KRISHI GOBESHONA FOUNDATION

ANNUAL REPORT
(January - December 2014)

Table of Contents

ABBREVIATIONS AND ACRONYMS

AIS	Agriculture Information Service
BARC	Bangladesh Agricultural Research Council
BADC	Bangladesh Agricultural Development Corporation
BARI	Bangladesh Agricultural Research Institute
BKGET	Bangladesh Krish Gobeshona Endowment Trust
BRRI	Bangladesh Rice Research Institute
BODs	Board of Directors
CGP	Competitive Grant Program
CRP	Commissioned Research Program
DAE	Department of Agriculture Extension (MOA)
DOF	Department of Fisheries (MOFL)
DLS	Department of Livestock Services (MOFL)
DG	Director General
DBMS	Data Base Management System
DBM	Data Base Management
ED	Executive Director
GOB	Government of Bangladesh
GIS	Geographical Information System
GO	Government Organization
GnB	General Body
IDA	International Development Association (WB Group)
IFAD	International Fund for Agricultural Development
IPM	Integrated Pest Management
KGF	Krishi Gobeshona Foundation
MOU	Memorandum of Understanding
M&E	Monitoring and Evaluation
MIS	Management Information System
NATP	National Agricultural Technology Project
NARS	National Agricultural Research System
NGO	Non Government Organization
OM	Operational Manual
PCU	Project Coordination Unit
PAD	Project Appraisal Document
PIs	Principal Investigators
PAM	Policy Analysis Matrix
R&D	Research and Development
RM	Research Management
RPATC	Regional Public Administration Training Center
SCA	Seed Certification Agency
TBS	Trap Barrier System
TTMU	Technology Transfer Monitoring Unit

I. INTRODUCTION

Krishi Gobeshona Foundation (KGF) a government sponsored non profit organization established in 2007 under the companies Act. of 1994 started functioning from 2008. The objective of the Foundation is the development of Agriculture through quality research in the field of Agriculture providing sustainable fund for research activities and common platform for concerned public and private organizations enabling them to work together in real needs. The foundation spent it's first two years establishing the necessary infrastructure and procuring necessary man power for running its regular activities. However, during the same period, simultaneously, it made its first announcement stating availability of fund for research activities to be conducted in some specific fields/areas, set by BARC on the basis of priorities and demand, under the name Competitive Grants Program (CGP). The first call was made public at the beginning of 2009 and the second in 2011. Undergoing a rigorous selection process 93 one special on Canker disease sub-projects complying the desired criteria and having merits as per the consideration of the relevant reviewers, were selected for awarding grants.

Most of the CGP sub project awarded in the first call were for 2 years and those in second call, were of 3 years and were completed in 2011 and 2014 respectively.

All together 93 (Including one special project taken up on Canker disease) CGP sub-projects were implemented by KGF during the period (2009-2014) as component of National Agricultural Technology Project (NATP: Phase-I) financed jointly by the World Bank, IFAD and GoB. Out of these 84 sub projects were completed successfully which ended with fruitful outcomes. The rest of the sub projects (9) were either terminated, abandoned or with held due to poor or unsatisfactory performance or for some other undesirable reasons.

While the CGP projects financed by NATP fund were in progress and proceeding forwards an end, KGF started receiving fund from Bangladesh Krishi Gobeshona Endowment Trust (BKGET), a sustainable funding source of KGF from the end of 2012. KGF started implementing 4 types of programs, (a) Competitive Grants Program (CGP), (b) Commissioned Research Program (CRP), (c) Capacity Enhancement Program (CEP) and (d) Internationals Collaborative Program (ICP). At present, 14 CGP Projects having the financial support from BKGET are being implemented.

Most of these BKGET-CGP projects are of 3 years and at their different stages of progress. In addition to these BKGET-CGP projects, activities related to CRP, CEP and ICP having financial support of BKGET are in progress.

This is the 5th Annual Progress Report which covers the activities, carried out by KGF from January-December, 2014. In addition to the regular activities like management of on going programs, monitoring, reviewing and evaluation, KGF also made arrangement for the meetings of the Board, General body and other interested consultative groups. Besides, KGF had to respond to different quarries preparing reports for Parliamentary standing committee, MoA, IMED, PCU/ERD/Planning Commission, BARC. World Bank. KGF also facilitated Auditing by different organizations.

II. SUMMARY OF PROGRESS: KGF ACTIVITIES UNDER NATP AND KGF BKGET FUND (JANUARY TO DECEMBER 2014)

Some of the notable activities under NATP fund and KGF BKGET fund are highlighted here:

A: Summary of Progress under KGF NATP Funding: Progress of CGP and other related activities (January-December 2014) of KGF:

A brief status on CGP project management and implementation progress and related activities (January to December 2014) under KGF NATP funding are given below:

- The Board approved (20 Dec. 2013) upscaling of the technologies/results of the 6 CGP pilot projects with budget. Six (6) pilot projects have been implemented and fund release started from January 2014 depending on the nature of the activities.
- Upon concurrence of the Chairman, KGF an EGM of KGF was also held on 22 February 2014 at 09:30 a.m. at BARC Conference Room-1, Dhaka. EGM minutes with decisions had been sent to Joint Stock Company for record and incorporation.
- Upon concurrence of the Chairman, KGF the 7th AGM of KGF was held on 22 February 2014 at 11:00 a.m. at BARC Conference Room-1, Dhaka. The minutes had been circulated among the General Body.
- The World Bank Project Identification Mission (PIM) reviewed NATP programs during 2-25 March 2014.
- Agricultural technology/knowledge transfer (short training) programs would be implemented for poor destitute farmers and women in vulnerable areas (like charlands of Jamalpur, Bogra, Pabna, and Rajshahi, hilly (CHT) and other areas) for improvement of their livelihood & income through technological interventions.
- NATP funded 17 CGP projects under 2nd call, phase-I completed in May/June 2014. A review workshop was held on 6-7 August 2014 for review and evaluation of progress and activities where PIs presented their project completion reports (PCR).
- KGF participated as a major sponsor in the International cotton network meeting in June 2014, jointly organized by MOA/CDB, BARC and KGF.
- KGF also participated and provided financial support to BARI for organizing the regional SAARC workshop on Coconut mite. The workshop held on 10-11 August 2014 was jointly organized by SAC, BARI, BARC and KGF. The main theme of the workshop cropped up from the results of KGF sponsored CGP and pilot project on management and control of coconut mite implemented by BARI during 2011-2014.
- The 2013-14 annual progress of expenditure (RADP NATP) was 98% upto June 2014 which was rated as satisfactory by MOA. However, for FY 2014-15 there are discrepancies in the 2nd and 3rd revised DPP provisions, ADP allocations and unavailability of USAID RPA fund. This has created some complexities in utilizing RPA fund of 3rd revised DPP.
- The 12 CGP projects (2nd call), Phase-II were completed in September 2014 and then KGF arranged review workshop on 23-24 November 2014 on the Project Completion Reports (PCR). Activities including workshops, committed expenditures/honorarium for PIs/Coordinators/CoPIs etc. and all other operating costs had been funded from BKGET funding as per the decision item-3 of the 39th Board meeting of KGF.

- Workshop on 3 completed CGP Projects under 2nd call, Phase-I was held on 16.11.2014.
- A review workshop on NATP funded 12 CGP projects under 2nd call, phase-II was held on 23-24 November 2014 for reviewing and evaluation of progress and activities where PIs presented their project completion reports (PCR).
- ADP meeting was held on 27 November 2014 in MoA. KGF submitted a detailed report to MoA and presented progress made during 2009 to 2014 in a powerpoint presentation. Among other suggestions and issues, it was decided to undertake R&D studies on agricultural issues in the Charlands.
- Implementation Completion and Results Report (ICRR) Preparation Mission of World Bank reviewed KGF NATP programs and progress during November 24 - December 08, 2014. Wrap up meeting was held on 07.12.2014 at MoA.
- Due to funding issues and discrepancies in the 2nd and 3rd revised DPP, the RADP NATP for July-December 2014 was proposed nil upon discussion with MoA/PCU/ERD. The RPA IDA unspent balance (Tk. 17 lakh) from FY 2013-14 has been refunded to PCU. As per suggestion and decisions of the 39th and 40th Board meetings, necessary funding for NATP unfinished activities, backlogs and operations during 2014 and 2015 are being provided from NATP refunds and BKGET KGF fund.
- KGF draft annual report 2014 was given on the table for recommendation and approval of the General Body.
- During the period KGF attended several meetings/workshops, ADP review meetings in MoA, World Bank, PCU of NATP, and BARC. KGF experts attended several meetings/workshops/field days, meeting with Australian Team on ACIAR, CEGIS Team, BKGET Board meeting, PCU of NATP, and BARC Executive Council meetings.
- KGF organized 4 Board meetings, 2 Extraordinary General Meetings (EGM) and 1 Annual General Meeting (for the year of 2013) in that year (2014). Proceedings of the 4 meetings of the BoDs, 2 Extraordinary General Meetings and 1 AGM were placed for endorsement and approval by the General Body.
- Recommendation for appointment of new audit firm for auditing KGF NATP expenditures for FY 2013-14 has been made.

B. Summary of progress under KGF BKGET funding: Progress of program activities during January-December, 2014 of KGF:

A brief status on project management and implementation progress under KGF BKGET funded programs and related activities from Jan-Dec. 2014 are given below:

- KGF awarded 12 CGP projects with KGF BKGET fund started in May/June 2013. Inception meetings/workshops of these projects were organized. 1st half yearly coordination meeting was held on 4 February 2014 to review progress and activities where PIs presented their reports.
- Two TAC meetings were held on 26 February and 6 March 2014. TAC reviewed and recommended two projects. One of the projects on "Sustainable management of flower and fruit dropping of mango" for 36 months had been prepared upon suggestion of TAC.
- Another special project on "Development of pre-harvest and post-harvest strategies to reduce the contamination of *paan* leaf with *Salmonella* spp" for 30 months has been prepared upon suggestion of TAC.

- But this CGP project could not be started. This is because the Vegetable Exporters Association (VEA) and Professor Dr. Bahanur Rahman of BAU claimed in writing that such technology for control and management of salmonella in pan was already available and being practiced.
- First annual progress review and planning workshop of 10 BKGET CGP projects was held on 15 June 2014. The inaugural session was chaired by the Executive Chairman, BARC. Annual Progress Reports (APR) were presented by the PIs. Expert reviewers of these projects provided their valuable comments to improve the quality of the reports and project implementation.
- A coordination meeting/workshop on 2nd Half Yearly Progress Report of CGP Projects (Call-1) under KGF BKGET funding was held on 17-18 December 2014.
- KGF organized a stakeholders' consultation workshop on 'R&D program for more intensive but less irrigation water requiring production systems in North-West Bangladesh' on 22 March 2014 at RDA, Bogra. A total of 91 participants and 6 resource persons attended the workshop, where Dr. Mohammed Zainul Abedin, former IRRI representative in Bangladesh and renowned FSR specialist was the designer of the CRP and key note speaker. Dr. M. A. Matin, DG-RDA was the Chief Guest while Director General-BRRI was the special guest. Besides, Director (Res.), BSRI, Director, BAURES, Director (Res.), BARI, Director (Res.), BINA, Additional Directors and Deputy Directors (DAE/DoF/DLS) Rajshahi and Rangpur Divisions were also present.
- Under the Commissioned Research Program (CRP), MoUs signed and fund released for the Hill Agricultural Project. Project inception workshop was held on 5 April 2014 in Bandarban of Chittagong Hill Tract (CHT). Dr. S. M. Nazmul Islam, Secretary, MoA attended the inception workshop as Chief Guest and Dr. Md. Kamal Uddin, Executive Chairman, BARC and Chairman, KGF, Chaired the workshop. Also present in the workshop were Dr. Md. Rafiqul Islam Mondal, DG, BARI, and KGF Board Member, Kbd. Md. Abdul Latif, Executive Director, CDB, Dr. Shajahan Kabir, Director (Res.)/DG (In-charge), BRRI, and Dr. Sajjad Zahir, BKGET Board Member. About 80 participants from participating institutions/universities, and scientists working in the hill agriculture project, and Additional Directors, Deputy Directors of DAE, representative of DLS, DoF, SRDI, BSRI, BADC, AIS working in hill districts attended the workshop. Besides, FAO representative in Bangladesh Mr. Mike Robson also attended the workshops as special guest.
- One Coordination meeting on CRP Hill Agriculture project components was held on 15 July at Khagrachari for finalization of Project Inception Report. All component leaders and the coordinator of the project were present in the meeting. Executive Director and Two Directors of KGF also attended the meeting.
- An expert consultation workshop on "Assessing vulnerability and impact of climate change on Bangladesh agriculture and designing proposal for possible mitigation and adaption measures" involving NARS scientist and institutions was held on July 01, 2014. On behalf of KGF, Professor Hamid, Coordinator the Climate Change Program. Dr. Md Kamal Uddin, Executive Chairman (EC), BARC and Chairman of KGF chaired the workshop. 40 climate experts including Professor M. Mahbubur Rahman, Vice Chancellor, BSMRAU, Dr. Asaduzzaman, former research director, BIDS and KGF & BKGET Board members, Dr. Z. Karim, Chairman, CASEED and Co-chair, TAC of KGF, Dr. Atik Rahman, Executive Director, BCAS, Dr. Naveen Kalra, Former Head, Agricultural Physics, IARI, New Delhi, India, Dr. Sajjad Zohir, Economic Research Group and BKGET Board member were present in the workshop. Representatives of BMD, CEGIS, BUET, DAE, SRDI, BANC, BAU, CVASU, BARC and other NARS institutions were also present in the workshop. Dr. Md. Abdul Aziz, CSO & Head, agronomy Division, BARI & Coordinator of NCCA and Dr. Jatish

Chandra Biswas, CSO, BRRI and Deputy Coordinator of NCCA presented a paper on assessment of climate change impact on rice and wheat production in Bangladesh using DSSAT.

- A meeting of the Network on Climate Change in Agriculture (NCCA) was held on July 17, 2014 for finalization of work plan. Fourteen NCCA members of different institutes were present in the meeting.
- A concluding session of the training workshop on Modeling Climate Change Impact on Agriculture was held on September 4, 2014 in BRAC CDM, Khagan, Savar. 25 NCCA members of different institutes participated in the workshop. Dr. M. Nurul Alam, Executive Director chaired the session and Dr. Md Rafiqul Islam Mandal, Director General (DG) BARI and member of the KGF Board present as a chief guest. Dr. Jiban Krishna Biswas, DG, BRRI and member of the KGF Board was also present in the workshop as a special guest. Dr. Z. Karim, Chairman, CASEED and co-chair, TAC of KGF was present in the workshop as guest of honor.
- KGF jointly sponsored two international/regional workshops/meetings held in June and August 2014 respectively on Cotton and research & development and Coconut mite management organized by MoA/CDB and BARC/SAC and BARI.
- Upon approval of priority thematic researchable issues by the Board, the 2nd call for CGP projects was made in April 2014 giving 6 weeks time for submission of research proposals.
- KGF received (5 June 2014) a total of 225 research proposals on twelve specific and one nonspecific (any other priority researchable issues) researchable issues. A 14-member screening team headed by Professor Dr. Md. Hazrat Ali of Sher-E-Bangla Agricultural University had prepared a short listing of proposals for facilitating technical evaluation of the responsive proposals. Out of total of 225 proposals, the screening team suggested to drop 115 proposals and remaining 110 to undergo technical evaluation. TAC generally accepted the recommendation of the screening team but also liked to cast a bird's eye view of the list of both responsive and non-responsive proposals. After reviewing the recommendation of screening team and going through both responsive and non-responsive proposals, TAC further dropped 24 proposals from the list of responsive proposals and included 3 proposals from non-responsive proposals. Thus the total number of selected proposals considered for undergoing technical review stood 89. TAC members then suggested the reviewers for each individual selected proposal.
- Based on technical reviews, TAC (7th meeting) recommended 44 proposals for presentation. These were presented on 9 & 11 October, 2014. Forty three PIs/Coordinators presented their proposals before the TAC.
- Upon rigorous review and evaluation, including subject matter expert evaluation, TAC recommended 22 CGP proposals out of 225 proposals received in the 2nd call. KGF Board in its 41st meeting (held on 2 January 2015) approved the TAC recommended 22 CGP projects.
- Under international collaborative program endorsed by the Board (39th meeting, 12 Aug.2014), discussion with an ACIAR Team (9 September 2014) had been initiated for preparation of a partnership proposal with KGF/ACIAR & other organizations. Another consultative meeting with ACAIR was held in December 2014 in Dhaka.
- Upon endorsement of KGF Board (39th meeting, 12 Aug.2014), 5 (five) Scientific Study Expert Teams were formed for studying and preparation of recommendation and proposal on the following:
    - One for preparation of a proposal on pulse related project, with two members.

- The other team was formed for assessment of the impact of reduced water flow in the river teesta on crop production and rural economy of the teesta basin (KGF letter issued on 25.09.2014), with three members.
- Another expert team to formulate strategies to reinvigorate sugarcane production in order for sustaining sugar and gur industry evaluating the problems and prospect of sugarcane production including diversification of cropping and industrial activities (KGF letter issued on 12.10.2014), with two members.
- The 4th expert team was formed for studying the present status of oilseeds sector in Bangladesh and prepare a project document on research and development in oilseeds under BKGET funding (KGF letter issued on 15.10.2014), with two members, and
- The team to study present status of the charlands (newly accreted lands and riverbeds) in Bangladesh. The team will prepare a research and development document for funding through KGF seeking solutions to problems associated with farming, productivity and farmers' livelihood in the charlands (KGF letter issued on 08.01.2015)

- Dr. Zahirul Islam, a former scientist of BRRI and IRRI, had been engaged for short-term as a resource person for preparation of scientific documents & editing reports/documents. He had been working from 28 September 2014.
- As per decision of the KGF Board, the 1st consultative meeting with leading seed industries/seed companies of Bangladesh having R&D facilities was held on 30 September 2014. Dr. Md. Kamal Uddin, Executive Chairman, BARC and Chairman KGF chaired the meeting and 30 persons including KGF experts were present in the meeting.
- The services of Dr. Nurul Islam Bhuiyan, Director (RM), KGF, completed a 2-year extension period on 31.12.2014 (attaining the age exceeding 67 years). As per Board suggestion he could be engaged for specific assignment of KGF.
- Two Program Directors (Livestock & Fisheries/Training & Technology Transfer) were appointed upon recommendation of the Board appointed selection committee. They have been working in KGF from September 2014. Recruitment in 2-3 other mid-junior level positions particularly Sr. Technical Officers/Sr. Program Officers, Manager/Accounts Officer/Asstt. Manager is in the process of appointment by the ED, KGF upon recommendation of the regular committee.
- BKGET funded six pilot projects on technology upscaling were approved by the Board and these have been under implementation.
- KGF submitted progress reports to BKGET in June/July 2014 and attended BoT meeting (2nd August 2014). KGF submitted a budget proposal of TK. 2000 lakh for 2nd year (2014-2015) to BKGET and against that 1st installment fund of Tk. 1000 lakh was released by BKGET in June 2014.
- The 33rd BoT meeting and 6th Annual General Meeting (AGM) of BKGET was held on 22 November 2014 at Dhaka Club. As per agenda, KGF submitted a progress report (both technical and financial), and presented its progress in a powerpoint presentation.
- Financial progress under KGF BKGET funding is more than 99% upto December 2014 against the 1st installment budget of Tk. 1000 lakh (for the year of 2013-14). KGF BKGET funded proposed budget of Tk. 4000 lakh for 2015/2016 has been placed for the approval of the General Body.
- Recommendation for appointment of new auditor for audited expenditures for calendar year Jan.-Dec.2014 has been made.

III. A. RESEARCH HIGHLIGHTS OF CGP PROJECTS UNDER NATP FUND

Being established in 2007, KGF starts functioning from 2008 with the implementation of CGP NATP sub-projects. Altogether, KGF executed 93 sub-projects with NATP fund of which 54, awarded in 2008 and 38 in 2011 came to their end in 2011 and 2014, respectively. A total of 35 CGP projects, awarded under 2nd Call of NATP in 2 phases, came to its end in 2014. The review workshops for presenting the Project Completion Report of the projects, completed under phase I and Phase II, were held in August and November 2014 respectively. With the completion of these projects (2nd call phase I & Phase II) all together 93 CGP sub-projects executed by KGF under NATP, are completed. Usually, the important findings of each of the running projects were used to be given in the Annual report of the concerned year under the sub-title "Research highlights". As 2014 was the completion year of NATP Phase-I and hence NATP CGP projects, instead of giving the research highlights of the currently running projects in the Annual report like previous years, a complete over view of all the NATP CGP projects are given under the subtitles, (i) Technologies developed (ii) Achievements (iii) Research accomplishment and (iv) Scientific impacts. This will help getting an over all idea about the completed NATP CGP projects.

Along with this, the research highlights of 6 pilot projects under taken to disseminate the promising technologies developed from NATP-CGP projects and currently being executed in different fields, are also provided here.

The details of the CGP projects completed under NATP funding are available in the KGF website (www.kgf.org.bd). The list of the CGP sub-projects, completed under NATP funding is given in the annexure (Annex-1(i) to Annex-1(iv)). A list of the pilot projects is also provided in the annexure (Annex-v).

III.A.i. Technologies developed

Under the NATP CGP projects, as many as 26 promising technologies were developed. Adoption of thes technologies will have a considerable positive impact on the production, productivity and farmers' income and benefit and as a whole on total agriculture of Bangladesh and consequently on the livelihood of the farmers of the country. The developed technologies are given below.

1. Identification of saline (moderate-high) tolerant crop varieties for growing in the coastal areas of Noakhali.
2. Development of homestead vegetable production practices throughout the year for the resource poor farmers in the hills (Khagrachari Model)
3. Development of intensive cropping system (3 crops/year) in light textured soil for the monga-prone areas of northern Bangladesh
4. Identification and release of one high yielding garlic variety: BAU Rasun-3
5. Development of hybrid dryer, operated either by electricity or solar power for seed drying.
6. Identification of sesame variety and development of its production practices for growing in the saline areas of Khulna region.
7. Development of KCM power tiller for deep tillage operation.
8. Improvement of STW operation through installation of a check value at the suction pipe
9. Development of a low-cost thatch store house with a capacity of 8 tons for storing potato tuber at farm level.
10. Development and release of two HYV pulse varieties: BARI Chola-9 and BARI Mashur-7 for large scale adoption.
11. Development of a formalin killed *Salmonella Pullorum* vaccine for poultry.
12. Development of a high production rice-cotton intercropping with improved management practices as an alternative to traditional jhum farming.
13. Land productivity improvement of the tidal floodplain ecosystem through crop intensification and diversification with better management practices.
14. Development of an intensive cropping system (4crops/year) with less irrigation water requiring crops for the N-W region of Bangladesh.
15. Convertion of Dhorla river char lands covered with vetivar grass into green crop lands
16. Development of an intensive cropping system (3crops/year) for the drought-prone areas of Barind tract with & without irrigation.
17. Identification of shorter duration HYV rapeseed mustard (85 days) and development of their management practices for inclusion in between T.Aman-Fallow-Boro cropping pattern.
18. Development of package of practices for the management of coconut mites in southern Bangladesh.
19. Productivity enhancement converting the tidally flooded medium low and low land into ditch and dyke system for raising vegetable and fish production.
20. Development of integrated management practices for the control of major diseases of Brinjal and Tomato.
21. Development of an improved animal health service management practices and milk marketing method for the char area of Rangpur and Jamalpur.
22. Development of improved seed production practices for the summer onion.
23. Improvement of the land productivity of acid soil through application of Dolochon.
24. Development of improvement management practices for the control of canker disease of citrus.
25. Development and dissemination of relay interplanting of rice- chickpea, rice-lentil and rice-maize systems in tidal floodplain ecosystem for crop intensification and increased production.
26. Improvement of cropping intensity and system productivity incorporating mustard and sesame in the cropping systems in some specific locations/AEZ.

III.A.ii. Achievements of the CGP Projects under NATP

The salient features of some of the notable and promising completed NATP CGP Sub-projects are gaven here:

C-CA-117: Adaptation of Suitable Crops in Saline Soils of Noakhali

- Thousands of hectares of charlands of Noakhali and Laxmipur remain barren rendering poor cropping intensity and land productivity of the area during the dry season.
- Consecutive on farm trials conducted in 4 Upazilas with high salinity, identified several crops having high tolerance (1.2-17.56 ds/m) to salinity.
- Sunflower, Sugarbeet, Barley and linseed proved to be promising crops for large scale production in about 20,000 ha of land in the coastal areas of Feni, Noakhali and Laxmipur districts.

Suitable crops have been identified for the vast Charlands of Noakhali:

Remarkable Achievements

The cropping pattern that removed the "monga" from the northern region.

C-FPE-055: Impact of Rice-Wheat/Potato-Mung bean Cropping system of Farmers' Employment Opportunity, Food Security and Livelihood in Selected Monga Prone Areas in Northern Districts of Bangladesh.

- The commonly followed cropping pattern T.Aman followed by Rabi of North Bengal used to create a period of unemployment which was the cause of the temporary famine, "Monga" of North Bengal.
- Introduction of a new cropping pattern, with the inclusion of an additional crop "Mungbean" in the existing system changed the whole scenario.
- Use of a short duration Aman rice variety and the addition of Mungbean in between Aman and Rabi Crop created Job opportunities for thousands of Poor farmers throughout the year.

L-HM-219: Improving Livelihood through Herd Health Management and Milk Market Access to poor Farmers living in Northern Bangladesh.

- Introduction of veterinary health care service improved cattle pregnancy rate and milk production.
- Development of market channel benefited both milk producing groups and Gowalas in terms of milk price.

