



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search

<http://ageconsearch.umn.edu>

aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Value chain analysis of rice seeds in Bangladesh

A case of three southern districts
(Jessore, Khulna, and Barisal)

Pradeep Man Tulachan, Md. Khairul Bashar,
Md. Rafiqul Islam, Debashish Chanda, and
Christian Portal



Value chain analysis of rice seeds in Bangladesh

A case of three southern districts
(Jessore, Khulna, and Barisal)

Pradeep Man Tulachan, Md. Khairul Bashar,
Md. Rafiqul Islam, Debashish Chanda, and
Christian Portal

SRSPDS Project under CSISA-Bangladesh
International Rice Research Institute, Bangladesh Office, Dhaka



The International Rice Research Institute (IRRI) was established in 1960 by the Ford and Rockefeller Foundations with the help and approval of the Government of the Philippines. Today, IRRI is one of the 15 nonprofit international research centers that is a member of the CGIAR Consortium (www.cgiar.org). It is supported in part by government funding agencies, foundations, the private sector, and nongovernment organizations.

The responsibility for this publication rests with the International Rice Research Institute.

USAID Disclaimer: “This (book, brochure, leaflet, video) is made possible through support provided by the United States Agency for International Development (USAID). The contents and opinions expressed herein are those of the author(s) and do not necessarily reflect the views of the US Agency for International Development or the United States Government.

Copyright International Rice Research Institute 2012

- © This publication is copyrighted by the International Rice Research Institute (IRRI) and is licensed for use under a Creative Commons Attribution-NonCommercial-ShareAlike 3.0 License (Unported). Unless otherwise noted, users are free to copy, duplicate, or reproduce, and distribute, display, or transmit any of the articles or portions of the articles, and to make translations, adaptations, or other derivative works under the following conditions:
- ⓘ **Attribution:** The work must be attributed, but not in any way that suggests endorsement by IRRI or the author(s).
 - Ⓒ **NonCommercial:** This work may not be used for commercial purposes.
 - Ⓓ **ShareAlike:** If this work is altered, transformed, or built upon, the resulting work must be distributed only under the same or similar license to this one.
 - For any reuse or distribution, the license terms of this work must be made clear to others.
 - Any of the above conditions can be waived if permission is obtained from the copyright holder.
 - Nothing in this license impairs or restricts the author’s moral rights.
 - Fair dealing and other rights are in no way affected by the above.
 - To view the full text of this license, visit <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Mailing address: IRRI, DAPO Box 7777, Metro Manila, Philippines

Phone: +63 (2) 580-5600

Fax: +63 (2) 580-5699

Email: irri@cgiar.org

Web: www.irri.org.

Rice Knowledge Bank: www.knowledgebank.irri.org

Courier address: Suite 1009, Security Bank Center

6776 Ayala Avenue, Makati City, Philippines

Tel. +63 (2) 891-1236, 891-1174, 891-1258, 891-1303

Suggested citation: Pradeep Man Tulachan, Md. Khairul Bashar, Md. Rafiqul Islam, Debashish Chanda, and Christian Portal. 2012. Value chain analysis of rice seeds in Bangladesh. Los Baños (Philippines): International Rice Research Institute. 46 p.

Contents

	Page
Acknowledgments	iv
Executive summary	v
Chapter I Introduction	1
Chapter II Value chain analysis: framework and methodology	3
Chapter III Mapping the actors in the rice seed value chain	5
Chapter IV A profitable value chain: constraints and opportunities	7
Chapter V Bottlenecks in the rice seed value chain	19
Chapter VI Improving the value chain: market-based solutions	22
Chapter VII Recommendations for strengthening the public and private sector	25
Chapter VIII Recommendations for specific project activities	27
Chapter IX The way forward	30
Bibliography	31
Annexes	33
Acronyms and abbreviations	46

Acknowledgments

First, I would like to express my sincere gratitude to Christian Portal and Uma Shanker Singh for assigning me the task of conducting this study under the CSISA-BD Project. Second, I would like to thank A.K.M. Ferdous, Md. Harunur Rashid, and Md. Shahidul Islam, cropping systems specialist and hub manager in Jessore, Khulna, and Barisal, respectively, for organizing meetings with a number of stakeholders in each district. All other SADOs and ADOs of SRSPDS accompanied and participated during the field trip in three districts.

I am extremely grateful to many rice farmers, contract growers, private small and medium (SM) seed producers and companies, private hybrid rice seed companies, seed dealers, NGOs, BADC, SCA, and DAE, which have given their valuable time for focus group discussions and individual interviews during the field survey. I am also thankful to high officials of BADC and Bangladesh Krishi Bank in Dhaka, and high officials of BRRI, SCA, and BRAC in Gazipur, for providing their valuable time for our meetings.

I am very grateful to the study team members—Md. Khairul Bashar, Rafiqul Islam, and Debashish Chanda—for their support during the rapid field survey in three districts and their valuable comments during the qualitative data/information analysis and report write-up. Nonetheless, the views expressed and recommendations made in this report are mine alone, and if there are any errors or misinterpretations, I am responsible for them.

I am also thankful to M.A. Bari and M.A. Saleque for their support and encouragement, and CSISA-BD and IRRI-Bangladesh administrative staff for their efficient logistical support. I would also like to thank my wife, Kamala Gurung, for her moral and intellectual support during the period of the study. I am also pleased to be able to timely complete the whole assignment, including the final draft report.

Finally, once more, I would like to thank Christian Portal and Uma Shanker Singh, who took initiative for the study, and gave me valuable suggestions during the study period. Without their interest and support, this study would never have been undertaken and completed.

Pradeep Man Tulachan

Executive summary

- A study presenting a value chain analysis (VCA) of rice seed is conducted with the overall goal of guiding the USAID-funded SRSPDS project (under the expanded CSISA-BD project) to formulate effective and efficient program intervention strategies that can facilitate the growth and competitiveness of the rice seed market in Bangladesh.
- The main purpose of the study is to benefit rice growers in terms of increased household food security through enhancing the functions of various stakeholders engaged in the rice seed sector value chain. At the same time, this will benefit all the value chain actors: a win-win situation.
- A rapid field survey with various stakeholders was conducted in three southern project districts from 8 to 15 July 2012 to (1) map the rice seed value chain and (2) better understand its key constraints. Meetings with senior government officials were also held in Dhaka and Gazipur (16-18 July).
- The study identifies a number of critical bottlenecks in the value chain and explores their underlying causes, identified during focus group discussions and individual interviews with the various stakeholders. The study also highlights the pivotal points of influence on the key actors at various stages of the value chain.
- The bottlenecks identified mostly involve the limited capacity of both the public and private sector in terms of a lack of modern infrastructure and a trained workforce, skilled in producing, processing, storing, and marketing quality rice seed. A number of policy constraints were also found to be hindering the growth of the sector.
- The study develops a number of potential solutions to bottlenecks in the value chain, and makes recommendations for appropriate activities to bring about these solutions.
- Long-term, market-based solutions (involving the capacity development of both public and private organizations) require considerable investment, and this is not feasible within the present project framework. To accommodate this, the national government could play a crucial role in attracting investment from the private sector through the creation of a conducive policy environment.
- A separate chapter provides a number of specific recommendations aimed at improving the value chain. The SRSPDS project currently distributes mini-kits of high-yielding varieties (in particular, stress-tolerant rice seed) to a large number of farmers, to demonstrate and popularize these varieties through awareness creation and the use of quality seed. These recommendations challenge the present agricultural development approach, which focuses only on farmers and excludes important players in the value chain, such as private seed producers and companies, and seed dealers.
- From the perspective of both ownership and sustainability, this project can help to strengthen the private sector on a long-term basis within the national system. In view of this, the activities we recommend focus realistically on short- and medium-term capacity development of the private sector in knowledge, skills, networking, a modern information system for sharing, and business planning and development.
- These activities include a particular focus on the capacity development of women farmers in modern postharvest technology and in business entrepreneurship.
- Before the recommended activities are implemented, any proposed solution should be presented to multistakeholders for assessment, and their comments should be considered during the design of any program intervention strategy. The same participatory method of assessment and program design is applicable for any long-term solutions.
- It is therefore recommended that the assessment of the market-based solutions, and any short-, medium-, and long-term activity presented in this study, be carried out with the active participation of the multistakeholders. They are the ones best equipped to decide the most crucial activities for their own

benefit, creating a sense of ownership before the program intervention strategies are designed. To this end, we propose the following:

- a) One workshop in each of the three CSISA-BD hubs (Greater Jessore, Greater Khulna, and Greater Barisal).
- b) A final workshop at Dhaka inviting relevant government officials, policymakers, researchers, scientists, and NGOs; and private seed producers, companies, and development partners to be invited to all four workshops.
- c) An invitation to donor representatives for all the workshops is highly recommended.
- d) During the final workshop, a reference group involving representatives from the various stakeholder groups can be created to support the design of the program intervention strategies.
- e) Development of program intervention strategies based on the potential options and their implementation would eventually result in

value addition to rice seed enterprises and rice growers, thus benefiting all actors in the value chain.

- We recommend that an international consultant team leader be hired for a period of ten days to plan and facilitate the workshops and for report writing, and for a four-week period to develop detailed program intervention strategies for the short- and medium-term activities recommended in this study. This would include new project design and development to promote the value chain of Bangladesh's rice seed sector in a sustainable manner.
- While designing the new project, it is crucial to consider the need to strengthen the ownership and sustainability of the private sector within the national system. This approach would complement the approach of the present SRSPDS project, in which the key emphasis has been on distributing rice seed for diffusion and demonstration, and adoption on a wider scale.

Chapter One

Introduction

The context

Bangladesh is a rice-growing country. Rice is grown for at least two seasons of the year, and in some areas for three. Of all the inputs, quality seed plays the most important role: other inputs such as fertilizer, pesticide, and irrigation water cannot contribute to increased productivity and production of rice unless farmers plant quality seed. Quality rice seed alone can increase yields by 8–10%. It is estimated that the country can produce an additional 2.1 million tons of rice annually (worth US\$420 million) by ensuring that quality seed is used (Hossain et al 2002).¹

There is thus a tremendous opportunity to increase rice yield and production, leading to increased household food security and improved livelihoods of farmers in rural Bangladesh. However, the biggest challenge is making quality rice seed available to these farmers. In 2006, the Ministry of Agriculture estimated a total rice seed requirement of around 313,955 tons, of which only 77,664 tons were supplied, about 25% of the requirement. The public sector supplied 74,314 tons and the private sector 3,350 tons (BSGDMA 2007).

It is therefore evident that Bangladesh has a huge potential market for quality rice seed; the estimated value of rice seed is around BDT 1,650 crore (\$290 million), with an annual demand for 786,000 tons (Hossain et al 2002). However, to achieve this would require an effective and efficient seed delivery system, facilitated by the active collaboration of both the private and public sector working alongside NGOs and farmers' organizations. Their participation in the rice seed-sector value chain is needed to ensure that rice-growing farmers get the quality seed they need, when they need it. Only then can they achieve the increased rice productivity and production that are needed to contribute to the country's economic growth.

¹However, Bashar et al (2012) claim that quality seed alone can boost yield up to 20%.

In view of the substantial and significant contribution that quality seed can make (improving both the country's economic growth and the livelihoods of individual farmers through increasing household food security), USAID has supported an 18-month project, Sustainable Rice Seed Production and Delivery Systems (SRSPDS) for southern Bangladesh. This is an integral part of CSISA-BD, and it aims to contribute to USAID's Feed the Future initiative, to improve national and household food security through enhanced and sustained productivity. The major aims of the SRSPDS project are to

- Coordinate and support the production and distribution of different categories of seed of high-yielding and stress-tolerant rice varieties through a network of partners.
- Establish effective systems for targeted dissemination, farmer-centered high-quality seed multiplication, and monitoring, evaluation, and impact assessment.
- Increase awareness of new varieties and explore marketing opportunities.
- Strengthen the capacity of seed production and distribution systems to ensure sustainability and longer-term impact by enhancing the facilities and increasing the capacity of key partners for systematic production and timely delivery of sufficient seed.
- Provide training and relevant information to farmers on the production, processing, storage, and delivery of rice seed to partners.
- To ensure that project interventions are both effective and efficient, it is critical to better understand the constraints (bottlenecks) and opportunities the rice seed value chain presents, and to formulate a long-term strategy and action plan accordingly. This study thus has the overall objective of studying the existing rice seed production and marketing system, and identifying any bottlenecks in project intervention areas and constraints in both the production and market expansion process. The specific objectives of the study are as follows:

- Map the rice seed production value chain.
- Identify bottlenecks around the value chain.
- Identify the underlying causes of those bottlenecks.
- Draft recommendations for activities and partnerships that address the underlying causes.

An exploration of both primary and secondary information reveals that no other study has been carried out on value chain analysis of rice seed, not even in Bangladesh. This study is thus unique, innovative, and challenging. VCAs have been conducted around the developing world on food grains (a number are on rice), and have been carried out along a single market chain from production to end-users (the consumers). However, the unique aspect of the rice seed value chain in Bangladesh is that it appears to have two market chains—the supply side and the demand side. The mapping of both these markets is envisaged in this study.

Since no such analysis has been conducted so far, there is a gap in the understanding of the constraints

and opportunities in the value chain. This study fills that gap—one of great national significance—first by mapping the value chain actors and then by identifying and exploring the key challenges (the constraints and their causes) and opportunities (the options for removing those constraints) in Bangladesh’s rice seed sector. Based on these findings, the study develops several potential market-based solutions, leading to the formulation of practical program strategies that tackle the key challenges inhibiting market growth and the competitiveness of rice seed, and its wide use by rice growers.

The overall goal of this study is thus to build a sound foundation to guide the expanded CSISA-BD project to formulate effective and efficient program intervention strategies, aimed at facilitating the growth and competitiveness of the rice seed market, while at the same time benefiting rice growers in terms of increased household food security. In fact, this will benefit all the actors engaged in the value chain, resulting in a win-win situation all around.

