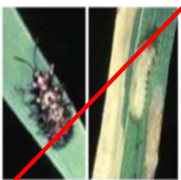









Project in Bangladesh – Stage 1

“Use appropriate technology and get more yield”

<u>Technology</u>	<u>No</u>	<u>Yes (✓)</u>
Good seed of modern variety	 <ul style="list-style-type: none"> • Bad seed 	 <ul style="list-style-type: none"> • Yield increase; • Require less seeds; • Less cost.
Ideal seed bed	 <ul style="list-style-type: none"> • Normal seedbed 	 <ul style="list-style-type: none"> • Healthy, strong and vigor seedlings; • Easy management; • Higher yield.
Line Transplantation	 <ul style="list-style-type: none"> • Random transplantation 	 <ul style="list-style-type: none"> • Ensure aeration; • Easy management; • Increase no. of tillers and higher yield.
Balanced Fertilizer	 <ul style="list-style-type: none"> • Prilled urea, TSP and MOP (unbalanced fertilizer) 	 <ul style="list-style-type: none"> • Urea, TSP/DAP, MOP, Zypsum and Boric Acid, Zinc Sulphate, Organic matter, Dolomite • Balanced fertilizer; • Higher yield; • Environment friendly.









Sustainable Soil Management Component (SSMC) of the OCP Foundation's Agricultural Development Project in Bangladesh – Stage 1

“Use appropriate technology and get more yield”

Technology	No	Yes (✓)
Irrigation	 <ul style="list-style-type: none"> • Rice field without irrigation; • Yield reduce 4-5md/bigha; • Crop damage. 	  <p>STW Rain water conservation</p>   <p>AWD Hose pipe</p> <ul style="list-style-type: none"> • More yield
Weed Control	   <p>Shyama Small Shyama Goicha</p>    <p>Boro Jabani Pani Kachu Pani Long</p>	  <p>Line transplanting Use of weeder</p>   <p>Hand weeding Weedicide application</p> <ul style="list-style-type: none"> • Cost minimize, yield increase
Pest Management (IPM)	  <p>Stem borer Rice hispa</p>   <p>Brown planthopper Green leafhopper</p> <ul style="list-style-type: none"> • Use of pesticide increase cost • Environment pollution 	  <p>Light Trap Parching</p>   <p>Netting Feroman trap</p> <ul style="list-style-type: none"> • Environment friendly • Less costly
Soil Fertility	 <ul style="list-style-type: none"> • Low Fertilizer 	  <p>Field with crop residue Affected straw burning</p>

Sustainable Soil Management Component (SSMC) of the OCP Foundation's Agricultural Development Project in Bangladesh – Stage 1

“Use appropriate technology and get more yield”

<u>Technology</u>	<u>No</u>	<u>Yes (✓)</u>
Good seed of modern variety	 <ul style="list-style-type: none"> • Bad seed 	 <ul style="list-style-type: none"> • Yield increase; • Require less seeds; • Less cost.
	 <ul style="list-style-type: none"> • Poor seedlings 	 <ul style="list-style-type: none"> • Healthy, strong and vigor seedlings; • Easy management; • Higher yield.
Line Transplantation		 <ul style="list-style-type: none"> • Ensure aeration; • Easy management; • Increase no. of tillers and higher yield.
Balanced Fertilizer	 <ul style="list-style-type: none"> • Prilled urea, TSP and MOP 	 <ul style="list-style-type: none"> • Urea, TSP/DAP, MOP, Zypsum, Boric Acid, Zinc Sulphate, Organic matter, Magnesium sulphate and Dolomite • Balanced fertilizer; • Higher yield • Environment frindly