Introduction of herd health management package and development of milk market channel improved livelihood.

Remarkable Achievements

Development of Hybrid dryer helped quality seed production.

C-PHT-175: Up-scaling and Adoption of Hybrid Dryer for Quality grain Seed Production

- Seed processing maintaining appropriate moisture content becomes difficult in rainy season.
- Development of hybrid dryer capable of using both electric and solar power facilitated processing of rice, wheat, maize and ground nut seeds.
- Abut 300, 250, 350 and 200kgs of rice wheat, maize and ground nut seeds could be processed in 17,12,16 and 20 hours respectively maintaining the germination percent and vigor index over 90 and 1, respectively.

C-SPM-096: Seed Production of Summer Onion Varieties.

- Different climatic factors have profound effects on different stages of seed production of summer onion, Different antagonistic weather factor requirements make summer onion seed production difficult in our country.
- Despite these barriers, appropriate methods for summer onion seed production has been developed.
- Bulblets, weighing 4-5 g, produced in seed beds can be kept stored until planting in October/November.

Alternate summer onion Seed production technology has been developed.

Remarkable Achievements

Management package developed against canker disease of citrus fruits.

C-FPE-01: Study of Canker Disease of Citrus and Development of Its Management Practices.

- Canker disease is one of the most common and menace pest of citrus fruits in Bangladesh. The disease incidence percent varies with variety, season and location.
- More than 68% incidence of this disease was observed during a study. Once lemon export business was threatened and European import from Bangladesh was banned due to this disease.
- The management package developed against the disease successfully controlled the disease.

C-S-149: Acid soil amendment through liming to increase crop yields in Panchagarh districts.

- Soil acidity threatened crop production in the northern part (Panchagarh) of Bangladesh.
- Liming improved crop yield irrespective of crop and Cropping pattern
- Application of dolomite @ 1 t/ha increased the mean yields of wheat, Mungbean and Maize by 29, 99 and 43% over the respective controls.

Acid Soil Amendment increased crop yields of Panchagarh

Remarkable Achievements

Inclusion of Short duration rice variety and Mungbean increased crop intensity and productivity in Northern Bangladesh.

C-2.11: Crop intensification in northern region of Bangladesh through up-scaling the production of short duration rice and mungbean.

- Replacement of the traditional cropping pattern (Boro-Aman-Potato) with a new pattern with 4 crops (Aus-Aman-Potato /Mustard-Mungbean) increased both the Cropping intensity and productivity.
- The new pattern minimized ground water use and benefited farmers
- The BCR obtained with the alternate cropping pattern was 3.02 against 1.42, used to be found with conventional pattern.

C-4.9 : Yield gap reduction through short duration rapeseed-mustard and sesame varieties under existing cropping system.

- Replacement of traditional oil crop varieties (Maghi sarisha) newly developed mustard varieties (BARI sarisha 14/15) showed an yield increase over 95%
- More than 30% higher seed yield of 9.1 has been obtained with newer varieties (BARI Tel 3/4 and BINA Til 1)

Shortage of edible oil can be minimized with newer oil seed varieties.

Remarkable Achievements

Little irrigation facilities can turn the northern charlands into lavish green crops fields.

C-6.8:Validation and up-scaling of mungbean and lentil technologies in the rice based cropping system in Bangladesh.

- Cultivation of HYV rice varieties (BRRI dhan 56, BU dhan-1 and BINA dhan-7) in T.Aman season and followed by lentil and Mungbean turned the vast charlands of Tista and Dharala in to green horizon.
- Little endeavour taken to facilitation required irrigation necessary for the onion removed the misery of thousands of people inhabiting there.

C-11.1: Management of Coconut Mite.

- The coconut cultivation of the southern region of Bangladesh was about to be totally destroyed by a menace pest - the coconut mite.
- Correct identification and development of a successful management package against coconut mite saved coconut orchards of the southern districts.

Mite management saved coconut orchards of the southern region of Bangladesh.

Remarkable Achievements

Use of residual moisture and minimum tillage cultivating chickpea and potato, opened new horizon for Barind Agriculture.

NR-15.22: Validation of drought management techniques for sustainable crop production in the high Barind tract.

- Cultivation of chickpea using residual moisture and potato with much and minimum tillage after short duration T.Aman rice was found promising for drought management Barind area.
- Inclusion of Mungbean in T.Aman-Wheat-Mungbean pattern increased cropping intensity by 1.88 - 2.30%

NR-16.15: Testing validation and up-scaling of Water saving Technology in Rice Production (TWST)

- Drought stress at the later part of T.Aman crops of northern region of Bangladesh is a regular feature.
- Required supplemental irrigation can be provided using rain water collected in on -farm reservoirs'.
- BRRI dhan 49 showed 21% yield increase with irrigation over the control.

Rain Water collected in 'on farm reservoirs can provide supplemental irrigation for T.Aman Crops.

Remarkable Achievements

Adoption of improved agronomic practices increased yields of different crops irrespective of patterns

C-1.26: Minimizing yield gaps in rice-based cropping systems of three northern districts.

- Adoption of improved packages of better agronomic practices for the component crops of the existing cropping pattern increased yield significantly.
- Significant yield increases (17-50%) of different crops irrespective of cropping patterns have been obtained adopting improved management packages.

CC-25.2: Development of integrated crop-fish production system using ditch-and-dyke method in low lying areas of Jhalakati and Bogra region

- A vast area of the country lying under water remains unproductive for about 6-8 months.
- Ditch and dyke system of producing crop and fish simultaneously made these areas productivity.
- Ditch and dyke system proved profitable and helped farmers to earn 10-12 times higher than that earned previously.

Ditch and dyke system of production changed the fate of the farmers of the low lying areas.

Remarkable Achievements

High yielding Garlic varieties, resistant to bacterial soft rot, has been developed.

C-VI-006: Collection, conservation characterization and varietal development of Garlic and Onion through selection and molecular techniques.

- BAU Rashun 3 was developed under BAU-KGF research project. It was registered as a new high yielding variety by NSB of MoA.
- A total of 25 local and exotic entries were tested in BAU farm at Mymensingh and Chalanbil areas of Natore district.
- The exotic line G 49 (Vietnam-2009) was found highest yielding (9.36 t/ha) which is 23% higher than existing varieties and it is resistant to Bacterial soft rot. This line (G49) was subsequently released as BAU Rashun 3.
- BAU Rashun 3 contains higher Allicin than local varieties.

C-PHT-179: Increasing storability of potato in natural storage and income generation through small scale processing of potato.

- Due to insufficient space and high cost at cold storage, farmers are bound to sell their products at lower price after harvest. Those who store naturally in their houses they incurr loss of large amount of potato tubers.
- Under BARI-KGF research project low cost potato storehouse was developed with a capacity to store about 8000 kg of potato tubers in Munshiganj.
- About 26% total loss was found in farmers conventional storage system after 2.5 months. With the new low cost storehouse the tuber loss can be reduced (only 10%) after storing for 3-4 months.

Simple low cost thatch house, a storage facility, saved hundreds of tons of potato of poor farmers

Remarkable Achievements

" Khagrachari model"- a vegetable production technoloty charged the nutritional status of the poof hill farmers.

C-HF-103: Validation of improved agricultural technologies at farmers fields in trill farming system.

- Year round homestead vegetables production technology in a small piece of land was developed as "Khagrachari model" under BARI-KGF research project implemented in three Upozillas of Khagrachari District.
- Due to technological interventions the homestead vegetable production increased in hills. As a
- result vegetables consumption by farm families increased three times (120g/ head/day) than the earlier consumption. Thus the project is contribution to improved nutritional status of resource poor farmers int he hills.
- Hill Farm families used 80% of vegetables produced for home consumption, 15% vegetables were sold in the market and 5% were distributed to relatives and neighbours thereby contributing to additional income.

C-VI-010: Validation and dissemination of new varieties and advanced lines for increasing the productivity of lentil, chickpea, mungbean and black gram in the northern region of Bangladesh.

- BARI Masur 7 was released as a variety under BARI-KGF research programme. It was registered as a new high yielding disease tolerant variety registered with National Seed Board (NSB) of the Ministry of Agriculture (MoA).
- Seven entries (Advanced lines and BARI released varieties were tested in farmers' field int he Northwestern region of Bangladesh
- The advanced line X95S-I67(4) was found high yielding (1.8 t/ha) and resistant to Stemphylium blight and Rust diseases and subsequently released as BARI Masur 7.
- This new variety is early maturing (95 days) and gives 35% higher yeidl as compared to existing BARI lentil varieties.
- BARI Masur 7 can be sown late (4th week of November) after harvesting T.Aman rice. It is suitable for cultivation in Northwestern region of Bangladesh.

Disease resistant variety of lentil with high yield potential was developed and released

Remarkable Achievements

BARI Chola 9, a chickpea variety developed under KGF project produced 38% higher yield than those of the varieties grown in Barind area.

BARI Chola 9: A new Chickpea variety

- BARI Chola 9 was released as a new high yielding variety under BARI-KGF research project and registered with NSB of MoA.
- Six entries (4 advanced lines and 2 BARI released varieties) were tested in farmers field after harvesting T.Aman rice in Barind area of Rajshahi and Chapai Nawabganj districts.
- The advanced line ICCV-95138 was found high yielding (1.2 th/ah) and resistant to Botrytis grey mold disease and insect pod borer. It was subsequently released as BARI Chola 9 Variety.
- BARI Chola 9 gives 38% higher yield than existing BARI varieties. It is suitable for cultivation after harvesting T.Aman rice in Barind area.

C-CA-113: Adaptation of improved sesame varieties in Khulna district optimizing sowing time and nitrogenous fertilizer management.

- Farmers of Batiaghata upazila in Khulna district generally cultivate the local varieties of sesame (Til) after harvesting T.Aman local varieties are low yielding, which is 0.05 t/ha.
- Undr the KGF Khulna University (KU) R&D program, it was observed that only through replacement of local variety by BARI Til 4 the yield increased to about 20-30%.
- Yield of BARI Til 4 with modest dose of fertilizer is 1.5 t/ha and without fertilizer is 1.0 t/ha.
- With adoption of new variety (NARI Til 4) 2,700 farmers have been benefited in Khulna. It has been estimated that the total additional value of increased Till production in the project area would be about Tk. 2800 lakh/year.
- Pilot program has been taken up for up scaling seed production and market linkage with traders/exporters to make Til oil as a separate brand', thereby encouraging sustainable production and additional income of farmers.

Higher production of sesam was acheived introducing new variety with better management practice

Remarkable Achievements

A vaccine against Pullorum disease was developed and molecular characterization of local isolates of salmnella pullorum was done.

L-DD-232: Molecular characterization of poultry salmonella and production of formalin killed pullorum disease vaccine using local isolate in Bangladesh.

- Salmonella Pullorum bacteria was isolated from field infection of chicks and confirmatory diagnosis was done using PCR to determine the presence of genes inv*/A and rfb S.
- Vaccine was developed using SP-BD-11, one of the local isolates of Salmonella Pullorum. [The mean titer of the vaccine was 3553±463.60 and 3834±582.74 for the post primary and post boosting vaccination respectively. Maternally derived antibody tiler in chicks at the age of 7, 14 and 21 days was 2751±701.85, 1581±371.75 and 1156±247.11 respectively].
- Nucleotide sequence of the rfbS gene of the isolate SP-BD-11 and blast search for homology comparison showed the gene to be 93% homologous to Korean isolate of Solmonella Pullorum.

C-8.14: Integrated Management of major diseases of brinjal and tomato in Jamalpur and Sherpur districts

- About 30-40% of regular yield loss of Tomato and brinjal from a number of pests is commonly observed in Bangladesh.
- Two cost effect management package developed against these pests reduced 80-90 and 75-85% of disease incidences of Brinjal and Tomato respectively
- Bacterial with of Tomato and vegetable has been reduced even upto 95-98%.

Dramatic success has been obtained against a number of pests of Brinjal and Tomato.

Remarkable Achievements

III.A. iii. Research Accomplishments of NATP CGP Projects

The whole endeavour, taken in connection with the implementation of CGPs by KGF, created a great concern in the field of Agricultural Research of Bangladesh. Execution of the demand driven CGP projects in problem striken fields in larger scale helped developing effective technologies that bestowed Agricultural production and productivity considerably. Hundreds of acres of barren Charlands, lands that remain under water for most of the year, huge tidal flood plains and salinity affected southern horizon have been explored and proved to be productive with little efforts. Besides, the activities of CGP projects and uninterrupted fund availability from KGF blessed the working scientists with greater exposure, gaining capability and opportunity of exploring the problem areas of the country. Remarkable accomplishments of the CGP projects are as follows:

1. Crop production in unfavorable environments

Coastal ecosystem*:* CGP projects addressing constraints in coastal region included screening salt tolerant crops and crop varieties in Noakhali, Khulna and Satkhira districts, production enhancement through improving production technology and increasing cropping intensity growing one additional dry season crop in tidal flooded areas of Jhalakati, Pirojpur and Patuakhali districts, and crop intensification by growing maize after T. Aman in Khulna and Satkhira districts, and vegetables and quick growing fruits in Patuakhali and Jhalakati districts. Growing of sunflower and soybean proved to be successful under moderate to high salinity conditions during dry season in Satkhira district. Sunflower, sugar beet, barley and a local variety of chili were found to have tolerated moderate soil salinity in the charland of Noakhali district. Land topography and hydrology in the tidal floodplain of greater Barisal region favor growing no HYV rice in the rainy season. Farmers growing low yielding, long duration local varieties in aman season keep land fallow during dry season. Addressing the issue scientists of PSTU and SAU introduced HYV aman rice (cv. BRRI dhan 44) in the periphery of the fields, improved management systems for local varieties (cv Lalmota, Sadamota) and relay planting of chickpea and maize at the terminal stage of aman rice that allowed an additional crop in the dry season. Improved practices included transplanting 65 d old seedlings of local varieties of aman rice in rows, 40 cm x 30 cm, configuration, and 5-7 seedlings per hill, and application of 25% of standard fertilizer dose recommended for HYVs.

Improved practices resulted in 45-50% more yield than traditional farming practice in salinity affected areas in southern part of Khulna district. Planting of improved variety of sesame (BARI til 4) during mid-February with moderate dose (20 kg N, 10 kg P and 10 kg borax per ha) of fertilizers increased yield by nearly 50%. The new technology has been upscaled through a pilot project whereby over 3,000 farmers in Batiaghata and Dumuria upazila of Khulna have adopted.

Suitable areas for sustainable shrimp farming without bringing environmental hazard to habitats or agricultural crops in the districts of Satkhira, Khulna and Bagerhat in South-Western coastal region has been delineated employing sophisticated GIS and RS techniques.

Vegetables are in short supply in the central coastal districts covering almost whole of Barisal-Patuakhali region. Maize production during dry season in the salinity affected Khulna region is constrained by soil salinity. Implementation of two sub-projects attempting to introduce production of vegetables and quick-growing fruits in the tidal flooded ecosystem in Patuakhali and Jhalakati districts and adaptation of maize after harvesting aman rice in dry season in salinity affected areas of Satkhira district is in progress.

Hill agriculture*:* Four CGP projects looked at improving productivity and increasing income of hill farmers of south-eastern region. BARI scientists developed and a large number of hill farmers adopted

Khagrachari model of vegetable garden on a small parcel of land (6 m x 6 m) that could ensure nutrition for the family and fairly good income through raising 9 different types of vegetables throughout the year. Over 1500 farmers adopted the model in Khagrachari and Rangamati districts.

Most farmers in Chittagong Hill Tracts grow crops in the hill slopes following traditional jhum system. The system essentially follows slash-and- burning prior to dibbling seeds of several crops (3-11) into a single hole immediately after first rain of the year. Growing a mixture of several species simultaneously is an insurance against crop failure. Replacement of jhum was attempted in many different ways but system persists widely in the hills. CDB scientists engaged in a CGP project (C 1.2) involving 40 farmers compared productivity of intercropping of rice and cotton with that of traditional multicrop jhum system. It appears that growing two rows of rice after every row of cotton gives better yields and substantially (30%) higher return than any jhum production system. Traditional local varieties of rice (Cokrow, Shere and Gellom) performed better in terms of yield, quality and farmers' preference compared with HYVS. Soil erosion in jhum system is, however, lower than in intercropping.

Gregarious flowering of bamboo, once in 50 years, causes simultaneous rat outbreak causing heavy damage to the crops particularly in jhum fields in the hilly region of south-eastern Bangladesh . Ecological consequence of bamboo flowering, simultaneous rat outbreaks and consequential crop damanage and impact on livelihood of farmers in CHT was studied. Out of 1857 rats collected representing 10 rodent species, the most dominant was Rattus rattus. Trap barrier system (TBS) and bamboo fencing (BF) effectively controlled crop damage by rat infestation.

***Crop production in drought-prone areas*:** Barind tract covering the districts of Rajshahi, Chapai Nawabganj, Naogaon, Joypurhat, Bogra, and Dinajpur is traditionally drought-prone. Despite the expansion of irrigation facilities, agricultural production in agricultural production in major parts of High Barind tract is dependent on rainfall. An extensive post-monsoon (January-May) drought is a characteristic feature of the region. Crop production in the dry season is severely constrained due to drought resulting to low productivity and thin cropping system. Productivity can be enhanced through effective drought management. Two years' results of a CGP project (NR 15.22) strongly suggest that agricultural productivity can be enhanced if the validated technologies are extensively adopted in the Barind area. The three improved techniques tried and found to have enhanced production are (i) growing chickpea using residual soil moisture, (ii) growing potato with minimum tillage and using straw mulch, and (iii) adopting wheat – mungbean- transplanted aman cropping system with minimum irrigation. In the area where irrigation facilities are not available, chickpea and potato will be raised on residual soil moisture using minimum tillage and mulches, respectively during dry season. Production will be enhanced adopting wheat-mungbean-aman rice cropping system in the area with installed irrigation facilities but land remaining fallow during dry season.

Improving productivity of acidic soils: Crop production in Himalayan piedmont soil in the northern districts of Panchagarh, Thakurgaon, Dinajpur, Rangpur and Nilphamari districts is constrained due to low pH. Two sub-projects addressed the issue by successfully growing maize, wheat and rice using lime (Dolochun) at 1-2 tons ha^{-1}. In a separate CGP project rate and application method ofliming has been standardized for improving yield of tea in hill soils of Sylhet region.

Crop Production in charlands: Crop production in charland or accreted river beds presents problems of sandy soil or a thin layer of sandy soil over sand deposition of several meters depth. Farmers barely grow a single aman rice crop during monsoon leaving the land fallow during dry season stretching from

November through June. Development of production technologies enabling farmers growing short duration, high yielding aman rice (BU dhan 1, BINA dhan 7 or BRRI dhan 56) replacing long duration BR 11 or Swarna followed by lentil or chickpea during dry season following the harvest of aman rice, and growing an extra- mungbean during pre-monsoon moist/dry period (March through June).

2. Climate Change: Bangladesh is most vulnerable to climate change. Collection of information on the extent of crop damage due to extreme events and adaptation practices being followed in different vulnerable areas was the objective of one the CGP projects. In the coastal region, yield reduction of T. aman due to tidal floods, yield reduction in boro rice due to high temperature and increasing salinity. Crop production without tillage (potato, maize), floating bed for vegetable production and seedling raising, ditch-dyke system for d crop and fish culture are potential adaptation mechanisms for coastal agriculture. Likewise, no-tillage for growing maize, potato, wheat, chickpea and garlic; raised-bed for vegetable production are the promising adaptation options for flood-prone ecosystems.

3. Variety Development: Implementation of CGP projects resulted in development and adoption of four varieties of pulses and spices. Two varieties of garlic – BAU rasun 3 and BAU-KGF rasun 4 have been developed by BAU and released by the National Seed Board (NSB). The varieties are high yielding with more alicin contents than the existing recommended varieties. One chickpea variety (BARI chola 9) and one lentil variety (BARI masur 7) have been developed BARI and released by the NSB. These two high yielding, disease resistant varieties have wider adaptability.

4. Enhancement of Farm Production: Production enhancement was an issue for at least 11 projects in phases. Introduction of short duration rice varieties (BRRI dhan 33, BU dhan 1 BINA dhan 7, and BRRI dhan 56) instead of long duration varieties (e.g., BR 11) facilitated timely planting of wheat/potato/mustard and fitting an additional crop mungbean after dry season crop before transplanting aman rice (CGP FPE 055). Early harvest of rice created employment opportunity for day laborers of rice and thus helped eradicate monga (hunger due to unemployment) in a large tract of greater North Bengal. Subsequently, the cropping system was further intensified fitting an additional short duration au crop (cv Parija) in between mungbean and T. aman (C2.11). Development and introduction of intensive cropping systems in greater Rangpur and Dinajpur districts helped farmers increase production and farm income and created additional job for hired farm laborers.

Due to poor fertility and low water holding capacity of the soil, agricultural productivity in the charlands of Kurigram district is poor where boro rice is the crop that the farmers grow. Large area remains uncultivated or poorly cultivated with insignificant productivity. Working for nearly 3 years, BSMRAU introduced three crops – short duration, HYV of T. aman (BU dhan 1, BINA dhan 7 and BRRI dhan 56)-lentil (BRI masur 6) –mungbean (BU mug 4) in sequence. The new cropping system has been boon to many farmers in the charlands of Kurigram, Nageswari and Bhurungamari upazila of Kurigram district. Currently over 1000 farmers are practicing the system.

5. Pulses and oilseeds*:* 4 sub-projects on pulses and 7 sub-projects on oilseeds have been implemented. One chickpea variety (BARI chola 9) and one lentil variety (BARI masur 7) have been released. BARI chola 9 is resistant to notorious BGM disease while Bari masur 7 is a widely adapted high yielding, disease variety. Both the varieties command substantial area under production. The varieties are quickly replacing the old ones in the traditional area. BARI chola 9 shows excellent performance in non-traditional areas like Barind, Madaripur and tidal flooded areas of Jhalakati and Pirojpur districts.

Activities of the sub-projects on oilseeds focused on increasing oilseeds production through adoption and upscaling of modern rapeseed and sesame varieties. BARI sharisha 14, BARI sharisha 15 and BINA til 1, and BARI til 4 produced to the tune of 50-96% higher yield compared with that of existing varieties. Production expanded replacing old varieties with modern ones in the districts of Manikganj, Faridpur, Jenidha, Jessore, Kushtia, Khulna, Pabna, Sirajganj, Bogra, Rangpur, Gaibandha, Tangail and Mymensingh.

***6. Spices*:** Two improved varieties of garlic (BAU rasun 3 and BAU-KGF rasun 4) have been released (CGP C-VI 006). Both the varieties produce 80-100% more yields than traditional varieties. BAU-KGF rasun 4 is resistant to viral diseases.

Production of summer onion is expanding but the availability of seeds and planting materials has been critical. Improved method of raising seedlings for planting in summer has been developed to overcome the problem (CGP SPM 096).

***7. Plant protection*:** Canker disease of citrus ravaged the production and export of Jara lemon- an indigenous citrus fruit of high demand in European market. The export was stopped. An especial project funded under CGP grant developed and applied an improved management system of lemon production that salvaged lemon export. Improved management practice includes –sanitation followed by eradication of infected plants in the orchard, application of balanced fertilizers and manure, pruning of older branches followed by application of Bordeax paste, application of copper fungicides at 15 days interval beginning the disease initiation, and monthly application of Imidacloropid. Post-harvest operation includes lemon fruit soaked in 2.3% SOPP solution for 1 minute. Administration of management practices for the control of canker disease resulted in resumption of lemon export from Bangladesh.

Infection of root rot, bacterial wilt and virus diseases causes extensive damage to brinjal and tomato – two major vegetable crops in the country. To control the diseases, BARI scientists developed intensive management practice (CGP 8.14). Improved practice (seed treatment with provax+seedling raising under net house and spraying with Imidacloprid + application of stable bleaching powder+Furadan+ Imidacloprid spray every 10 days) reduced wilt disease by 95% or more. The practice has been tested on-farm and standardized running trials involving commercial 25 farmers in Jamalpur and Sherpur districts.

Coconut is an important cash crop in Bangladesh but its production is rapidly declining primarily because of widespread mite attack. Mite has been a major pest during the recent years. The pest attacks on coconut fruits at the early stage results in deformed, small fruits. Mite being a very small insect remains unnoticed and effective management practice for controlling coconut mite was not available. Working on CGP project, a group of BARI scientists identified the mechanism and extent of coconut damage due to mite attack and standardized an effective management option for controlling mite infestation in coconut. A 5-step management practice includes I: harvesting of all the infested young nuts and burning, ii. after harvesting the infested nuts, spraying Omite-57 EC; 1.5 ml per liter of water on the foliage and the trunk stem attaching the bunch of fruits, iii. spraying for the second time when the young nuts attain 2 months old (iv) spraying for the third time after harvesting young and mature nuts; and (v) repeating step iii for the coconut bearing plants as well as neighboring non-bearing plants. Application of management treatment successfully controlled mite and increased coconut productivity in Jessore and Narail districts. Campaign is underway in five southern districts to make the coconut growers aware of the pest problem and its remedial measures.

Two popular varieties of ber – BAU kul and Apple kul extensively grown throughout the country are seriously infected with powdery mildew disease (organism- Odium ziziphi) causing serious yield

reduction. A management practice developed through CGP C12.1 (pruning at end-March followed by 4-5 sprays with sulfur containing fungicide like McSulphur 80 WP and Caivest 80 DF at 15 d interval from the visible appearance of the disease symptom) effectively controls powdery mildew disease of ber.

8. Farm Machinery & Post harvest technology: Development of power tiller: An efficient KCM (KGF-CASEED_MAWT) power tiller has been developed. The walking type power tiller with deep tillage capacity can be effectively used in land preparation both under upland and lowland conditions for growing different types of crops including rice, mustard, wheat, jute and vegetable crops.

