

Rice Seeds

*A Study of Availability and Accessibility
in Bangladesh and India*



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Abbreviations

BAU:	Birsa Agriculture University
BIS:	Bureau of Indian Standards
BRBN:	Bihar Rajya Beej Nigam
BRRI:	Bangladesh Rice Research Institute
BS:	Breeder Seed
BSTI:	Bangladesh Standard and Testing Institution
CRRI:	Central Rice Research Institute
DESA:	Department of Economic and Social Affairs
DOA:	Directorate of Agriculture
EAT:	Enabling Agricultural Trade
ECA:	Eastern and Central Africa
FGDs:	Focused Group Discussions
FS:	Foundation Seed
HYV:	High Yielding Variety
ICAR:	Indian Council of Agriculture Research
IPRs:	Intellectual Property Rights
IRRI:	International Rice Research Institute
KVK:	Krishi Vikas Kendra
LAMPS:	Large Area Multi-Purpose Societies
NRLM:	National Rural Livelihood Mission
NSC:	National Seeds Corporation
OAIC:	Orissa Agro Industries Corporation
OSSC:	Orissa State Seeds Corporation
OUAT:	Orissa University of Agriculture & Technology
PACS:	Primary Agricultural Co-operative Society
R&D:	Research and Development

RAU:	Rajendra Agriculture University
SAARC:	South Asian Association for Regional Cooperation
SMF:	Seed Multiplication Farms
SPS:	Sanitary and Phyto-sanitary
SRR:	Seed Replacement Rate
SVP:	Seed Village Programme
TDC:	Tarai Development Corporation
TLS:	Truthfully Labelled Seeds
URRI:	Upland Rice Research Institute
USAID:	United States Agency for International Development
WBSDC:	West Bengal Seed Development Corporation
ZRS:	Zonal Research Station

Note on Contributors

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Preface

Importance of high yielding variety (HYV) of rice seeds in raising crop yield is well understood – with right mix of other inputs it can raise yield by 15-20 per cent. Another important feature of HYV seeds is that it is available at a relatively low price (compared to hybrid seeds) and is relatively easy to access. Because of these features, HYV seeds remain a basic and critical input for enhancing agricultural production and productivity.

In Bangladesh and India a sustained increase in rice production over the last two decades is made possible by increased availability and accessibility to quality rice seeds, more particularly, HYV seeds. At the same time, it is observed that the increased availability and accessibility is not enough to take care of ever increasing demand in these countries. There is a mismatch between demand and supply of HYV rice seeds.

The issues and challenges regarding availability and accessibility of HYV rice seeds faced by the two countries vary. In India the overall supply of HYV rice seeds is sufficient but it is not enough considering specific variety needs of farmers and variations in soil types and farming practices. In Bangladesh, it is noted that the supply of HYV rice seeds is only around one-third of its demand.

This mismatch in demand and supply has resulted in the emergence of unorganised sector of seed production and informal cross-border trade. Several instances of huge informal flow of HYV rice seeds on both sides of the border are observed. This is further aggravated by lack of formal trade and cooperation in HYV rice seeds between the two countries.

For improving the situation in both the countries, the seed production system and its supply chain need to be made more efficient. Furthermore, considering the similarities in agro-climatic conditions, and proven adaptability of HYV rice seeds which are available across the border, there is a need for mutual acceptance and recognition of seed certification. This can be made possible by harmonisation of seed laws and regulations.

Knowledge sharing is another useful tool which can help the two countries addressing the challenges and opportunities. In short, bilateral cooperation between India and Bangladesh can help in making HYV rice seeds available and accessible to farmers of both the countries, particularly in border areas, at affordable prices and on time.

Given this background, this study is prepared under a project titled ‘Addressing Barriers to Rice Seeds Trade between India and Bangladesh’ (RISTE project), supported by Bill & Melinda Gates Foundation. I express my gratitude to the Bill & Melinda Gates Foundation for its generous support.

My sincere thanks go to all the stakeholders and experts interviewed and interacted during the field work in four states in Eastern India and in Bangladesh. I thank our partners in these states (Bihar Water Development Society, Bihar; Samruddhi, Odisha; Indian Grameen Services, Jharkhand and Mukti, West Bengal) and that in Bangladesh (Unnayan Shamannay, Dhaka) for their support.

It has also benefitted from comments and suggestions from workshops, held in Patna, Ranchi, Bhubaneswar, Kolkata and Dhaka in the months of October and November, and an international conference, held in Dhaka in December 2013.

This study has immensely benefitted from guidance, inputs and suggestions from Sushil Pandey, former Senior Scientist, International Rice Research Institute, Manila, and Advisor to the RISTE project and Hari Menon, Deputy Director, India Office of the Bill & Melinda Gates Foundation. I thank them and my colleagues at CUTS who have been associated with this project in various capacities.

I hope that this study will contribute towards building a consensus between the Indian and the Bangladeshi stakeholders on three areas concerning the development and supply of HYV rice seeds in these countries. First is the need to improve the delivery system of HYV rice seeds within the geographical boundaries. Secondly, there should be formalisation of cross-border trade in HYV rice seeds with increased participation of the private sector. Thirdly, there should be knowledge-sharing on the applicability of HYV rice seeds.