Chapter Two

Value chain analysis: framework and methodology

The conceptual framework used by this study is an adaptation of the approach developed by Action for Enterprise (AFE 2007); some modifications have been made to render it appropriate for the rice seed-sector value chain in Bangladesh.

Figure 1 illustrates this conceptual framework. It shows that the first task is the identification of all the stakeholders/actors in the value chain: without this, mapping of the value chain would not be possible. The rice seed sector in Bangladesh reveals two distinct value chains: the supply side and the demand side. Next, the bottlenecks in each stakeholder category in the value chain are identified, along with their causes, and the opportunities available to each stakeholder to overcome them. An analysis of these will facilitate recommendations for the formulation and development

of market-based solutions. The second phase of the VCA should begin with an assessment of the proposed solutions by multistakeholders, and this then forms a sound basis for the design and formulation of program intervention strategies.

Study methodology

Survey method and selection of study districts

The study methodology follows several systematic steps. The first is a desk review of all available relevant publications (we refer to reports, articles, and secondary information). Second, a checklist including a structured and semi-structured questionnaire is developed; this is to be used as a guide for the focus

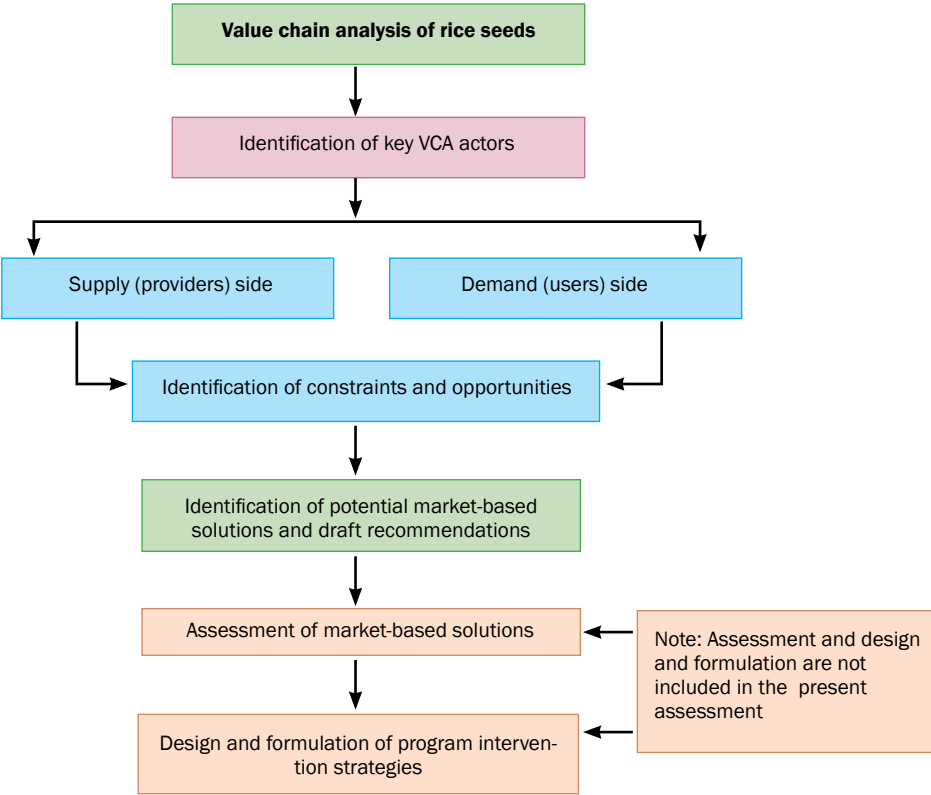


Fig. 1. Conceptual framework for value chain analysis (VCA) of rice seed in Bangladesh.

group discussions and individual interviews carried out with the various stakeholders in the value chain as part of the field survey. This checklist is shared with the professional staff of both the SRSPDS and CSISA-BD projects, and is finalized before the field survey takes place.

Next, three southern project districts are selected for the field survey, in consultation with the project professionals. Meetings with the various stakeholders in each district are coordinated and organized by the hub managers, with the guidance of study team members working on the SRSPDS and CSISA-BD projects in the IRRI-Bangladesh office in Dhaka.

A study team of four (including the consultant team leader) carried out a field visit from 8 to 15 July 2012. The team conducted a series of focus group discussion meetings and individual interviews with the various stakeholders and actors in the rice seed value chain (see Annex I), using the checklist guide and focusing on the three key objectives in the terms of reference (Annex I). Annex II provides the checklist guide and Annex III presents a list of the stakeholders who participated in the discussions and interviews. The group discussions emphasized exploring the bottlenecks and their causes, and identifying opportunities in the value chain to overcome these. Qualitative information was thus collected from the various value chain stakeholders. Next, on 16-18 July 2012, the study team met with senior BADC and BKB officials in Dhaka, and BRRI and the Seed Certification Agency (SCA) in Gazipur, to explore the constraints and opportunities in the respective organizations.

The mapping of both supply- and demand-side markets is then carried out, showing the various actors in the value chain. The supply-side value chain includes key actors: government institutions producing breeder seed (BS), foundation seed (FS), certified seed (CS), and truthfully labeled seed (TLS), as well as private seed producers, companies, and processors. It also shows their links to public research farms, foundation seed producers and seed multipliers, financial institutions, and input suppliers. The demand-side value chain also identifies key value actors (such as public and private seed producers, processors and companies, private wholesale dealers [traders], retail dealers/village seed shops, and rice growers/farmers), as they are linked to technical backstopping and institutional support.

Data analysis and verification

Qualitative information is collected during a rapid survey in the three project districts, and is used to carry out the analysis by linking it to the study framework and objectives. Any information requiring clarification is verified by further discussion with selected stakeholders on an individual basis. Discussion among the study team, supplemented by expert analysis, identifies the bottlenecks and their causes, and market-based solutions are then developed. Based on these, the consultant team leader recommends a number of project activities, which are presented in this study.

Chapter Three

Mapping the actors in the rice seed value chain

Figure 2 maps the linkages and interlinkages of the various actors involved in the rice seed value chain on the supply side.

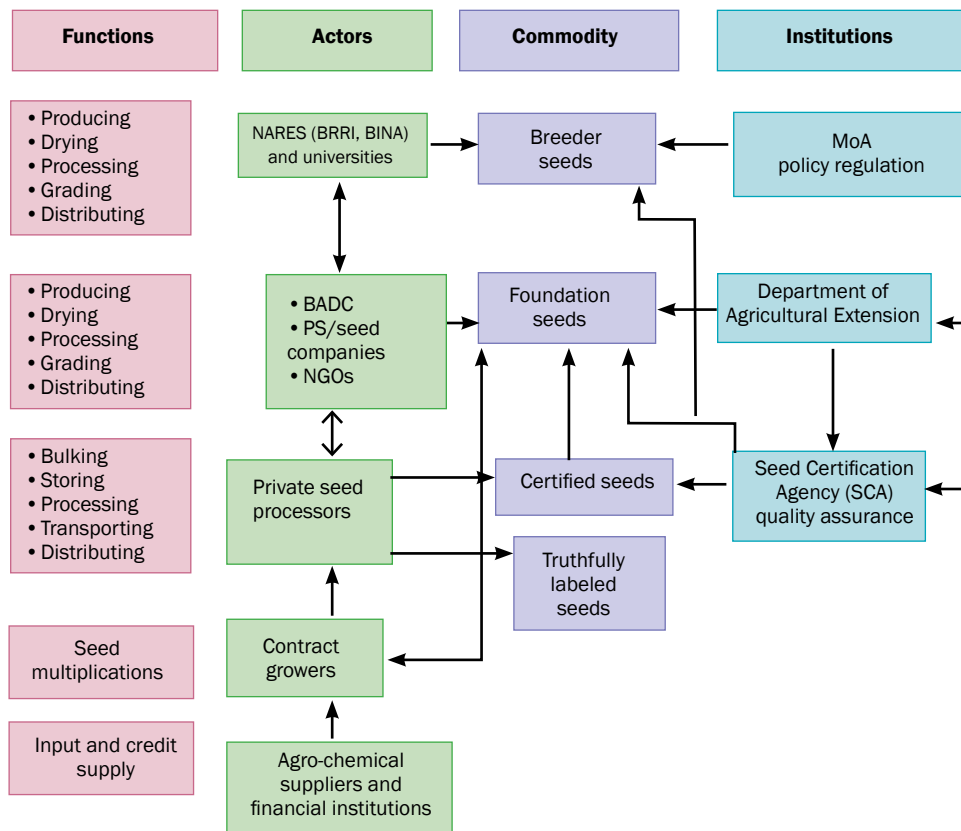


Fig. 2. Mapping the supply-side market of the rice seed value chain.

The Bangladesh Rice Research Institute (BRRI), the Bangladesh Institute of Nuclear Agriculture (BINA) in the national agricultural research and extension system (NARES), and several agricultural universities play a key role in the development, evaluation, and release of rice varieties. The functions and activities of these institutions are influenced by the policy regulations of the Ministry of Agriculture.

These institutions have a mandate to produce, process, and distribute breeder seed to the Bangladesh Agricultural Development Corporation (BADC), pri-

ivate seed companies and processors, and those NGOs with a mandate to produce foundation seed, certified seed, and truthfully labeled seed. BADC also produces foundation seed on its own farms and supplies it to contract growers, who then produce certified seed and truthfully labeled seed under BADC's supervision and technical backstopping.

BADC has the largest rice seed drying, processing, grading, and storage facilities in the country (a few large private seed companies and NGOs have similar facilities, but on a more limited scale), and

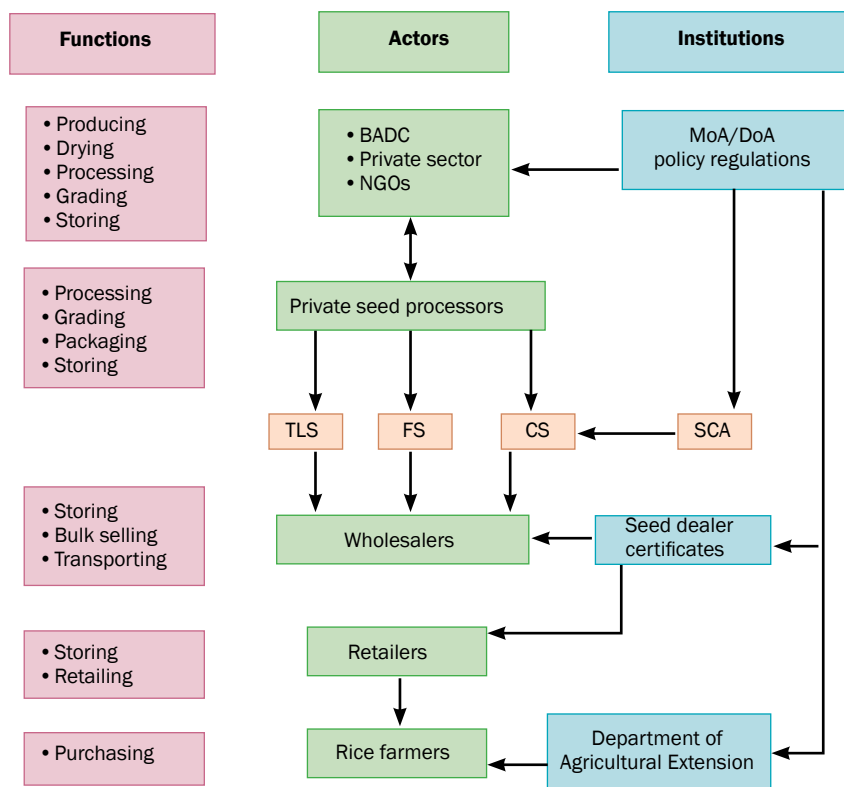


Fig. 3. Mapping the demand side of the rice seed value chain.

makes these facilities available to small and medium (SM) seed companies. Many of these companies obtain breeder seed from BIRRI and BINA, and use contract growers to produce foundation seed, certified seed, and truthfully labeled seed. The SCA (part of the Ministry of Agriculture) is mandated to certify breeder and foundation seed and maintain quality assurance. The certification of seed by the SCA is optional and upon request.

Figure 3 maps the linkages and interlinkages of the various actors involved in the rice seed value chain on the demand side, and here BADC is again a major player. It has a mandate to supply quality seed to rice growers throughout the country. It has its dealers across the country, selling both certified and truthfully labeled seed (around 80% is TLS) to farmers according to their demand, on a commission basis. BADC uses most of its foundation seed for its next cycle of seed production; a small amount is left over, and is sold to farmers through dealers.

Next in the demand-side value chain are the private seed producers, companies, and NGOs who produce and process rice seed, and then sell it to farm-

ers through their dealers in the various markets (these dealers need a seed dealer certificate to operate, which they obtain from the Ministry of Agriculture). Finally, farmers are the key actors, and they demand various varieties of quality rice seed according to their needs. Input suppliers such as those who supply them with fertilizer, pesticide, and credit influence these farmers.

The seed wing of the Ministry of Agriculture exerts influence on all the actors in the value chain (on both the supply and demand sides); its resources as well as policy regulations can significantly affect the functioning of each actor.

The National Seed Board plays an important role in drafting policy that affects both the public and private sector engaged in the rice seed business. The role of Bangladesh Krishi Bank (BKB) is significant in helping the private sector in terms of creating infrastructure; at the grass-roots level, the Department of Agricultural Extension has a paramount role in diffusing knowledge of HYVs among farmers, and providing them with technical support.