9. Post-harvest: C-PHT 179, C-PHT 175 and C-FM 163 focused on post harvest processing and storage. A low-cost, well-ventilated thatch house measuring 4.0 m L x 3.5 m W x 4.0 m H with a capacity of about 8000 kg storage capacity was designed and tested on-farm. Spoilage of potato stored in the newly designed thatch-house during 4-5 months was the minimum. The technology is being up-scaled in greater Bogra and Rangpur districts involving wider farmers' participation. Hybrid dryer for drying seeds of wheat and groundnut has been developed by a BARI scientist. The dryer operates on solar power or on electricity.

10. Marketing; Analysis of global market and feasibility of growing crops suggested strong potentiality of exporting sesame, cashewnut, baley, vegetables and banana from Bangladesh (CGP C-HV 202). Potentiality of growing barley and sesame in the coastal areas is high while sloping uplands in the Chittagong Hill Tracts can be used for growing banana and cashewnut.

Feasibility of growing four high value crops – strawberry, broccoli, capsicum and cherry tomato in the hills and plain land, and mechanism of linking farmers with super market was studied in an another CGP project.

Constraints of marketing five selected crops – brinjal, bean, cucumber, bottle gourd and papaya in the hills, and opportunities, and market actors were identified and their value chains analyzed (CGP SE-MSC 279). Improved production technologies for growing these selected crops were also introduced to a large number of participating growers. The project output is expected to result enhanced competence and economic benefit of the farmers.

11. ***Livestock:*** Pullorum disease caused by Salmonella enteric in chicken is most prevalent in Bangladesh. Molecular characterization of S. pullorum bacteria and vaccine to control Pullorum disease has been developed using local isolates (L-DD-232). A CGP project (L 20.4) focused on clinicopathological and serological surveillance of FMD and PPR diseases and adopting preventive measures against them in remote villages in Tangail district. Priming and boosting at an interval of 2-3 weeks enhanced immune response against FMD vaccine for a period of 6 months. De-worming cattle, buffaloes and goats thrice a year yielded an overall 20-30% increase in weight gain and 25-35% increased in milk production.

Two projects (L-HM-214 and L-HM219) addressed herd health and suggested appropriate veterinary service delivery system. Low-cost feed formulation was the focus of another two projects (L-LM 227 and L-LM 235). Techniques of growing fodder from African Dhaincha and making hay and box-bailing thereof was developed and disseminated. Feeding fodder and hay to milking cows resulted in increased milk yield to the tune of 20-23%.

Introduction of duck raising in the rice fields directly benefited 200 resource-poor farmers in the low-lying areas of Netrokona and Kishoreganj area. In the rice-duck plots, duck droppings acted as source of plant nutrients, ducks scavenging in rice fields effectively controlled insect pests and weed growth and consequently rice yield increased by 17-23%. Net income margin ranged between Tk 35,198 to Tk 62,839 per ha across growing seasons and locations.

12. Fishery: A total of 6 projects were awarded in two calls. All the projects were implemented in southern coastal belt or in central region.

Stocking density significantly affected Shing (H. fossilis). A density of 500 fries per decimal gave the highest fish weight (57.17 g) and highest yield (5426 kg/ha) with a net return of Tk. 889,524 per ha (F 21.20).

III.A.iv. Scientific Impacts of the NATP CGP Projects

A number of scientific impacts have resulted as a consequence of on-farm and on-station trials, and technologies and practices developed as part of the CGP projects carried out during the past five years. The major impact is the introduction and sustenance of competitive environment in scientific research in the field of agriculture- both public and private sectors. Technologies developed from 11 projects have been scaled up as an intermediate step between technology generation and large-scale adoption by farmers. Besides these, there are some institutional and social impacts which are of worth mentioning. The impacts are as follows:

1. Khagrachari Model, a year round vegetable production to promote production and consumption of vegetable for meeting family requirements of human nutrition and generation of cash income for the poor and marginal hill farmers is gaining popularity. The technology has been adopted by a large number of farmers (>2000 farmers) in Khagrachari, Dighinala, Mohalchari of Khagrachari and Baghaichari and Longadu upazila of Rangamati districts.
2. Jhuming or dibbling mixture of seeds of several crops (3-12) in hill slopes and harvesting at different maturity dates over the season spanning from May through November is the traditional farming practice. Productivity of jhum farming is low but better farming in sloping upland has not been evolved yet. Systematic arrangement in rice-cotton intercropping with improved agronomic practices as an alternative to jhum farming resulted in greater yield advantage. Farmers in Thanchi, Ruma, Bandarban sadar and Rowangchari of Bandarban district, Khagrachari sadar, Matiranga of Khagrachari district and Rangamati sadar and Naniarchar of Rangamati district are increasingly adopting the rice-cotton intercropping instead of jhum farming. The technology has generated both social and economic benefits to thousands of hill farmers
3. Constraint of fitting HYV rice in deeply flooded land in the tidal floodplain of Jhalakati and Pirojpur districts can now be overcome with local varieties lalmota, sadamota with improved management practices developed through C-2.20. Large number of farmers (>2500) in the area have adopted row planting of 65 d old seedlings at 40 x 25 cm configuration, 5-7 seedlings per hill with 25% of recommended fertilizers recommended for HYVs.
4. Relay inter-planting of chickpea (BARI chola 9), lentil (BARI masur 7) with standing aman rice (local varieties) under moist soil condition helps farmers getting an additional crop in dry season where land usually remains fallow. The technology is rapidly getting popularity in the tidal floodplain of Jhalakati district.

5. Converting low land into ditch (pond) and dyke for raising vegetable crops in dyke and raising fish into the pond has been proved to be more profitable than any other enterprise in the coastal ecosystem that small farmers can afford.

6. Salinity tolerant sesame variety – BARI til 4 has been identified and agronomic practices developed for growing in saline areas. In the salinity affected areas of southern part of Khulna district farmers are now increasingly adopting an improved method of sesame production using BARI til 4 variety. Estimated income from sesame production in Batiaghata and Dumuria upazila of Khulna districts is over Tk.280 million annually using the land that remained fallow during dry season.

7. High productive, multi-crop sequences have been developed, tested and adopted in monga-prone northern districts (Gaibandha, Rangpur, Kurigram, Nilphamari and Lalmonirhat). The three crop annual cropping system developed is growing short duration rice variety BU dhan 1 or BINA dhan 7 (replacing long duration BR 11) favors timely planting of subsequent potato/wheat and the subsequent mungbean (instead of fallowing) in between wheat and aman rice. Curtailing more than 30 days by growing short duration rice eliminates post-monsoon for rice irrigation water requirement during reproductive growth. Fitting an additional crop mungbean during lean period presents an opportunity of labor employment and additional income. Planting cv Parija –an extra-short duration aus rice variety after harvesting mungbean and harvesting before transplanting aman seedlings is further advancement of the four crop-system providing additional income. Major focus of developing intensive cropping system was reducing the amount of irrigation water. The system is being followed by a large number of farmers in the northern districts.

8. Introduction and adoption of improved cropping system with short duration HYV aman rice, wheat or potato and mungbean in sequence created employment opportunity for the monga affected day labors and potentially increased farm income in Northern Bangladesh. Over 5000 farmers in Gaibandha, Ragpur, Nilphamari, Kurigram, Dinajpur and Thakurgaon districts have been practicing the new cropping system. More intensive cropping system potato-mungbean-aus- aman rice replacing boro with mungbean followed by short duration aus (cv Parija) and thereafter T. aman is now being developed. The new cropping system saves electric energy (5,112 KJ) and 190 kg TSP and 125 kg MoP fertilizers and at the same time substantially increases system productivity. The four-crop system is now being rapidly adopted in the northern districts.

9. For the charland or accreted river beds along the Dharala river in Kurigram district development of production technologies enabling farmers growing short duration, high yielding aman rice (BU dhan 1, BINA dhan 7 or BRRI dhan 56) followed by lentil or chickpea during dry season following the harvest of aman rice, and an extra- mungbean during pre-monsoon moist/dry period turned the fields once covered with wild vetivar grass to green fields without leaving land fallow even for weeks. The technology generated by CGP project and adopted by a large number of farmers (>3000) creates an immense social and economic impact in the region.

10. CGP projects engaged in location specific screening and adoption of high yielding varieties of rapeseed-mustard. Most projects were successful demonstrating the technical feasibility of growing of mustard after harvesting transplanted aman. A large number of farmers (over 7,000) realized the potential benefit of growing mustard in post-monsoon dry season on residual soil moisture. BARI sharisha 9, 14 and 15, and BINA sharisha varieties were disseminated through on-farm trials. Neighboring farmers gained the technology through spill-over effect. Margin of benefit comparing the old indigenous and modern varieties was quite high. Participating farmers as well as the neighboring farmers gainfully produced additional as much as 1,500 tons using modern rapeseed varieties.

11. Crop intensification fitting wheat or potato after harvesting transplanted aman rice (short duration) and mungbean after wheat or potato harvest in the drought-prone Barind tract of Rajshahi, Chapai Nawabganj and Naogaon districts has created massive impact on farmers' economy and environment. The 3-crop intensive cropping system with or without irrigation is proved to be more remunerative than existing cropping system with long duration t. aman rice. More and more farmers beyond the participating 1,200 farmers in the region are now benefiting by adopting the technology.
12. Development of package of practices for management and control of coconut mites has been a milestone to arrest yield loss and decline of production area in Jessore, Khulna, Bagerhat, Gopalganj, Pirojpur and Jhalakati districts. Over 2,000 farmers benefited receiving training and treatment packages.
13. Export of citrus from Bangladesh stopped due to infection of canker disease. Development and adoption of clinico-pathological management methods helped eradicate canker disease in citrus growing areas in Moulavi Bazar, Habiganj and Sylhet districts that spurred export of citrus fruits again.
14. Effective control of root rot, bacterial wilt and virus diseases in two major vegetable crops – brinjal and tomato helped avoid extensive damage to these two crops.
15. Converting medium lowland and low land subject to inundation into ditch and dyke system in the tidal flood ecosystem convincingly demonstrated system increased more than three-folds compared with traditional single crop aman rice. Production of vegetables in dykes round the year and fish culture in the ditch/pond during monsoon substantially increased farmers' income in the southern district of Jhalakati. The potential benefit of the project is discernible in increased supply of vegetable in the local markets.
16. Extensive cultivation of two newly developed varieties of chickpea and lentil (BARI chola 9 and BARI masur 7) in northern, central and southern districts bears the testimony of farmers' acceptance. BARI chola 9 and BARI masur 7 are resistant to BGM and Stemphylium blight, respectively and give around 40% and 30% higher yields than existing varieties.
17. Adoption of intensive management practices will potentially increase production and farm income of brinjal, tomato and ber producers.

Institutional and Social Impacts:

1. Nearly 300 scientists from public and private sectors engaged in the CGP projects had direct contact with the farmers in implementing the projects. A linkage among scientists, farmers and extension personnel has been established by running the trials under CGP projects. Over 15,000 farmers in 50 districts associated with the implementation of CGP projects benefited by improving their knowledge and skill. Apart from economic gain that they accrued from adopting improved practices and technologies, many of them now gained command over the farming communities because of their knowledge and skill.
2. Scientists engaged in the CGP projects could have gained deeper knowledge of the problems they worked on and acquainted with field problems that empowered them to have engagement with new scientific assignments.
3. All the leading NARS institutions and the agricultural universities engaged in implementing CGP projects improved scientific capacity of undertaking and implementing research projects. A healthy

competitive environment for doing research has which was virtually absent been created in the NARS institutions.

4. For effective implementation of the CGP projects 500 scientists, 200 scientific assistants, 15,000 farmers and 1,200 extension personnel have been trained on aspects of agricultural production or related issues. This has created enormous impact on the capacity of research and extension organizations in the country.
5. Backward and resource-poor hill farmers and women farmers have been especially encouraged to increase production adopting improved technologies like vegetable production through Khagrachari model, adopting intercropping instead of jhum farming, growing vegetables in coastal region, raising duck in rice crop in Netrokona and Kishoreganj.

Greater emphasis was laid on production enhancement in coastal areas with greater risk of climate change. Vegetable production has been increased in Jhalakati and Patuakhali districts as a result of implementation of a CGP project

III.A.v. Pilot Projects

Implementation of the CGP projects helped developing important technologies. Some of these technologies are considerably promising and noteworthy. The developed technologies have the potentials to bring immense changes in the production and productivity of the Agriculture of the country. But this needs a wider adoption of the technologies among the farmers. Piloting and upscaling enhance the process of transfer and adoption of technologies. Realizing the situation, KGF executed 6 pilot projects in 2014 with the approval of the 36th Board meeting held in December 2013. The progress and research highlights of those ongoing 6 pilot projects are provided in this section.

Project Code with Title: P-01: Crop intensification in Barind area through effective drought management.

Principal Investigator: Dr. Md. Abdus Salam, Senior Scientific Officer, OFRD, Barind Station, BARI, Rajshahi.

Barind tract covers most of the greater districts of Dinajpur, Rangpur, Rajshahi, Pabna and Bogra. Livelihood of the people of Barind tract depends largely on agriculture. Despite expansion of irrigation facilities, agricultural production in major parts of High Barind tract is dependent on rainfall. Crop production in the dry season is severely constrained due to drought resulting in low productivity. However, productivity can be enhanced through effective drought management. Three proven technologies (i) growing chickpea using residual moisture, (ii) growing potato with minimum tillage and using straw mulch and (iii) adopting wheat/potato-mungbean-transplanted aman cropping system with minimum irrigation were tested in the barind tract through a CGP project. Success of the CGP project strongly suggest that agricultural productivity can be enhanced if the validated technologies are extensively adopted in the Barind area.

Based on the success of the CGP project, an up-scaling program was undertaken for expanding wheat/potato-mungbean- T. aman cropping system in the High Barind tract of Rajshahi, Chapainowabgonj and Noagaon district.

One thousand farmers were involved covering 1000 bighas of land in three Upazilas (Godagari of Rajshahi, Nachole of Chapainowabgonj and Shapahar of Noagaon district). Selected farmers were trained on different drought management activities. Short duration mungbean vty. (BARI mung 6) and T. aman rice (BRRI dhan 57) were selected for timely planting of rabi crops. Mungbean was sown from 20 March to 05 April and harvested between 25 May to 15 June 2014. The average yield of mungbean was 3.14 t/ha. with BCR of 3.47. Short duration aman (BRRI dhan 57) that was transplanted between 10 to 30 July 2014 has already been harvested. Data analysis is in progress.

With the introduction of a new crop (mungbean) the cropping intensity of the area has been increased from 180-230%. Cultivation of BRRI dhan 57 will create a scope in timely establishment of rabi crops with residual soil moisture.

Project Code with Title: P-02: Management and Control of Mite in Coconut Through farmers' capacity enhancement.

Principal Investigator: **Dr. Md. Nazirul Islam, Principal Scientific Officer, Horticulture Regional Research Centre, BARI, Gazipur-1701.**

Coconut is an important cash crop of Bangladesh but its production has been found declining rapidly causing serious loss to the coconut palm/orchard owners. Widespread attack of mite has been identified as the major cause of such yield decline. The pest attacks on coconut fruits at the early stage results in deformed, small fruits. Mite being a very small insect remains unnoticed and effective control measures against this enemy was not known to the farmers. A group of BARI scientists working with the support of a CGP project funded by KGF, identified the mechanism of mitecontrol and determined the extent of coconut damage due to mite attack. They also standardized an effective management option for controlling mite infestation in coconut. Application of management treatment successfully controlled mite that helped increasing coconut productivity in the project areas.

Based on the results of the above project, this Pilot project has been designed to take forward the success of the CGP project to major coconut growing districts- Khulna, Bagerhat, Gopalganj, Jhalakathi and Pirojpur through farmers training and campaigning. Thirty five upazilas of 5 districts have been covered. A total of 1250 farmers were selected from the project area for imparting training. PI of the project prepared necessary action plan and modules for the training program. Scientists involved in the previous project, experienced experts from BARI and DAE were invited as resource speaker for conducting the training. The daylong training program conducted in the selected districts included lectures along with practical demonstration on formulation of miticides (mite control chemical) and spraying of crown and trunk of coconut palms. Handouts and leaflets in Bengali on mite control techniques were prepared and distributed among the farmers. Leaflets, booklets were distributed to the general farmers for creating awareness. Participating farmers were provided with mite management equipment and miticide, as training materials.

The treated palms of Gopalgong, Bagerhat Sadar, Mollarhat and Fakirhat were found to produce nuts without any sign of mite infestation.

Project Code with Title: P-03: Increasing production adopting improved production Practices in tidal floodplain.

Principal Investigator: Prof. Dr. Md.Jafar Ullah, Dept. of Agronomy, She-e-Bangla Agricultural University, Dhaka.

In order to increase system productivity, cropping intensity and farmers income, a CGP project (C.2.20) titled "Development of intensive cropping system in two coastal districts for increasing Production" was implemented in two upazilas of Jhalakathi by Agrarian Rresearch Foundation (ARF) in association with Patuakhali Science & Technology University. Through two years (2012 & 2013) project intervention, some viable technologies appropriate to the tidal floodplain ecosystem was developed.

In view of the success of the above project, this pilot project was undertaken to up-scale the technology in 6 upazilas of Jhalakathi and Perojpur districts for increasing production of local varieties of aman rice followed by maize in dry season. Improved technology developed and validated in the ecosystem were used for growing local variety of aman rice (sadamota) using moderate dose of fertilizers followed by maize as new crop.

Maize was planted between 20-01-2014 to 31-01-2014. Area covered under maize was 81 bigha involving 128 farmers. Four hybrid varieties were tested. Harvesting of maize ended on 30-05-2014. Average yield was recorded as 5 t/ha.

Local aman (sadamota) was transplanted in 700 bighas involving 700 farmers between Aug-24 to Sep-30. Harvesting of T. aman has been completed. Data analysis is in progress. At least 20% higher yield over farmers practice is expected.

Project Code with Title: P-04: Up-scaling improved jhum cultivation introducing intercropping rice with cotton.

Principal Investigator: **Dr. Md. Farid Uddin, Executive Director (CC), Cotton Development Board (CDB), Khamarbari, Dhaka.**

Most farmers in Chittagong Hill Tracts grow crops in hill slopes following traditional jhum system. The system essentially follows slash and burning prior to dibbling seeds of several crops (3-11) into a single hole immediately after first shower of the year. Replacement of jhum was attempted in many ways but system persists widely in the hills. Scientists of CDB implemented a CGP project involving 40 farmers, compared productivity of intercropping of rice and cotton with the traditional multi-crop jhum system. It appears that growing two rows of rice after every row of cotton gives better yield and substantially higher (30%) return than any jhum production system. Traditional local varieties of rice (Cokrow, Shere, Galoon, Manthor) performed better in terms of yield, quality and farmers' preference compared with HYVs.

Based on the success of the earlier project, this Pilot project seeking up-scale rice-cotton intercropping to replace traditional jhum practices was undertaken. Seven upazilas from three hill districts (Rangamati Sadar of Rangamati district, Khagrachari Sadar, Matiranga of Khagrachari

district and Bandarban Sadar, Rowangchari, Thanchi and Ruma upzilas of Bandarban district) were selected for project intervention. The technology was demonstrated in 700 plots/hill slopes involving 700 jhum farmers. Farmers training and input distribution was confirmed well ahed of sowing time. Pick sowing was done in June-July and continued up to August due to late on set of monsoon in the hill districts. Condition of both the crops was good in most of the plots though the hills experienced drought at the beginning of sowing season. Rice was harvested in September/October 2014. Average rice yield was 2.46 t/ha, which is much encouraging in hill ecosystem. Harvesting of Cotton has also been completed. Data analysis is in progress. Moderate cotton yield is expected.

Project Code with Title: P-05: Up-scaling Mungbean-Rice pattern in the Charland of Kurigram.

Principal Investigator: Prof. Dr. M. Abdul Karim, Dept. of Agronomy, Bangabandhu Sheikh Mojibur Rahman Agricultural University (BSMRAU), Gazipur-1706

In order to improve the system productivity, cropping intensity and livelihood of the people of the Charlands, a validation program on lentil-mungbean-short duration T. aman rice production technology was undertaken in the Charlands of Kurigram district in 2012 under CGP project. Two chars from two upazilas-Kurigram Sadar and Nageshwari was selected. Sixty farmers, 30 from each site having one bigha land each were involved with the program. Evaluation of two years results of the validation program proved the technology to be most appropiate for the Charlands.

Based on the success of the above project, an up-scaling program for testing the technologies in wider areas 1000 farmers from Kurigram Sadar, Nageshwari and Burungamari was selected. Farmers' training, necessary inputs, irrigation facilities, etc. was [rpvoded in time. Mungbean (vty. BARI Mung-6 and BU Mung-4) was sown between March 10 to April 05. Serious drought and high temperature (49-59^0) in April/14 damaged the crop of most of the sites. However, the damage was low in the chars of Burungamari and 30% crop could be harvested. Recorded yield was 0.9 t/ha as against 1.5 t/ha in 2012.

After mungbean, short duration T. aman rice namely BU dhan 1 and BRRI dhan 56 was transplanted in the same land in the last week of July, 2014. But two waves of floods during 15 August to mid September damaged the crop. Rice crop in Burungamari upazila, however, recovered and harvested. Recorded yield was 3.5 t/ha as against 4.5 t/ha in 2013.

Despite damage of mungbean due to severe drought and un-usual flood damaging standing rice field, the farmers got updated knowledge on modern production technologies of two new crops. Plantation of short duration aman rice like BU dhan 1 and BRRI dhan 56 will enable the farmers to cultivate rabi crops in time, after harvesting of rice at the end of October.

Pilot Project No. 06: "Integrated crops and fish culture through land conversion into ditch-dyke system"

Principal Investigator: Prof. Dr. M. Mofazzal Hossain, Dept. of Horticulture, BSMRAU, Gazipur-1701.

Medium low land and low land in the tidal flood plain ecosystem is subjected to submergence due to tidal flood in the costal districts rendering the ecosystem unproductive or less productive. In most of

the lands local low yielding varieties of aman rice is planted. About 50% land remains fallow during rabi season. In order to increase the system productivity in the area, a CGP project was implemented from 2012 for two years. In the Project 10 participatory farmers converted their land, (33 decimal per farmer) into ditch-dyke system. Vegetables were planted on the dykes and the ditches used for fish culture. Evaluation of the results revealed that system productivity increased three folds compared with traditional single crop T. aman rice.

To create greater impact an up scaling program was undertaken at the adjoining areas of the above project targeting 20 more units involving 30 farmers. After completion of ditch-dyke system, summer vegetables and papaya were planted on the dykes and mono sex tilapia was released in the ditches. A good harvest of vegetable crops was obtained from which Indian spienach, bottle gourd, Ash ground and papaya performed better. Average net return of the pond owners from one bigha land was Tk. 42,500.00 from summer vegatables and Mono-sex-Tilapia (Summer vegetables-17,500 and Tilapia- 25,000). Expected average net return from winter vegetable is Tk. 7,000.00.

The ditch-dyke system has been proved as an appropriate technology for unproductive and less productive low lying areas of southern region of Bangladesh. This technology, if extensively disseminated to this area, is expected to help increse cropping intensity, yield potentiality and farmers income by 5-7 times compared to existing single crop production practice.

III.B. RESEARCH HIGH LIGHT KGF BKGET FUNDED CGP PROJECTS AND ACTIVITIES

While NATP phase-I was approaching towards its ending, KGF starts getting fund from its sustainable funding source, Bangladesh Krishi Gobeshona Endowment Trust (BKGET). In fact, KGF started receiving fund from BKGET from the later part of 2012.

Having BKGET fund, KGF awarded 14 CGP projects of which 12 started by the middle of 2013, one from the end of the year and the last one from April 2014. Infact, CGP projects under taken with BKGET and NATP funds were going on simultaneously in 2014. A list of the ongoingBKGET CGP projects is provided in the Annexure (Annex-1(vi). However, KGF planned for four types of programs for implementation under different models with BKGET funds, they are as follows:

(i) Competitive Grants Program (CGP)-short to medium term
(ii) Commissioned Research Program (CRP)-medium to long term
(iii) Capacity Enhancement Program (CEP)-short to medium term
(iv) International Collaborative Program (ICP)-short to medium term.

Activities planned and progresses made during the year 2013- 2014 under BKGET funding are summarized below:

(i) Competitive Grants Program (CGP)

KGF invited short term CGP proposals based on BARC research priority under BKGET fund in August 2012 in the daily newspapers and KGF website. Proposals (128) received from researchers of NARS institutes and Universities were screened and reviewed by the expert reviewers and overviewed by TAC members. Based on TAC recommendations the KGF Board approved 14 projects that are being implemented in different locations at a total cost of Tk. 1017 lac for 3 years. Organizations involved are

BARI, BRRI, BJRI, BAU, BSMRAU, Syl. Agril University and NGO/DoF. Project Coordinator/PIs prepared their project brief and inception report followed by prescribed format.

KGF technical professionals conducted desk and field monitoring of these 14 projects, particularly during the cropping seasons to see whether activities performed by PIs are in line with planned activities as well as quality of performance.

Field Monitoring, Patuakhali

PIs of ten projects out of 14 already submitted their 1st Annual Progress Report and other PIs are going to complete their 1st year project implementation in September 2014. Annual Progress Review workshop on the 10 CGP projects was held in June 2014. Most of them made satisfactory progress. KGF established RMIS for all implementing projects and is updated by the concerned desk officer regularly.