It is expected that addressing these concerns at the political and operational level will create an enabling environment for greater cooperation between Bangladesh and India in the areas of agriculture and allied sector.

Bipul Chatterjee
Deputy Executive Director
CUTS International

Executive Summary

Agriculture market is increasingly becoming the focus of attention in the world trading community. This is especially true after the 9th WTO Ministerial Conference held in Bali in December 2013, where the noted agreement was focused on the trade facilitation, including the trade in agriculture commodities both inputs and outputs. Universally, trade is accepted as the channel through which the countries can enhance their specialisation by focusing their limited resources to further their existing capacities. Increasingly this dimension is widening its spectrum, now trade is also utilised to combine the economic resources to face the domestic challenges in meeting the demand of the country and the region.

This demand for combining forces via trade in agriculture commodities is turning into the need, after the world faced the implications of the food crisis in the year 2008, where the developing countries faced adverse impact directly on their domestic food security. Food Security is a complex problem weaving across the commercial, social and political fabric of the country. Thus, increase in the agriculture production is rightfully asserted as the way to move towards the solution for this multi-directional problem of food security. In increasing the agriculture productivity seed has a decisive role to play as it is the primary input having a trickle down implications on the complete agriculture value chain of the country.

The study focuses on rice seeds trade between India and Bangladesh. Rice being the staple crop, with more than 50 percent of the population dependent on it for their food security as well as livelihood security, carries importance for both the countries. The areas bordering the Bangladesh in eastern India are the primary zone where the rice cultivation accounts for more than 70 percent of the total economic activities. In addition, the instances of informal exchanges in rice seeds across the border in these areas are presenting testimonies of the acceptance of trade and its benefits for the small and marginal farmers in both the countries.

The project ‘Addressing Barriers to Rice Seeds Trade between India and Bangladesh’ aims to assess the potential economic viability of trade in rice seeds between the two countries and suggest policy changes to create an enabling environment for promoting seed trade and knowledge-sharing in HYV rice seeds.

The project is guided by three broad objectives which are as follows:

- a. Understanding of factors that drive demand and flow of HYV rice seeds in eastern India and Bangladesh.
- b. Understanding of systemic enabling factors and challenges to bilateral knowledge-sharing and trade of seeds.
- c. Influence changes to policies and practices to facilitate formalisation and expansion of bilateral trade and knowledge-sharing on HYV rice seeds varieties between Bangladesh and India.

Major Challenges and Issues

The seeds market in India and Bangladesh are disoriented with the seed subsidies provided by government on HYV rice seeds, which in turn pushes private sector out of the market perimeter of the HYV rice seeds and let them confine their economic resources on the hybrid seeds largely. This is evident in both the countries, where public sector is dominant in supplying the HYV rice seeds and due to inefficiencies prevailing in the public bodies, the supply falls short of the total demand leaving a gap to be either filled by farmer's saved seeds or informal flow within and across the border.

Seed can rightfully be called as the primary input which can be decisive for the agriculture production and the yield, directly impacting the economic remuneration for the farmers. Keeping this in mind, one can understand the apprehension that farmers have over the use of any new technique or a new quality of the seed, even if they may be aware about the scientific technology innovations and its importance but still for making them to move towards accepting the new quality of seeds, there needs to be a financial backing for them to fall on in case something goes against the expectations. It was found in the study that even after the provisions in seed policies and programmes, the government's initiatives are lacking towards facilitating the farmers with the insurance in case of crop failure or any other financial support, which could increase their risk taking capacity. This is true in all the eastern Indian states and Bangladesh where the study was conducted.

In case of Bangladesh, the rice seeds demand is witnessing a drift away from the hybrid rice seed varieties, due to the adverse effects that hybrid rice seeds are leaving on the soil due to excess requirement of the fertilisers and pesticides in its cultivation. And more specifically this change is set in motion because of the low market price and high cost of cultivation and also, as revealed during the stakeholder interactions in Bangladesh, the rice produced from the hybrid variety of rice seeds is not compatible with the palate of the farmers themselves who are producing it and also in the region, as it is said to be soggy and cannot be stored for long time once cooked unlike the HYV rice. This changing demand portfolio for the rice seeds in Bangladesh is widening the demand-supply gap in the country.

As noted in the study, in case of India, the primary challenge which is commonly faced by all the states, covered in the study, is the inadequate State Seed production (including seeds multiplication), procurement and distribution (including marketing and promotion) policies. Where there is enough production of the rice seeds by the registered seed growers but the upliftment of the seeds is neither adequate nor unrestrained. Due to ineffective seed production and procurement policies, seed producers are left with more seeds in their store than the quantity of seed supplied to the government agency. Because of their inadequate infrastructure facilities of storage and transportation extra seed is then sold in the open market as grains, leaving farmers to cope with heavy losses in the process.

Apart from structural challenges, one of the biggest challenge faced by both India and Bangladesh, is the wide knowledge-gap spanning across all the stages of the rice seeds flow map and among almost all the stakeholders in the flow map. This concern is not limited to the top-down knowledge gap i.e.; the gap between the scientific innovations and implications of the effective usage of research and developments, to the farming community, but also other way round, the lack of information of the scientists, seeds growers, breeders, and government agencies about the needs of the farmers.