Chapter Four

A profitable value chain: constraints and opportunities

This chapter examines the constraints and opportunities that emerged from discussions with the stakeholders in the value chain, and that relate to the mapping of those stakeholders. The focus group discussions and individual interviews identify the bottlenecks, explore their causes, and reveal opportunities to unblock them.¹

Bangladesh Rice Research Institute (BRRI)

BRRI produces breeder seed on its own farms. It performs all its own postharvest activities (drying, processing, grading, and storage), using its own infrastructure at its headquarters in Gazipur. It also distributes and sells breeder seed to BADC, private seed companies, and NGOs engaged in rice seed production and marketing. Increasing demand has led BRRI to produce breeder seed at all its substations, but it has to be transported to BRRI headquarters in Gazipur to be processed and graded. Because the system of processing, grading, and distribution/sales is centralized (at the Gazipur distribution center), breeder seed becomes expensive due to transportation and handling. Breeder seed also requires certification from the SCA, and, to obtain this, its standards need to be maintained every step of the way, which also increases costs.

BRRI produces around 150 tons of different high-yielding varieties of rice breeder seed each year. Its biggest client is BADC, which purchases 50%, with the remaining 50% being sold to private seed companies and NGOs across the country. BRRI meets around 90% of BADC's demand, but barely 25% of private-sector demand. Some 90% of the private seed companies use breeder seed to produce foundation seed, which is sold directly to farmers for commercial rice growing; they do not produce certified seed or TLS. Private-sector demand for breeder seed is far from

satisfied. According to BRRI scientists, if all breeder seed were used to produce certified and truthfully labeled seed, the demand for breeder seed would not be as high; this is because 1 ton of breeder seed produces a minimum of 80 tons of foundation seed, and this would produce a conservative estimate of $80 \times 80 = 6,400$ tons of certified/truthfully labeled seed.

This is a matter of government policy. Either it makes laws restricting sales of foundation seed directly to rice growers for commercial rice production (making it mandatory that foundation seed be used to produce only certified or TLS) or, if such a law is not in place (or not implemented strictly on the ground), demand from the private sector for breeder seed is bound to increase significantly each year. To meet this increasing demand, the present capacity of BRRI needs to be developed and strengthened in terms of a skilled workforce, logistics, and infrastructure.

The vulnerability caused by climatic conditions (such as excessive rains, floods, and other natural calamities) and market uncertainties poses additional challenges to the production of breeder seed. In some years, an excess amount of some high-yielding varieties of breeder seed remains unsold; however, the low standard of BRRI's humidity-controlled storage facilities means that only a very limited amount of carryover seed can be kept for use the following year. A consequence of the uncertainties mentioned above is that BRRI needs to keep a buffer stock of breeder seed to provide an assured supply, even during periods of natural disaster. It is therefore essential that it develop adequate standard cold storage facilities, dehumidified and fit to store seed without any deterioration in quality. This, however, needs policy intervention from SCA.

Another serious challenge is posed by the fact that the majority of private-sector seed companies operate their rice seed business on an ad hoc basis with little or no long-term planning. This makes it unclear to BRRI how much breeder seed it should produce each year. For a proper indication of the demand situation, each

¹Limited issues relating to profitability and value addition of rice seed were also touched upon. A future study on the benefit-cost analysis of each category of stakeholder in the value chain would give invaluable support to each stakeholder in his or her business plan development.

seed company should formulate a minimum three-year strategic rollout business plan. The rice seed market information system is also poor and it needs to be improved significantly.

BRRI has so far developed four hybrid rice varieties: BRRI hybrid dhan 1, 2, and 3 (for the boro season), and BRRI hybrid dhan 4 (for the aman season). Two more varieties are in the pipeline (one for each season) and are expected to be ready in the next two to three years. At the same time, private seed companies have registered around 100 hybrid rice varieties, obtaining parental lines from China and the Philippines.

In order for BRRI's capacity in the development of hybrid rice to be strengthened and enhanced, it needs to overcome several challenges. These include a lack of isolated plots, a lack of a workforce sufficiently skilled and well trained in parental line development, a lack of linkages for germplasm dissemination, and a lack of infrastructure.

Bangladesh Agricultural Development Corporation (BADC)

This is the government parastatal organization, mandated to produce and supply quality rice seed throughout Bangladesh. BADC has a sufficient, skilled workforce and modern facilities. It gets 90% of the breeder seed it requires from BRRI (50% of BRRI's production); it then produces foundation seed on its own farms, which it supplies to contract growers, mainly to produce TLS. It has its own automatic drying, processing, and grading machines, and adequate storage facilities. During 2012, BADC produced around 120,000 tons of cereal seed, of which around 91,800 tons were rice seed (about 76.5% of the total cereal seed production). Assuming an estimated rice seed requirement of around 236,000 tons, this means BADC supplied only 38.9% of the country's total needs during 2012.

Over the past six to seven years, Bangladesh's production of rice seed has increased significantly as a response to considerable growth in market demand. However, the country has been unable to achieve a commensurate expansion in infrastructure, despite many attempts to do so. Furthermore, under the public-private partnership framework, BADC is mandated to provide a certain number of services to the private sector, including making its infrastructure facilities (for drying, processing, grading, and storage) available for use. However, its own expanded use in recent years

has reduced its ability to provide private seed companies with these services.

BADC has prepared a strategic vision plan and projection of the increased quantity of rice seed it expects to supply each year until 2020-21. Its aim is to supply 51% of the country's total rice seed requirement in 2012-13, 55% in 2013-14, and 59% in 2014-15; by 2020-21, it expects to be supplying 65% of the total requirement. However, in view of the existing workforce and infrastructure facilities, and without developing its human resources and infrastructure facilities rapidly, this plan seems very ambitious.

In 2011-12, BADC produced 800 tons of hybrid rice seed from its single registered hybrid variety, SL8H. It sold this for BDT 150/kg, which, compared with the price offered by private seed companies (BDT 300-350/kg, or more than double),² indicates that BADC is not a profit-making organization; rather, it is service-oriented, geared toward providing benefit for rice farmers throughout the country.

During their meeting with the project team at their office in Jessore, BADC officials said the organization produces foundation seed on its own farm, over 95% of which is used for seed multiplication of certified seed and TLS, with 3-4% being sold to the private sector on a first-come, first-served basis. BADC uses contract growers/farmers for seed multiplication and produces mostly TLS: contrary to the claims of SM seed companies and NGOs, BADC does not sell large amounts of foundation seed. BADC states that it supplies the southern districts of Bangladesh with around



Discussion meeting with BADC officials, Jessore.

²Information obtained through personal communication with BADC.

36% of their rice seed requirement: 80% of this is TLS, and government policy dictates that the price of TLS be kept the same across the country. BADC also believes the private sector share of the rice seed market is only 2–3%. In addition to its production of rice seed, BADC sells fertilizer and cereal, vegetable, and potato seed on a large scale.

Nongovernment organizations (NGOs)

A number of NGOs are engaged in the rice seed business, in production and marketing. Among them, BRAC, a national NGO, has a large stake. It began producing rice seed in 2000; in the beginning, production was around 500 tons per annum. With its own processing center established, and production increasing each year, production targets increased by 1,000 tons each year. In 2012, BRAC was fulfilling this target. It produces foundation seed on its own farms, 80% of which is used to grow TLS through contract growers. It has about 400 dealers across the country marketing its rice seed. One of its key challenges is that the center has only one processing plant; transportation and specialized bags to haul the rice seed across the country to BRAC dealers are additional costs. Limited storage capacity is also a major challenge.

BRAC also produces hybrid rice seed, and has developed three varieties, obtaining seven parental lines from China and one from the Philippines. BRAC uses contract growers to grow the seed, and plans to expand hybrid seed production in the near future. Its workforce is skilled, but, to expand production, it needs to increase both its workforce and its infrastructure: its current infrastructure facilities are not adequate for the expansion of both types (inbred HYVs and hybrid) of seed.

The cost of producing TLS is estimated to be around BDT 25/kg and the sale price is BDT 32–35/kg; when the costs of transportation, processing, and storage have been taken into account, the net profit margin is only 5–10%. On the other hand, the cost of production of hybrid seed is estimated at around BDT 100/kg and the sale price is around BDT 250/kg; when the transportation, processing, and storage costs are added, the net profit margin is 20–25%. The production and marketing of hybrid rice seed are clearly much more profitable than for TLS or rice seed of HYVs.

Some local NGOs are also actively involved in rice seed production and marketing. One example is the Jagarani Chakra Foundation (JCF) in Jessore, whose main activity is to provide short-term credit to farmers for agricultural production.³ In 2011, it produced and sold 78 tons of foundation seed to rice farmers, at a price of BDT 52–55/kg. The estimated cost of production and marketing is around BDT 47/kg, yielding a profit margin of around BDT 5–6 per kg. JCF also provides training to its contract growers.



Discussion meeting with JCF, a leading NGO in Jessore.

Although JCF employs agricultural experts, many small NGOs cannot afford to hire full-time agriculturalists. JCF customers are well-established and medium-sized farmers. The majority of poor farmers buy cheap seed from BADC and tend to depend for advice on seed dealers and retailers, who can influence farmers to buy certain varieties of seed. Imparting training to these dealers and retailers is thus crucial to ensuring that farmers get the advice they need.

Both NGOs (JCF and Shushilan in Khulna) pointed out a number of problems in running a profitable rice seed business (see Box 1). These include the lack of mechanical dryers (critical because of bad and uncertain weather conditions during the harvest and postharvest periods) and lack of standard storage facilities. It seems clear that most of the challenges are related to postharvest activities; losses resulting from the lack of proper postharvest infrastructure are estimated at a massive 30–40%. Workers are unaware of appropriate handling and managing techniques once the seed reaches their facilities and shops, resulting in

³JCF's interest rate is 24% per annum.

high losses there, too. Providing training to the private sector is thus an opportunity for the project to ensure rice seed quality.

Box 1. The NGO Shushilan.

Shushilan, an NGO working in Greater Khulna, started producing rice seed in 2001. That year, it produced only 0.5 ton, which it distributed to local farmers. Since then, it has been producing and marketing an increased amount of rice seed each year, rising from 8.8 tons in 2002 to 17.7 tons in 2012, using both its own farms and contract growers.



From that 17.7 tons, Sushilan produced 5.7 tons on its own farms and obtained 12 tons from contract growers. During the 2012 boro season, the NGO distributed a total of 77 tons of rice seed (17 tons of foundation seed and 60 tons of certified seed) to 15,400 farmers. According to Sushilan, the key constraints to rice seed production and marketing businesses are the following:

1. Infrastructure facilities related to seed production, processing, and storage require improvement and substantial upgrading, which requires high capital investment.
2. Almost 80% of the seed used in Bangladesh agriculture is farm-saved seed. Systematic upgrading of the quality of this seed is required, including training in seed production technology.
3. Frequent natural calamities such as drought or floods result in enhanced seed requirement by the areas affected.
4. Seed quality control arrangements require upgrading and strengthening.
5. Extension and farmers' networks should be developed to facilitate technology dissemination.

The Seed Certification Agency (SCA)

The task of this government agency is herculean: to assure the quality of rice seed across the whole country. It has the mandate to monitor fields for breeder, foundation, and certified seed, as well as to monitor seed markets across the country, but it has very limited capacity to fulfill this mandate. It now has only 25 field inspectors covering 64 districts (five positions are vacant). The constraint is not only one of personnel but also of mobility, as the staff members do not have enough vehicles to carry out field inspections and market monitoring.

During our meeting with senior SCA officials, one pointed out that SCA was established in 1974. At that time, the production of quality seed that needed to be

certified was negligible. Production has now increased by 100 times or more, but the capacity of SCA in employees and facilities is limited, making it increasingly difficult to carry out efficient and effective monitoring to assure seed quality.

The fact that TLS does not require SCA certification is a policy loophole, one which without doubt leads to low-quality seed on the market; both private and public-sector companies producing TLS take advantage of SCA's limited capacity. There is thus an urgent need to upgrade, strengthen, and develop this capacity if farmers are to obtain quality rice seed in the market. This opportunity is one that can be taken up by the national government.

Private seed companies

Many newly emerging private seed producers and companies see a window of opportunity in the rice seed business. Many, however, lack the necessary knowledge and skills in areas such as business planning, record-keeping, supply and demand forecasting, and modern information systems, making it impossible to operate a business profitably. They also lack knowledge and understanding of rice seed from HYVs, and how to improve rice seed quality through proper drying, processing, and storage. These gaps offer many opportunities to build the capacity of SM seed producers and companies.

At the same time, almost all the private, small, and medium seed producers and companies in the three project districts surveyed do not have their own drying, processing, testing, and grading facilities. The majority of seed companies make use of contract growers. Over 90% of the small and medium farmers produce foundation seed. Although they do not openly admit the reason for producing only foundation seed and selling it directly to farmers for commercial rice production, the reasons seem obvious. First, profitability: the production and marketing of foundation seed are much more profitable than those of TLS. Second,

since BADC produces a large volume of TLS, and government subsidies mean that it sells it at a reduced price, the position of the private sector in terms of the production and marketing of TLS is untenable, and it finds itself unable to compete.

The serious challenge currently faced by the small and medium companies is the scarcity of space for drying, processing, grading, and storage facilities. In Jessore District, only Ali Seed Farm can provide these facilities, and only to a limited number of companies (see Box 2). The remaining companies try to take advantage of the facilities offered by BADC, but, over the past four to five years, this has become increasingly difficult, as BADC is itself producing more seed each year. Because it needs its facilities for its own use, it is less able to make them available to others. The private sector reports that delays of several days are not uncommon, contributing to the deterioration of seed quality.

The Ali Seed Farm is the only private-sector seed farm in Jessore with facilities for drying, processing, and storage, but a visit to the storage facility indicated the poor method being used: the bags of rice seed are piled up against the walls, leaning against each other and against the walls, with no space for ventilation

Box 2. The Ali Seed Farm.