In April 2014, KGF made a second public call for submission of research proposal through on-line as well as hard copy on 13 researchable issues identified by TAC and approved by Board. 225 research project proposals received are now under the review and evaluation process as done before which are expected to be completed by early October, 2014.

Progress of BKGET funded 1st Call CGP projects:

BKGET funded 1st call CGP projects started from May 2013 and 14 CGP projects were awarded in this call. These projects were planned for 3 years. At present these projects are at different stage of implementation. Out of 14 projects 10 have completed their 1st year planned activities and made some progress in line with the objectives of the project. Project briefs on all projects were prepared and published. Project inception workshops of these projects were organized separately to make aware all relevant stakeholders about the projects activities and expected outputs. However, a brief progress of these projects are given below-

Project code & Title: TF 01-C: Validation and Up-scaling of High Value Vegetable Crops production in Sylhet region.

Main objective of the project- To popularize the selected best varieties and production technology of high value vegetable crops in Sylhet region

Progress with result- Experimental site was selected inside the university campus. Ten decimal of land was also selected in the research field of FIVDB (a NGO) at Khadimnagar, Sylhet for some experimental purpose; A quick survey on vegetable production, problem and consumption was made in nine upazillas (90 farmers)

with the help of DAE personnel; Inception workshop was organized where 25 participants were attended from DAE, NGO and Research Organization; Data collection and statistical analysis of the collected data was made and two scientific papers also prepared. The genotype California wonder produced the highest number of fruits per plant (13.61) and fruit yield per plant (0.77 kg) followed by BARI Mistimorich 1 (0.71 kg/plant).

1. **Project code & Title:** TF-02-C: Development/ validation and up-scaling of dry direct seeded boro rice system for improving crop productivity in areas with limited water supply

Main objective of the project- To adapt dry direct seeded (DDS) Boro rice and to improve system productivity of T. Aman-Mustard/Potato/Bushbean-DDS Boro rice with less irrigation water.

Progress with result- Two sites (Godagari of Rajshahi & Sadar upazila of Rangpur) were selected; Adaptive trial & data collection of T. Aman, Rabi crop & DDSR completed; Organized result sharing workshop; 4 batches farmers training with 100 participants completed. The result shows that the average yields in Rajshahi and Rangpur were 4.72 and 5.09 t ha^{-1}, respectively.

2. **Project code & Title:** TF 03-C: Adaptation of high yielding soybean in polder areas in Barguna and Patuakhali districts

Main objective of the project- To select/ identify high yielding soybean varieties suitable for polder areas of Barguna and Patuakhali districts and increase cropping intensity and system productivity.

Progress with result- Two sites, Amtali of Barguna district and Kalapara of Patuakhali district were selected, 20 farmers were selected; one inception workshop organized where DAE, OFRD personnel, Local representative, Teachers of PSTU and farmers were present; 2 farmers training organized with 50 farmers on soybean cultivation; one field day was organized where 25 farmers, 2 DAE personnel and NGO personnel were present. The maximum number of seeds/pod was calculated from AGS 313 with F2 fertilizer where minimum number of seed/pod was produced by Shohag with F2 Fertilizer. The soybean variety AGS 313 produced seeds of maximum weight where the 100 seed weight was more than 11g/100 seeds.

3. **Project code & Title:** TF 04-C: Screening and testing of Improved Aus Rice Varieties/Genotypes Suitable for Rainfed Aerobic Soil Condition of Bangladesh

Main objective of the project- To select improved Aus rice varieties/genotypes having high yield, shorter growth duration for growing under aerobic soil condition.

Progress with result- Inception Workshop was organized where 8 BRRI scientists, 10 Agril Officers and 15 SAAOs and 25 farmers of Bagha upazial under Rajshahi district were present; Two project site, Bagha, Rajshahi and Rajnogor, Moulvibazar and Four farmers from 2 upazillas with land area of 0.5 ha/upazilla for breeding and Twenty six farmers from 3 upazillas with land area of 1.5 ha/upozilla selected for PVS trial; Three improved direct seeded Aus rice varieties: BR7566-4-4-2 BR7384-2B-5 and BR6855-3B-12 were selected for their higher yield under direct dry seeded conditions for further evaluation. BR7182-2B-1-HRY-10, BR7178-2B-13-10 and BR6855-3B-12-10 performed well under direct wet seeding conditions at seedling stage. Among the tested 103 IRRI entries, IR92240-40-2-2-1 gave highest yield (5.6 t/ha) followed by NSIC RC 116 (5.4 t/ha) and IR91099-91-3-2-3 (5.5 t/ha).

4. **Project code & Title:** TF 05-C: Year-round Production of Some Selected HYVs and Hybrid Vegetable Varieties in Southern and Hilly Regions of Bangladesh

Main objective of the project- To adapt HYV and hybrid vegetable varieties with package of production practices in winter and summer season for increasing year round production in Bandarban and Patuakhali districts and increase household consumption level of vegetables and cash income of the farmers of the project areas;

Progress with result- One upazila and 30 farmers each with 200 sqm and total 0.61 ha of land per upazila are selected; All the farmers of Bandarban sadar consume some parts of produced vegetables (155.0 kg), some were distributed among neighbor & relatives (60.0 kg) and rest of vegetables was sold (289.0kg). Vegetable consumption of each farmer families was increased than earlier intake of vegetables; One farmers training conducted at Bandarban under HRC and three farmers training conducted at Patuakhali for SSURDA farmers, Total 120 farmers have learnt about modern seedling raising techniques and production packages on selected winter vegetables. From five decimal lands in an average each farmer harvested tomato 180.0kg, brinjal 100.0kg, french bean 39.0kg, garden pea 55.0kg, bottle gourd 140.0kg and in total 514.0 kg of vegetables harvested from the whole plot.

5. **Project code & Title:** TF 06-C: Validation and up scaling of HYVs of brinjal, tomato, bottle gourd, as gourd and pointed gourd in hilly areas of Moulvibazar

Main objective of the project- To increase production of diversified vegetable crops in hillocks/hilly areas of Moulvibazar district.

Progress with result- One inception workshop was organized with 40 personnel from DAE, BADC & NGO; 20 farmers from 4 upazillas with 1000m ^{2} land area were grown with S.tomato and 60 farmers with about 16000m^2 land area were grown winter vegetables (tomato, brinjal & bottle gourd); 20 farmers were trained on S.tomato and 100 farmers were trained on winter tomato. Highest 87.3 kg/plot (17.5 ton/ha) with gross return Tk.8063 (› Tk.16 lacks/ha) and BCR 2.69 was obtained from s.tomato cultivation.

6. **Project code &Title:** TF 07-C: Adaptation of newly released HYV oil seeds (Mustard, Groundnut, Soybean and Sesame) in Charland of Padma

Main objective of the project- To select/identify HYV oil seed crop varieties suitable for growing in the Charland of Padma and develop best management practices (BMP) for maximizing yield of selected oilseed crop varieties

Progress with result- 20 farmers/location and 1 bigha/farmers for mustard, soybean, groundnut and sesame at four locations were selected; 140 farmers and 30 SA/SSA/SAAO/Field Staff have been trained up; BINA Sarisha-4, BARI Sharisha-11, BARI Sarisha-16 and BINA Sarisha-8 showed better performance in respect of yield and economic returns at four locations. Crop yields are of mustard: 1.10 t/ha, soybean: 0.80 t/ha, groundnut: 1.60 t/ha and sesame: 0.90 t/ha

7. **Project code & Title:** TF 08-NR: Evaluation and Up scaling of Resource Conservation Technologies (RCTs) for Improving Productivity in the Drought Prone Areas

Main objective of the project- To increase cropping intensity & system productivity under drought prone areas and to create awareness among the farmers of the project sites on RCTs in crop production.

Progress with result- An inception workshop organized with 4 participatory farmers, 2 local leaders, 20 SAAO, 5 UAO from DAE, 5 NGOs and 3 Mass Media personnel; Two hire staff appointed from RWRC, BARI, Rajshahi. Field and Lab. equipment like 1 Power tiller, 1 Bed planter, 1 Power tiller operated seeder, 1 Digital soil moisture meter also bought for staring the project activities ; Three participatory training organized with 100 farmers, 3 local leaders, 15 SAAO from DAE, 3 FA from KGF project, 3 NGOs in that location and Mass Media personnel; Two participatory field day with 200 farmers, 5 local leaders, 8

SAAO from DAE, 3 FA from KGF project, 5 NGOs in that location and Mass Media personnel. T.Aman rice yield was higher under resource conservation technologies from both the location in both the varieties. Maximum yield was found (4.28 t/ha) from BINA Dhan 7 and (4.71 t/ha) from BRRI Dhan 49 under Charghat Upazila over farmers practice and yield increase (0.46 & 0.59 t/ha) also higher from BINA Dhan 7 and BRRI Dhan 49 in that location.

8. **Project code & Title:** TF 09-NR: Validation and up-scaling of Tricho-products for soil borne disease management in vegetable Crops

Main objective of the project- To control/reduce soil borne diseases and to increase yield of vegetable crops by using Tricho-products

Progress with result- Total 20 farm families with 3.24 ha lands (10 farm families and 1.62 ha land in each of Jessore and Bogra site) selected; Ten pair (total 20 pair) compost devices/ houses were prepared in Sherpur of Bogra & Churamonkati of Jessore; 2 trainings organized at Bogra and Jessore with 50 participants including farmers, DAE and NGO personnel; Total 9240 kg final product of Tricho-compost and 264 liter leachate were produced. With the high management, average yield of summer and winter eggplant was 27.13 and 37.09 t/ha, respectively. Net return was Tk. 55187/ha for summer and Tk. 145721/ha for winter eggplant crop.

9. **Project code & Title:** TF 10-F: Adaptation of Community Enterprise Approach for Intensification of floodplain fish production in Chalan beel

Main objective of the project- To Enhance capacity of the community members & catalysts of potential communities for intensification of fish production in floodplain through Community enterprise initiatives

Progress with result- 10 floodplains short listed from 33 potential sites; One inception workshop was organized at Rajshahi, Divisional Director, Fisheries, District Fisheries officer and Upazila fisheries officer were present in the workshop as guest; Two exposure visits organized, 25 community representatives from Tarash of Sirangoj district and Sherkol of Natore district; Management committee has formed in Tarash under Sirajgonj district and Sherkol of Natore district.

(ii) Commissioned Research Program (CRP)

CRP is generally designed and developed through consultative process. KGF organized a series of consultative meetings with Heads of different research organizations and other relevant stakeholders and identified a few vulnerable areas of national importance like-CHT, Coastal ecosystem and Drought Prone environment for undertaking R&D activities. KGF prepared concept notes on these areas and placed before KGF Board for consideration. Another concept note on climate change impact on agriculture was also placed. KGF Board approved the CN and suggested to include “Haor” areas to address.

KGF organized consultative meetings with the Heads of different research institutes and other stakeholders who prioritized the research topics and research agenda. These were placed before the KGF Board as concept notes. The following two projects were finally approved by the KGF Board.

(a) Harnessing the potential of Hill agriculture for enhancing the productivity in three Hill districts of CHT
(b) Project on Crop modeling and mitigation measures under Network on Climate Change in Agriculture (NCCA)

KGF Board also approved the Concept Note and suggested to include "Haor" areas. KGF Board approved Tk. 4000 lac for implementing the five components of CRP: Hill Agriculture for a period of 5 years.

(a) CRP-1: Hill Agriculture

With the recommendation of TAC, KGF Board approved. CRP: Hill Agriculture Project consisting of 5 components and 14 implementing units of multi-organization & multi-disciplines and started implementing from October 2013 for a period of 5 yrs at a cost of about Tk. 400 million. The following organizations are involved for implementing CRP Hill Agriculture: (a) BARI, (b) BSMRAU, (c) SAU & CDB.

KGF organized an inception workshop of CRP Project on 'Harnessing the Potential of Hill Agriculture: Enhancing Crop Production Through Sustainable Management of Natural Resources' at Upazila Parishad Hall Room of Bandarban sadar upazila on 05 April, 2014. The main objective of the workshop was to finalize the detailed implementation plan and activities of CRP Hill Agricultural project upon discussion among the stakeholders and pursue their cooperation for implementing the project. Dr. S. M. Nazmul Islam, Secretary, Ministry of Agriculture was the Chief Guest in the workshop; Dr. Kamal Uddin, Executive Chairman of BARC & Chairman KGF Board chaired the workshop. Mr. Mike Robson, FAO Representative in Bangladesh; Dr. Md. Rafiqul Islam Mondal, Director General, BARI; Md. Abdul Latif, Executive Director, Cotton Development Board were the Special guests. Besides, KGF and BKGET Board members were also present in the inception workshop.

Inception workshop, Bandarban

All these 5 components have already submitted their project inception reports. Each component has initiated their activities according to their work plan.

(b) CRP-2: Climate change

Climate change had been increasingly impacting on agricultural production as well as in other sectors in Bangladesh. In order to sustain production, farmers need to adapt to changing climate.

KGF already trained a group of scientists of NARS institutions and universities. The group


Workshop on Modeling Climate Change Impact on Agriculture, BARC, Dhaka

called network scientists representing BARI, BRRI, BINA, BARC, SRDI, BJRI, SAU and BSMRAU, through consultative process, prepared and submitted a proposal "Modeling climate change impact on agriculture and developing mitigation and adaptation strategies for sustaining agricultural production in Bangladesh", seeking KGF funding under Commissioned Research Program. KGF forwarded the proposal to TAC for its comments and recommendation.

During this reporting period 8 trainings on climate change were conducted and 68 scientist from different research institutes attended these trainings where Dr. Naveen Karla, Former Head, Agricultural Physics, IARI, India and Dr. Dinesh Chandra Uprety, F.N.A.Sc., Emeritus Scientist, Division of Plant Physiology, IARI, India were present as resource persons. Most of the trained scientist now operate climate change modeling software and perform their research activities using the modeling software.

The CRP project, containing the above pre-proposal activities as per TAC recommendation, was approved at a total cost not exceeding Tk 2000 lac for the 1st year under CRP of KGF BKGET fund.

(iii) Capacity Enhancement Program (CEP)

KGF organized several training programs for developing the skills of researchers of different NARS institutions and Universities. Total 20 training workshops & consultative meetings were organized by KGF since December'12. Both national and international scientists took part as trainers in these training/workshops. Some of the training courses are highlighted bellow:

Training on Research Planning & Proposal writing, BARC, Farmgate, Dhaka

a) **Climate change modeling**:-
   i. Training Workshop on Climate Change and Bangladesh Agriculture at BARD, Comilla in December 2012
   ii. Training workshop on Modeling Climate Change Impact on Bangladesh Agriculture at BRAC-CDM, Rajendrapur, Gazipur in July 2013
   iii. Training Workshop on Application of GIS and Remote Sensing in Crop at BRAC-CDM, Khagan, Savar in November 2013

Network on Climate Change in Agriculture (NCCA) was formed headed by CSO (Agronomy) of BARI with 27 trained scientists of 13 institutions. The NCCA had been refining the research proposal on Climate Change Impact Assessment in Bangladesh Agriculture.

b) **Scientific writing skill Improvement**:
   In 3 batches 87 participants attended the Training Workshops on Research Proposal Preparation and Scientific Report Writing at BRAC-CDM, Rajendrapur, Gazipur.

Capacity building and technical up-scaling/ action research and training programs were under taken after receiving the KGF BKGET fund by the end of 2012 under the guidance of KGF Board.

c) **Capacity enhancement of NARS through Agricultural Research Management Information System (ARMIS):**

KGF provided fund to Computer and GIS Unit of Bangladesh Agricultural Research Council (BARC) for implementing the project 'Capacity Enhancement of NARS through ICT-based Agricultural Research Management Information System (ARMIS). About 6000 research information were targeted from 16 organizations (13 NARS institutes and 3 universities).

In the meantime (commencement date of the project July 8, 2013) 7670 research data entered into the ARMIS database of which 6033 completed with mandatory information. Considering the merits and performance, the project was extended up to December 2015 with a total budget around Tk. 387 lac.

Summary on the Training Workshop:

Areas of Training Workshop	Training Venue	#Participants & batch	Resource Persons
1. Planning, proposal physiology, preparation and scientific report writing	BRAC-CDM, Rajendrapur	107(4)	BRAC Learning Centre Div. Andrew Jenkins. Agnese Carrera & others
2. Crop physiology, Climate Change, Modeling Climate Change Impact on Bangladesh Agriculture	BARD, Comilla, BARC-CDM, Rajendrapur BRAC-CDM, Savar	149(6)	Dr. D.C Uprety, IARI, India Dr. Naveen Kalra , IARI, India
3. Application of GIS & remote sensing in Crop Production & Natural Resource Management; Hands on training on IDRISI and GIS and Agro-ecology /production zones.	BRAC-CDM, Savar	68(3)	Dr. Naveen Kalra, IARI, India Prof. Dr. M. Rafiqul Islam, BSMRAU, Gazipur M.A. Aziz, Patwary, Geological survey of Bangladesh. Mr. Shisher Choudhury, GIS Analysis,

d) **Other Activities Performed:**

A document on KGF strategy and Implementation Plan (2013-20122) has been prepared by engaging Dr. Mruthyunjaya, Former National Director NAIP and Former Director, NCAP, ICAP, India. Two Half Yearly and one Annual Progress Review and Planning Workshop organized on CGP and CRP projects under implementation. Two Regional (Barisal and Bogra) Consultative Workshops for developing R&D Programs under Coastal and Drought Prone Ecosystem was organized in this reporting period. Besides, nine (9) consultative meetings/workshops on different issues were organized during the last two years.

Regional workshop on Drought Prone Environment, RDA, Bogra

(iv) International Collaborative Program (ICP)

KGF explores the avenues for undertaking collaborative programs through co-financing with Universities/ Organizations of developed countries like Cornell University, USA; ACIAR/ CSIRO, Australia; NUFIC, Netherland etc. KGF held a meeting very recently with members of ACIAR/CSIRO, Australia to develop a collaborative R&D program in agriculture.

III. C. TECHNICAL BULLETINS AND PROJUKTI BARTA (প্রযুক্তি বার্তা) ON CGP COMPLETED PROJECTS, 1ST CALL, PHASE-II UNDER NATP FUNDING.

Most of the CGP projects awarded by KGF under two phases of 2nd round call ended in 2014. Although projects did not end at a time of the year but a good number of projects came to its end by June 2014. The rest of the projects belonging to 2nd call were completed by November 2014 and relevant different reports (PCR, technical bulletins and the Projukti Bartas) were submitted accordingly. Some of the received technical bulletins and the Projukti Bartas have already been edited and made ready for printing. A total of 15 Projukti Barta (Bangali) and 17 technical Bulletins will be printed and disseminated among the stakeholders very soon.

কেজিএফ সিজিপি গবেষণা ফলাফলের ভিত্তিতে প্রণিত প্রযুক্তি বার্তার তালিকাঃ মে ২০১৩

ক্রমিক নং	প্রকল্প কোড নং	প্রকল্প শিরোনাম
১।	সি-এফপিই-০৫৫	বৃহত্তর রংপুর অঞ্চলে খাদ্য নিরাপত্তা ও কর্মসংস্থান বৃদ্ধিতে নিবিড় ফসল চাষাবাদ
২।	সি-সিএ-১১৭	নোয়াখালী জেলার লবনাক্ত মাটিতে চাষাবাদের উপযুক্ত ফসল নির্বাচন
৩।	সি-এইচএফ-১০৩	পার্বত্য অঞ্চলের জন্য উন্নত কৃষি উৎপাদন প্রযুক্তি ঃ খাগড়াছড়ি মডেল
৪।	সি-ভিআই-০০৬	উন্নত জাতের রসুনঃ বাউ রসুন- ৩
৫।	এল-এইচএম-২১৯	চর অঞ্চলের দরিদ্র কৃষকের জীবনযাত্রার মান উন্নয়নে পশুস্বাস্থ্য সেবা ব্যবস্থাপনা ও দুগ্ধ বিপনন
৬।	সি-পিএইচটি-১৭৯	উন্নত পদ্ধতিতে কৃষকের বসতবাড়িতে গোল আলু সংরক্ষণ
৭।	সি-এসপিএম-০৯৬	গ্রীষ্মকালীন পিঁয়াজের উন্নত বীজ উৎপাদন কৌশল
৮।	এল-ডিডি-২৩২	মুরগীর সালমোনেলা পুলোরাম রোগের টিকা উৎপাদন
৯।	সি-পিএইচটি-১৭৫	দানাজাতীয় ফসলের মানসম্পন্ন বীজ শুকানোর হাইব্রিড ড্রায়ার
১০।	সি-এস-১৫০	এডবি- উডি পদ্ধতিতে জমিতে সেচ প্রয়োগ এবং অগভীর নলকুপের প্রাইমিং সমস্যা নিরসনে সাকশন পাইপে চেক ভাল্‌ব সংযুক্তি

Development of low cost milk replacer with locally available feed ingredients for rearing calves

Project Code	: L-FF-231
Principal Investigator	: Professor Dr. Md. Nurul Islam
Implementing Organization	: Department of Dairy Science, Bangladesh Agricultural University Mymensingh-2202
Duration	: November 1, 2009 to January 31, 2012

Introduction

Future of the dairy industry depends mainly on better replacement stocks. For this reason we have to give more attention on the feeding and management of dairy calves. Usually the first three months of the calves life are very critical because at that time their rumen are not fully developed, can not digest fibrous feeds and mainly depend on whole milk or milk replacer. Milk replacer is a diet having a composition very close to that of cow's milk and is cheaper than milk. Raising calves using whole milk is very expensive. Due to this reason about 86% farmers of the United Kingdom rear calves by feeding milk replacer (Thickett *et. al.* 1986).

In Bangladesh, dairy industry is developing gradually, but the progress is rather slow due to various reasons. One of the main factors is non-availability of good quality dairy calves. Most of the dairy calves in our country are emaciated, not healthy during their early life as because they do not get adequate nutrition at that time. Due to low productivity and high price of milk, farmers are not interested to give milk to their calves. For this reason calves do not show their full genetic potentiality what they have. Their maturity comes in late, shows delayed estrus, low conception rate, produce small calves with high mortality. This problem could be solved by providing adequate nutrition to calves during their early life and milk replacer can play a vital role in this aspect.

Milk replacer is prepared by mixing different feed ingredients in such a way that its nutrient content becomes nearly similar to whole milk. In Bangladesh no systematic efforts have yet been taken to prepare milk replacer for rearing calves. To produce better replacement stock it is urgently necessary to conduct research work in this line. If we can do this successfully then we will be able to produce healthy calves and ultimately will get more milk from them when they will come in production. Considering these things in mind, the proposed research programme was developed to prepare low cost milk replacer for rearing dairy calves.

Specific project objective (s):

- To develop low cost milk replacer with locally available feed ingredients.
- To evaluate the nutritional status of prepared milk replacer
- To improve the skill of farmers and also to assess the economics of feeding milk replacer.

Approaches and Method

Major part of research works (5 expt.) were conducted at Bangladesh Agricultural University Dairy Farm (BAUDF) and one experiment was conducted at Baghabari ghat milk shed area of Milk-Vita, Bangladesh. All research facilities, including supply of calves, housing, water supply, security etc. were provided by BAUDF. Analysis of the experimental samples was carried out in Animal Nutrition and Dairy Technology Laboratory of the Faculty of Animal Husbandry, Bangladesh Agricultural University (BAU), Mymensingh. All the research activities, conducted at BAUDF, were regularly monitored by Principal Investigator (PI) of the project, officer in charge of the BAUDF and head of the Department of Dairy Science. Moreover, all financial activities regarding purchase of materials were monitored by Bangladesh Agricultural University Research System (BAURES).

During the whole study period a series of experiments were conducted to achieve the objectives of the project. The ingredients, used for preparation of milk replacer, were collected from local markets and analyzed in the Laboratory to know their composition. Different types of milk replacers were prepared by different combination of feed ingredients. Field trials on crossbred calves were conducted to monitor the quality of milk replacers. Parameters used to monitor the quality of milk replacers were growth rate changes in height, length and heart girth of calves. Feed ingredients used for preparation of milk replacer were soy powder, whey powder, barley powder, gram powder, soyabean oil, vit-mineral premix and common salt. The first feeding experiment was conducted to find out the optimum level of protein in milk replacers. The second experiment was conducted to monitor the feasibility of using soymilk as milk replacers for calves. The third experiment was conducted to find out the suitable level of fat in milk replacers. In fourth experiment, the milk replacer used was prepared by considering the optimum level of protein and fat found from the results of 1st and 3rd experiments (22% CP and 10% fat). Feasibility of these milk replacers was monitored in the fourth experiment. In the fifth experiment, attempts were made to measure the effect of partial replacement of whole milk with the prepared milk replacer. Finally in the sixth experiment, a comparison in between the calves raised on milk replacer and traditional feeding, was made at Village level of Baghabari ghat of Milk-Vita.