Evidences Supporting the Need for Bilateral Cooperation

Evidences found during the course of this study, clearly suggest that there is demand for the cross border trade of rice seeds from farmers of the local communities surrounding the borders of the two countries. In India, during the field visits it was observed that many of the Bangladeshi rice seeds varieties are popular in the farming communities, where there is no sign of formal rice seeds trade between the two countries, but still that has not stopped farmers from utilising quality rice seeds from the other side of the borders via informal exchanges. Some of Bangladeshi varieties of rice seeds popular on the Indian side are; BR-11, BRRI Dhan-28 and BRRI Dhan-29 and on the other side the Indian rice seeds varieties popular in Bangladesh are; Swarna (including Guti and Sada), Parijat, Somsor, Swampa, Mamun etc. (Table 2.2).

The field visits in the Bangladesh revealed some striking facts, the certified rice seeds, of Swarna and Miniket variety, from India are sold to the farmers in the informal market at Tk. 60 per kg, where they are been bought from India at half the amount Tk. 30 per kg. In spite of this high price the demand for these varieties can be distinctly noted, as in Dinajpur district 53 percent of total rice cultivated area is covered by Swarna, in Aman season (Table 2.3).

In order to fully capture the picture of the need for formalisation of the rice seeds trade between India and Bangladesh, one needs to understand the specific barriers hindering the trade at present. Some of the barriers as pointed out by the research and field visits in both India and Bangladesh are; classification, laboratory testing and chemical testing procedures, labelling requirements, registration procedures, intellectual property rights and quarantine requirements. All these technical requirements are proving to be a barrier in trade in terms of increase in the time and cost and the unreliability of the results as the laboratories are ill-equipped in both the countries and thus, resulting in non-recognition of standards and certificates which are proving to be a serious barrier in trade and hindering both the countries from the benefits that bilateral cooperation can bring to their farmers and other stakeholders in the rice seeds flow map.

An effective trade initiative between the two countries is not only expected to increase the availability and accessibility of quality rice seeds but will also have deeper impacts on the agriculture value chain, by increasing the seed replacement rate which in turn would lead to higher crop yields and production and thus, enhance the food security in the country. In addition, it will also expect to bring positive results in the commercial agriculture economy where bilateral cooperation will result increase in the market and livelihood opportunities and also increased research and development initiatives.

Conclusion and Recommendations

The challenges in rice seeds availability and accessibility in India and Bangladesh can be divided into two broader categories; one is the domestic constraints which includes infrastructural, administrative, financial and other structural gaps. And second is the constraint in the cross border movements of the seeds this can be due to several reasons as listed in the study, such as standards, laboratory requirements and other such issues. Therefore, there is a need for set of initiatives to independently tackle each of these issues.

The study ponders over each of the issues in-depth and comes out with a set of recommendations for both India and Bangladesh for facilitating and enhancing the bilateral trade and knowledge-sharing on HYV rice seeds.

Some of the key recommendations are as follows:

- The study urges governments of both the countries to take/ensure initiatives such as; NGOs making interventions to improve the situation of availability and accessibility of rice seeds

in local markets are sustained and further strengthened in especially in areas suffering from low seed replacement rates.

- As the seed dynamics has significantly changed over the last few decades. Seed production and certification seems constrained by lack of government capacity to produce and market seeds. Facilitating the increased role of private sector in the rice seeds market is the need of this hour.
- For enhancing the cooperation between the two countries which may help in addressing many of the factors that constraint availability, there is a need to identify specific areas of cooperation. For instance one such initiative in the process is the talk between Bureau of Indian Standards (BIS) and Bangladesh Standard and Testing Institution (BSTI), over the issues of mutual recognition of certificates and capacity building programmes. In the coming times India and Bangladesh needs to fasten their steps towards harmonising the trade between the two countries.

1

Introduction

Importance of Quality Rice Seeds

A projection made by the United Nations Department of Economic and Social Affairs (UN DESA) shows that world population will increase from 6.9 billion in 2010 to 9.6 billion people in 2050.¹ Agriculture will play a fundamental role in meeting the world's growing demand for food, feed and fibre. The report further indicates that in order to feed the world population in 2050, agricultural production will have to almost double, and most of the incremental output will have to come from increases in yields. Going by this projection, one expects that increase for demand in food in India and Bangladesh, is expected to be more than proportional. This is because of two specific reasons. Firstly, a large number of people presently are unable to access adequate food as they are below the poverty line, and with increase in income over the period, demand for food will increase. Secondly, the population of the two countries is growing at a relatively fast pace compared to other countries.

Within the overall food requirements, rice holds a place of prominence for the people of Bangladesh and India. While in Bangladesh, rice is a staple food for about 70 percent people; in India, it is for 65 percent of its population.² In terms of calorie intake, it accounts for about 30 percent of the total calorie intake (Singh *et al.*, 2013).³ India's relatively lower dependence on rice does not lessen the importance of rice as staple food. In fact, this amounts to over 360 million people, more than that of Bangladesh in number. Interestingly, for Bangladesh, rice and other cereals contribute nearly 80 percent of total energy. In comparison, the contribution of fruits and vegetables is only 3 percent. The trend is expected to continue in the coming period.