In 2003, Ali started small-scale dealing in TLS. However, he discovered that farmers preferred foundation seed, so he started producing his own. He soon faced serious constraints in getting access to drying, processing, grading, and storage facilities, and also found out that a majority of other SM seed companies were facing the same problem. This presented him with the opportunity to build his own infrastructure, with all the facilities he needed for rice seed production and marketing. At the same time, plenty of other SM seed companies in the area would pay money to hire his facilities. So, in 2008, he invested around BDT 2 crore, or \$250,000, to build the infrastructure for drying, processing, grading, and storage. Now, he provides services to 62 SM seed companies, charging 60 *paisa* (less than 1 BDT per kg) for processing and BDT 2/kg for 6 months of storage. The storage capacity is 2,500 tons.



Seed warehouse, Jessore.

(see Box 2). This is a prime example of a private seed company lacking basic knowledge of quality seed storage, and it provides an opportunity for the project to provide training in appropriate storage methods to SM seed companies.

No data are currently available concerning the actors in the rice seed value chain. This presents a challenge for both monitoring and evaluating the progress and outcome of the projects; it also provides an opportunity for the project to fill the gap by setting up and maintaining a database of the various actors involved.

Contract farmers

Most contract farmers in Jessore produce foundation seed for private seed companies (see Box 3). This is mainly done on an informal basis; few formal agreements are made. The price of the seed is determined after harvest, based on the current market price of rice; the farmers receive BDT 100 per 40 kg more than the market price of paddy. Both NGOs and the DAE have provided the farmers with training in rice seed production; however, they indicate there is a gap in field supervision during production and postharvest.

In both Khulna and Barisal, contract farmers grow foundation seed, TLS, and hybrid seed, and, like Jessore farmers, their product price is determined at the time of delivery. During the focus group discussion, farmers highlighted a number of challenges. These include high labor costs and shortage of labor during harvest, the traditional method of drying in the sun often being disturbed by bad weather (heavy rains or cloudy days), and lack of modern storage facilities on



Discussion meeting with contract farmers, Jessore.

their farm. In some years, these can lead to the farmers incurring 40% loss.

The farmers see a great opportunity in having their own harvesting, threshing, and drying machines, either in their community or nearby, which would ensure quick and proper processing, thus avoiding losses in bad weather (a drying machine can reduce moisture content by 20–30%). Considerable transportation costs would be saved, as well as reducing waste during grading (due to incorrect drying), and maintaining seed quality by avoiding rotting during storage.

Private rice seed dealers

Private seed dealers across the three survey districts (Jessore, Khulna, and Barisal) report similar issues. The volume of their transactions has increased every year for the past five years, along with their profits. Their profit margin for TLS is 5–10%, although in



A private seed dealer shows a BADC seed bag.

some years unsold TLS seed, which they cannot return to BADC, means they incur losses. Their profit margins are greater (15–20%) from the sales of foundation and hybrid seed.

In Jessore, the rice seed sold is mostly foundation seed (supplied by private seed companies) and a little TLS and hybrid seed. In Khulna, dealers also sell mostly foundation seed, and some TLS supplied by BADC; there is also an increasing trend of using hybrid rice seed (see Box 4). Demand by farmers is increasing for hybrid rice seed due to the salinization of their agricultural lands—they report that, in saline conditions, hybrid rice seed provides a much higher

Box 3

Nazrul Islam from Choromenkali Village, Sadar, Jessore, is a contract grower and small seed company owner. His father started out as a BADC contract grower in 1984. As the eldest son of the family, he took over from his father; now, seven brothers with their families live together as a joint family. In 2000, a severe flood damaged his seed. He managed to save only 3 tons, which he distributed to farmers in three *upazilas*, on the condition that they pay him after harvest if the seed performed well. All the farmers experienced good harvests and, based on the performance of his seed, Mr. Islam obtained a rice seed dealership license from the Seed Wing of the Ministry of Agriculture. In 2003, he produced 5 tons of foundation seed; this has increased every year, and in 2011-12 he sold 13 tons of foundation seed, 10 tons of certified seed, and 7 tons of TLS (at BDT 50/kg, BDT 42/kg, and BDT 35/kg, respectively). He sold 30 tons of seed in total, with 3 tons of TLS being left unsold.

His family, his brothers, and their families are actively involved in the seed business as well as the production and marketing of vegetables; the women work in the production, drying, and storage of the seed. Over the past years, he has increased his assets significantly. In 2008, from the income he made from the seed and vegetable business, he built an underground irrigation system; he bought a power tiller in 2009, a tractor in 2010, and in 2011 he bought some agricultural land. He owns a color television and two mobile phones.

His experience in producing and marketing rice seed leads Mr. Islam to believe that timely harvesting and drying and the use of appropriate storage facilities are critical to ensuring high seed quality. High labor costs during harvest time and wet weather conditions mean he frequently incurs heavy damage to his crops, which a harvesting machine, thresher, and drying machine would avoid. The latter would also reduce his transportation costs, as seed that is not properly dried is more costly to transport.

yield than high-yielding varieties. In Barisal, dealers mostly sell TLS and hybrid rice seed, although there also the trend of using hybrid rice seed is increasing.

Private seed dealers want to sell quality rice seed to the farmers. However, they themselves are getting low-quality seed; one wholesale dealer reported receiving complaints from 23 retail dealers about the quality of the seed he supplied. At the same time, a dealer's license can be obtained only from the Seed Wing, and this is a costly and inconvenient process. To overcome this, one suggestion is that the licensing procedure be decentralized to the regional or district level.

These dealers across the three districts trade not only in rice seed but also in vegetable seed (which they find most profitable), fertilizer, pesticide, and agricultural equipment. In terms of challenges, the majority

of the dealers lack the necessary knowledge and skills to operate their business in the efficient and effective manner needed to sell quality seed. Low-quality packaging, reckless transportation methods, and poor storage results all contribute to this. The dealers also seem to operate on an ad hoc basis, with little or no planning. They are unaware of the potential of HYVs and how quality seed contributes to increasing yields. In addition, the majority of resource-poor farmers buy whatever seed the dealers have on offer, often not even knowing what variety they are buying.

These gaps offer the project a number of opportunities: strengthening the capacity of dealers to operate their seed business in a profitable manner, delivering quality rice seed to farmers, and providing them with knowledge to better understand HYVs of rice seed and yield potential.

Box 4

Mr. Azaharul Islam of M/S Krishi Vandar, Dumuria market, Khulna, started his rice business in 1995. He sold 10 tons of rice seed in his first year of trading and he is now one of the largest BADC dealers in the district. Over the past five to six years, he has found that demand for quality rice seed has increased more than tenfold: in 2011-12 he sold 100 tons, 80 tons of TLS and 20 tons of foundation seed. About eight years ago, he started selling hybrid rice seed; the first year he sold only 0.5 ton but by 2011-12 this had increased to 15 tons, and there is no sign of this demand decreasing. The profit for both foundation seed and hybrid seed supplied by private seed companies is much higher than for TLS supplied by BADC (BDT 10–20/kg for FS and hybrid rice seed, and only half this from BADC).



Interview with a seed retailer, Dumuria, Khulna.

Mr. Islam identified several advantages in dealing with the private sector: first, the seed is delivered directly to his shop; second, he can pay for the seed after he has sold it; finally, any unsold seed can be returned. On the other hand, his business dealings with BADC do not really work in his favor. First, his profit margin with them is low (BDT 5–10/kg); second, he has to pay cash in advance and transport the seed himself from the BADC center to his shop, paying the costs of transportation, loading, and unloading; finally, he cannot return any unsold seed, thus incurring further losses.

Rice-growing farmers and seed savers

Out of the rice farmers across the three districts, those in Jessore (60% of them) know the most about HY rice varieties. They have little trust in TLS (which is not certified), with the majority of them preferring foundation seed. This is much more expensive than TLS (around 36% higher, BDT 50–55/kg compared with BDT 32–35/kg for TLS). Nonetheless, these farmers recognize certain advantages to using foundation seed for commercial rice cultivation: first, because of its genetic purity (resulting in higher yields); second, because seed from these rice crops can be saved for at least three years, assuring quality seed for their own commercial rice production.

In Khulna, around 40% of the farmers seem aware of the benefits of using foundation seed and hybrid seed, and they demand it; the remaining 60% look for cheaper seed, mostly purchasing TLS supplied by BADC at a highly subsidized rate. In Barisal, 20–30% of the farmers seem aware of the benefits of foundation seed and hybrid seed and they also demand it; the majority, however, prefer the cheaper TLS (see Box 5).

Some 30–50% of the farmers across all three districts save their own rice seed to sow the following season. During the focus group discussion, these farmers said the main reason they do this is to minimize risk: they cannot be sure of the quality of the seed they buy or that it will perform well, whereas they can depend on their own saved seed, even though it produces around 20% less than that on sale in the market. They thus tend to save a small quantity of their own seed each year. However, traditional storage methods incur high damage, and many farmers are thus looking for modern drying and storage facilities at the farm household level to preserve their seed quality and thus guarantee higher crop yields.

Farmers say that they depend on seed dealers more than any other organization. The majority of poor and illiterate farmers have blind trust in dealers, and purchase whatever is available without even knowing what variety they are buying. However, the dealers themselves are often not very knowledgeable about the different varieties available. This offers an opportunity to train rice seed dealers on the different rice varieties

and their yield potential under different soils and agro-climatic conditions.

Bangladesh Krishi Bank (BKB)

This bank was established in 1973, mainly to serve agricultural sector development. It provides credit for any activity related to agricultural production, and for the machinery needed for the drying, processing, grading, and storage of rice seed. Collateral is not required for small loans for seasonal crop production, but farmers requiring a larger investment for postharvest infrastructure facilities (such as drying, processing, and grading machinery) do need collateral, and matching funds of 30% are also required. Credit is also provided to only 75% of the value of collateral. It would clearly be highly challenging for small and medium seed companies to get a bank loan, despite the relatively low interest rate (ranging from 12% to 14% per annum). At the same time, private bank interest rates are prohibitively high (around 24% plus service charge).

Department of Agricultural Extension (DAE)

In the rapid survey districts, DAE manages its own projects funded by the government and World Bank. Each year, it distributes rice seed mini-kits to 400 to 600 farmers, and provides them with training and sacks to store the seed. However, the DAE work-



Laminated jute bag for seed storage, DAE, Khulna.

Box 5: Seed growers

Jalal Ahmed Akhand from the village of Gojalia, Barisal, got 1 kg of hybrid rice (parental line) from BRRI, and a BRRI scientist provided him with training and supervised his production of rice on his own farm. His first attempts produced 20 kg of F_1 seed; he sold 15 kg to his neighbors and used 5 kg on his own farm to grow paddy. Over the following years, he improved his skills and techniques of producing hybrid rice seed; as a result, he produced 60 kg of F_1 hybrid seed in 2010-11 and 2011-12; he kept 5 kg for his own use and sold 55 kg to his neighbors and people in his village for BDT 200/kg, cheaper than the local market price of BDT 275/kg. He states that 5 kg of his F_1 hybrid seed can produce around 20 *maunds* of hybrid rice on 40 *decimals* of land. He also sells seedlings produced from his hybrid seed, for BDT 500/kg of seed.

The cost of producing 1 kg of F_1 hybrid seed is around BDT 50; if labor is used, this comes to around BDT 60/kg and results in sales worth BDT 200/kg. Clearly, producing F_1 hybrid seed is very profitable. This producer is highly trusted among the other villagers as an F_1 hybrid rice seed producer and seller because he maintains high-quality drying and storage using special techniques that he does not want to reveal to us. Both quality drying and storage techniques make a significant difference in seed quality.



Interview with seed growers, Barisal.

force tends to be engaged in its own projects, and has limited time to provide the training or adequate field supervision needed by the contract growers of the SM seed companies. Easy-to-understand, effective leaflets and pamphlets seem to be nonexistent; these are needed to facilitate the effective diffusion of newly released, promising, high-yielding varieties of rice seed. According to DAE officials, the majority of farmers (around 60%) are not aware of the high yield potential of HYVs of rice seed; they tend to choose the much cheaper TLS. DAE is working to improve rice, wheat, and jute seed; they also provide farmers with laminated sacks, but say that farmers complain of rats attacking the sacks during storage, thus incurring loss.

Factors contributing to low-quality seed in the market

The low quality of rice seed starts with poor supervision during the actual growing of the crop, and continues with inadequate monitoring to poor drying and



Infested seeds found by a retailer in Khulna.

storage on the farming homestead. Once the seed gets to seed companies for processing and storage, limited infrastructure leads to long delays and further deterioration in seed quality, and poor storage facilities and low-quality packaging make things worse. Poor transport adds to the damage and, although this seed can be returned to the dealer, it is often mixed with new seed or simply re-packaged in new bags and taken back to the market for sale. A seed dealer in Khulna showed us a sample rice seed that he had found to have fungal growth.

Retailers transport seed over long distances. The first problem arises when it is being carried to the village shops, when poor packaging or poor quality of bags may lead to the seed being spoiled by rainwater. Next, poor storage in village shops can contribute to

deterioration in seed quality. Unsold carryover seed is also a big problem: it is frequently mixed with new seed, packaged in bags, and taken to retail dealers in village shops, which can lead to a poor harvest.

Profitability and market competition in the value chain

The private sector and NGOs engaged in the production and marketing of rice seed regard BADC as a competitor with whom it is impossible to compete due to the subsidies it receives from the government. Nonetheless, the need for quality rice seed far exceeds its supply (BADC presently supplies around 36% of the seed required and the private sector 5% at most). There is thus considerable opportunity for the private sector to invest in and expand its rice seed business and, rather than seeing BADC as a threat to this, the private sector could complement its efforts to supply quality rice seed to farmers.