Result/Output:

Specific Project Objectives(s)	Planned activities performed against each objective	State progress made clearly during the reporting period against each activity	Outputs/results achieved during this period*
1. To develop low cost milk replacer with locally available feed ingredients.	1.1 Purchase of feed ingredients and chemicals 1.2 Laboratory analysis of feed ingredients 1.3 Preparation of milk replacer with different levels of protein content and utilization of soymilk as milk replacer. 1.4 Execution of feeding trails on calves. 1.5 Statistical analysis.	1.1 Feed ingredients and chemicals have been purchased through BAURES and procurement committee. 1.2 Dry matter, crude protein, fat, ash, crude fiber, etc. has been determined for each of the feed ingredients. 1.3 Milk replacer with 18, 20 and 22 % protein were prepared. 1.4 Two feeding trails, one with milk replacer with different level of CP and another with different levels of soymilk have been completed with calves at BAU Dairy Farm. 1.5 Data collected from two experiments have been analyzed statistically.	1. Composition of feed ingredients. 2. Optimum level of protein in milk replacer identified. 3. Soymilk as milk replacer established
2. To evaluate the nutritional status of prepared milk replacer.	2.1 Development of milk replacer with different level of fat. 2.2 Development of milk replacer with selected level of protein and fat based on the results of previous experiments. 2.3 Replacement of whole milk with prepared milk replacer. 2.4 Comparative growth performance of calves reared traditionally and feeding milk replacer under village condition 2.5 Statistical analysis	2.1 Feeding trial with different level of fat (10, 12 and 15%) containing milk replacer has been completed 2.2 Conducted feeding trials on calves with selected level of protein(22%CP) and selected level of fat (10% fat) containing milk replacer 2.3 Animal feeding trial completed. 2.4 feeding trials on calves under village condition completed. 2.5. Statistical analysis completed.	1. Optimum level of fat in milk replacer established 2. Milk replacer with high nutrient content established.
3. To improve the skill of farmers and also to assess the economies of feeding milk replacer.	3.1 Cost of milk replacer 3.2 Training of farmers 3.3 Conducting workshop	3.1 Cost of milk replacer was calculated on the basis of market price of ingredients used 3,2 Farmers training completed 3.3 Workshop conducted.	1. Low cost milk replacer 2. Trained farmers

Benefit/Outcome: Following benefit/Outcome accrued from this study.

Nutritional benefit
Calves, raised on the developed milk replacer, having proper nutrient contents, grew healthy with least mortality and full genetic potentiality.

Economic benefit
Raising of calves on developed milk replacer reduced cost of rearing.

Social benefit
Awareness regarding the use of newly developed cost effective milk replacer makes calves rearing profitable and in turn helps farmers improving livelihood.

High light of research findings:
Followings are the important findings of the project.

- Milk replacer containing 22% crude protein and 10% fat was found optimum for rearing calves in our climatic condition.
- Prepared milk replacer was cheaper than liquid whole milk of cows.
- Cost of production of 1 kg milk replacer in powder form was Tk. 91.00 to 103.00 but for liquid form was only Tk. 11.50 to 12.75.
- Soymilk alone could be used to feed calves as milk replacer. However, a combination of 50% soy milk and 50% liquid whole milk showed slightly better performance.
- Forty dairy farmers, including male and female, were trained on importance and use of milk replacer for their dairy calves.

Recommendation:

- Advocacy should be carried on for raising calves on developed milk replacer.
- Feed manufacturing companies should come forward to market this product.
- Further research works are necessary to establish level and frequency of feeding milk replacer for optimum growth of calves.
- Research funding organization like Krishi Goveshana Foundation (KGF), SPGR, BARC, etc. should provide more grants and encourage this type of research work for dairy development of the country.

Expected Impact:

As the milk replacer is cheaper than whole milk and ensures proper calves' growth, farmers will be interested to raise calves on milk replacer. Calves will get adequate nutrition during their early life and will be able to show their full genetic potentials for milk production. Hence, good quality dairy replacement stocks will be available and more people will come forward to establish dairy farms. So, milk production of the country will be increased, farmers will be economically benefited and the nation will get high quality food for development and proper nourishment. Finally, we will get a healthy nation.

Note: This bulletin has been prepared based on a completed CGP Project entitled "Development of low cost milk replacer with locally available feed ingredients for rearing calves" implemented under GoB-World Bank funded NATP: Phase-I

December 2012

KRISHI GOBESHONA FOUNDATION

A non-profit foundation to support CGP for agricultural research

National Agricultural Technology Project (NATP): Phase - 1, GOB/IDA; REG. No. C - 684(05)/07

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প্রযুক্তি বার্তা

মে ২০১৩

বৃহত্তর রংপুর অঞ্চলে খাদ্য নিরাপত্তা ও কর্মসংস্থান বৃদ্ধিতে নিবিড় ফসল চাষাবাদ

কৃষি গবেষণা ফাউন্ডেশন
বিএআরসি ক্যাম্পাস, ফার্মগেট, ঢাকা-১২১৫, টেলিফোনঃ ৮৮০-২-৯১১১০৪১, ৮১৫৩৮৭২
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বাংলাদেশের উত্তরাঞ্চলের পাঁচটি জেলা যথা: গাইবান্ধা, রংপুর, নীলফামারী, লালমনিরহাট ও কুড়িগ্রাম জেলায় এপ্রিল-মে এবং সেপ্টেম্বর-নভেম্বর মাসে কৃষক ও কৃষি শ্রমিকদের কাজের অভাবে আয়-রোজগার না থাকায় এই সময় তীব্র খাদ্য সংকট দেখা দেয়। এই মৌসুমী কাজের অভাবজনিত খাদ্য সংকটকে স্থানীয়ভাবে মঙ্গা বলা হয়। এই অঞ্চলের অধিকাংশ মানুষ প্রধানত: কৃষিকাজ এবং কৃষি শ্রমিকের কাজের মাধ্যমে তাদের জীবিকা নির্বাহ করে থাকে। দেশের অন্যান্য অঞ্চলের চেয়ে বৃহত্তম রংপুর অঞ্চলে কৃষি শ্রমিকের সংখ্যা বেশি। এই অঞ্চলের ফসল আবাদ মূলত: ধানভিত্তিক। অধিকাংশ কৃষক মধ্যম উঁচু জমিতে আমন ধান চাষ করে। সাধারণত: আগষ্ট মাসের শেষ দিকে ধানের চারা রোপন করা হয় এবং ডিসেম্বর মাসের প্রথম ভাগে ধান কাটা হয়। আমন ধানের চারা রোপন ও ধান কাটার মধ্যবর্তী এই দীর্ঘ সময়ে মজুরদের কোন কাজ থাকে না। তাই সেপ্টেম্বর-নভেম্বর মাসে একটি মঙ্গা দেখা দেয়। আমন ধান বিলম্বে কাটার দরুণ স্বাভাবিকভাবেই পরবর্তী রবি ফসল আলু/গম আবাদে বিলম্ব ঘটে। নাবী চাষাবাদের ফলে এসব রবি ফসলের ফলন কম হয়। ফলন কম হওয়ার কারণে অধিকাংশ সময় রবি ফসল আবাদ না করে জমি পতিত রাখা হয়। মার্চ মাসের শেষ ভাগে রবি ফসল তোলার পর থেকে আমন ধানের চারা রোপনের কাজ শুরু হওয়া পর্যন্ত সময় জমি পতিত থাকায় এই সময়ও কৃষি মজুরদের কোন কাজ থাকে না। এই কারণে এপ্রিল-মে মাসেও আর একটি মৌসুমী মঙ্গা দেখা দেয়। এপ্রিল-মে মাসের মঙ্গার চেয়ে সেপ্টেম্বর-নভেম্বর মাসের মঙ্গা তীব্রতর হয়। খাদ্য নিরাপত্তা নিশ্চিতকরণ ও পুষ্টির চাহিদা পূরণে মঙ্গা একটি বড় সমস্যা। মঙ্গাপীড়িত অধিকাংশ মানুষ অনাহারে-অর্ধাহারে দিন কাটায়। তাছাড়া তারা চরম অপুষ্টিতেও ভোগে এবং শিশুরাই সবচেয়ে বেশি এই অপুষ্টির শিকার হয়।

নিবিড় ফসল চাষাবাদ পদ্ধতি উদ্ভাবন

বর্ণিত অবস্থার প্রেক্ষাপটে কৃষি জমির সর্বোত্তম ব্যবহারের মাধ্যমে ফসলের উৎপাদনশীলতা বাড়িয়ে মঙ্গা দূরীকরণ তথা খাদ্য সংকট নিরসন, কৃষকদের অর্থনৈতিক উন্নয়ন এবং কৃষি মজুরদের বছরব্যাপী কাজের নিশ্চয়তা বিধানের উপর কৃষি গবেষণা ফাউন্ডেশন গুরুত্ব আরোপ করে। তৎপ্রেক্ষিতে কৃষি গবেষণা ফাউন্ডেশনের আর্থিক ও কারিগরি সহায়তায় বঙ্গবন্ধু শেখ মুজিবুর রহমান কৃষি বিশ্ববিদ্যালয় (বিএসএমআরএইউ) এবং রংপুর-দিনাজপুর রুরাল সার্ভিস (আরডিআরএস) যৌথভাবে একটি গবেষণা প্রকল্প বাস্তবায়ন করে। বঙ্গবন্ধু শেখ মুজিবুর রহমান কৃষি বিশ্ববিদ্যালয়ের কৃষিতত্ত্ব বিভাগের অধ্যাপক ড. মোঃ মঈনুল হক এ গবেষণা কর্মকান্ডে মূখ্য গবেষক হিসাবে নেতৃত্ব দেন। মে ২০০৯ থেকে মে ২০১১ এই দুই বছর মাঠ পর্যায়ে ব্যাপক পরীক্ষা-নিরীক্ষার মাধ্যমে বৃহত্তর রংপুর এলাকায় চাষাবাদের উপযোগী একটি নিবিড় ফসল চাষাবাদ প্যাকেজ/প্রযুক্তি উদ্ভাবন করা হয়।

উদ্ভাবিত নিবিড় ফসল চাষাবাদ প্রযুক্তির সংক্ষিপ্ত বিবরণ

- নিবিড় ফসল চাষাবাদ পদ্ধতি উদ্ভাবনের লক্ষ্যে গবেষণা প্রকল্পটি পাঁচটি জেলার ৯ টি উপজেলায় বাস্তবায়ন করা হয়। উপজেলাগুলো হলো: গাইবান্ধা জেলার সাদুল্লাহপুর উপজেলা, রংপুর জেলার গঙ্গাচড়া ও সদর উপজেলা, নীলফামারী জেলার কিশোরীগঞ্জ ও সদর উপজেলা, লালমনিরহাট জেলার কালিগঞ্জ ও সদর উপজেলা এবং কুড়িগ্রাম জেলার ফুলবাড়ী ও সদর উপজেলা। এই গবেষণা কার্যক্রমের সঙ্গে ১০০ জন কৃষক সম্পৃক্ত ছিলেন।

- কৃষকের জমিতে সরেজমিনে পরীক্ষা-নিরীক্ষার মাধ্যমে প্রচলিত ফসল বিন্যাসের চেয়ে একটি নিবিড় ও উন্নতর ফসল বিন্যাস উদ্ভাবন করা হয়।
- এ এলাকায় বেশি প্রচলিত ফসল বিন্যাস হলো: খরিফ-২ মৌসুমে দীর্ঘমেয়াদী আমন ধান আবাদ এবং তার পর রবি মৌসুমে নাবী আলু/গম আবাদ।
- নিবিড় ফসল চাষাবাদ পদ্ধতিতে ২টি ফসল যথা: দীর্ঘ মেয়াদী আমন ধান ও একটি রবি ফসল (প্রধানত আলু/গম) এর পরিবর্তে ৩টি ফসল যথা: স্বল্প মেয়াদী আমন ধান-আগাম আলু/গম-মুগ কলাই আবাদ পদ্ধতি উদ্ভাবন করা হয়। নিবিড় ফসল বিন্যাসে সময় মত রবি ফসল আবাদ এবং একটি বাড়তি ফসল (গ্রীষ্মকালীন মুগ) আবাদের লক্ষ্যে প্রচলিত দীর্ঘ মেয়াদী আমন (স্বর্ণা অথবা বিআর-১১) এর পরিবর্তে আগাম আমন জাত বিইউ ধান-১ ও বাড়তি ফসল হিসাবে বিইউ মুগ-৪ আবাদ করা হয়। স্বল্পমেয়াদী মুগ (বিইউ মুগ-৪) মার্চ-এপ্রিল মাসে বপন করে মে মাসের মধ্যে ফসল তোলা হয় এবং জুলাই মাসের শেষার্ধে স্বল্প মেয়াদী আমন ধান বিইউ ধান-১ রোপণ করে অক্টোবর মাসের মধ্যে ধান কাটা হয়। অক্টোবর মাসের মধ্যে আমন ধান কাটার পর আগাম আলু/গম আবাদ করা যায়। আগাম আলু চাষ করে অধিক ফলন ও প্রিমিয়াম মূল্য পাওয়া যায়। আলু/গম তোলার পরেও গ্রীষ্মকালীন মুগ আবাদের জন্য যথেষ্ট সময় থাকে।
- উদ্ভাবিত নিবিড় ফসল চাষাবাদের জন্য ফসল বিন্যাসের অন্তর্ভূক্ত সকল ফসল চাষাবাদে আধুনিক চাষাবাদ পদ্ধতি অনুসরণ করাতে হবে। সুপারিশকৃত ফসল বিন্যাসের অন্তর্ভূক্ত বিইউ ধান-১, আলু/গম ও বিইউ মুগ-৪ চাষাবাদে এ সকল ফসলের জন্য অনুমোদিত মাত্রায় বীজ/চারা ও সার ব্যবহার করতে হবে। ফসলের রোগ-বালাই, পোকা-মাকড় সময়মত দমনসহ সকল প্রকার অন্তবর্তীকালীন পরিচর্যা করতে হবে।

নিবিড় ফসল চাষাবাদ প্রযুক্তির সুফল ও আর্থ-সামাজিক অবস্থার উন্নয়নে অবদান

উদ্ভাবিত নিবিড় ফসল চাষাবাদ পদ্ধতিতে প্রচলিত পদ্ধতির তুলনায় নিম্নোক্ত সুবিধাদি রয়েছে;

১. ধানের ফলন ৮.৪ শতাংশ, আলুর ফলন ১৯.২ শতাংশ এবং গমের ফলন ১৩ শতাংশ বৃদ্ধি পায়।

২. হেক্টর প্রতি ৬৬৭ কেজি মুগ ডাল বাড়তি ফসল হিসাবে পাওয়া যায়। বাড়তি ফসল আবাদের দরুন ফসল আবাদের নিবিড়তা বৃদ্ধি পায়।

৩. প্রচলিত পদ্ধতির তুলনায় এ পদ্ধতিতে হেক্টর প্রতি ৭৭,৪৬৬/- টাকার নীট মুনাফা অর্জিত হয়।

৪. রবি ফসল আলু/গম আবাদের পর বাড়তি ফসল মুগ ডাল আবাদের জন্য কৃষি শ্রমিকদের হেক্টর প্রতি ১২২ শ্রম ঘন্টা কর্ম-সংস্থানের সুযোগ সৃষ্টি হয়।

৫. প্রচলিত ফসল বিন্যাসে এপ্রিল-মে মাসে কৃষি শ্রমিকদের হাতে কোন কাজ থাকে না। নতুন ফসল বিন্যাসে ফসল আবাদের নিবিড়তা বৃদ্ধি পায় বলে সারা বছরব্যাপী কৃষি শ্রমিকরা কাজের সুযোগ পায়। তাই উদ্ভাবিত নতুন ফসল চাষাবাদ প্রযুক্তি কর্মসংস্থান সৃষ্টি, দরিদ্র কৃষক ও কৃষি শ্রমিকদের খাদ্য নিরাপত্তা নিশ্চিতকরণ ও জীবনযাত্রার মানোন্নয়নের জন্য দারুণ ফলপ্রসূ।

BSMRAU/RDRS/KGF পরিচালিত গবেষণার মাধ্যমে উদ্ভাবিত আগাম ও স্বল্প মেয়াদী উচ্চ ফলনশীল আমন ধান-আলু/গম-মুগ এর সমন্বয়ে গঠিত এ উন্নতর ও নিবিড় ফসল আবাদ পদ্ধতি মাঠ পর্যায়ে দ্রুত সম্প্রসারণ করা একান্ত প্রয়োজন। এ পদ্ধতির সফল ও দ্রুত বাস্তবায়ন উত্তরাঞ্চলে শস্য আবাদের নিবিড়তা ও উৎপাদনশীলতা বৃদ্ধি এবং কর্মসংস্থান সৃষ্টির মাধ্যমে মৌসুমী মঙ্গা প্রতিরোধ ও কৃষকদের জীবনযাত্রার মানোন্নয়নে কার্যকর ভূমিকা রাখবে মর্মে আশা করা যায়।

NATP-WB এর অর্থায়নে KGF এর CGP গবেষণা প্রকল্পের ফলাফলভিত্তিক প্রযুক্তি প্রফেসর ড. মোঃ মঈনুল হক এর নেতৃত্বে BSMRAU তে ২০০৯-২০১১ সনে বাস্তবায়ন করা হয়।

III. D. WORKSHOP/TRAININGS/COORDINATION MEETINGS AND REVIEWS.

Krishi Gobeshona Foundation (KGF) organized a number of Training, Workshop, Coordination meeting, expert consultation, review workshops etc. for better management and implementation of the projects running with the technical and financial support of KGF. In total 10 training programs, two review workshops and one half yearly coordination meeting were organized by KGF in the year 2014. The two review workshops were held in connection with the submission of Project Completion Report. One 3rd half yearly coordination meeting was held for the CGP 2nd call projects which were supposed to be completed by the end of 2014. Relevant people from NARS Institutes, DAE, DLS, DoF, BWDB, BADC, Universities and NGOs along with the respective PIs and or Coordinators participated in the above mentioned occasions. The respective expert reviewers participating in the half yearly coordination meeting made their valuable comments and suggestions for the improvement of the respective projects.

During the year 2014 KGF organized 5 training workshops for the scientists of the NARS. These programs mostly addressed different issues developing in the country in connection with climate change. The trainees were trained on crop modeling and handling IDRISI and GIS programs. In addition to this, they were also trained on research planning and research proposal writing. All together 85 scientists of different research organizations had these opportunities of getting themselves prepared for future research works.

List of Workshops/Trainings/Meetings organized under KGF

Sl. No.	Name of training	Duration	Venue	No. of Participants	Resource person
1.	First half yearly coordination workshop on CGP projects KGF BKGET 1st Call	4th Feb. 2014	Training Room, BARC, Dhaka	50	PIs & Scientists of Relevent Project
2.	Consultation workshop on research and development programme for less water requiring production system in drought prone environment.	22 March, 2014	Conference Room-1, RDA Bogra	80	
3.	Consultative workshop on research and development programme for less water requiring production system in drought-prone environment.	16th April 2014	Training Room, BARC, Dhaka	45	Dr. Zainul Abedin Former IRRI Representative in Bangladesh & FSR Specialist.
4.	3rd half yearly coordination workshop on CGP phase II, (2nd Call) projects.	19 April 2014	Training Room, BARC, Dhaka	14	
5.	Training workshop on modeling climate change impact on Bangladesh	07-19 June, 2014	BRAC-CDM, Savar, Dhaka	27	Dr. Navin Kalra, Soil Physicist, Head, Unit of Simulation & Informatics, IARI, India

6.	1st annual project review workshop under KGF-BKGET funding	15th June 2014	Training Room BARC, Dhaka	65	PIs & Experts.
7.	Training workshop on research planning and proposal writing	22-27 June, 2014	BRAC-CDM, Rajendrapur, Gazipur	20	Mr. Andrew Jenkins, Coordinator, Impact Assessment Unit, RED, BRAC, Mr. S. M. Mustafizur Rahman, Faculty Member, BLD, BRAC, Dr. Fakir Md. Yunus, Res. Assoc., RED, BRACMr. Alamgor Cowdhury Consultant, BRAC, Dr. M. Sirajul Islam Coordinator, Agril. Programme, BRAC, Mr. Ni Ratan Hatder, SPM, BEP, BRAC
8.	Expert consultation and policy workshop on modeling climate change impact on Agriculture and developing mitigation and adaptation strategies for sustaining Agricultural production in Bangladesh	1st July 2014	Conference Room-1, BARC, Dhaka	45	
9.	Review workshop on project completion report for CGP Phase-I Projects (2nd Call)	6-7 August 2014		80	NARS Scientist
10.	Training workshop on crop growth modeling of mungbean, and mustard using infocrop and WOFOST	19-23 August, 2014	BRAC-CDM, Savar, Dhaka	15	Dr. Navin Kalra, Soil Physicist, Head, Unit of Simulation & Informatics, IARI, India
11.	Training workshop on crop growth modeling of chickpea, maize, jute and sugarcane using DSAAT	26-28 August, 2014	BRAC-CDM, Savar, Dhaka	11	Dr. Navin Kalra, Soil Physicist, Head, Unit of Simulation & Informatics, IARI, India
12.	Hands-on training workshop on IDRISI and GIS	30 August-02 September	BRAC-CDM, Savar, Dhaka	12	Dr. Navin Kalra, Soil Physicist, Head, Unit of Simulation & Informatics, IARI, India
13.	Review workshop on project completion report for CGP phase-II projects (2nd Call)	23-24 Novemebr 2014		80	Participants from NARS DAE, DLS

IV. GOVERNANCE, FINANCE AND AUDIT

A. Governance:

KGF operates under the overall guidance and supervision of the Board and General Body of the Foundation. During the reporting period Board had meetings for reviewing project proposals, reviewers' reports and approving projects and providing necessary guidelines for effective implementation of the CGP projects and operation of KGF. Some of the Board members were kind enough to remain present during the Review Meetings and Workshops organized for the CGP implementation.

During the period, 4 Board meetings, and 2 AGM and 1 an EGM (6th AGM for the year 2012 held on 24 Jan.2013 and 7th AGM for the year 2013 was held on 22 February 2014 and also an EGM was held on the same day) were held for providing strategic policy direction to KGF operations and management. In the general meetings annual budget, finanacial expenditures and audit reports were approved.

B. Financial Progress:

Financial Progress and Budget of KGF:

(i) KGF NATP fund: Annual and supplementary (revised) budget and financial progress.
(ii) KGF BKGET fund: Annual budget and financial progress

Financial Progress of KGF:

This is in reference to the KGF Memorandum and Articles of Association clause no. 18 (page no.-11) and clause no. 78-89 (page no.-20). It was inter-alia indicated that the General Body approved the annual budget and supplementary budget with expenditure.

NATP fund: Annual and supplementary (revised) budget and financial progress for year 2012-2013:

Under NATP: Phase-I project for FY: 2012-2013, the ADP allocation was Tk.1020.00 lakh and revised budget allocation was Tk. 976.07 lakh. Financial progress of KGF unit under NATP Phase-1 was 95.69% against RADP (supplementary budget). The budget and expenditure were approved by the General Body.

NATP fund: ADP budget and expenditure for the FY: 2013-14:

The budget allocation for ADP 2013-14 was kept by PCU/MoA at Tk. 2255.00 lakh. Financial progress of KGF unit under NATP Phase-1 was Tk. 498.86 lakh up to January 2014. The proposed RADP, which was the actual requirement of KGF was Tk. 1144.00 lakh for FY 2013-14. The progress up to January 2014 was 44% based on proposed RADP. The budget and expenditure for the FY 2013-14 are shown in ***Annex-2***.

KGF BKGET fund: Financial progress: Budget and Expenditure for the year 2013, 2014 and 2015:

KGF received a pay order for Tk. 500 lakh for the 1st instalment from the BKGET on 01.08.2012 against an annual (2012-13) allocation of Tk. 1000 lakh. KGF Board meetings held in August and December 2012 provided strategic guidance for implementation of KGF programs under BKGET fund. So, upon approval of KGF Board in December 2012. KGF actually started implementation of programs under the Trust fund mainly from 2013 January.

Financial progress under KGF BKGET fund for the year 2013 was Tk. 714.40 lakh and progress was about 71% (up to January 2014). The annual (2014-15) budget recommended by the Board was Tk. 2200

lakh. Budget and progress for the 2013 were placed and approved by the General Body. BKGET funded budget and progress for the year 2013 and 2nd year annual budget (2014-15) are shown in ***Annex-3 and 3(i).***

C. Audit Report:

KGF Audit: NATP Fund

(i) GF NATP audited by FAPAD for FY 2011-12

(ii) GF NATP audited by M/s. J.U. Ahmed & Co. for FY 2011-12 appointed by PCU.

(ii) KGF NATP audited accounts for FY 2011-12 by M/s. Rahman Mostafa Alam and Co. appointed by KGF.

(iv) Appointment of Audit Firm for FY 2012-13 for auditing both KGF NATP & KGF BKGET funded expenditures.

Accounts & audit function of the foundation shall be regulated in accordance with clause no. 78-89 of Memorandum and Articles of Association of KGF. As per function of the foundation, the General Body approve balance sheet for FY 2011-12 audited by **M/s. Rahman Mostafa Alam and Co.** The report is given in the ***Annex-4***.

KGF NATP fund: Audited for FY: 2011-2012 by FAPAD:

As per requirement of the Govt. fund, Foreign Aided Project Audit Directorate (FAPAD) audited the Project Financial Statements of KGF NATP Unit for the financial year (FY) ended 2011-12. During the course of audit examination for FY 2011-12, the audit team made 04 numbers of observations and those were settled. FAPAD also completed audit for FY 2012-13 without any objection/observation. But the final report is not yet available.The audit report for FY 2011-12 was approved of the General Body.

KGF NATP fund: Audited for FY: 2011-2012 by M/s. J.U. Ahmed & Co. appointed by PCU:

As per requirement of the Project Co-ordination Unit (PCU), **M/s. J.U. Ahmed & Co.** has audited the project financial statements of KGF NATP Unit for the financial year (FY) ended 2011-12. During the course of audit examination for FY 2011-12, the audit team made 34 numbers of observations including mostly CGP projects and those were settled. All the audit observations were settled through the exist meeting. The audit report for 2011-12 was approved of the General Body.

J.U. Ahmed & Co. also audited the KGF accounts for FY 2012-13 with some observations mostly for CGP projects. An exit meeting was held on 11 February, 2014 settling all the observations.

KGF NATP audited accounts for FY 2011-12 by M/s. Rahman Mostafa Alam & Co. appointed by KGF.