To meet a growing food demand from a growing population and rising income level in the two countries, there is need not only for increasing the rate of growth, but also for making it sustainable. A consistently good yield in rice will crucially depend on quality of seeds produced and accessible to the farmers. Optimum outputs and good returns for farmers, thus, depend on availability and accessibility to good-quality rice seed – it is rather a pre-requisite. To attain this, focused and sustained initiatives for a consistently good yield in crop production are needed.

Of all the agricultural inputs, seed is a living and base input used for the purpose of regeneration. Its importance in production can be gauged from the fact that it is an absolutely irreplaceable, most vital and crucial input for crop production. Besides, it is the cheapest input and forms only a small fraction of cultivation expenses; more importantly, good quality is one of the ways to increase productivity without adding appreciably to the extent of land under cultivation by planting quality seed.

For reasons indicated above, India and Bangladesh will be in greater need to produce and use high-quality seeds because of their increasing food demand arising from changing demographic profiles and also the need for poverty alleviation, which will continue to be a phenomenon for

several decades. It is expected that in the coming period the two countries might have to confront several constraints and issues – declining agricultural land, increasing population, inadequate infrastructure, inefficient marketing and distribution chain (see Annexure 2a-2d for seed flow maps of four states in India and Bangladesh) – regarding availability of and accessibility to rice.

To understand the current status of the rice seed cooperation between India and Bangladesh, CUTS International is implementing a project entitled “Addressing Barriers to Rice Seeds Trade between India and Bangladesh.”⁴ It aims to assess the potential economic viability of trade in rice seeds between the two countries, and to suggest policy changes to create an enabling environment for promoting seed trade and knowledge-sharing in high yielding varieties (HYV) rice seeds.

Need for the Project, its Goal, Objectives and Expected Outcomes

There are at least two compelling factors that reinforce the need for developing an enabling environment for cooperation in rice seeds. Firstly, it is noted that both India (especially states like West Bengal, Odisha, Bihar, Jharkhand and others in the north-eastern region) and Bangladesh have a similar agro-climatic conditions and food habits, and thus, varieties produced and available in one country could be adapted in other; secondly, farmers of Bangladesh and India cultivate varieties which are informally traded.

Prevalence of the two factors, as indicated above, is indicative of its potential and economic viability. Formalisation of seed trade is expected to help not only in meeting farmers’ demand for quality rice seeds, but also making the rice seed markets of the two countries more efficient. This will also open up a wide range of possibilities for bilateral cooperation in several related (sub) sectors.

In addition, it is also noticed that farmers in the two countries have made impressive progress with regard to transition from the use of traditional varieties to modern techniques and HYV. Quite visibly, governments in the two countries are pursuing a high input and high output agricultural policy, and this has opened up opportunities for supplying agricultural input to farmers by private enterprises. Agricultural input market is gradually becoming market-oriented through involvement of the private for-profit sector, donor communities and NGO activities, beside government interventions. Such developments have catapulted into increased farmers’ dependence on external sources for inputs.

While farmers’ dependence on external sources has increased, the new market dynamics, especially relating to variety of rice seeds, seem to have a number of issues and concerns. Seed industry in India and Bangladesh suffer from inadequacy in production and storage and inefficiency in marketing and distribution systems.⁵ It is expected that existing issues and challenges to a large extent could be addressed by creating an enabling environment for cooperation and collaboration, more particularly formalisation of trade in seeds and knowledge sharing between the two countries. Further, such an initiative would address the issue of food insecurity.

Since cooperation in rice seeds between India and Bangladesh is at a nascent stage, and developing an enabling environment might be a difficult proposition, the success of the project will depend on achievement of three broad, progressive objectives. In the set of three objectives given below, achievement of objectives 2 and 3 will be linked to and dependent on achievement of the first objective.

Objectives include:

1. Understanding of factors that drive demand and flow (production, marketing and use) of HYV rice seeds in eastern Indian states and Bangladesh to identify varieties with bilateral trade potential

2. Understanding of systemic enabling factors and challenges (institutions, laws, policies, regulations and practices) to bilateral knowledge-sharing and trade of seeds between India and Bangladesh, particularly on HYV rice seeds
3. Influence changes to policies and practices to facilitate formalisation and expansion of bilateral trade and knowledge-sharing on HYV rice seeds varieties between Bangladesh and India.

The three objectives seems clearly linked to one another. This essentially implies that to influence changes in policies and practices with regard to formalisation and expansion of bilateral trade (objective 3), objectives 1 (understanding of factors that drive demand and flow) and 2 (understanding of systemic enabling factors and challenges) are to be achieved.

The project has set forth a set of five expected outcomes. These outcomes are subject to successful implementation of planned activities and realisation of three project objectives outlines above.

1. Consensus among major stakeholder groups on demand scenarios and bilateral trade potential between Bangladesh and India for HYV varieties of rice seeds
2. Buy-in from a set of policy champions from among key stakeholder groups to promote bilateral trade in HYV varieties of rice seeds
3. Inclusion of rice seeds trade in the agenda of the joint task force on bilateral trade
4. Dialogues initiated on mutual recognition of certification methods and standards of HYV rice seeds
5. Enabling of private sector participation in bilateral HYV rice seeds trade.