Furthermore, the field survey found that both the private sector and NGOs produce and market only foundation seed directly to farmers, which is in much greater demand among the conscious or knowledgeable farmers. Foundation seed provides a profit margin of BDT 10–20/kg. At the same time, government policy dictates that BADC produce and market mainly TLS, whose market price is around BDT 35/kg. Interestingly, although the price of FS is around BDT 55/kg (around 57% higher than that of TLS), the first choice of knowledgeable farmers is foundation seed. Seed dealers and traders make higher profit margins from sales of foundation seed than from selling the lower priced TLS. Sales of foundation seed supplied by the private sector are assured (and any not sold can be returned, although this rarely happens). Additional advantages in dealing with private SM seed companies include the fact that, first, seed is delivered directly to the shops (incurring no transport, loading, or unloading costs), and, second, dealers get seed on credit, which can be paid for after the sale.

With BADC, however, dealers have to pay cash in advance. They also have to pay to transport the seed to their shops themselves, and unsold seed cannot be returned. During 2011-12, some dealers made a loss from marketing TLS; although they received up to 30% in commission, they were selling at a price of BDT 280 for a 10-kg bag, compared to BADC's fixed price of around BDT 320/10 kg.

Gender differences in the value chain

The value chain players are exclusively men. SM seed companies are owned and managed by men, and seed dealers are almost all men.

Only one woman entrepreneur in the three districts (see Box 6) owns a small rice seed company and works as a rice seed dealer. This presents the opportunity for the project to help women to become successful rice seed entrepreneurs and dealers.

In the focus group discussions, up to half of those present were women. They explained that, although they do not know what varieties of rice seed their husbands buy, when it comes to storing their own seed, they are the ones who take charge at the farm household level.

It is the women who dry, clean, and store the seed, having selected the best plots in the rice fields in which to grow it in the first place. They test and determine the dryness of the seed (by biting it), and store the seed in earthen pots. They get good service from the NGOs that work in their villages, improving their livelihoods through various services for their agricultural activities such as rice production, the raising of goats and cattle, and the production of vegetables, mustard, and pulses. In terms of the challenges to saving rice seed at the farm household level, all four women declared that they need to upgrade their knowledge and skills in modern storage techniques (see Box 7).

Box 6. Asma Kabir, woman entrepreneur

Ms. Asma Kabir from the village of Malonche, Sader, Jessore, is a rice seed dealer and owns her own small seed company. She produces her own seed on her farm and also acts as a seed dealer, taking other companies' seed. During 2011-12, she sold 47 tons of foundation rice seed, of which 7 tons were produced from her farm and 40 tons she got from other seed companies. She also got 200 bags of TLS (each bag containing 10 kg) from BADC. BADC allowed her to buy 175 bags at the price of BDT 310/bag of 10 kg, and she got a 9% commission from BADC. But, she was unable to sell the remaining 25 bags and had to reduce the price to the paddy market price, which ranges from BDT 120 to 150/10 kg.

She said that producing rice seed is much more profitable than producing rice as a commercial crop. Her profit margin was around BDT 200/10 kg bag from sales of 47 tons of foundation seed. However, her business faces several challenges because of the lack of harvesting and threshing machinery, and proper drying and storage facilities, and the scarcity and high cost of labor.



Interview with a woman entrepreneur, Jessore.

Box 7: Women farmers

A focus group discussion was held with four women farmers from Khulna (Fatema Begum, Firoja Begum, and Sufia Begum from Vandanpara Village, and Parvin Begum from Rajibpur Village), in which they explained their role in the family's rice seed business. They save about 50% of their own rice seed for two years once their husbands bring purchased seed from the market to grow in their fields. They are the ones who decide the best rice crop plots from the fields, and, once the crop is harvested, they manage the drying of the seed in the sun, carrying out a teeth-biting test to determine the moisture content. When they consider the seed to be well-dried, they store it in earthen pots. In response to the question of how the quality of rice seed could best be improved, all four were unanimous in their response:

1. Provide improved knowledge of rice seed crop management;
2. Provide knowledge on how to improve the storage of rice seed at the farm household level, and in plastic storage drums;
3. If possible, provide harvesting and threshing machines to avoid the risk of damage in uncertain and bad weather conditions.

The high cost and shortage of farm labor are a serious constraint for the women's business; labor is needed for both transplanting and harvesting the boro rice crop. Male labor costs range from BDT 300 to 400/day, and women earn around BDT 100 less. The women believe they do an equal amount of work; in response to why they are discriminated against and paid less, they simply smiled. Other problems they face are a lack of easy access to agricultural inputs (such as seed, fertilizer, and pesticide) in their local markets, meaning that their husbands have to travel to distant markets to buy them.

Most of their fellow villagers are poor farmers (about three-quarters of the farmers in Vandanpara are poor, and two-thirds in Rajipur). More support from the government and NGOs is needed to improve our agriculture, household food security, and livelihoods. For the past two years, the women have been growing hybrid rice, after hearing about its advantages from their relatives, NGOs, and DAE. Their experience is that hybrid rice yields are higher than those of HYVs (hybrid rice yields 25–30 *maunds* per 50 *decimals* of land, while BRRI 28 yields only 20 *maunds*). However, hybrid rice does not taste as good and it does not keep well—once cooked, it will not keep overnight.



Interview with women farmers, Barisal.

Chapter Five

Bottlenecks in the rice seed value chain

Based on the analysis of the focus group discussion outcomes, as well as on individual interviews with numerous stakeholders in the value chain, a number of key bottlenecks are identified and their deep causes explored. During the focus group discussions, stakeholders are asked to be specific about the most critical bottlenecks they face in the rice seed business, and to identify the causes of these. They are also asked whether they have ever come up with possible solutions to the key challenges. The following are the key bottlenecks the stakeholders identified:

I. Lack of knowledge and understanding among private seed producers/companies, and dealers of HYVs of rice/quality seed

Underlying causes: Private companies and dealers receive no training on the various qualities of rice seed and good-quality seed. Development organizations engaged in the agricultural sector focus only on the farmers, believing that reaching out to them with improved rice varieties and related technology is the only way to solve existing challenges. They do not consider other stakeholders in the value chain—such as private seed companies, processors, and dealers—who also need to improve their knowledge and understanding; such knowledge would help them to maintain the quality of the seed, eventually contributing to increased yield and production.

II. Lack of knowledge and skills among SM seed companies and dealers in rice seed postharvest technology, business planning, and management

Underlying causes: First, nearly all private seed producers and companies involved in the processing and marketing of rice seed are trying to capitalize on

the opportunities presented by increasing demand. They have not, however, had any relevant management training, preferring instead to operate on an ad hoc basis without proper planning, record-keeping, or supply and demand forecasting. They also lack training in postharvest technology, and are ignorant of appropriate techniques to improve the quality of harvested seed through proper drying, processing, and storage. The main cause of this has already been mentioned—development organizations do not consider actors in the value chain such as seed producers, companies, and dealers to be their clients. Their role, however, is vital to increasing rice yields and production, and training for them is thus essential to the operation of a profitable business.

III. Short supply and high cost of breeder seed as perceived by private seed companies

A. Short supply of breeder seed

Underlying causes: Private seed companies prefer the production of foundation seed over breeder seed, marketing it directly to farmers for commercial rice production. As a result, requests for the private sector to produce such seed are increasing considerably every year. At the same time, public-sector institutions seem to be constrained by their capacity (in terms of human resources, laboratory facilities, and other resources); they can thus produce only limited quantities of breeder seed, despite the huge market demand for it. BRRI's view is that the volume of breeder seed they produce should be enough, if all of it is used to produce certified seed and TLS. However, this is not happening, and private seed producers and companies complain that they are obtaining barely 25% of their demand or need.

B. High market price of breeder seed

Underlying causes: Private seed companies and traders believe that centralized procurement and collection, testing, processing, and sales increase the cost of breeder seed. These centralized systems mean that breeder seed has to be transported from the seven substations, where it is produced, to BRRI headquarters (a distance of up to 300 km). All private-sector seed companies thus incur disproportionate travel and accommodation costs to get a limited quantity of breeder seed.

IV. Lack of modern postharvest infrastructure

A. Lack of modern drying, processing, and storage infrastructure for SM seed producers and companies

Underlying causes: There is practically no modern drying, processing, and storage infrastructure throughout the three survey districts. The key reason is that SM seed companies have limited capital; the capital outlay required for modern postharvest infrastructure is large, and funds are not easily accessible. Bangladesh Krishi Bank, the only government organization providing agricultural loans, requires evidence of collateral and matching funds and charges 12–14% interest (this, however, is much lower than the commercial banks, whose interest surpasses 24%). As a result, SM companies cannot afford to establish modern, well-equipped drying and storage facilities. As the volume of rice seed produced each year is growing rapidly, the difficulty these companies face in obtaining access to such facilities, from either the public or private sector, is increasing.

B. Lack of modern drying and storage infrastructure with contract seed growers

Underlying causes: Current natural methods of drying and storage can incur losses of up to 40%. However, modern drying and storage infrastructure requires huge investment, far beyond the financial capacity of small and medium village rice seed contract growers; purchasing modern machinery and building proper storage facilities are therefore not an option. Bank loans from Bangladesh Krishi Bank are hard to get, for the same reasons given above.

V. Lack of effective on-farm technical backstopping, supervision, and monitoring

Underlying causes: Government agencies authorized to supervise and monitor rice seed crops do not have adequate resources (in terms of workforce, transportation, and laboratory facilities). This can lead to ineffective field supervision and monitoring of rice seed crops, meaning that some seed producers and contract growers can sell poor-quality seed to both public- and private-sector organizations and dealers.

VI. Lack of effective market monitoring

Underlying causes: This is a problem of capacity: government agencies authorized to carry out market monitoring do not have adequate resources (in terms of sufficient workforce, transportation, and laboratory facilities). The resulting lack of effective market monitoring means that seed companies and dealers are able to sell poor-quality seed under a variety of brand names.

VII. Poor storage conditions at the farm household level

Underlying causes: Farmers frequently save their own rice seed in sacks and earthenware pots, which are not moisture-proof, routinely resulting in infestation (either insect or fungal) that deteriorates quality. In addition, rats sometimes attack the sacks, adding to losses. Farmers are also not making use of fumigation, which would enhance storage.

VIII. Lack of awareness of quality rice seed of HYVs among poor and illiterate farmers

Underlying causes: With limited resources and workforce, public-sector agencies cannot reach the majority of poor and illiterate farmers; their contacts are generally rich and medium farmers. Although some local NGOs are making an attempt to diffuse HYVs, these efforts are project-based and resources are limited. As a result, they cannot afford to employ full-time agricultural workers in the field. Poor and illiterate farmers are unable to make an informed judgment regarding seed quality, and have no option but to depend on seed dealers, who can be unscrupulous.

IX. Lack of standardized training manuals and materials

Underlying causes: To date, no organization appears to have given serious thought to developing a standardized, easily readable, practical manual to be used for training on modern rice seed production of HYVs and their postharvest. Such a publication would be aimed at agricultural field workers and rice seed growers, and would need to include graphics appropriate for illiterate farmers.

X. Low-quality rice seed

Underlying causes: Several factors affect the quality of rice seed, from poor supervision and monitoring during crop growing to poor drying and storage in the

farm household. Once seed gets to seed companies for processing and storage, limited infrastructure leads to long delays, thus reducing seed quality further. At the same time, poor storage facilities and low-quality packaging contribute to deterioration. Poor transport frequently causes damage. Seed unsold due to infestation can be returned to the seed company and is sometimes mixed with new seed or repackaged in new bags and taken back to the market to be re-sold. Also, although production and distribution of rice seed are increasing each year, the infrastructure necessary for proper drying, processing, and storage has not increased proportionately. Inadequate facilities can also lead to deterioration in seed quality.

Chapter Six

Improving the rice seed value chain: market-based solutions

Based on the analysis of the causes of each bottleneck in the value chain, this study develops potential market-based solutions, along with a number of alternative options. Factors such as the availability of funds and current institutional policy can determine which of these options presents the best market solution. The study proposed the following market-based solutions to the present challenges:

I. Market-based solutions for a lack of knowledge and skills of SM seed companies and dealers in HYVs of seed, business planning, and management

- Provide training to increase knowledge and understanding of HYVs of rice seed regarding high yield potential under different conditions.
- Provide training on modern techniques of rice seed production, postharvest technology (focusing on seed drying, preserving, and storage), and the importance of women's involvement.
- Provide training on skills development (business planning, management, and deal negotiation).

II. Market-based solutions for poor storage at the farm household level

- Facilitate the supply of small-scale, low-cost, modern storage facilities at the household level (such as airtight, moisture-proof plastic drums and IRRI Super Bags) through private companies.
- Develop easy-to-understand training materials using graphics appropriate for illiterate farmers.
- Provide modern, postharvest-related training, aimed particularly at women, using hands-on, easy-to-understand materials at the farm household level.

III. Market-based solutions for low-quality seed

- Provide training to enhance knowledge and skills regarding the maintenance of seed quality in storage.
- Provide training on business ethics.
- Provide training on proper and modern techniques of drying, processing, grading, and storage.
- Provide training on modern techniques of quality packaging and branding of rice seed.

VI. Market-based solutions for the short supply of breeder seed

- Increase capacity of the public sector to handle an increased volume of breeder seed.
- Seek policy reform by government to allow the private sector to produce breeder seed under strict supervision of and with technical support from NARES.
- Seek policy reform by government to allow the private sector to develop rice varieties and release them, with their own capacity developed in terms of technical expertise, infrastructure, and other necessary resources.
- NARES should play a leading role in the private sector's development of varieties and their release to the public after approval.

V. Market-based solutions for the high price of breeder seed

- Decentralize production, collection, testing, processing, and sales of breeder seed.
- Establish mini-testing and processing facilities on public-sector farms where breeder seed is produced. Sales can be made regionally through private dealers or directly from the research farm.