As per requirement of the KGF, M/s. Rahman Mostafa Alam & Co. has audited the Project Financial Statements of KGF NATP unit for the financial year (FY) ended 2011-12. As per the KGF Memorandum and Articles of Association clause no. 18 (page no.-11) the General Body is requested to approve the Audited Accounts given in ***Annex-5*** audited by M/s. Rahman Mostafa Alam and Co. for FY 2011-12. During the course of audit, the audit team made some minor suggestions which were taken care of properly. The audited accounts for FY 2011-12 were approved by the General Body of KGF.

V. KEY LESSONS LEARNED AND WAY FORWARD

Targeting awarding and implementing CGP sub-projects with year-wise break-up as outlined in the PAD proved to be unrealistic. Generally sub-projects proposed to be offered in the third year is less likely to be completed to deliver outputs within the project period.

WB Mission suggested offering a few 'mega projects' to create greater impact instead of dozens of smaller projects. KGF in the second call offered larger sized coordinated projects involving multiple organizations. Experiences suggest that coordination being difficult, implementation of coordinated projects resulted no better outcomes, in terms of quantity and quality of deliverables, than in smaller sub-projects.

Institutional capacity of fisheries and livestock sectors is inadequate to develop and effectively implement CGP projects and ultimately failed to produce any tangible impacts.

VI. LIST OF THE ANNEXES:

Annex-1(i) List of CGP/ NATP Projects (Call 1, Phase-I)
Annex-1(ii) List of CGP NATP Projects (Call 1, Phase-II)
Annex-1 (iii) List of CGP NATP Projects (Call 2, Phase-I)
Annex-1 (iv) List of CGP NATP Projects (Call 2, Phase-II)
Annex-1 (v) List of CGP NATP Pilot Project
Annex-1 (vi) List of CGP BKGET Projects.
Annex-2 Commissioned Research Program (CRP) under KGF BKGET fund
Annex-3 Financial Prgresss for the Financial Year 2013-14 under KGF NATP Fund
Annex-4 Revised Annual Budget and Financial Progress for the Financial Year 2013 Statement of Expenditure (SOE) up to january under KGF BKGET Fund
Annex-4(i) Approved Annual Budget for the Year 2014 and 2015 under KGF BKGET Fund
Annex-5 Audited Accounts Report: Rahman Mostafa Alam & Co. Ltd for Financial year 2011-12
Annex-6 The KGF Organogram
Annex-7 List of Members of General Body and Board of Directors of KGF
Annex-8 List of the KGF Expert Professionals

Annex-1 (i)

1st Call

List of CGP Phase-I Projects of 1st Call

Serial No.	Code and Title of the project	Name of PI and Address
Climate change		
1.	C-CC-129: Assessing the long term impacts of climatic vulnerabilities on crop production and evaluation of adaptation practices in the vulnerable areas of Bangladesh	Dr. Moslem Uddin Miah, Senior Agriculture Specialist, Bangladesh Centre for advanced studies. House-10, Road-16/A, Gulshan-1, Dhaka-1212, 01711591066
Coastal Agriculture		
2.	C-CA-117: Adaptation of suitable crops in saline soils of Noakhali	Dr. Mohammad Amin, Principal Scientific Officer,OFRD, Bangladesh Agricultural Research Institute, Maijdi Bazar, Noakhali, 01819803229
Database development		
3.	F-DD-240: GIS and Remote Sensing database for Spatial decision support system for sustainable shrimp culture in South-West coastal region of Bangladesh	Dr. S.M. Bazlur Rahman, Associate Professor, , Fisheries and Marine Resource Technology Discipline, Khulna University, Khulna- 9208, 01914325048
Diagnosis and diagnostic		
4.	L-DD-232: Molecular characterization of poultry salmonellae and production of fomalin killed pullorum disease vaccine using local isolate in Bangladesh	Dr. Makbul Hossain, Deptt. of Pathology, Bangladesh Agricultural University, Mymensingh-2202, 01715154694
Farm machinery		
5.	C-FM- 163: Development of small scale electric powered oil expeller suitable for adaptation among the rural farmers' in Bangladesh	Prof. Dr. Md. Daulat Husain, Department of Farm Power and Machinery, Bangladesh Agricultural University, Mymensingh-2202, 01716411105
Farm Productivity Enhancement		
6.	C-FPE-049: Wider adaptation of modern rapeseed, mustard and sesame varieties with production technology for yield gap reduction	Dr. Md. Ali Akbar, Executive Director, Agrarian Research Foundation, House-48, Road-5, Pisciculture Housing Society, Dhaka-1207, 01731628722
7.	C-FPE-054: Up - scaling of integrated rice - duck farming in Bangladesh: Improvement of rural livelihood through community approach	Dr. Sk. Tanveer Hossain, Maneger, , Padakhep Manabik Unnayan Kendra, House-548, Road-10, Baitul Aman Housing Society, Adabar, Dhaka-1207, 1730026955
8.	C-FPE-055: Impact of rice - wheat/potato mungbean cropping system on farmers employment opportunity, food security and livelihood in selected monga prone areas in northern districts of Bangladesh	Dr. M. Moynul Haque, Professor, Deptt. of Agronomy, Bangabandhu Sheikh Mujibur Rahman Agricultural University,, Salna, Gazipur-1706, 01711908640
Health management		
9.	L-HM-214: Study of herd health management practices for Ruminants in Bangladesh	Dr. Sayed Anwar Hossain, Livestock Advisor, Social Upliftment Society (SUS), 76/A Uttarpara, Savar, Dhaka, 01715 0222 67
10.	L-HM-219: Improving Livelihood through Herd Health Management and	Dr. Md. Golam Shahi Alam, Professor, DSO, Faculty of Veterinery Science, Bangladesh

Serial No.	Code and Title of the project	Name of PI and Address
	Milk market access to poor farmers living in the northern Bangladesh	Agricultural university, Mymensingh-2202, 01199288630
High Value		
11.	C-HV-194: Assessment of effectiveness of IPM practices for pest management in Brinjal	Kbd. Rafiqul Haider, Programme Advisor, SEDA, Rebeca Cottage, Mashkanda, Mymensingh, 01715022673
12.	C-HV-197: Standardization of production practices and technology transfer of BARI Strawberry-1	Munshi Rashid Ahmed, SSO, Pomology Division, Horticultural research Centre, Bangladesh Agricultural Research Institute, Gazipur-170
13.	C-HV-202: Global market analysis for production and export potentials of high value crops in Bangladesh	Mr. Abdur Rashid, Senior, Research Fellow, Agrarian Research Foundation, House-48, Road-5, Pisciculture Housing Society, Mohammadpur, Dhaka-1207, 01919282978
Hill Farming		
14.	C-HF-103: Validation of improved agricultural technologies at farmer's field in hill farming system	Dr. Md. Mohabbat Ullah, Principal Scientific Officer, Hill Agril. Research Station, Bangladesh Agricultural Research Institute, Khagrachhari
15.	C-HF-104: Ecological determinants of bamboo flowering and rodent population outbreacks in the Chittagong Hill Tracts	Dr. Nazira Q. Kamal, , AID –Comilla, Vill.-Raghupur, P.O.-Rajapara, Union-Jagannathpur, Upazilla- Comilla Sadar, Comilla. 01713018973
Marketing and supply chain		
16.	SE-MSC-266: Processing of indigenous fruits and vegetables to improve livelihood of rural poor in Madhupur Region	Professor Dr. Md. Shams-Ud-Din Department of Food Technology & Rural Industries, Bangladesh Agricultural University (BAU), Mymensingh
17.	SE-MSC-279: Promotion of Agricultural Marketing in Hills	Md. Badrul Alam, , International Development Enterprises, House-28 (3rd floor), Road-130, Gulshan-1, Dhaka-1212, 01711591613
18.	SE-MSC-285: Capacity building of the farmers through exporting comparative advantaged horticultural products	Md. Kamruzzaman, Associate Professor, Agril. Econ. Division, Bangabandhu Sheikh Mujibur Rahman Agricultural University, Salna, Gazipur-1706, 01712650662
19.	SE-MSC-287: Linking small farmers with supermarkets through promotion of peri-urban agriculture	Md. Moksedur Rahman, Programme Officer, Social Upliftment Society, 76/A Uttar para, Savar, Dhaka- 1340, 01715022673
Post harvest technology		
20.	C-PHT-175: Up-scaling and adoption of hybrid dryer for quality grain seed production	Dr. Md. Ayub Hossain, SSO, FMP, Engineering Division, Bangladesh Agricultural Research Institute, Gazipur-1701, 01716979034
21.	C-PHT-179: Increasing storability of potato in natural storage and income generation through small scale processing of potato	Dr. Md. Azizul Haque, SSO, Tuber Crops Research Sub-center, Bangladesh Agricultural Research Institute, Munshiganj-1500, 01912126302
Seeds and Planting Materials		
22.	C-SPM-092: Quality improvement of farmers stored seeds of mungbean, lentil, chickpea and its relation to diseases development in Bangladesh	Dr. A. H. M. Mahfuzul Haque, SSO, Pulse Research Sub-station, Bangladesh Agricultural Research Institute, Gazipur-1701, 01712154073
23.	C-SPM-096: Seed production of summer onion varieties: Determining Appropriate	Dr. Md. Shawkat Ali Mallik, CSO, Spices Research Centre, Bangladesh Agricultural

Serial No.	Code and Title of the project	Name of PI and Address
	Method and Agro-ecological Condition for Optimal Production	Research Institute, Sibganj, Bogra, 01715527855
Socio-economic		
24.	F-SE-257: Socio-Economics and livelihood development of aqua-products trader in urban and per-urban areas of Khulna Metropolis	Dr. Saifuddin Shah, Vice Chancellor, Khulna University, Khulna-9208, 01711218993
25.	F-SE-290: Factors affecting shifting from food insecurity to food security, A study of selected Monga prone areas	Dr. Ashoke Kumar Ghose, Research and Development Foundation for the Poor Silicon Arcade,, 1/1(B), Mohonpur, Adabar, Ring Road, Shyamoli, Dhaka-1207, 01711189398
26.	F-SE-291: Assessment of techno-Socioeconomic Resources and development of strategies for Promoting food and economic securities of Ethnic communities in Bangladesh	Dr. Md. Abiar Rahman, Asstt. Professor, Deptt. of Agrofroestry and Environment, Bangabandhu Sheikh Mujibur Rahman Agricultural University, Salna, Gazipur-1706, 01552495452
Soils		
27.	C-S-132: Agricultural land loss and food security: An Assessment	Dr. Md. Abul Quashem, Bangladesh Unnayan Parishad, , House-50, Road-8, Block-D, Niketon Gulshan-1, Dhaka-1212, 01715006916
28.	C-S-144: Maximizing yield of tea in some selected problematic Acidic soils through improved management practices	Dr. Quamrul Ahsan, Senior Research Associate, CASEED, House-59, Road-12/A, Dhanmondi, Dhaka-1209, 01715199264
Varietal Improvement and Genetic resources		
29.	C-VI-006 Collection, conservation, characterizations and varietal development of garlic and onion through selection and molecular techniques	Dr. M. A. Rahim, Professor, Deptt. of Horticulture, Bangladesh Agricultural University, Mymensingh- 2202, 01711854471
30.	C-VI-025: Rice germplasm collection and conservation from hilly, coastal, haor and other areas of Bangladesh	Dr. Md. Khairul Basher, CSO & Head, Genetic Resource and Seed Division, BRRI, Gazipur-1701, 01711283982

Annex-1 (ii)

List of CGP Phase-II Projects of 1st Call

Serial No.	Code and Title of the project	Name of PI and Address
Coastal Agriculture		
1.	**C-CA- 109:** Development of appropriate irrigation and water management technologies for increasing and sustaining crop production in the saline coastal area of Bangladesh	Dr. Nazmun Nahar Karim, Principal Scientific Officer, Agricultural Engineering Division, BINA, P.O. BOX-04, Mymensingh-2200, 01715013033.
2.	**C-CA- 113:** Adaptation of improved Sesame varieties in Khulna District optimizing sowing time and Nitrogenous fertilizer management	Dr. Md. Sarwar Jahan, Professor, Agrotechnology Discipline, Khulna University, Khulna-9208, 01712813106
3.	**C-CA- 116:** Improvement of cropping system through introduction of pulse and species crops during the fallow period in Khulna area	Dr. Md. Sirajul Islam, Chief Scientific Officer, OFRD, Regional Agricultural Research Station, BARI, Jessore, 01712142042
Farm machinery		
4.	**C-FM- 173:** Design and development of power tiller for dry and wet crop land cultivation in Bangladesh	Mr. Md. Abdus Satter, Principal Investigator of the project and senior research fellow, CASEED, House-59, Road-12/A, Dhanmondi, Dhaka-1209, 01712082656
Farm Productivity Enhancement		
5.	**C-FPE- 033:** Evaluation of herbicide use in Bangladesh agriculture with special reference to wetland	Mr. Md. Nasimul Bari, Associate Professor, Department of Agronomy, Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur-1706, 01552356277
6.	**C-FPE- 051:** Validation and Up-scaling of Improved Varieties of Mungbean, Blackgram, Groundnut and Sweet Potato in the Char Areas of Jamalpur and Sherpur Districts	Dr. Mrityunjoy Biswas, Senior Scientific Officer, BARI Regional Agricultural Research Station, Jamalpur-2000, Jamalpur 01711240580
7.	**C-FPE- 052:** Productivity Improvement of Acid Soil by Using Dolochun in Northern Bangladesh	Dr. Abdul Hakim, SSO, Wheat Research Centre, BARI, Nsashipu, Dinajpur, 01711788153
8.	**C-FPE- 063:** Determination of factors responsible for yield Gaps in rice and wheat at farmer's field	Dr. M Abul Kashem, Professor, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh-2202, 01711957558
Feed and Fodder		
9.	**L-LM- 227:** Integrated rice/forage production and storage technology increase milk yield of diary cows pf smallholder rural farmers	Dr. M. Ali Akbar, Professor, Department of Animal Nutrition, Bangladesh Agricultural University, Mymensingh, 01711592145
Livestock Marketing		
10.	L-LM- 235:Identifying high risk areas for introduction of Avian Influenza via cross border routes through poultry trading	Dr. M. Harun- Ar-Rashid, Department of Agricultural Economics, BAU, Mymensingh-2202, 01925165211
11.	**L-FF-231:** Development of low cost milk replacer with locally available feed ingredients for rearing calves	Dr. Md. Nurul Islam, Department of Dairy Science, BAU, Mymensingh-2202, 01712621079
Post harvest technology		
12.	**C-PHT- 186:** Small-Scale processing of	Prof. Dr. M Burhan Uddin, Department of

Serial No.	Code and Title of the project	Name of PI and Address
	functional fruits Juices applying enzyme technology	Food Technology and Rural Industries, BAU, Mymensingh2202, 01711110509
13.	**SE-PP- 262:** Employment generation and food accessibility in the Monga regions: An analysis of existing and improved technologies	Dr. M. Mazharul Anwar, SSO, Agricultural Research Station, BARI, Burirhat, Rangpur, 01720660167
Productivity and Profitability		
14.	**SE-PP- 264**: Impact analysis of spices research and extension in Bangladesh	Dr. M. Serajul Islam, Professor, Department of Agricultural Economics, BAU, Mymensingh, 01715028792
15.	**C-FPE-01:** Study of Canker Disease of Citrus and Development of its Management Practices	Dr. Tapan Kumar Dey, Chief Scientific Officer, Plant Pathology Division, BARI Gazipur-1701, 01716122331
Seeds and Planting Materials		
16.	**C-PHT- 177:** Reduction of post-harvest losses of selected horticultural crops through improved handling and packaging	Dr. M. Abdul Baqui, Visiting Professor, Department of Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur-1706, 01713881104
Soils		
17.	**C-S- 135:** On-Farm soil fertility management through IPNS approach	Mr. Dilwar Ahmed Chowdhury, Senior Scientific Officer, On-Farm Research Division, BARI, Joydebpur, Gazipur-1701, 01711318685
18.	**C-S- 149:** Acid soil amendment through liming for improving livelihood of farmers	Mr. Md. Bodruzzaman, Senior Scientific Officer,, Wheat Research Centre, Nashipur, Dinajpur, 01712600518
19.	**C-S- 150:** Validation refinement and dissemination of water management technologies for increasing water use efficiency and rice production	Dr. Md. Nazmul Hassan, SSO, Irrigation Water Management Division, BRRI, Gazipur, 01711431370
20.	**C-S- 156:** Effects of Household wastes on vegetable production in monga area of Bangladesh	Dr. G.K.M. Mustafizur Rahman, Professor, Department of soil science, BSMRAU, Gazipur-1706, 01718186642
21.	**C-S- 161:** Water management practices for increasing cropping intensity in Chapai Nawabganj district of Bangladesh	Dr. Md. Asgar Ali Sarkar, CSO (cc), Agriculture Engineering Division, BINA, P.O. BOX-04, Mymensingh-2202, 01715998145
22.	C-S- 162: Upscaling alternate wetting and drying (AWD) to reduce irrigation cost in high yielding rice production in Tangail, Pabna and Sirajgonj district.	Mr. Md. Monir Uddin, Executive Director, Centre for Integrated Rural and Agricultural Development (CIRAD), Biswas Betka, Dhaka Road, Tangail Mobile: 01711987113
Varietal Improvement and Genetic resources		
23.	**C-VI- 010:** Validation and dissemination of new varieties and advanced lines for increasing the productivity of lentil, chickpea, mungbean and blackgram in the northern region of Bangladesh	Dr. Md. Jalal Uddin, Chief Scientific Officer, Pulses Research Centre, Regional Agricultural Research Station, BARI, Ishurdi, Pabna-6620, 01720620621
24	**C-VI- 015:** Collection and conservation of indigenous vegetable germplasm	Dr. Md. Khaled Sultan, CSO, Plant Genetic Resources Centre, BARI, Gazipur-1701, 01921857809

2nd Call

Type of CGP Project Phase-I (2nd Call)

Sl. No.	Project Code and Title	Name of the PI
01.	**C-1.12** : Rice Production in Drought Prone Areas of Bangladesh	**Coordinator:** Dr. Md. Safiul Islam Afrad, Associate Professor, Dept. of Agri. Extension and Rural Development. BSMRAU, Tel: 9205310-14 Ext.-2054(O), Fax: 9205333, Cell: 01712-584820, Email: afrad69@gmail.com/ safiulislamafrad@yahoo.com
02.	**C-1.21 :** Yield gap minimization in rice using Integrated Crop and Resource Management (ICRM) practices at selected locations in Bangladesh	**Coordinator:** Dr. M. Safiqul Islam Mamin, PSO & Head Adaptive Research Division, BRRI, Gazipur, Phone:9256873, Cell: 01711-075486, Email: msimamin@yahoo.com
03.	**C-2.11 :** Crop intensification in northern region of Bangladesh through up-scaling the production of short duration rice and mungbean	**PI:** Dr. M. Moynul Haque, Prof. Dept. of Agronomy, BSMRAU, Gazipur, Phone: 9205310-14, Fax: 9205333, Cell: 01711-908640, Email: moynul60@yahooc.com
04.	**C-2.20 :** Development of Intensive Cropping System in Two Coastal Districts for Increasing Production	**Coordinator:** Prof. Dr. Md. Harun-or-Rashid, Agronomy Department, PSTU, Dumki, Patuakhali-8602, Cell: 01552-429714, Email: mhrashid_pstu@yahoo.com
05.	**C-3.1 :** Validation and up-scaling of maize after T. Aman rice in two southern districts.	**Coordinator:** Dr. M. Jalal Uddin Sarkar, CSO and Head, OFRD, Joydebpur BARI, Gazipur-1701 Fax: 9261415, Cell: 0176-2010797, Phone: 9252085 Email: ofrdjoy@yahoo.com
06.	**C-4.1 :** Intensification of rice based cropping system incorporating short duration oilseed mustard varieties	**Coordinator:** Prof. Dr. Lutful Hassan, Department of Genetics & Plant Breading, BAU, Mymensingh-2202, Tel: 091-52268, Cell: 01715-091096, Email:lutfulhassan@yahoo.co.uk
07.	**C-4.9 :** Yield gap reduction through short duration rapeseed-mustard and sesame varieties under existing cropping system	**PI:** Dr. Md. Abdul Latif Akanda, SSO (Plant Bleeding), Oilseed Research Centre, BARI, Gazipur-1701, Cell: 01716-335626, Email: alatifakanda@gmail.com
08.	**C-5.5 :** Variety Selection and Integrated Crop Management for Yield Gap Minimization in Mustard and Sesame in the High Ganges River Floodplains	**Coordinator:** Dr. Md. Sirajul Islam, PSO, On-Farm Research Division (OFRD), RARS BARI, Jessore, Cell: 01712-142042, Email: sirajpso@yahoo.com
09.	**C-6.8 :** Validation and up-scaling of mungbean and lentil technologies in the rice based cropping system in Bangladesh	**Coordinator:** Dr. Md. Ashraf Hosain, PSO, Pulses Research Center, BARI, Joydebpur, Gazipur-1701 Cell: 01712-948871, Email: ashrafbd61@yahoo.com
10.	**C-6.9 :** Validation and up-scaling of improved pulse production technologies for crop intensification	**Coordinator:** Dr. Md. Harunor Rashid Senior Scientific Officer Regional Agricultural Research Station Rahmatpur, Barisal Cell: 01915-345460, Email: md_harunor_rashid@yahoo.com

Sl. No.	Project Code and Title	Name of the PI
11.	**C-7.12:** Standardization of protocol, and in vitro production of BARI kala-3 & BARI kala-4 plantlets and their validation trial at hilly areas	**PI:** Mst. Dilafroza Khanam, PSO, Bio-technology Division, BARI Gazipur, Phone: 9261509, Cell: 01673-900311, Email: khanammarry@gmail.com
12.	**C-9.6 :** Rhizome Rot Disease of Ginger and Its Management	**PI:** Dr. Mahbub Uddin Ahmed, PSO, Plant Pathology Division, BARI, Joydebpur, Gazipur, Cell: 01557-615836, Phone: 9256854 Email: mahbubpso@yahoo.com
13.	**C-11.1 :** Management of coconut mite	**PI:** Dr. Md. Nazirul Islam, PSO Horticulture Research Station Mojlishpur, Shibpur, Narshingdi Cell: 01715-855239, Email: nazirhrc@yahoo.co.in
14.	**C-13.2 :** Selection and application of BPH management technologies in Sirajgonj	**PI:** Dr. Mohibul Hasan, PSO and Head, Entomology Division, BRRI, Gazipur, Phone: 9257401-5 Ext. 547, Cell: 01711-438445, Fax: 9261110, Email: mhasanbul@gmail.com
15.	**NR-15.22:** Validation of drought management techniques for sustainable crop production in the high barind tract	**PI:** Md. Abdus Salam , SSO & Station In-charge, OFRD, BARI, Barind Station, Paramedical Road, Laxmipur, Rajshahi, Phone: 0721-812474 (O), Cell: 01712-092122, Email: salamraj67@yahoo.com
16.	**NR-16.15:** Testing, Validation and Up-scaling of Water Saving Technology in Rice Production(TWST)	**PI:** Dr. Md. Towfiqul Islam, SSO, Irrigation Water Management Division, BRRI, Joydebpur, Gazipu-1701, Tel: 9257401-5 Ext. 437, Cell: 01715-090879, Email: islam.towfiq@yahoo.com
17.	**L-17.4:** Development of cost-effective complete feed formula for the productive and reproductive performances of buffaloes	**PI:** Prof. Dr. Md. Ruhul Amin, Dept. of Animal Science, BAU, Mymensingh-2202, Fax:091 61510, Cel:01714-217157, Email: aminmr64@yahoo.com
18.	**L-19.2:** Investigation on calf diseases and development of mitigation measures	**Coordinator:** Prof. Dr. A. S. Mahfuzul Bari, Vice-Canceller, CVASU, Khulsi, Chittagong, Cell: 01740-642318, Email: bari.bau.bd@gmail.com
19.	**L-20.4:** Clinicopathological and serological surveillance of Foot and Mouth Disease (FMD) and Peste des Petits Ruminants (PPR) and adopt preventive measures against them at Shakipur and Madhupur Upozilla	**Coordinator:** Prof. Dr. Md. Abu Hadi Noor Ali Khan, Dept. of Pathology and Proctor, Bangladesh Agricultural University, Mymensingh-2202 Cell: 01724-203934 Email: hadikhan68@yahoo.co.uk
20.	**F-22.1 :** Diversification of Carp Polyculture Integrating Snail *(Viviparus sp.)* Shing, (*Heteropneustes sp.)* Culture in Cage in Ponds of Adviasi Households.	**PI:** Dr. Mohammad Mahfujul Haque, Associate Professor, Dept. of Aquaculture, BAU, Mymensingh, Cell: 01712-006293, Email:mmhaque@yahoo.com
21.	**CC-25.1:** Development of an integrated rice-fish production system in lower Meghna river floodplain of Noakhali and Lakshmipur districts.	**PI:** Prof. Dr. Mohammad Amin CSO, RARS, BARI, Hathazari, Chittagong-4330 Cell: 01819-803229, Email: csohathazari@gmail.com

CGP Project Phase-II (2nd Call)