Methodology

Selection of states and country

The project focuses on four East Indian states (Bihar, Jharkhand, Odisha and West Bengal) and Bangladesh. There are several reasons for the selection of these four states. They rank higher in the list of major rice-producing states in eastern India and more importantly are the focus of the government of India's recent initiative for a second green revolution in the country.⁶ It might be noted that rice is a priority crop under the scheme. Selection of Bangladesh is also guided by several factors. States in eastern India and Bangladesh share a 4,096-km porous border, and it is noticed that production and availability of rice seed in India and Bangladesh have direct influence on cultivation practices in the other. It is also observed that farmers in the two countries seem to have the same preferences for good quality rice seeds. This, in fact, prompts farmers to go for informal trade in rice seeds. Since quality seed is a basic and perhaps the most important input for rice production, it will be immensely useful for both the countries to understand demand-supply flow of this input to make it more efficient and effective with regard to availability and accessibility.

Selection of project partners

For implementing project activities, CUTS has entered into separate, time-bound, output- and activity-based contract with the five partners – four in India and one in Bangladesh. While selecting partners, it was ensured that they have the requisite expertise and background to execute desired project activities.

As indicated above, the implementation of activities under the project has, thus, been carried out four partners in India, and one partner in Bangladesh (Box 1.1).

Box 1.1: State/country level partners	
<i>State/country</i>	<i>Partners' location</i>
Bangladesh	Unnayan Shamannay, Dhaka, Bangladesh
Bihar	Bihar Water Development Society, Patna, Bihar
Jharkhand	Indian Grameen Services (Basix), Ranchi, Jharkhand
Odisha	Samruddhi, Bhubaneswar, Odisha
West Bengal	Mukti, Kolkata, West Bengal

Interactions with stakeholders

Data and inputs collected under the project by the partners is based on research teams' interactions with the stakeholders: farmers, seed traders, seed producers, research institutions, government officials, non-government and community-based organisations. While farmers' perception on availability and accessibility to HYV seed is secured through farmers' focused group discussions (FGDs), views of other stakeholders were gathered through direct interaction and interviews.

Altogether, 15 FGDs were organised (three in each select state in eastern India and three in Bangladesh). FGDs in West Bengal and Bangladesh were mainly confined to border areas, where there were indications of informal trade (see Annexure 1a and 1b for FGD maps). Besides, several interviews and interactions with other stakeholders were also organised.

Selection of areas

Project activities have been carried out in three specific areas identified by the project partners for the purpose (Box 1.2).

Box 1.2: Areas covered under the project	
<i>State/country</i>	<i>Areas selected</i>
Bangladesh	Jessore, Dinajpur, Nawabganj
Bihar	Bhojpur, Kishanganj, Purnea
Jharkhand	Ranchi, Gumla, West Singhbhoom
Odisha	Bhadrak, Puri, Dhenkanal
West Bengal	Dakshin Dinajpur, Burdmaan, Cooch Behar

Report and its structure

This report is premised on the draft reports produced by five project partners. Each of the reports has brought into focus major findings in the form of issues and challenges and future prospects specific to areas covered by the respective partners under this study. This report is an attempt to synthesise five reports produced by partners and present their major findings. It primarily highlights issues and challenges faced by the four states in India and Bangladesh with regard to availability and accessibility to quality rice seeds. Some additional information from

other sources has also been included to support the observations emerging from the partners' reports. Besides, inputs and suggestions gathered during the five workshops organised by partners and the international conference in Dhaka jointly organised by CUTS International and Unnayan Shamannay in December 2013 have also been duly covered.

Section II deals with the availability and accessibility of HYV rice seeds in the two countries (four states in India and in Bangladesh).⁷ It also highlights major issues and challenges faced by the seed industry and their implications. Section III presents an analysis of how issues and challenges can be transformed into opportunities for both the countries. Section IV highlights potential factors that will guide cooperation in rice seeds between India and Bangladesh. Section V provides conclusion and recommendations.

Endnotes

- 1 United Nations Department of Economic and Social Affairs (2013), World Population Prospects: the 2012 Revision, available at <https://www.un.org/en/development/desa/news/population/un-report-world-population-projected-to-reach-9-6-billion-by-2050.html>.
- 2 International Year of Rice 2004, <http://www.fao.org/rice2004/en/p6.htm>.
- 3 Singh, Suresh P., Saurabh Kumar, Neha Jain and Nitesh Kumar Singh (2013), "Dynamics of Rice Seeds Trade: Need for Cooperation between India and Bangladesh," CUTS, Jaipur.
- 4 To find more about the project please visit: <http://cuts-citee.org/riste/>.
- 5 "Indian Seed Sector: The Way Forward," Special lecture delivered by R.S. Paroda at Indian Seed Congress 2013, available at http://www.taas.in/documents/slecture_isc13.pdf. See also Salahuddin Ahmed, Mohammad Siddiquir Rahman, and Mohammed Moniruzzaman, "Integrated Seed Sector Status Paper: Bangladesh Perspective" available at: <http://q.datakultur.se/~svalofco/wp-content/uploads/2012/12/Bangladesh-Seed-Sector-Status-Paper1.pdf>.
- 6 Under Rashtriya Krishi Vikas Yojana covering Assam, Bihar, Jharkhand, Eastern UP, Chhattisgarh, Odisha and West Bengal, the government of India in 2012-13 allocated Rs 10 billion. The purpose is to extend green revolution to the eastern region.
- 7 In the document, variety rice seeds, HYV rice seeds and quality rice seeds are used interchangeably.