VI. Market-based solutions for the lack of access to modern infrastructure for SM seed companies

- The SM seed producers' association takes the lead to build modern communal facilities involving all its members.
- Convince large companies to invest in building modern infrastructure (for drying, processing, grading, and storage) to adequately provide services to SM seed companies.
- Under public-private partnership policy, the public sector can expand its capacity to provide postharvest facilities to SM seed companies by investing in additional infrastructure in various regions across the country, especially the central and southern regions (at least one seed processing center in each district where a seed business exists).

VII. Market-based solutions for the lack of modern infrastructure for contract growers

- Develop community-managed and -operated small-scale modern facilities with the supervision, monitoring, and advice of the local government (for example, the local union *parisad*).

- Convince wealthy farmers and local service providers to invest in and establish these modern facilities to rent out to contract seed growers (and potentially for grain drying) on a commercial basis.
- Establish these modern facilities in locations where they are currently nonexistent.

VIII. Market-based solutions for the lack of effective field monitoring of rice seed crops

- Increase the trained workforce qualified to carry out rice seed field inspections and provide technical backstopping to seed growers.
- Increase the mobility of field inspectors to rice seed production areas.
- Expand SCA's infrastructure facilities necessary for ensuring quality rice seed.

IX. Market-based solutions for the lack of effective monitoring of the rice seed market

- Increase the number of trained market monitors to carry out regular inspections of rice seed markets.
- Increase the mobility of market monitors to ensure greater coverage of markets.

Chapter Seven

Recommendations for strengthening the public and private sector

These recommendations are based on the current gaps in both the public and private sector. Most are not applicable to or feasible in terms of the SRSPDS subproject. Nonetheless, if the rice seed sector is to be strengthened, those recommendations should not be overlooked: the project should refer them to the relevant government ministries and to the private sector for possible action. On the other hand, if the development partners (donors) decide to prioritize support for some of these recommendations, the project can develop its partnership with the various actors and stakeholders along the rice seed value chain and work to strengthen their capacity in the areas of current weaknesses identified in this study. Since these long-term solutions require a large capital outlay, the most appropriate—indeed, the most crucial—role for the national government to play is to create a conducive policy environment to attract investment from the private sector.

I. Capacity development of the private sector in modern postharvest technology and infrastructure

A. Strengthen the capacity of the private sector

- Expand modern drying machinery and storage facilities.
- Provide training on modern packaging, branding, and business marketing of rice seed.
- Provide training on HYVs, modern techniques of producing quality seed, and modern storage practices.
- Provide help in product popularization to improve marketing.

B. Strengthen the capacity of local NGOs

- Expand training capacity through the training of

trainers in modern rice seed production packages (techniques and practices).

- Expand the dissemination of modern HYVs to make rice growers more aware of such varieties and their suitability for a variety of locations.

C. Strengthen the capacity of contract farmers

- Establish mini-drying machines and mini-storage facilities at the *upazila* village level (whose capacity should be determined by the number of contract growers).
- Provide training on a complete package of modern rice seed production and postharvest technology (to include drying and storage).
- Provide mini-harvesters and mini-threshers at the community level.

C. Strengthen the capacity of rice farmers in saving quality seed at the household level

- Provide training on modern rice seed production techniques and postharvest technology (in particular, drying and storage).
- Negotiate deals with private manufacturers of moisture-proof plastic containers (drums and bags) to make them available to farmers at a lower price.

II. Capacity development of government institutions and agencies

A. Strengthen the capacity of public research institutions for enhanced/increased production of breeder seed

- Expand the human resource capacity (of breeders) through training and higher educational degrees.
- Expand the necessary modern infrastructure facilities (such as drying, testing, cleaning, processing, grading, and storage).

B. Strengthen the capacity of BRRRI for producing parental lines for hybrid rice seed production and distribution

- Expand the human resource capacity (of breeders) through training and higher educational degrees.
- Expand the necessary infrastructure facilities.
- Provide additional incentives to the scientists and researchers (this job is service-oriented).
- Provide an ensured flow of funds to breeder seed production.

C. Strengthen public-private partnerships

- Expand the necessary modern infrastructure facilities (such as drying, testing, cleaning, processing, grading, and storage) of public-sector organizations.
- The public sector should provide additional services to the private sector, SM seed companies, and NGOs.

D. Strengthen the capacity of the public sector to carry out effective and efficient supervision and monitoring of rice seed production and markets

- Expand public-sector human resource capacity through training and higher educational degrees.
- Expand the necessary infrastructure facilities

(such as equipment, testing laboratories, and vehicles).

- Provide additional initiatives to market and crop field inspectors/monitors to encourage additional inspections and monitoring.

III. Policy dialogue to attract private-sector investors to the rice seed business

- Under the government's present PPP policy, allow the private sector to jointly produce breeder seed under the supervision of NARES institutions, leading to private-sector investment in the development of the human resources and infrastructure required to produce sufficient breeder seed to meet the country's demand.
- Under the government's present PPP policy, allow private-sector companies to develop, test, and release inbred and hybrid rice varieties under the supervision and technical backstopping of government institutions. This will attract private-sector investment to develop the human resources and infrastructure required to carry out all tasks related to hybrid rice seed development, production, and distribution to meet the growing demand.

Chapter Eight

Recommendations for specific project activities

In order for the sustainable adoption of HYV rice seed by farmers to occur, the constraints in the value chain need to be addressed properly, adequately, and in a timely manner. If this happens, there is great potential for increasing household food security and the income of rural farmers. Tremendous opportunities exist to build companies' capacity and that of their service providers (such as contract growers, SM seed producers and companies, and seed dealers) to enable them to supply an adequate amount of quality rice seed to farmers.

Based on an analysis of the constraints and opportunities currently faced by the sector, this chapter recommends specific activities for the ongoing SRSPDS subproject (operating under CSISA-BD). The project currently distributes mini-kits of HYVs of rice seed (in particular, stress-tolerant and quality seed) to a large number of farmers through different partner organizations; the aim is to demonstrate and popularize such varieties through awareness creation, and to obtain high yield potential through on-farm demonstrations in 20 southern districts. From the perspective of both ownership and sustainability, such a project initiates the strengthening of the private sector on a long-term basis within the national system. The activities recommended by this chapter thus focus on software development, that is, capacity development of the private sector in knowledge, skills, networking, and information systems. Some of the recommended interventions can be implemented within the present project time-frame and budgetary framework. However, several activities require additional funding support and more time. In order to implement them all, a new project could be developed to promote the private sector in the rice seed value chain in Bangladesh. This would aim to fill the gap occasioned by the fact that no development organization engaged in the agricultural sector considers the various stakeholders (such as private seed producers, companies, and dealers) in the value chain to be important agents of change.

I. Creation of large demand for quality rice seed

At present, the majority of farmers are unaware of the potential benefits of using quality rice seed, and that using their own saved seed year after year contributes to lower rice yield. Others know about the benefits of purchased seed but are not able to risk buying it from the market. There is thus a need for a mass campaign to raise awareness of HYVs of rice, while at the same time building confidence among farmers in the benefits of quality rice seed. Although the project has already been promoting and diffusing newly released HYVs of rice, these efforts should be further strengthened through capacity development of the DAE, NGOs, and farmer organizations in the wide dissemination and diffusion of HYVs of rice seed through effective information sharing, in particular by reaching out to women farmers, and the poor and vulnerable farmer groups.

II. Strengthen the capacity of SM seed companies and seed dealers in better knowledge of HYVs of rice and seed quality maintenance and assurance

Many companies and dealers receive no training regarding the characteristics of rice varieties and quality seed; development organizations focus only on farmers, believing that reaching out with knowledge of improved rice varieties and technology is the only solution to the existing challenges to enhancing rice productivity and production. They do not consider the other stakeholders in the value chain: private seed companies, processors, and dealers whose knowledge and understanding of HY rice varieties and quality seed need improving. Such knowledge would lead these stakeholders to maintain seed quality, which would eventually contribute to increased yield and production of rice.

III. Strengthen the capacity of SM seed companies and private seed dealers and NGOs in modern postharvest technology

The private sector lacks knowledge of and skills in modern techniques of drying, processing, and storage, whose provision would enable it to improve the quality of rice seed by an estimated 20–30%.

IV. Strengthen the capacity of SM seed companies and NGOs in long-term planning and business action plan preparation

None of the SM companies and dealers have any long-term or business action plans in place designed to improve and add value to the seed business; the opportunity therefore exists to build their capacity in this regard. The project can offer support by providing training and technical advice. Before this can take place, it is crucial to carry out a detailed benefit-cost analysis of the rice seed business at the level of each stakeholder in the value chain.

V. Establish a regular and reliable market network through regular interaction and price information-sharing

Seed companies, producers, and dealers tend to work independently; there is no platform where they can interact to share business-related information. The project can facilitate and create such a platform by organizing workshops in which seed companies, contract growers, dealers, and farmers can discuss emerging issues in the rice seed business, and share updated market information and the challenges they face and how best to address them. This could enhance the development of an efficient and effective market network.

VI. Organize SM seed companies to develop modern infrastructure through technical advice and support

There is a serious lack of modern infrastructure and it is financially unfeasible for individual small and medium companies to develop the technology needed

(such as auto-machines) for drying, processing, and grading. Drying in the sun is unreliable, and grading by hand is expensive as wages for this are high. One way to overcome this constraint is to mobilize group resources on a shared basis to build the modern facilities needed. The project can provide technical advice and support in the form of feasibility studies, preparing business plans and raising funds from among the companies, negotiating with financial institutions, and even attracting investment from the private sector.

VII. Effective advice services in market development and quality assurance

Many newly established companies and new entrepreneurs need advice regarding market development, quality assurance, and know-how pertaining to modern rice seed business technologies.

VIII. Building the capacity of SM seed companies and dealers in market vigilance and forward contracting

The current ad hoc basis on which almost all SM companies and dealers work means a lack of proper business planning, with no systematic approach to, for example, determining the amount of market demand, reducing transaction costs, or maximizing efficiency. These companies need to upgrade their market intelligence and information to enable forward planning. At the moment, operating on trust works: no formal agreements are made. However, as the volume of transactions increases, to guarantee the purchase of the seed produced by contract growers and its price, formal agreements (for example, in the form of forward contracting) could prove to be a strong tool to ensure the smooth running of their business.

IX. Strengthen the capacity of SM seed companies and dealers in quality services

Developing the organizational capacity of SM companies to provide quality services to dealers and farmers is pivotal to improving the rice seed value chain. They should also provide technical advice to customers on the concept of quality assurance (such as how this can

enhance business deals on a sustainable basis), which is also vital.

X. Strengthen the capacity of the SM seed producers' association

SM seed producers are now loosely organized into an association whose membership in the Jessore and Khulna regions grew from 40 to 120 from 2004 to 2012. This association needs further support in strengthening management capacity, planning, and resource generation.

XI. The development of standard training manuals and training for NGO workers

No standard training manual exists for use by NGO workers and farmers. This is needed in two distinct areas: (1) modern techniques of rice seed production and (2) modern postharvest technology (focusing on seed drying, preserving, and storage). The project can develop such a manual to provide effective training to NGO field workers, with a similar manual for farmers, using the local language, and graphics, pictures, and diagrams for those unable to read.

XII. Capacity development of rural women in modern postharvest technology

The project should provide effective training in modern postharvest technology specifically for women farmers. This should employ easy-to-understand, hands-on training manuals that use graphics, pictures,

and diagrams in the local language. In the meantime, the project can help women to obtain plastic storage drums and IRRI Super Bags at a low cost from the manufacturers, to be used for low-cost, moisture-proof storage of seed.

XIII. Capacity development of women entrepreneurs in rice seed enterprises/businesses

The project should provide effective training aimed specifically at women. This would include the development of entrepreneurship skills appropriate to the rice seed business, and provision of an appropriate training manual (see XII above). In the meantime, the project should provide support in obtaining dealership certificates for women entrepreneurs from the Ministry of Agriculture on a priority basis.

XIV. Strengthen the CSISA-BD data/information system for stakeholders in the value chain

CSISA-BD has already begun to set up an efficient data management system, collecting and collating information related to its project activities. However, data specifically pertaining to stakeholders in the rice seed value chain (under the remit of the SRSPDS project) have not yet been properly managed. This needs to be done to strengthen the current information system. Eventually, these data will be used to monitor and design activities appropriate for the promotion of the private sector under the CSISA-BD project.

Chapter Nine

The way forward

The expanded CSISA-BD project has taken the initiative to conduct this study with the overall goal of guiding the USAID-funded SRSPDS project to formulate effective and efficient program intervention strategies that can facilitate the growth and competitiveness of the rice seed market in 20 southern project districts. The main purpose of the study is to benefit rice growers in terms of increased household food security through enhancing the functions of the various stakeholders in the rice seed value chain. At the same time, this will benefit all the actors in the value chain.

To this end, a rapid field survey of the various stakeholders/actors in the rice seed value chain was conducted in three southern project districts from 8 to 15 July 2012 to map the various actors in the value chain of the rice seed sector, and to better understand the key bottlenecks and the underlying causes. Also, meetings with high-level government officials were organized during 16-18 July in Dhaka and Gazipur.

Based on an analysis of the outcomes of the focus group discussions and individual interviews with the various stakeholders, a number of critical bottlenecks in the rice seed value chain are identified and their underlying causes explored. The majority of the bottlenecks refer to the limited capacity of both the public and private sector in terms of modern infrastructure and skilled trained personnel to produce and market quality seed. Several policy constraints also hinder the growth of the sector.

A number of potential market-based solutions are developed to overcome these bottlenecks, and recommendations for suitable activities are made in the study. These include the long-term capacity development of both public and private organizations, which requires considerable investment and is thus not feasible for the SRSPDS project. The project can, however, refer such recommendations to the relevant government ministries as well as to the private sector for possible action if the rice seed sector is to be strengthened. The large capital outlay required highlights the role of

the national government, which would be crucial to attracting investment from the private sector through its creation of a conducive policy environment.