Sl. No.	Project Code and Title	Name of the PI
22.	**C-1.2:** Testing, validation and upscaling of cotton-rice intercropping in Chittagong Hill districts. **Location:** Bandarban, Rangamati & Khagrachari District	**PI:** Dr. Md. Farid Uddin, Deputy Director (H.Q) Cotton Development Board (CDB) Khamarbari, Farmgate, Dhaka-1215 Phone: 8117728(O), Cell: 01711-020798 Email: mfarid08@yahoo.com
23.	**C-1.11:** Improvement of appropriate rice based cropping systems in Barind areas **Location:**3 upazilas of Bogra district:Sherpur, Shajahanpur and shibonj upazila and on station trial of RDA Demonstration farm at Sherpur upazila, Bogra	**PI:** Mr. Md. Feroz Hossain, Director (Project Planning & Monitoring), Rural Development Academy (RDA), Sherpur, Bogra, Fax:051-78615 Phone: 015-73601-2 Ext.-2..., Cell: 01711-587799, Email: firozrda@gmail.com
24.	**C-1.26:** Minimizing yield gaps in rice-based cropping systems three northern districts. **Location:** Rangpur, Kurigram and Bogra districts.	**Coordinator:** Dr. S.M. Mahabubur Rahaman Khan, PSO, OFRD, BARI, Gazipur, Phone: 9252085, Cell: 01712-598035, Email: ofrdjoy@yahoo.com, Fax: 9261415
25.	**C-1.27**: Productivity enhancement through improved management practices, tools and techniques **Location:** Dhamrai upazila of Dhaka & Singair upazila of Manikganj districts.	**PI:** Dr. Dilwar Ahmed Choudhury, SSO, OFRD, BARI, Gazipur, Phone: Cell: 01711-318685, Email: dilwar92@yahoo.com
26.	**C-2.19** Crop intensification through incorporating quick growing fruits and vegetables into existing cropping systems in Jhalakati and Patuakhali districts **Location:** Dumki and Patuakhali Sadar (Patuakhali) and Jhalakhati Sadar (Jhalakhati).	**PI:** Mr. H. M. Khairul Bashar, SSO (I/C), OFRD, BARI, Sabujbag, Patuakhali-8600 Phone: 0441-62431, Cell: 01716-599601, Email: basharlaboni@yahoo.com
27.	**C-4.5:** Maximization of crop yield in T. Aman-Mustard-Boro cropping pattern by Agronomic Manipulation **Location:** Dhanbari & Kalihati upazila of Tanigail district.	**PI:** Prof. Dr. M. Rafiqul Islam, Department of Soil Science, BAU, Mymenshingh Phone: 091-55695-7 Ext.-2436, Cell: 01711-985414, Fax: 091-55810 Email: mrislam58@yahoo.com
28.	**C-5.2:** Yield maximization of mustard and sesame through improved package of production practices in some selection areas of the country. **Location:** Jessore Narail, Jhenaidah, Faridpur, Kushtia and Chuadanga Districts	**Coordinator:** Dr. M. Raisul Haider PSO and Head, TC&P Division, BINA, BAU Campus, Mymenshingh-2202 Phone: 091-67834 Cell: 01715-372740 Email: haidertcp@yahoo.com
29.	**C-7.9:** Validation and up-scaling of year round pineapple production technology in hilly areas. **Location:** Maulavibazar, Rangamati and Khagrachari districts	**PI:** Dr. Madan Gopal Shaha, PSO (Horticulture), Polomology Division, HRC, BARI, Joydebpur, Gazipur-1701, Phone:....., Fax: 9261415, Email:
30.	**C-8.14:** Integrated management of major diseases of brinjal and tomato in Jamalpur & Sherpur districts. **Location:** Jamalpur & Sherpur districts.	**PI:** Dr. Biresh Kumar Goswami PSO,RARS, BARI, Jamalpur-2000 Phone: 0981-63147, Fax: 0981-63138 Cell: 01716-519187/01813-158197 Email: bkgbari@yahoo.com

Sl. No.	Project Code and Title	Name of the PI
31.	**C-12.1:** Development of Management Package for Powdery Mildew of BAU kul and apple kul **Location:** Satkhira, Jessore and Natore District.	**PI:** Prof. Md. Rejaul Islam, Agrotechnology Discipline, Khulna University, Khulna Phone: 041-733886, Fax: 041-731244 Cell: 01926-865086, Email: refa_bd@yahoo.com
32.	**L-17.1:** Least cost feed formulation for poultry through the production of fermented yeast product from locally available feed resources **Location:** Chittagong Veterinary and Animal Science University, Khulshi, Chittagong	**PI:** Md. Ashraf Ali Biswas, Professor and Director (E/A), Dept. of AS&N,CVASU, Khulshi, Chittagong Phone: 031-659093, Fax: 031-659492 Cell: 01195-098971, Email: bisws1@bijoy.net
33.	**L-17.14:** Formulation of cost effective poultry feed using parboiled rice polish **Location:** Poultry Farm and Poultry Science Laboratory, BAU, Mymenshingh-2202	**PI:** Dr. Md. Abdur Rahman Howlider, Professor ,Dept. of Poultry Science, BAU, Mymenshingh-2202 Phone: 091-55695-7 Ext.-2271(O) & 2534(Res) Cell: 01712-147185, Fax: 091-55810 Email: unicorn_porag@yahoo.com
34.	**L-19.7:** Calf mortality in large and small holder cross breed dairy Cattle: Epidemiological and Pathological investigation and mitigation **Location:** Muktagacha-Mymensingh, Sahjadpur-Sirajganj;	**Coordinator:** Prof. Dr. Emdadul Haque Chowdhury, Professor, Dept. of Pathology, Faculty Veterinary Science, BAU, Mymenshingh, Phone: 091-66049, Cell: 01712-017381 Email: emdad001@yahoo.com
35.	**F-21.20:** Adaptation of high valued fish species shing (*Heterponeustes fossilis)* culture technology for Maximizing prediction in three Agro-Ecological zones of Bangladesh. **Location:** Narsingdi, Hobigong and Sirajgong	**Coordinator& PI:** Dr. Md. Jahangir Alam, Professor & Head, Department of Fisheries Technology, BSMRAU, Gazipur-1706 Phone9205310, Cell: 01715-143521, Email:alammj_bfri@yahoo.com
36.	**CC-25.2:** Development of integrated crop-fish production system using ditch-and-dyke method in low lying areas of Jhalakati and Bogra region **Location:** Jhalakati & Rajapur upazila of Jhalakati and Gobtoli upazila of Bogra districts	**PI:** Dr. M. Mofazzal Hossain Director (Research) BSMRAU, Gazipur-1706 Phone: 9205310-4 Ext.-2151, Fax: 9205333 Email:

Pilot Project List

Sl. No.	Project Code and Title	Name of the PI
1.	C-HF-103: Validation of improved agricultural technologies at farmer's field in hill farmeing system	Dr. Md. Mohabbat Ullah, Principal Scientific Officer, Hill Agril. Research Station, Bangladesh Agricultural Research Institute, Khagrachhari Mobile: 01550605727
2.	C-PHT-179: Increasing storability of potato in natural storage and income generation through small scale processing of potato	Dr. Md Azizul Haque, Former in charge, Tuber Crops Research Sub-center, BARI Munshiganj-1500. Currently Professor, BSMRAU. Mobile: 01711488619
3.	C-CA-113: Adaptation of improved Sesame varieties in Khulna District optimizing sowing time and Nitrogenous fertilizer management	Dr. Md. Sarwar Jahan, Professor, Agrotechnology Discipline, Khulna University, Khulna-9208. Mobile: 01712813106
4.	C-S-161: Water management practices for increasing cropping intensity in Chapai Nawabganj District of Bangladesh.	Dr. Md. Asgar Ali Sarker, CSO (cc), Agriculture Engineering Division, BINA, P.O. Box-04, Mymensingh-2202. Mobile: 01715998145
5.	**P-1:** Crop intensification in Barind area through effective drought management	Dr. Md. Abdus Salam, Senior Scientific Officer On-Farm Research Division, Bangladesh Agricultural Research Institute, Rajshahi Mobile: 01712092122
6.	P-2: Management and control of mites in coconut through farmers' capacity enhancement	Dr. Md. Nazirul Islam, Principal Scientific Officer Regional Horticultural Research Station, Shibpur, Narshingdi. Mobile: 01715855239
7.	P-3: Increasing rice production adopting improved production technologies in the tidal floodplain.	Professor Dr. Md. Jafar Ullah, Department of Agronomy, Sher-E-Bangla Agricultural University, Dhaka. Mobile: 01552331605
8.	P-4: Upscaling of mubgbean-rice pattern in the Charlands of Kurigram.	Professor Dr. Md. Abdul Karim, Department of Agronomy Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur-1706 Mobile: 01716752414
9.	P-5: Upscaling improved jhum cultivation introducing intercropping rice with cotton	Prof. Dr. Md. Farid Uddin, Additional Director Cotton Development Board Khamarbari. Mobile: 01711020798
10.	P-6: Integrating crops and fish culture through land conversion into-ditch-dyke system	Professor Dr. Md. Mofazzal Hossain, Department of Horticulture, Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur-1706. Mobile: 01819433225
11.	P-7: Upscaling and validation of a proven technology on management of the major diseases of Bringal and Tomato.	Dr. Biresh Kumar Goswami, CSO, TCRC, BARI, Gazipur-1701. Mobile: 01716519187

List of BKGET funded CGP projects

SL.#	Title of the Proposal , code no., Locations and commencement date	Coordinator/ PI/CI	Lcations
1	TF 01-C: Validation and Up-scaling of High Value Vegetable Crops production in Sylhet region. **Date of commencement:** 20 May 2013	**PI**: Dr. Md. Shahidul Islam Address: Associate Professor and Chairman, Dept. of Horticulture, Sylhet Agricultural University, Sylhet-3100 Mobile no. 01916662421 Email: shahidulhrt@gmail.com	Sylhet Agricultural University campus, Two upzillas of each district of Sylhet, Moulavibazar, Hobigonj and Sunamgonj
2	TF-02-C: Development/ validation and up-scaling of dry direct seeded boro rice system for improving crop productivity in areas with limited water supply **Date of commencement:** 20 May 2013	**PI:** Dr. Md. MoshiurRahman Professor, Department of Agronomy Bangladesh Agricultural University Mymensingh, Bangladesh Mobile: 01711-072561 Email: rahmanag63@yahoo.com	**Locations:** • GodagariUpazilla of Rajshahi district • RangpurSadarUpazilla of Rangpur district
3	TF 03-C: Adaptation of high yielding soybean in polder areas in Barguna and Patuakhali districts **Date of commencement:** 20 May 2013	**PI:** Dr.Md. A. MannanAssociate Professor, Department of AgronomyBangabandhu Sheikh MujiburRahman Agricultural University, Gazipur-1706 Tel. No: (02) 9205310-14- 2114 Mobile No.: 01816020290 E-mail: mannanbsmrau@yahoo.com	• AmtaliUpazila under Barguna district • KalaparaUpazila under Patuakhali district
4	TF 04-C: Screening and testing of Improved Aus Rice Varieties/Genotypes Suitable for Rainfed Aerobic Soil Condition of Bangladesh **Date of commencement:** 20 May 2013	**Coordinator:** Dr. A S M Masuduzzaman Principal Scientific Officer, Plant Breeding Div. BRRI, Gazipur. Tel. No.9257405 ext 559 Mobile no. 01721964002 E-mail: masudbrri@gmail.com	Rajshahi, Gazipur, Moulvi Bazar
5	TF 05-C: Year-round Production of Some Selected HYVs and Hybrid Vegetable Varieties in Southern and Hilly Regions of Bangladesh **Date of commencement:** 20 May 2013	**Coordinator:**Dr. G M A HalimCSO, Olericulture DivisionHRC, BARI, Gazipur-1701Mobile: 01715 179366.Dr. G M A HalimCSO, Olericulture DivisionHRC, BARI, Gazipur-1701 Mobile: 01715 179366. Email: gmahalimbari@gmail.com	• BandarbanSadarUpazila of Bandarban District • Golachipa, Dashmina and Baupholupazilas of Patuakhali District
6	TF 06-C: Validation and up scaling of HYVs of brinjal, tomato, bottle gourd, as gourd and pointed gourd in hilly areas of Moulvibazar **Date of commencement:** 20 May 2013	**PI:**Dr. ReazUddinShamimChief Scientific OfficerBangladesh Agricultural Research Institute (BARI)Regional Agricultural Research Station, Akborpur,Moulvibazar Mobile: 01711-459104 E-mail: reaz-shamim@yahoo.com	• Sreemangal, Kamolgonj, MoulvibazarSadar and Rajnagar of Moulvibazar District • Sreemangal, Kamolgonj, MoulvibazarSadar and Rajnagarof Moulvibazar District covering 5 selected unions of each upazila.
7	TF 07-C: Adaptation of newly released HYV oil seeds (Mustard, Groundnut, Soybean and Sesame) in Charland of Padma	**PI:** Dr. Md. AbulKhayerMian Senior Scientific Officer (Agronomy) Bangladesh Agricultural Research Institute (BARI) Ishurdi-6620, Pabna, Mobile: 01914-661301	• BBC Bazar and Lokhikunda of Ishurdi, Pabna • Golapnagar of Kushtiasadar • Philipnagar of Veramera of Kushtia

SL.#	Title of the Proposal , code no., Locations and commencement date	Coordinator/ PI/CI	Lcations
	Date of commencement: 20 May 2013	E-mail: mianmd.abulkhayer@yahoo.com	
8	TF 08-NR: Evaluation and Up scaling of Resource Conservation Technologies (RCTs) for Improving Productivity in the Drought Prone Areas **Date of commencement:** 20 May 2013	**PI:**Dr. Md. IliasHossainSenior Scientific OfficerRegional Wheat Research Centre, BARI, RajshahiTel. No. 0721-750462 Office, Mobile no. 01712632167 E-mail: iliasrwrc@gmail.com	Charghat, Paba and Godagariupazila under Rajshahi district.
9	TF 09-NR: Validation and up-scaling of Tricho-products for soil borne disease management in vegetable Crops **Date of commencement:** 20 May 2013	**PI:** Dr. MossammatShamsunnahar Principal Scientific Officer Plant Pathology Section, HRC, BARI, Gazipur 1701 Cell: 01674876252 Email: nahar321@yahoo.com	• Bagdanga village of Churamonkathi union in Jessore district • Vatra village of Khanpur union in Bogra district.
10	TF 10-F: Adaptation of Community Enterprise Approach for Intensification of floodplain fish production in Chalanbeel **Date of commencement:** 20 May 2013	**Coordinator:**SakiulMillatMorshedExecutive Director, SHISUK. 16/D, ModhubagMog bazaar, Dhaka 1217, Bangladesh Cell phone: 01713 037796 Email: ed.shisuk@gmail.com	ChalanBeel area (Sirajgonj, Pabna and Natoredistircts)
11	TF 11-C: Validation and up-scaling of Off-season jute seed production technologies in different jute growing areas of Bangladesh. **Date of commencement:** 25 August 2013	**PI:** Md. Abdul Alim, Principal Scientific Officer, Agronomy Division, Bangladesh Jute research Institute (BJRI). Cell phone: 01911395624, E-mail: alimbd1968@yahoo.com	Barishal (Ujirpur, Babuganj and Muladi) and Patualhali (Kalapara, PatuakhaliSadar and Dumki)
12	TF 12-L: Investigation on livestock diseases and development of appropriate control measures in hilly areas **Date of commencement:** 05 September 2013	**PI:**Dr. Shonkor Kumar DasAssociate Professor, Department of Anatomy and Histology, BAU, Mymensingh Cell phone: 01716-855186 E-mail: skdas76@yahoo.com	Bandarbansadar, Lama and Rowangchari in Bandarban
13	TF 13-F: Production enhancement of aquaculture through innovative technologies in cage culture system in haor areas of Karimganj, Kishoreganj **Date of commencement:** 29 December 2013	**Coordinator cum PI:** Professor Dr. A.K.M. NowsadAlam, Dept. of Fisheries Technology, Bangladesh Agricultural University, Mymensingh-2202; Mobile: 01711446315 E-mail: nowsad12@yahoo.com	RaijanidaiJolmohal of Uttar Sutarpara, Suturpara Union, Upazila: Karimganj, Dist: Kishoreganj
14	TF 14-C: Sustainable management of flower and fruit dropping of mango. **Date of commencement:** 20 April 2014	**Coordinator:** Dr. Syed NurulAlam, CSO & Head, Entomology Division, BARI, Gazipur Mobile: 01711-907886 E-mail: alamsn09@gmail.com	Major mango growing 14 (fourteen) districts, ChapaiNawabgonj, Rajshahi, Natore, Naogaon, Rangpur, Dinajpur, Thakurgaon, Jessore, Kustia, Meherpur, Sathkhira, Chudanga, Mymensigh and Gazipur.

KGF BKGET Funded CRP

Summary of Commissioned Research Program (CRP): Hill Agriculture

Upon approval of concept notes by the KGF Board, project proposals had been prepared through consultative process for four commissioned R&D areas (i) Hill agriculture in three Hill districts of CHT (ii) Network on Climate Change in Agriculture (NCCA) Gi AvIZvq Project on Crop modeling and mitigation measures (iii) Southern region costal floodplain agriculture; (iv) Drought prone agriculture in north west region (v) Haor Agriculture in Kishoregonj and Sunamgonj districts.

Upon several consultation meetings with heads of institutions and all relevant stakeholders in the hill region of Chittagong Hill Tract (CHT), a project document had been prepared. The Hill Agriculture Program is designed to contribute to improved natural resource management, greater agricultural productivity and enhanced food security in the hills. Impacts are sought in areas of (i) rainwater harvesting and watershed management, (ii) natural resources management (environmental, in particular improving soil fertility and deducting soil erosion), (iii) improving crop productivity by generating, delivery and adoption of improved production technologies, and (iv) value chain development and linking farmers with market. While much of the focus will be on agricultural production, income and livelihood will be targeted for which activities and impact will go beyond agricultural production. Sustainable production in the hills will require effective linkage of farmers with market. Development of value chain will receive special attention in the program.

The program is designed to be implemented building partnership among the key NARS institutions, agricultural universities and selected non-government research institutions in the country. Scientists participating in the program are highly motivated, adequately trained and well experienced in research on hill farming. With administrative support from their respective institutions and technical & financial assistance from KGF, the group will engage in implementing the program. Activities will concentrate on crops, soils, water and watershed management, capacity enhancement and development of market linkage. With progress of basic works, scientists working on agro forestry, livestock and fisheries will join the team. Five institutions (BARI, BSMRAU, CDB, SAU and SRDI) will initiate implementing the program. Selected non-government organizations and the Department of Agricultural Extension (DAE) will be involved in technology dissemination.

Concept note and activities of CRP Hill Agriculture project was approved by the KGF Board on 27 December 2012. CRP Hill Agriculture project is going on at 3 hill districts of CHT. There are 5 components in CRP: Hill Agriculture project. About Tk. 4000 lakh was approved by the KGF Board for CRP: Hill Agriculture project. Summary of 5 components are given bellow.

KGF BKGET funded CRP Hill Agriculture
Project: Harnessing the Potential of Hill Agriculture
Project Location: Bandarban, Khagrachari and Rangmati
Duration 5 years: July 2013 to June 2018

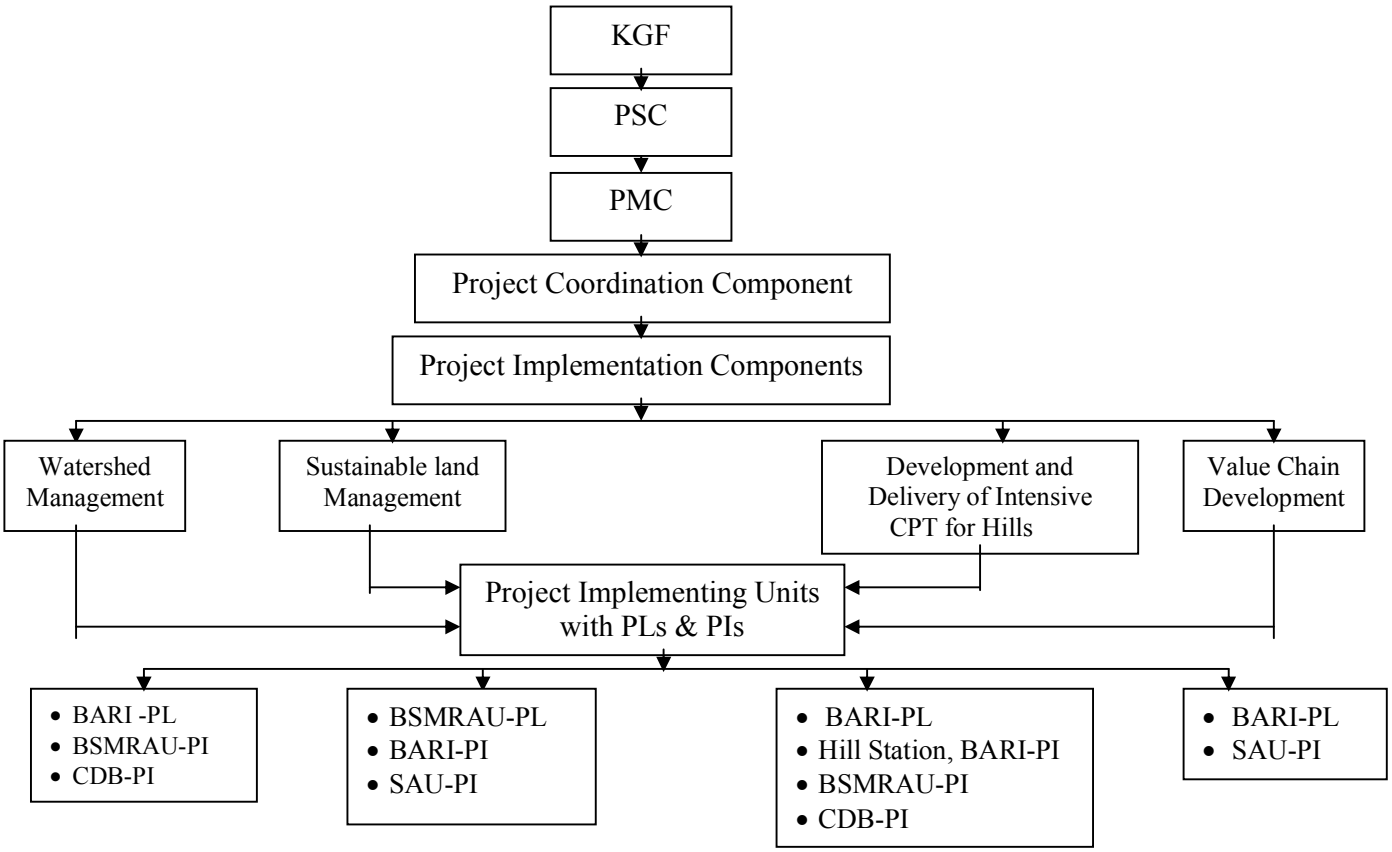
Component with Implementing Institute	Objectives	Coordinator, Component Leader (CL) & Principal Investigator (PI)	Approved Budget	
			Total	1st year
I: Watershed Management for Sustainable Agricultural Production **Implementing Institute:** BARI, Joydebpur, Gazipur 1701	1. Selection, delination and characterization of watersheds in selected locations of Bandarban, Rangamati and Khagrchhari districts for increasing crop production through crop intensification 2. Development and management of watersheds for augmenting surface water for developing irrigation facility and domestic uses	**CL: Dr. Md. Mohabbat Ullah,** PSO, HARS, Khagrachari **PI:** 1. Prof. Dr. Md. Rafiqul Islam, BSMRAU 2. Mr. Mong Sanue Marma, SSO, Cotton Research Station, Balaghata, Bandarban	Total Tk. 707 lakh	Total Tk. 333.41 lakh
II: Sustainable Land Management **Implementing Institute:** BSMRAU, Salna, Gazipur 1706	1. To study the soil properties (Physical, chemical and hydrological) of selected watersheds to gain understanding of and make decision tool for developing sustainable soil management strategies 2. To manage and enhance soil fertility for sustainable agriculture in the uplands 3. To create awareness among the farmers and adoption of sustainable land management in the hills and valleys	**CL: Prof. Dr. AJM Sirajul Karim,** Soil Science Dpt., BSMRAU, Gazipur **PI:** 1. Prof. Dr. Alok Kumar Paul, Department of Soil Science, SAU, Sher e Bangla Nagar, Dhaka-1207 2. Dr. Monoranjan Dhar, PSO, RARS, Hathazari, Chittagong	Total Tk. 801 lakh	Total Tk. 168.14 lakh
III: Development and Delivery of Intensive Crop Production Technologies for Hill Agriculture **Implementing Institute:** BARI, Joydebpur, Gazipur 1701	1. Validating and up scaling of improved technologies for production enhancement 2. To improve jhum system for enhancing production and reducing environmental degradation 3. To conduct strategic and applied research for developing appropriate crop production technologies suitable for upland and valleys 4. Adoption of improved cropping systems and management practices for sustainable production in the hills	**CL: Dr. Mohammad Amin,** CSO, RARS, BARI, Hathazari, Chittagong **PI:** 1. Prof. Nasimul Bari, Agronomy Department, BSMRAU, Salna, Gazipur 2. Dr. Zulfiqur Ali Firoz PSO, Hill Agricultural Station, Ramgarh, Khagrachari 3. Dr. Md. Farid Uddin, Additional Director, CDB, Khamarbari, Dhaka 4. Dr. M.A. Rouf SSO, Hill Agricultural Research Station,	Total Tk. 1490 lakh	Total Tk. 284.19 lakh

Component with Implementing Institute	Objectives	Coordinator, Component Leader (CL) & Principal Investigator (PI)	Approved Budget	
			Total	1st year
		Khagrachari		
IV: Entrepreneurship and Value Chain Development for linking farmers with market **Implementing Institute:** BARI, Joydebpur, Gazipur 1701	1. To develop value added products and entrepreneurs for income generation and poverty reduction 2. To develop market/ value chain and linking hill farmers with markets 3. To develop value-chain of selected vegetables and fruits grown in the hills 4. To identify and promote quality product and preservation of vegetables and fruits through local technology 5. To produce manure and high value crops as business enterprise for raising farm income 6. To follow-up action for entrepreneurs and impact assessment of their business enterprises	**CL: Dr. Md. Jamal Uddin,** SSO, RARS, BARI, Hathazari, Chittagong **PI:** Prof. M. Mizanul Haque Kazal, Department of Rural Development Economics, SAU, Sher e Bangla Nagar, Dhaka-1207	Total Tk. 143 lakh	Total Tk. 36.56 lakh
V: Program Coordination **Implementing Institute:** KGF, Dhaka	To coordinate implementation of activities of four components of the project providing financial assistance, developing human resources and improving knowledge and skill of farmers	**Coordinator:** Dr. Md. Abdul Jalil Bhuyan, Coordinator, KGF and former DG, BRRI	Total Tk. 763 lakh	Total Tk. 155.28 lakh
Total			Tk. 3904 lakh	Tk. 977.58 lakh

Project Coordination Component (PCC)

Out of five (5) components of this Hill Research Project under the Commissioned Research Program (CRP), the first four will be directly involved in project implementation and the 5th one (PCC) will be involved in providing management and coordination support for other four components. This 5th component (PCC) will be under direct administrative control of KGF and will act as bridge between KGF and Project Implementation Units (PIUs) of other four components. Four public sector organizations (BARI, BSMRAU, SAU and CDB), 4 component leaders, 12 principal investigators (PIs) including 4 component leaders, several scientific and support staff will be involved in the implementation of project activities. Under this component, KGF will establish and operationalize a Project Coordination Unit (PCU) at Khagrachari, CHT to support, coordinate and facilitate implementation of this project through four components and 12 Project Implementation Units (PIUs) of four organizations under the guidance of the Project Steering Committee (PSC) and Project Management Committee (PMC). KGF will also hire on contractual basis a full time Project Coordinator for running the PCU. The PCU would, with input from different components and implementing units consolidated Project Annual Work Plan and Budget for approval by PMC/PSC. Besides, holding regular coordination meeting, project inception workshop, conducting concurrent M&E, providing technical support through contractual expert services, organizing training programs and compiling half yearly, annual implementation progress and completion report of the project, documentation, communication and awareness building on key findings of the project are some of the key functions of PCU.