2

Availability and Accessibility of HYV Rice Seeds in India (four states) and Bangladesh

Present Status, Issues and Challenges

In all the four eastern states of India and Bangladesh, there are several issues relating to rice seed availability and accessibility as highlighted by the state and country (Bangladesh) level reports. Some of the major cross-cutting issues include lack of farmers' awareness on type of seeds suitable for local conditions, inadequate government support with regard to extension services, inadequate infrastructure in relation to production, upliftment, certification, marketing and distribution. These issues are compounded by obsolete seed laws existing in both the countries.

It needs mentioning that the intensity of these issues is not similar in all the four states or in Bangladesh. For example, while low seed replacement is a major issue in states in Jharkhand and Odisha, low seed upliftment seems to be a major issue in Bihar. Farmers in West Bengal in India and Bangladesh suffer from lack of timely availability of quality seeds and seed adulteration. However, one common issue faced by all the four states in India and Bangladesh is inadequate infrastructure for seed production and storage. This covers both public and private sectors and institutions involved in seed production, marketing and distribution. A potential reason for this is the low profile maintained by the private sector.

Some specific developments and issues with regard to state and country level seed scenario, as revealed by the respective report, are briefly described below.

Bihar

In Bihar, area under rice production was 3.3 million hectare in 2011-12, with productivity of about 2.5 MT per hectare in 2011-12. Total rice production in 2011-12 was 8.2 million tonnes while it is projected to increase to 8.5 million tonnes in 2012-13. This increasing level of rice production is because of increased area under irrigation, and increasing use of inputs such as fertiliser. Despite increasing trend in rice production, Bihar suffers from low rice yield compared to many other states in India. One of the main reasons cited for low productivity in the Bihar is low seed replacement rate (SRR). The reason behind this is lack of farmers' awareness on the need for seed replacement and also their low capacity. Non-availability of preferred varieties and low quality of available HYV rice seeds in the local markets are also cited as major reasons.

Table 2.1: Comparing Rice Yields (on unmilled basis) in Selected States in Eastern India (Yield in MT/ha)						
State	2000-01	2005-06	2010-11	Deviation from All India Level (kg)		
				2000-01	2005-06	2010-11
Bihar	2.36	1.71	1.74	(-)412	(-)1028	(-)1150
Jharkhand	1.77	1.84	2.48	(-)790	(-)952	(-)684
Orissa	1.66	2.44	2.59	(-)860	(-)571	(-)619
West Bengal	3.64	4.0	4.16	386	407	368
All India	3.04	3.36	3.58	—	—	—
<i>Source: Adapted from Singh et al. (2013), Dynamics of Rice Seeds Trade: Need for cooperation between India and Bangladesh, CUTS International</i>						

The state through National Seeds Corporation (NSC) and Tarai Development Corporation (TDC) also provides subsidies to farmers. This is mainly to increase accessibility to quality rice seeds. As a result of the government initiatives and enthusiastic participation of the farmers, anecdotal evidence suggests that overall the seed replacement rate of rice reached 33 percent in 2011-12, up from around 6.8 percent in 2003-04.¹

Seed production programme has been recently strengthened in the agricultural universities and research institutions to promote production and use of Breeder, Foundation and Certified seeds of rice. Seed production at government seed multiplication farms has also been revived to meet the existing demand and supply gap in the state. Along with these, the State Seed Corporation has been revived. In addition, to promote use of quality seeds, an ambitious programme “Chief Minister’s Crash Seed Programme” was launched in 2008. Under this programme, Foundation seed of paddy, wheat, gram and lentil at 50 percent of cost has been given to two farmers from each eligible village. This programme has been applauded at all levels. The Indian Council of Agricultural Research (ICAR) has praised it as the Bihar Model and advised all states to replicate it.²

Rice seed availability data reflects that the overall supply situation is improving in the state. The total supply of certified rice seeds which was nearly 1,300,000 MT in 2009-10 increased to 1,710,000 MT in 2011-12. This increased supply is against a total demand of 1,580,000 MT in the same year. However, the existing demand-supply situation is based on a low seed replacement rate, implying that the availability needs further improvement, if the state realises further increase in seed replacement rate.

Steps taken so far seem to be too small an initiative when one considers the severity of issues, such as low awareness and infrastructure lags which prevents the smooth functioning of the seeds market in Bihar. Some of the major issues encountered by the seed industry, as reflected by the state report in Bihar, are enumerated hereunder.

Major issues and challenges

- SRR in the state appears to be low, even though there is some improvement over the last few years. Farmers also suffer from lack of awareness in many areas;
- Farmers often have no choice but to accept seeds available in the market. This is because of lack of timely availability of HYV rice seeds;

- Instances of adulteration of certified seed is a major problem faced by farmers in some areas of the state;
- It is reported that seed growers despite having arrangements with the state government are often forced to sell HYV rice seed as grain. This is because the state government often decline to procure seeds produced by these growers. This lead to loss of trust and demotivates seed growers;
- The state also suffers from lack of adequate infrastructure, which is cited to be a primary obstacle in timely availability and accessibility;
- There is inadequate government support, which hinders production and distribution of HYV rice seed;
- In the light of limited production and marketing capacity of the state, role of the private sector need to be enhanced. The state has good scope for increasing rice seed production and improving marketing and distribution if government allows the private sector to operate more freely. A favourable policy environment is required for this to happen.