In order for HYVs of rice to be adopted in a sustainable manner by farmers, and to enhance household food security, the constraints in the value chain need to be addressed properly, adequately, and in a timely manner. If this is done, the potential is great for increasing the household food security and income of rural farmers. Tremendous opportunities exist to build the capacity of these farmers and their service providers (contract growers, SM seed producers and companies, and seed dealers) to enable them to supply quality rice seed adequately to farmers in a timely manner. The SRSPDS subproject is primarily engaged in distributing mini-kits of quality rice seed of HYVs to a large number of farmers through different partner organizations, with the aim of popularizing the high yield potential through on-farm demonstrations.

From the perspective of both ownership and sustainability, a short-term project such as this can help somewhat to strengthen the private sector on a long-term basis within the national system. The study therefore makes project-specific recommendations for activities, and these focus on software development and capacity development of the private sector in knowledge, skills, networking, and information systems. Some of these interventions could be implemented within the present project timeframe and budgetary framework; a number need more funding and additional time. Thus, in order to implement all the activities recommended, a new project needs to be developed, to promote the private sector in the value chain of rice seed in Bangladesh. A particular opportunity of such a project would be the development of women entrepreneurs, and its short- and medium-term strategy should thus provide entrepreneurship development training in rice seed enterprises specifically for women.

Within Bangladesh's agricultural sector, no specific training is provided within the present developmental framework on rice varieties and quality seed to seed companies and dealers. Development organizations focus on farmers, believing that reaching them with improved rice varieties and related technology is the only solution to existing challenges to the improvement of rice productivity and production. These organizations overlook other stakeholders (such as private seed companies, processors, and dealers) vital to the value chain and important players in the development of the agricultural sector. This study believes that private-sector players play so important a role in the value chain that improved knowledge and better understanding of HY rice varieties and quality seed should also be imparted to them. Such knowledge would aid them in maintaining high-quality seed, eventually contributing to an increase in both yield and production.

Before actual implementation, the solutions recommended by the study should be assessed by the multistakeholders, and only based on their response should program intervention strategies be designed. This gives any solution more chance of being effective (the same method of assessment and program design is applicable to any long-term solution proposed).

It is therefore recommended that the assessment of the market-based solutions and recommendations for short-, medium-, and long-term activities presented in this study be carried out with the active participation of the multistakeholders before designing the program intervention strategies. To this end, the following activities are recommended:

- a) One workshop in each of the three CSISA-BD hubs (Greater Jessore, Greater Khulna, and Greater Barisal).
- b) A final workshop in Dhaka inviting relevant government officials, policymakers, researchers, scientists, and NGOs, along with private seed producers and companies.
- c) Inviting donor representatives to all the workshops is highly recommended.
- d) During the final workshop, a reference group involving representatives from the various stakeholders can be created to support the design of the program interventions strategies.

These workshops are so important that it is not only the assessment of the market-based solutions developed and recommendations made in this study,

but also the stakeholder beneficiaries who can prioritize the recommended activities; such prioritization will help the project to identify what it can and cannot do within the project budgetary framework, and what additional funding support and time are required to implement the activities prioritized to have maximum impact on the beneficiaries.

The development and implementation of program intervention strategies would eventually achieve value addition for rice seed enterprises and rice growers, resulting in a win-win situation for all actors in the value chain. To this end, a second phase of the ongoing SRSPD subproject needs to be developed and presented to donors for their support.

Finally, it is recommended that an international consultant team leader be hired for a period of 10 days for the workshop planning, facilitating, and report writing, and for a 4-week period to develop detailed program intervention strategies for the short- and medium-term activities recommended in this study, including a new project design and development for promoting the value chain of the rice seed sector in a sustainable manner in Bangladesh.

Bibliography

AFE (Action for Enterprise). 2007. Value chain program design: promoting market solutions for MSMEs.

AgriFood Consulting International. 2002. Rice value chain study: Cambodia. A Report prepared for the World Bank, September 2002.

Bangladesh Seed Grower, Dealer and Merchants Association (BSGDMA). 2007. Bangladesh seed industry at a glance. Asian Seed Congress 2007, Manila, Philippines.

BARCIK. Undated. Research report on situation analysis of seed business in Bangladesh (final draft).

Bashar MK, Khalequzzaman M, Siddique MA, Shahjahan M. 2012. Quality assurance in different classes and of seed: Bangladesh perspective. In: National Seed Fair and Seminar 2012. Sher-E-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka, 11-13 July 2012.

- Bashar MK, Salahuddin A, Van Mele P. 2005. Building a rice seed network. In: Innovations in rural extension: case studies from Bangladesh. CABI Publishing Ltd., UK. p 209-220.
- Bodker L, et al. 2006. Seed sector country profile: Bangladesh. Volume I. Danish Seed Health Centre for Developing Countries. December 2006.
- Hossain M, et al 2002. Rice seed delivery system and seed policy in Bangladesh. CPD-IRRI Policy Brief 1. IRRI. October 2002.
- Hossain M, et al. 2003. Rice seed delivery system and seed policy in Bangladesh. Poster paper presented at PETRRA Communication Fair. Dhaka, 10-11 August 2003.
- IRRI (International Rice Research Institute). 2010. Sustainable rice seed production and delivery systems in southern Bangladesh. A project proposal for USAID Bangladesh.
- IRRI (International Rice Research Institute). 2010. Expansion of the Cereal Systems Initiative for South Asia (CSISA) in Bangladesh. A project proposal, August 2010.
- Hoque MA. 2012. Production, preservation and distribution of truthfully labelled seed. In: National Seed Fair and Seminar 2012. Sher-e-Bangla Agricultural University, Sher-e-Bangla Nagar, Dhaka, 11-13 July 2012.
- Ministry of Agriculture. 2009. The National Seed Policy and Seed Ordinance, Acts and Rules.
- Ministry of Agriculture. 2010. Seed standard and field standard of notified and non-notified crops.

ANNEX I

Cereal Systems Initiative for South Asia (CSI-SA) in Bangladesh Terms of Reference for Consultancy Services—Value Chain Analysis

1. Introduction

The Sustainable Rice Seed Production and Delivery Systems (SRSPDS) for southern Bangladesh is an 18-month project, an integral part of CSISA-BD that aims to contribute to the efforts of USAID Feed the Future to improve national and household food security through enhanced and sustained productivity. To achieve this goal, the project is disseminating seeds of high-yielding varieties equipped with tolerance of prevailing stresses that are already released for commercial use. The project intervention includes strengthening the capacity of the local institutions involved in the production and distribution of high-quality seeds and intends to provide proper training to the partners and beneficiaries involved, including farmers and extension personnel. The major objectives of the project follow:

- Coordinate and support the production and distribution of different categories of seeds of high-yielding and stress-tolerant rice varieties through a network of partners.
- Establish effective systems for targeted dissemination, farmer-centered high-quality seed multiplication, and monitoring, evaluation, and impact assessment.
- Increase awareness of new varieties and explore marketing opportunities.
- Strengthen the capacity of seed production and distribution systems to ensure sustenance and longer-term impacts by enhancing the facilities and increasing the capacity of key partners for systematic production of sufficient seeds and for timely delivery, training partners involved, and providing relevant information on production, handling, storage, and delivery.

The key activities of the project for achieving the objectives follow:

- The project coordinates and supports the production and distribution of high-quality rice seeds of different categories through BIRRI SEEDNet as well as other institutions. Government institutions (i.e., BARI, BINA, DAE, BADC), public universities located in Mymensingh, Patuakhali, Noakhali, and Khulna; NGOs (i.e., BRAC, Sushilon, etc.) and CSISA-BD project hubs in southern Bangladesh are also taking part for additional seed production and distribution and for training and coordination of seed dissemination.
- This activity constitutes the major part of the project and will be carefully executed to ensure the adoption of improved new and stress-tolerant varieties on at least 500,000 ha in the 20 southern districts over 18 months during the project period.
- The project executes the targeted dissemination, monitoring, and evaluation activity constituting a multidisciplinary team of socioeconomists, GIS specialists, and partners involved in seed production, distribution, and field evaluation. Under this activity, GIS is used in mapping exercises of project areas to observe the suitability of different rice varieties in each rice production season.
- M&E is introduced to assess the project milestones for each partner through a focus on seed production, seed distribution, and changes in farmers' annual production as well as income.
- The farmers' communities are introduced to the new high-yielding and stress-tolerant varieties through an increase in stakeholders' awareness and they explore marketing opportunities in various means such as seminars, field tours, field days, and demonstrations.
- The strengthening of capacity of seed production and distribution systems to ensure sustenance and long-term impact is taking place through capacity strengthening of seed systems. This activity includes enhancing the facilities and increasing the physical capacity of the key partners. Training partners become involved in seed chain activities, including the provision of information and training material, handling, storage, and delivery.

2. Objectives of the assignment

The overall objective of the assignment is to study the existing production and market system, bottlenecks in the project areas, and constraints in both the production and market expansion process. The specific objectives are to

- Map the value chain in rice seed production
- Identify bottlenecks around the value chain
- Identify the underlying causes of these bottlenecks
- Draft recommendations for the activities and partnerships to address the underlying causes

3. Scope of work

- Conduct interviews with market actors (farmers, GoB, traders, and other related entities)
- A description of each of the economic activities/services taking place (input supply, output marketing, storage rental, etc.)
- Embedded service taking place in conjunction with commercial relationships (market information, advice on inputs, etc.)
- Estimated numbers of farmers, traders, and/or other commercial entities participating in each activity
- Value added and profit for stakeholders
- Benefits for farmers, traders, and/or other commercial entities in these business relationships
- Disaggregate information based on gender when possible

4. Specific tasks

- Review literature relevant to the assignment.
- Develop approach, methodology, tools and sampling, guidelines, and survey plan for the study.
- Conduct field survey to collect qualitative information using the tools developed.
- Do quality assurance of the field data.
- Analyze the collected information.
- Validate the collected information through expert-level workshop.
- Prepare and submit draft value chain analysis and present this to SPRSPD and CSISA-BD management.

- Submit final version of the report within 2 weeks after completion of the assignment.

5. Team

The team will consist of an international consultant with 10–15 years' experience in analyzing value chains in South Asian countries.

The consultant should have significant technical experience, particularly in enterprise development and value chain analysis. Recent experience working on a USAID-funded agricultural development project is desirable.

6. Duration

The assignment will be for approximately 3 weeks, with 5 days of preparation, 10 days of travel, and 6 days for report preparation and administration. The final study report will be delivered 2 weeks after the mission.

Time line (tentatively may start in mid-June 2012)

Preparatory work	5 days
Travel/field days	10 days
Report preparation	6 days
Total	21 days

7. Deliverables

- Submit inception report within 3 days after signing of contract stating the study design, methodology, tools, survey plan, data analysis, and reporting outlines,
- Submit final study report with all relevant data and information in soft and hard forms.

8. Remuneration

The whole work should be completed within approximately 21 days based on remuneration at the daily standard short-term international consultancy rate of IRRI. The proposal with the budget breakdown for the assignment will be expected from the consultant team: 30% of the contracted amount will be paid after signing of the contract and the remaining 70% will be paid after acceptance of the final study report and all relevant documents.

9. Terms and conditions

- All reports and documents prepared during the assignment will be treated as IRRI property. The reports/documents or any part thereof cannot be sold, used, and reproduced in any manner without prior written approval of IRRI.
 - The consultant agrees that, during the period of this agreement and for a further period of 12 weeks, he or she will not issue any written materials or express publicly any personal opinion concerning the services under this agreement, except with the prior written approval of IRRI.
 - The consultant will not, without first obtaining consent in writing from IRRI, permit any of his/her duties or obligations made under this contract to be performed or carried out by any other person, or reassign interest in a contract.
 - If the consultant requires additional time to complete the contract, over and above that previously agreed to, but without IRRI changing the scope of work, IRRI's prior written concurrence to the same is necessary.
 - CSISA-BD project management, on behalf of IRRI, may by written order make general changes within the scope of the content affecting the services to be performed or time of performance. If any such changes cause an increase or decrease in the cost or time required for performance of any part of the work under the contract, IRRI will make equitable adjustment in the contract price, delivery schedule, or both, and will modify the contract in writing accordingly.
 - In case of failure on the consultant's part to meet the agreed deadline, IRRI reserves the right to penalize the consultant or his/her firm at the rate of 5% of the total remuneration for every week after the deadline.
- After completion of the assignment and submission of the final report, the SPRSPD/CSISA-BD management, on behalf of IRRI, will be responsible for making all payments after proper evaluation of the deliverables.
 - Notwithstanding anything contained in the agreement or these conditions, IRRI may at any time terminate this agreement in whole or in part by requiring the consultant to stop performing the work or any part thereof. In this event, the consultant will have no claim against IRRI by reason of such termination, other than payment in proportion to the work performed under the agreement less any sums previously paid on account thereof.
 - IRRI reserves the right to deduct income tax/VAT from the remuneration for all the consultancy work irrespective of the remuneration. If any change in the income tax/VAT regulation is announced by the government, the consultant must agree with the change accordingly.

10. Contact

1. Christian Portal
Chief of Party, CSISA-BD Project
IRRI-Bangladesh
House No. 9, Road 2/2
Banani, Dhaka, Bangladesh
Email: c.portal@irri.org
Phone: +880-2-9898011
2. Dr. Uma Shankar Singh
Scientist II and Team Leader, CSISA-Seed Project
IRRI-Bangladesh
House No. 9, Road 2/1
Banani, Dhaka, Bangladesh
Email: u.singh@irri.org
Phone: +880-2-9851672

ANNEX II

CHECK LIST GUIDE FOR THE RAPID FIELD SURVEY

A. Specific questions for rice growers (farmers disaggregated by gender)

- Name (of interviewee)
- District
- Village
- Location

.....