A. Organizational and Management Structure of the Commissioned Research Program (CRP): Harnessing the Potentials of Hills: *Enhancing Crop Production through Sustainable Management of Natural Resources.*



B. Management Structure of the Commissioned Research Program (CRP)

(I) Project Management Committee (PMC) Composition

1. Director (RM)/ (P&E), KGF	Chairman
2. Project Component Leaders	Member
3. Project Sub- Component PIs	Member
4. Project Coordinator	Member Secretary

ToR

1. Review implementation Progress of the Project
2. Suggest solutions of problems encounter by the implementing organization.
3. Committee will meet once in every three/six months.

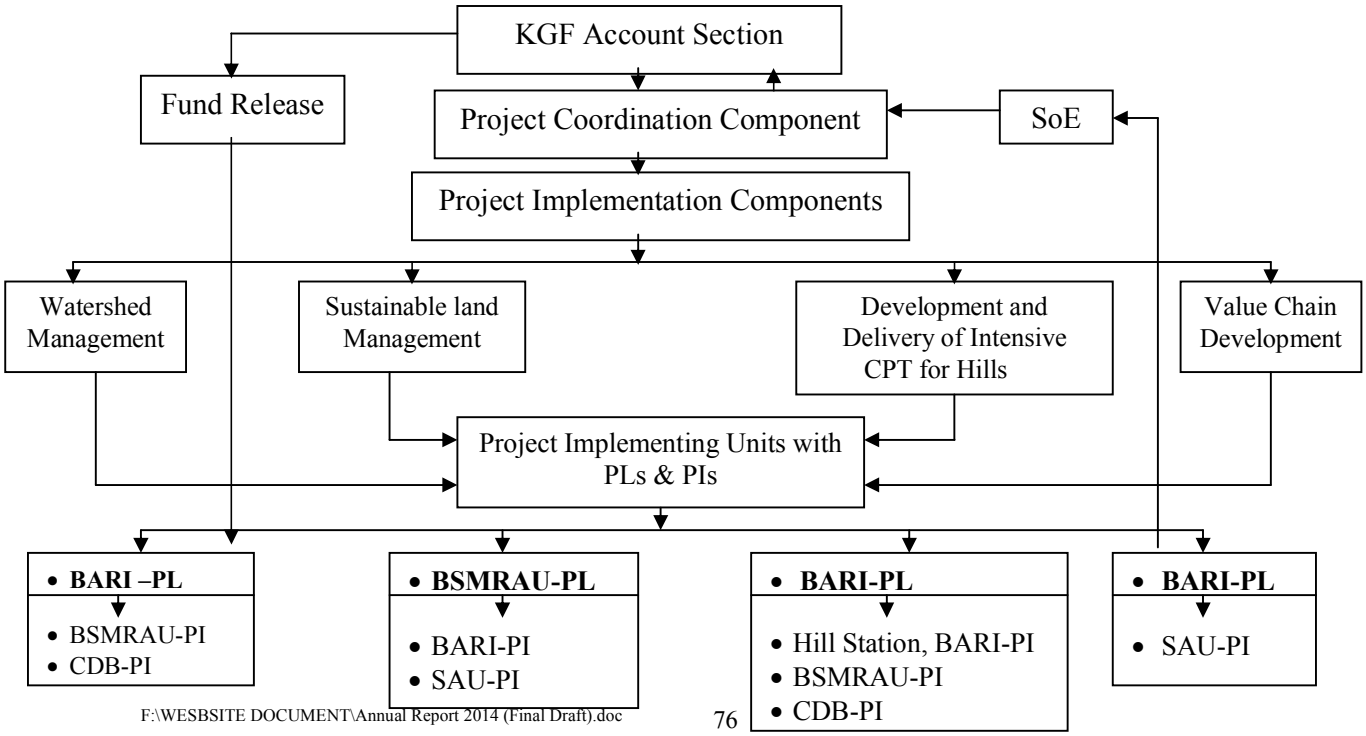
(II) Project Steering Committee (PSC) Composition

1. Executive Director, KGF	Chairman
2. Head/Authorized representative of implementing organizations	Member
3. Director (RM)/ (P&E), KGF	Member
4. Project Component Leaders	Member
5. **Project Sub- Component PIs**	**Member**
6. Project Coordinator	Member Secretary

ToR

1. Provide technical and management guidance for proper implementation of project activities.
2. Provide appropriate solutions to technical and financial problems encountered by any implementing organization.
3. Committee will meet at least once in each project year.

C. Fund Management for Hill Research under CRP



Annex-3

Financial Progress for the Financial Year 2014-2015 under KGF NATP Fund

Budget Allocation Vs Statement of Expenditure(SOE) upto December 2014

(In lakh taka)

Code	Particulars	ADP: 2014-2015			* RADP: 2014-2015			Expenditure:2014-2015 (up to December 2014)			** % of Exp.
	A. Revenue Component	**RPA**	**GOB**	**Total**	**RPA**	**GOB**	**Total**	**RPA**	**GOB**	**Total**	
4500	Salary of officers										
4600	Pay of establishment	69.12	2.88	72.00	0.00	0.00	0.00	0.00	0.00	0.00	
4700	Allowances	6.72	0.28	7.00	0.00	0.00	0.00	0.00	0.00	0.00	
4800	Supply & services	253.18	3.42	256.60	0.00	0.00	0.00	0.00	0.00	0.00	
	CGP Programme	400.00	-	400.00	0.00	0.00	0.00	0.00	0.00	0.00	
4900	Repair and maintenance	9.98	0.42	10.40	0.00	0.00	0.00	0.00	0.00	0.00	
5900	Grans/Credit	-	-	-							
6600	Lum Grant	-	-	-							
	Sub Total A:	***739.00***	***7.00***	***746.00***	0.00	0.00	0.00	0.00	0.00	0.00	
	B. Capital Component					0.00	0.00	0.00	0.00	0.00	
6800	Asset acquisition	15.00	3.00	18.00	0.00	0.00	0.00	0.00	0.00	0.00	
	CGP - Equipment	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Sub-Total B:	***15'00***	***3.00***	***18.00***	0.00	0.00	0.00	0.00	0.00	0.00	
	Grant Total (A+B):	**754.00**	**10.00**	**764.00**	0.00	0.00	0.00	0.00	0.00	0.00	**00%**

Annex-4

Second Annual Budget and Financial Progress for the Financial Year 2014 Statement of Expenditure (SOE) for the period of June-December 2014 under KGF BKGET Fund

Fig. in Lakh Tk.

Sl. No.	Line Items	Approved Budget	Revised Budget	Expenditure upto January 2014
1.	**Program Cost**			
1.1	**Research Grants Program:**	460.00	460.00	
	(a) Competitive Grants Program (CGP)			129.95
	(b) Commissioned Research Program (CRP)			133.69
	(c) Action research and outreach pilot programs including preparation management, review and M&E cost, etc.			10.02
1.2	**Capacity Building Program(CBP)**:			
	(a) Human **capacity (HRD Program):** Training/ Workshops by national/international resource person/ consultant/ experts perdiem, remuneration, fees, airfare, lodging and others cost.	110.00	160.00	157.34
	(b) Commissioned research	180.00	145.00	108.40
	(c) **Preparation of Strategic Plan & other Documents**: by National/ International experts/consultants/resource persons fees including logistics support and printing cost, etc.	50.00	35.00	31.53
	1. Sub-total of Programme Cost:	**800.00**	**800.00**	**570.92**
2	**Operational Support Cost**			
2.1	(a) National/international Linkage development programme with KGF: attending workshops, trainings, consultative meetings, visits etc.	60.00	20.00	10.88
	(b) Technical & Financial Performance: Monitoring/review/ evaluation, etc.	10.00	5.00	0.83
	(c) Printing, publication, documents & video production etc.	20.00	5.00	3.91
	(c) **Salaries:**,Salaries, allowances, service benefits, Tax/VAT payments, etc. for KGF experts/fellows/managers and support services staffs, fees, remuneration of contractual services & other staff etc.	85.00	125.00	104.40
2.2	(a) **General Operating Cost:** (utilities, hiring of vehicles, repair & maintenance/ renovation, supply & services, TA/DA and other costs, etc.)	16.00	36.00	21.84
	(b) Audit fees/financial /technical services etc.	5.00	5.00	1.24
	(c) Contingency / Any other Misc. Cost (As per need)	4.00	4.00	0.38
	2. Sub-total of Operational Support Cost:	**200.00**	**200.00**	**143.48**
(1+2)	**Total Budget and Expenditure (Taka in lakh)**	**1000.00**	**1000.00**	**714.40**
	Progress upto January 31, 2014			**71.44%**
	(As per need, line-item costs may be adjusted within the Total)			

Trust fund grants (Tk.1000 lakh) will be utilized as per objectives of the BKGET Clause iv no.7 (page-10) and the provisions of the Memorandum of KGF.

Auditors' Report
Of
Krishi Gobeshona Foundation.

We have audited the accompanying financial statements of National Agricultural Technology Project (NATP) of **Krishi Gobeshona Foundation**. ("the company") which comprise the statement of financial position as at June 30, 2013, the statement of comprehensive income for the Year ended June 30, 2013 and statement of cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information disclosed in note 1 to 10 and Annexure-A to D.

Management's responsibility for the financial statements

Management of the company is responsible for the preparation and fair presentation of these financial statements in accordance with applicable laws and regulations and such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatements, whether due to fraud or error.

Auditors' responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Bangladesh Standards on Auditing (BSA). Those standards require that we comply with relevant ethical requirements and plan and perform the audit to obtain reasonable assurance whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, we consider internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements present fairly, in all material respects, the financial position of National Agricultural Technology Project (NATP) of **Krishi Gobeshona Foundation.** as at June 30, 2013 and its financial performance for the Year ended June 30, 2013 in accordance with Basis of preparation of financial statement as disclosed in note # 2 of this financial statements and comply with the applicable sections of the companies act 1994 and other applicable laws and regulations.

We also report that:

a) we have obtained all the information and explanations which to the best of our knowledge and believe were necessary for the purposes of our audit and made due verification thereof;
b) in our opinion, proper books of account as required by law have been kept by the company so far as it appeared from our examination of these books; and
c) the statement of financial position and statement of comprehensive income dealt with by the report are in agreement with the books of account and returns;

Dated: Dhaka
June 24,2014

Rahman Mostafa Alam & Co.
Chartered Accountants

Rahman Mostafa Alam & Co.
Chartered Accountants.

Krishi Gobeshona Foundation (KGF)

National Agricultural Technology Project (NATP)

Project ID : 084078, IDA Credit No: 4386-BD (KGF Unit)

Statement of Financial Position

As on June 30, 2013

Particulars	Notes	Amount in Taka	
		30.06.2013	30.06.2012
Assets :			
Non-current assets			
Property, Plant and Equipments.	4	17,347,822	16,226,297
Current assets			
Cash and Cash Equivalents	5	2,797,429	4,305,975
Total Assets		**20,145,251**	**20,532,272**
Fund & Liabilities :			
Fund Account:			
GOB Fund		-	-
RPA Fund	6	20,145,251	20,532,272
Total Fund & Liabilities		**20,145,251**	**20,532,272**

The accompanying notes from 1-10 & Annexure-A to D form an integral part of these Financial Statements.

Deputy Director (Finance) **Executive Director**

Signed in terms of our separate report of even date .

Dated : Dhaka
June 24, 2014

Rahman Mostafa Alam & Co.
Chartered Accountants

Rahman Mostafa Alam & Co.
Chartered Accountants

Krishi Gobeshona Foundation (KGF)

National Agricultural Technology Project (NATP)
Project ID : 084078, IDA Credit No: 4386-BD (KGF Unit)
Statement of Comprehensive Income
For the Year ended June 30, 2013

Particulars	Notes	Amount in Taka	
		2012-2013	2011-2012
INCOME :			
Grant	6	96,485,961	88,598,329
Total Income		**96,485,961**	**88,598,329**
EXPENDITURE:			
Services	7	8,261,550	8,095,796
Training /Workshop & CGP Rlated Expense	8	4,731,357	2,361,136
Operational Cost	9	18,127,955	13,190,931
Competitive Grant Program (CGP) Grants	10	65,365,099	64,950,466
Total Expenditure		**96,485,961**	**88,598,329**

The accompanying notes from 1-10 & Annexure-A to D form an integral part of these Financial Statements.

Deputy Director (Finance) **Executive Director**

Signed in terms of our separate report of even date .

Dated : Dhaka
June 24, 2014

Rahman Mostafa Alam & Co.
Chartered Accountants

Rahman Mostafa Alam & Co.
Chartered Accountants.

Krishi Gobeshona Foundation (KGF)

National Agricultural Technology Project (NATP)

Project ID : 084078, IDA Credit No: 4386-BD (KGF Unit)

Statement of Cash Flows

For the Year Ended June 30, 2013

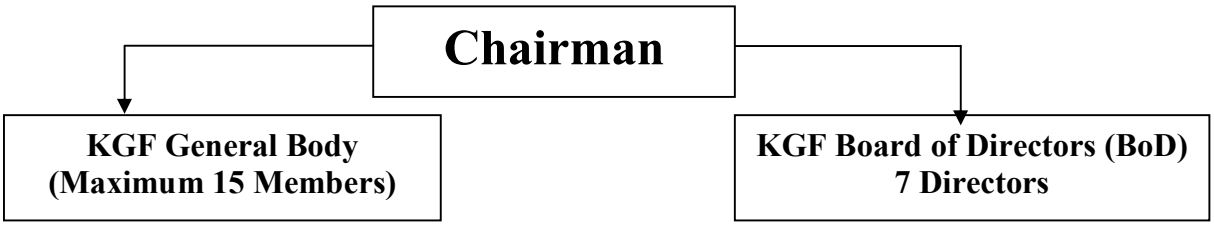
Particulars	Amount in Taka	
	2012-2013	2011-2012
A. Cash flows from operating activities		
Fund Received during the period	96,098,940	91,538,894
Grants and other operating expenses paid	(96,485,961)	(88,598,329)
Net cash provided by operating activities	**(387,021)**	**2,940,565**
B. Cash flows from investing activities		
Acquision of property, plant and equipment	(1,121,525)	(83,823)
Net cash used in investing activities	**(1,121,525)**	**(83,823)**
C. Cash flows from financing activities	-	-
D. Net cash and cash equivalents (A+B+C)	**(1,508,546)**	**2,856,742**
Cash and cash equivalents at the beginning of the year	4,305,975	1,449,233
Cash and cash equivalents at the end of the year	**2,797,429**	**4,305,975**

Deputy Director (Finance) **Executive Director**

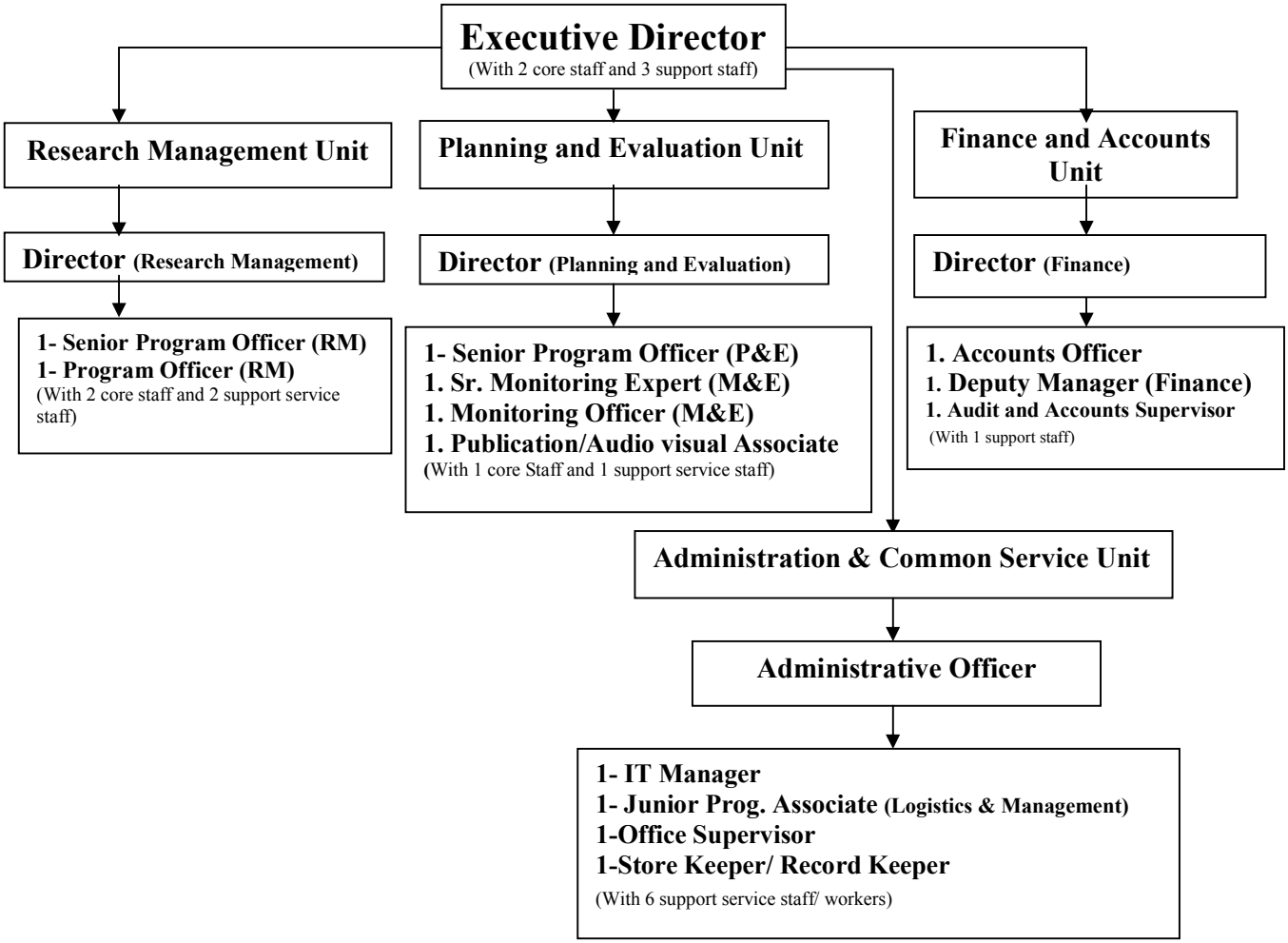
Annex-6

The KGF Organoram

A. Policy and Guidanance:



B. Program Management and Implementation:



Annex-7

List of Members of General Body and Board of Directors of KGF

(As per provisions in the KGF Memorandum and Articles of Association)

Sl. No	General Body (Not exceeding 15 members)	Sl. No	Board of Directors (7 members to be selected)
01.	Dr. Wais Kabir (up to Dec.2013) Dr. Md. Kamal Uddin (January 2014 onward) Chairman, KGF and Executive Chairman, BARC, Farmgate, Dhaka-1215. Tel: 9135587 (O), 8150009 (Res.), Mob: 01713-118907	1.	Dr. Wais Kabir (up to Dec.2013) Dr. Md. Kamal Uddin (January 2014 onward) Chairman, KGF and Executive Chairman, BARC Farmgate, Dhaka-1215. Tel: 9135587 (O), 8150009 (Res.), Mob: 01713-118907
02.	Dr. Mahabub Hossain Former Director General, BIDS and former Head of Social Sciences Division, IRRI Tel: 9881265 Ext.-3152, Mob: 01714-078866	2.	Dr. Mahabub Hossain Former Director General, BIDS and former Head of Social Sciences Division, IRRI Tel: 9881265 Ext.-3152, Mob: 01714-078866
03.	Director General, DAE Khamarbari, Farmgate, Dhaka-1215 Tel: 9140857 (O)	3.	Director General, BARI Joydebpur, Gazipur Tel: 9252715 (O)
04.	Director General, BARI Joydebpur, Gazipur Tel: 9252715 (O)	4.	Director General, BRRI Joydebpur, Gazipur 9263815(O)
05.	Director General, BRRI Joydebpur, Gazipur 9252736(O), 9263642(Res.)	5.	Dr. M. Asaduzzaman Former Research Director, BIDS, Sher-e-Bangla Nagar, Dhaka-1207 Tel: 8118920, Mob: 01711-595066
06.	Director (Animal Health and Admin), DLS, Khamarbari, Dhaka Tel: 9117736 (O),	6.	Mr. Mohammad Masum Chairman, Supreme Seed Company Ltd. 10 Gareb E-Newas Avenue Sector-13, Uttara, Dhaka-1230. Tel: 8951823/ 8951830 (O), Mob: 01711-521630
07.	Prof. Dr. Md. Hazrat Ali, Treasurer Sher-e-Bangla Agricultural University (SAU), Sher-e-Bangla Nagar, Dhaka-1207 Tel: 8619355 (Res.), Mob: 01714-396906 Residence: Tower Building, 8/BU, Dhaka	7.	Dr. Syed Samsuzzaman Executive Director, North Bengal Institute of Development Studies (NBIDS) House no.-47, Road no.-2, Islambag R. K. Road, Rangpur Tel: (0521) 62893, Mob:01715-002336
08.	Prof. Dr. M. Aminul Islam Former DG, BFRI & Professor BAU 5/A Regent Tower , 133/1, Outer Circular Road, Mogbazar, Dhaka Tel: 8050828, Mob: 01938-849120		
09.	Dr. M. Asaduzzaman Former Research Director BIDS, Sher-e-Bangla Nagar, Dhaka-1207 Tel: 8118920, Mob: 01711-595066		
10.	Mr. Mohammad Masum Chairman, Supreme Seed Company Ltd. 10 Gareb E-Newas Avenue Sector-13, Uttara, Dhaka-1230. Tel: 8951823, 8951830 (O), Mob: 01711-521630		

Sl. No	General Body (Not exceeding 15 members)	Sl. No	Board of Directors (7 members to be selected)
11.	Dr. Syed Samsuzzaman Executive Director, North Bengal Institute of Development Studies (NBIDS) House no.-47, Road no.-2, Islambag R. K. Road, Rangpur Tel: (0521) 62893, Mob:01715-002336		
12.	Prof. Dr. Shah-e-Alam, Professor of Plant Breeding and Genetics Department, BAU, Mymenshingh-2202 Mob:01713-311332 Residence: House: 66/C Flat :B-5, Road 6-A, Nazir Road, Dhaka Cantonment, Dhaka		
13.	Dr. Craig A. Meisner, Country Director WorldFish Centre, Bangladesh and South Asia Bangladesh Office, House 22B, Road 7, Block-F, Banani, Dhaka 1213 Tel: (+880-2) 881 3250,881 4624, Fax : 881 1151 Email : worldfish-bangladesh@cgiar.org		

Annex-8

List of KGF Expert Professionals

- **Chief Executive: Dr. M. Nurul Alam, Executive Director (ED), KGF.**

Sl. No.	Name Experts & Designation (Technical and Financial Management)
01.	Dr. Nurul Islam Bhuiyan, Director (Research Management).
02.	Prof. Dr. Abdul Hamid, Director (Planning & Evaluation).
03.	Dr. Rahim Uddin Ahmed, Sr. Program Officer (Planning & Evaluation).
04.	Dr. Md. Abdur Razzaque, Sr. Program Officer (Research Management).
05.	Dr. Mohibul Hasan, Sr. Technical Expert (Monitoring & Evaluation).
06.	Mr. Suvash Chandra Halder, Technical Expert (Monitoring & Evaluation).
07.	Mr. Md. Salat Ahmed, Deputy Manager (Finance).
08.	Mr. Mehedi Hasan, Administrative Officer.