Jharkhand

Rice is a major crop in the state along with pulses and wheat. Cultivation of paddy is primarily done in a mono-cropping basis, with exception of smaller areas under ragi (finger millet), maize and wheat. Often a large area of about 14.8 lakh hectare vacated by kharif rice is left fallow in rabi season in Jharkhand, which is typically called rice fallow. Total area under rice cultivation was 1.7 million hectare, with the production of 5.0 million MT. Rice productivity in the state is estimated at about 2.9 MT per hectare, much lower than many states in India. Several reasons could be cited for this low productivity.

One potential reason is adoption of traditional cultivation practices by the farmers. It is also due to the lack of facilities for irrigation, undulated land terrain and high soil porosity. The state, however, has made significant progress with regard to SRR. The SRR, which was as low as less than two percent in 2006-07, increased to 25.0 percent in 2011-12.

The government of Jharkhand has initiated a farmers' participatory seed production programme. This programme facilitates farmers to produce seeds for their own use, and also for exchange and sale of seeds. In 2012-13 (kharif), the Jharkhand government distributed 9,568 MT certified HYV rice seed and 123 MT hybrid seed on 50 percent subsidy to the farmers. Total HYV rice seeds production in the state was 12,500 MT in 2012-13. The gap between production and actual distribution is probably because of low procurement of produced seeds by governmental agencies. This was corroborated during the interactions with seed producers. The main source of rice seed in many villages is private seed dealers. Another channel is Large Area Multi-Purpose Societies (LAMPS). But it is noted while interacting with the rice farmers that they do not get required variety and quantity of rice seed through LAMPS.

Further interaction with farmers reveals that no receipt is provided by seed sellers to farmers, when seeds are purchased by them. Sometimes, farmers receive poor quality seeds which lead to crop failure. Farmers do not have any insurance to protect themselves against such crop failures. In such cases, no complaints can be lodged against the seed retailers. Besides, in some areas, more particularly in many tribal belts, awareness about HYV rice seeds is negligible, and farmers, who are predominantly small and marginal, use only traditional varieties. One good development

in this area is that these farmers spend time and resources in seed purification which helps them to harvest good crop.

Some popular varieties grown, especially in non-tribal villages, are N-R-89 (Kranti), Alfa-1 (Jyothi), Swarna, Tej, Loknath-505, Arize-6444, PHB-71 and Lalat. It is also observed that farmers bring rice seed through informal means across the border from Odisha and West Bengal (for example, Naveen and Swarna variety). The most popular HYV rice varieties, according to seed dealers, are Swarna, Lalat, Abhisekh, IR-64 and IR-36.

Seed Village Scheme seems to be a good development for the state. The scheme was introduced with the objective of organising seed production clusters, increasing seed production, meeting local demand, increasing seed replacement rate as well as introduction of new crops. It is also noted that registered seed villages have a major contribution in meeting seed requirements in the state. These villages are engaged with HYV rice seed production with government assistance. They receive Breeder seed and Foundation seed from different sources such as Birsa Agriculture University (BAU), Rajendra Agriculture University (Pusa), Krishi Vikas Kendra (KVK), Upland Rice Research Institute (URRI) Hazaribagh and produce certified seed.

HYV rice seed market in the state continues to remain uncompetitive compared to other types of seeds (hybrid). With regard to marketing and distribution, it is observed that dealing in HYV rice seed often results in losses incurred by some seed dealers. This is certainly because of low commission, and maintenance costs. In comparison, the hybrid seed trade appears to be more organised and remunerative.

Major issues and challenges

Registered seed villages are the major source of rice seeds in the state. These operate through NGOs and community-based organisations. As indicated above, these villages are engaged in HYV rice seed production with the government assistance. But they are solely dependent on government sources.

Several NGOs such as Ram Krishna Mission, Grameen Vikash Trust, Holy Cross and Vikash Bharti are also involved in rice seed production. Some of the major varieties being grown by them include, among others, Swarna, Lalat, etc. At the same time, new varieties such as Rajendra-Mansoori have been introduced in seed villages.

It is observed that seed growers face difficulties in getting Breeder seeds, though they get Foundation seed easily. This is primarily because, state agencies seem to have gained monopoly in supply of breeder seeds to seed producers. However, in the recent periods, private agencies have also emerged as a major supplier of Foundation/Breeder seed.

Seed growers also suffer due to processing delays, labour problem, inadequate infrastructure and obsolete machinery. They also encounter problems in storage. It is reported that seed villages face problem in getting registered and getting their seeds certified.

A major issue faced by dealers in sales of HYV rice seed is low commission offered to them. It is observed that hybrid seed companies give higher commissions. Some dealers informed that they receive a commission of Rs 50-70 per kg on hybrid rice seed sold (a nominal market price of hybrid is around Rs 100 per kg). In contrast, HYV dealers receive commissions worth Rs 1.50-3.00 (as price of HYV Swarna seeds is around Rs 25-30 in Bihar) on sale. In many cases, it is found that if a dealer sells HYV rice seeds to a smaller dealer, he has to share a part of the 10 percent commission he receives from the company. Some dealers say they at times incur losses in dealing with HYV seeds, or earn lower margins.