- a. Name of rice seed varieties (improved and hybrid) used
- b. How much of your own seed varieties do you save (%), and why?
- c. How much comes from neighbors (%)?
- d. How much of purchased seed (improved and hybrid seed varieties) comes from private wholesaler traders (%) and village retailers (%)?
- e. How much more yield do you get from improved varieties compared with your own seeds (yield differences) (%)?
- f. What is the difference in profitability (%) by using HYVs?
- g. Why do you grow some specific improved rice varieties? Reasons?
- h. Why do you grow own/neighbor's seeds? What are the reasons?– easy access, low cost, no credit (lack of money to purchase improved seeds), no information about the benefits of purchased improved rice seed varieties?
- i. Why use less of purchased improved rice seed varieties? Reasons?
 - No easy access
 - Not available on time (of planting)
 - High cost/high price
 - No credit
 - No storage facility
- j. Do you have adequate financing (credit support), if any?

Is the following a problem?

- k. High cost and profitability
- l. Low profit margin
- m. Policy environment
- n. Lack of support of extension working in linking with rice growers

B, Related to breeders' seeds (BRRI and other research farms and private farms (If any)

- Name (of interviewee)
- District
- Location

.....

- a. Name some specific rice varieties of which your institution/organization has been supplying their breeder seeds.
- b. Do you visit farmers/fields to identify which rice varieties are in great demand and why? How often? If not, is there another way to ensure that demand by farmers is met?
- c. Do you have adequate technical support, staff, equipment, materials, etc? Any bottleneck? If yes, mention the causes and solutions/ways to solve the problems/constraints.
- d. Are you able to meet the demand for foundation seed?
- e. Is funding adequate? Human resources, infrastructure—yes or no? If no, why? How much less (%)?
- f. Marketing: from whom do you obtain breeder seed? For agreements and forward contracts to ensure sales and prices, are prices determined during the forward contracts or other processes your institution/organization has been practicing? Do you think this is efficient or not? Why?

C. Related to foundation seeds (public and private sector, farmer-growers disaggregated by gender)

- Name (of interviewee)
- District
- Market area
- Location

.....

- a. Why do you grow some specific varieties? How can you ensure their availability?
- b. Is there an adequate supply to meet the demand for breeder seeds? Is availability timely?
- c. Is technical support adequate, along with supervision from research farms?
- d. Is financing (credit support) adequate, if any?
- e. Do you have any problem in marketing and storage?
- f. Do you have types of agreements with seed growers— and who are they?
- g. Who does quality assurance?

- h. What are the cost and profitability, profit margin?
- i. Do you receive any training related to quality seeds and modern postharvest technology?
- j. Do you have adequate knowledge and understanding of the yield potential of seeds of modern high-yielding rice varieties?
- k. Do you receive any training related to business planning and development?
- l. Who provides support for extension working in linking with quality assurance?

D. Related to seed multiplication (private companies, NGOs, seed associations, private farmer-growers)

- Name (of interviewee)
- District
- Market area
- Location
- m. Why do you grow some specific varieties?
- n. Is the supply adequate for the demand for foundation seed? Is availability timely?
- o. Are technical support and supervision from research farms adequate?
- p. Is financing (credit support), if any, adequate?
- q. Is access to inputs (fertilizer, pesticide, irrigation water, farm labor) adequate?
- r. To whom do you supply seeds? Any problem in marketing?
- s. What types of agreements do you have with seed growers and who are they?
- t. Do you receive any training related to seed quality and modern postharvest technology?
- u. Do you have adequate knowledge and understanding of the yield potential of seeds of modern high-yielding rice varieties?
- v. Do you receive any training related to business planning and development?

E. Private seed companies/processors (disaggregated by gender)

- Name (of interviewee)
- District
- Market area
- Location
- a. Do you sell only to wholesalers or also to farmers' groups, including women's groups?

- b. Which varieties of rice seed are they distributing/selling? Is the volume of sales increasing each year (%)?
- c. Which varieties have the most demand and why?
- d. What volumes are you selling each year by variety?
- e. At what prices are you selling rice seeds by variety?
- f. Are there differences in price by variety and why?
- i. What would happen to seed provision if the government removed the subsidy?
- j. Do you actively promote your improved and hybrid seed during field days?
- n. What specific challenges/constraints do you face in running your rice seed business and why?
- o. Have you ever thought of solutions to your challenges and how you can reach them?
- p. What is your annual sales volume (tons) and annual turnover (in taka)?
- q. What is your profitability/profit margin?
- w. Do you receive any training related to seed quality and modern postharvest technology?
- x. Do you have adequate knowledge and understanding of the yield potential of seeds of modern high-yielding rice varieties?
- y. Do you receive any training related to business planning and development?

F. District-based agricultural extension offices and research farms

- a. How do you promote the use and sales of improved rice varieties (which varieties in particular) and hybrid rice seeds?
- b. Have you noticed or heard of the drawbacks of improved and hybrid varieties as opposed to local varieties? If so, list those drawbacks.
- c. What are the main causes of/reasons for farmers using their own seeds instead of improved ones?
- e. Have you experienced any policy constraint to the wide use of improved varieties?
- d. Based on your working experience with farmers in fields, what practical suggestions can you provide to promote improved rice varieties among the rice growers in your district?
- f. What challenges/constraints do you face to promote HYVs and what could be solutions?

G. Contract farmers

- Name (of interviewee)
- District
- Market area
- Location

- j. Your arrangements for growing rice seeds—What kinds of agreements do you have in terms of prices, input supplies, and credit needs?
- n. What specific challenges/constraints do you face in running your rice seed business and why?
- o. Have you ever thought of solutions to your challenges and how you can reach them?
- p. What is your annual sales volume (tons) and annual turnover in (Taka)?
- r. Do you receive any training related to seed quality and modern postharvest technology?
- s. Do you have adequate knowledge and understanding of the yield potential of seeds of modern high-yielding rice varieties?
- t. Do you receive any training related to business planning and development?

H. Input suppliers (fertilizer, agrochemicals)

- Name (of interviewee)
- District
- Market area
- Location

Do you provide fertilizers and pesticides to seed growers on credit?

At what interest rate?

Do you give increasing credit each year (%)?

What is the total annual amount?

What is the profitability/profit margin?

I. Financial institutions

- Name (of interviewee)
- District
- Market area
- Location

Do you provide credit to seed growers?

At what interest rate?

Do you give increasing credit each year (%)?

What is the total annual amount?

What is the profitability/profit margin?

J. Common questions for all stakeholders in the value chain

A. What are the three most crucial challenges you face in your growing improved rice varieties (rank them) and what are the underlying causes?

- 1.
- 2.
- 3.

B. Tell us what the best solutions could be to tackle/solve those problems so that you could put most of your land under improved rice varieties to increase your rice productivity.

- 1.
- 2.
- 3.

C. Do you have any specific suggestions to add value to your activities and increase profitability from your present rice cultivation?

- 1.
- 2.
- 3.

ANNEX III

Names and contact address of the stakeholders who participated in focus group discussions and individual interviews by dates

9 and 10 July (Jessore)

Md. Wahiduzzaman
Director (Micro Finance)
Jagorani Chakra Foundation (JCF)
Jessore
Mobile: 01712891102

Md. Ashraful Islam
Deputy Project Director
JCF SRP-1
Jessore
Mobile: 01712891102

Md. Kuddussalam
Senior Manager

M. Failul Bari
Technical Advisor
SMSPA
Jessore
Mobile: 01715224257

Shahanwas Ali
Proprietor
Ali Seed Farm
Ali Cold Storage
Ali Seed Processing
Jessore
Mobile: 01917094980

Kbd. Sk. Hemayet Hossain
Deputy Director
DAE
Jessore
Mobile: 01711971194

Samit Kumar Goswami
Crop Protection Specialist
DAE
Jessore
Mobile: 0171681937

Prakash Kanti Mandal
Joint Director
Seed Marketing, BADC
Khulna/Jessore
Mobile: 01712515253

Proshanto Kumar Saha
Deputy Director
Seed Marketing Division
BADC Jessore
Mobile: 01711955734

Mr. Ahasan Kabir
M/S Kabir Traders (Rice Seed Retailer)
Market: New Khoirtola (Palbari), Jessore

Md. Golam Mortoba
Jecby Enterprise
Churamankitij Bazar, Jessore

Md. Katibur Rahman
Contract Rice Seed Grower
Rupdia Village, Jessore Sader, Jessore

Md. Shamim Reza
Rice Farmer
Malonche Village, Sader

Md. Anisur Rahman
Malonche Village, Sader

Md. Abdur Rashid
Malonche Village, Sader

Md. Nazrul Islam
Malonche Village, Sader

Md. Kamruzzaman
Malonche Village, Sader

Md. Anamul Kobir
Malonche Village, Sader

11 and 12 July, 2012 (Khulna)

Md. Abdual Aziz
DAE, Khulna
Mobile: 01711316530

Mostafa Nuruzzaman
Director
Mobile: 01720510199
E-mail: director.shushila@gmail.com

Sk. Amirul Islam
Adviser
Mobile: 01823536400
E-mail: amirul.shushilan@gmail.com

Sharifun Nahar Rani
Chief Assistant to Director
Mobile: 01711073010
E-mail: snraani@yahoo.com

S.M.M. Akmal Huda
Sr. Monitoring Officer
Mobile: 0175420389
E-mail: ahuda2308@gmail.com

Lutfunnessa Hira
Adviser
Mobile: 01759814519
E-mail: hiralutfunnessa@yahoo.com

Rostom Ali
Vandarpara Village

Nojrul Sana
Vandarpara Village

Hakmot Gaze
Vandarpara Village

Rowsan Biswas
Vandarpara Village

13 and 14 July (Barisal)

Md. Mamnn Hossain
E.O.
Lal Teer Seed Ltd.
Mobile: 01710622003

Abul Hasanat Khan
Marketing Officer
BRAC Seed Divison
Mobile: 01730349824

S.M. Jakir Hossain
Proprietor
Seed Dealer
Mobile: 01711476231

S.M. Rasikulislan
Proprietor
Seed Dealer
Mob: 01719-689704

Md. Alamgir Farid
Proprietor
Seed Dealer
Mob: 01712434814

Md. Shamim Hossain
P.M. BDS
Mobile: 01750-814429

Md. Nizamul Hassan
Divisional Manager
Krishi Baniswa Protestant
Mobile: 01711835581

Md. Akteruzzaman
Regional Manager
Petrochem (Bangladesh) Ltd.
Mobile: 01713335713

Kbd. Sanjay Kr. Debnath
Sr. Asst. Director
BADDC
Mobile: 01717-005841

Md. Asaduzzaman
Deputy Director
(Seed Market)
BADC-Barisal
Mobile: 01718772620

Shebna Akter
Staff of Shade Bagerhat
Shade Bagerhat, Bagerhat
Mobile: 01733808213

Bikash Chandra Golder
Chairperson & Chief Executive
Faith Foundation, Dacope
Mobile: 01714562993

Ms. Sarwar Hossain
ED
Gano Shaki Sarankhola
Mobile: 01714597485

S.K. Abu Hossain
ED
Upogul Foundation, Saromkhola
Mobile: 01714617325

Ashimkr Saha
Coordinator
Help, Bagerhat Sadar
Mobile: 01711155759

Akrammuzzaman
ED
Pds, Chitulmari Sadar
Mobile: 01931-028599

Md. Anisur Rahman
ED
Rupsa, Mongla
Mobile: 01612123103

F. Jamela
Shad. B., Bagerhat
Mobile: 01733808219

16-18 July (Dhaka and Gazipur)

Md. Azizul Hoque
General Manager (Seed)
BADC
Dhaka
Mobile: 01711980287

A.H.M. Monirul Haque
Advisor (Seed)
BADC
Dhaka
Mobile: 01712044146

Dr. Jiban Krishna Biswas
Director (Admin. and CS)
Bangladesh Rice Research Institute (BRRI)
Gazipur 1701, Bangladesh
Mobile: 01711960349

Dr. Helal Uddin Ahmed
Chief Scientific Officer and Head
Plant Breeding Division
Bangladesh Rice Research Institute (BRRI)
Gazipur 1701, Bangladesh
Mobile: 01916577660

Dr. Mohammad Khalequzzaman
Project Director (Breeder Seed Project)
Bangladesh Rice Research Institute (BRRI)
Gazipur 1701, Bangladesh
Mobile: 017157525595

Md. Jamil Hasan
Principal Scientific Officer
Hybrid Rice Research
Bangladesh Rice Research Institute (BRRI)
Gazipur 1701, Bangladesh
Mobile: 0171829331

Priya Lal Biswas
Senior Scientific Officer
Hybrid Rice Research
Bangladesh Rice Research Institute (BRRI)
Gazipur 1701, Bangladesh
Mobile: 01716937130

Md. Hafizar Rahman
Scientific Officer
Hybrid Rice Research
Bangladesh Rice Research Institute (BRRI)
Gazipur 1701, Bangladesh
Mobile: 01716937130

Acronyms and abbreviations

BADC	Bangladesh Agricultural Development Corporation
BINA	Bangladesh Institute of Nuclear Agriculture
BKB	Bangladesh Krishi Bank
BRAC	Bangladesh Rural Advancement Committee
BRRl	Bangladesh Rice Research Institute
BS	breeder seed
CS	certified seed
CSISA-BD	Cereal Systems Initiative for South Asia in Bangladesh
FS	foundation seed
HYVs	high-yielding varieties
IRRI	International Rice Research Institute
MoA	Ministry of Agriculture
NARES	national agricultural research and extension systems
NGOs	nongovernment organizations
PPP	public and private (sector) partnership
PS	private sector
SM	small and medium
SCA	Seed Certification Agency
SRSPDS	Sustainable Rice Seed Production and Delivery Systems
USAID	United State Agency for International Development
VC	value chain
VCA	value chain analysis