Many dealers are not really aware about HYV seeds. It is also noted that seed of HYV is not readily available and therefore dealers do not stock it in the desired quantity. In some areas, it is found that farmers have limited exposure to HYV rice seeds barring a few like Lalat, Swarna, IR-36 and IR-64.

In the state, it is noted that farmers' choices for rice seed are limited to traditional varieties and hybrids. The reason is an aggressive promotion of hybrid rice by private companies.

In sum, paddy farmers of the state have got a low access to infrastructural facilities in terms of high-end agricultural equipment, irrigation sources, storage space, processing units like rice mills, research stations, soil testing labs and market yards. Lack of storage space forces many farmers to sell their produce to traders and middleman immediately after harvest. The state has also low facilities for seed production and seed treatment. Recently, a State Seed Corporation has been established in the Jharkhand. For production of inputs, i.e. seeds, fertiliser, pesticides and vermicompost, there are no organised production units in the state.

To summarise, major highlights (prospects, issues and challenges) include the following:

- There are significant variations in preference for different types of seeds by farmers of different age groups. At one place where FGD was conducted, it is noted that while older people prefer traditional varieties of rice seeds, younger generation farmers favour hybrid seeds. This is primarily because of high yield capacity of hybrid seeds. For farmers who are in middle age, the vote goes to HYV seeds. It is also noted that literate farmers prefers HYV rice seeds;
- Preference for short duration rice seeds is very high among farmers. This allows farmers to go for raising crop intensity;
- Farmers have no choice but to accept seeds available in the market. This is because of shortage in production and inefficient distribution systems;
- Lack of adequate infrastructure is also argued to be a primary reason leading to low availability and accessibility. This often causes seed growers (village seed growers) to sell seeds as grains;
- There is inadequate government support, hindering production and distribution of HYV rice seeds;
- Farmers in many areas suffer from absolute lack of awareness on selection and use of HYV rice seeds. The government extension services in almost all areas are very poor. This compels farmers to use a single seed available with them;
- There are restrictions on the state seed growers to procure Breeder/Foundation seed from outside the state. They are asked to procure such seeds from BAU, the only agriculture university in seed production in the state. Such a restriction leads in informal procurement from other states;
- There are indications that over the last few years, marketing of hybrid seeds by private seed companies is influencing some farmers to adapt hybrid rice seeds. However, experts are of the opinion that sustainability of use of hybrid rice seeds might continue to be very low because of small and fragmented nature of land, predominance of small and marginal farmers and their low buying capacity, and also climatic conditions. In the light of prevailing

conditions, many experts suggest greater reliance on HYV seeds for sustenance in agriculture production;

- Like in other states, seed certification infrastructure is very weak and inefficient in Jharkhand, and at many times farmers find it difficult to procure seed at the right time;
- At present SRR in Jharkhand is only 25 percent. Lack of awareness, weak infrastructure, and lack of support from the government are argued to be primary reasons;
- Adulteration of certified seeds is a major problem, and need immediate government attention;
- There is scope for greater contribution from the private sector. Stakeholders, especially seed village associations, opined that seed production and distribution in the state will improve significantly if government allows the private sector to operate more freely in terms of procurement of Breeder and Foundation seeds from other places/states. A favourable policy discourse is required for this to happen;
- Private seed growers such as seed village associations receive higher preference from farmers compared to state agencies. These growers supply a major percentage of seeds in the state;
- There is also a suggestion to include seeds in the National Rural Livelihood Mission (NRLM);
- The Jharkhand government has initiated a farmers' participatory seed production programme. This programme facilitates farmers to produce seeds for their own use, and also for exchange and sale of seeds.

Odisha

In Odisha, out of the total paddy area of 4 million hectares, HYV constitutes more than 84 percent of the area. In spite of high percentage of area under HYV, steady increase in fertiliser consumption and irrigation potential, average productivity of rice remains low at 2.2 MT per hectare during 2011-12 which is one of the lowest among eastern India states. One reason for this low yield may be low seed replacement rate apart from stress due to biotic as well as abiotic factors.

For a state with about 4 million hectares of total rice area, to maintain a seed replacement rate of 25 percent, more than six lakh quintals of rice seed is needed. The SRR of rice during 2011-12 remained at 21.65 percent.

Data for Odisha from 2000-01 to 2011-12 indicates that SRR of rice was below 10 percent in majority of the years except for the last four years. Low SRR of rice during the period from 2002-03 to 2004-05 is mainly attributed to severe drought during 2002-03, which caused low uptake of rice seeds in that year and in subsequent years because of poor productivity of rice seed. Due to climatic aberrations, enough seed was not available for replacement purposes.

During 2012-13, highest amount of Foundation seed (254 MT) was produced and tagged under Seed Village Scheme, contributing 32.82 percent of the total Foundation seeds tagged in the state followed by private seed growers/entrepreneurs/farmers (29.7 percent), state departmental seed farms (22.3 percent), Orissa University of Agriculture & Technology (OUAT 8.1 percent) and Orissa Agro Industries Corporation (OAIC, 1.7 percent). However, in case of Certified seeds, Orissa State Seeds Corporation (OSSC) continued to be the leading producer. In overall

total seed production and tagging, OSSC contributed 60 percent of the rice seed produced in the state; private entrepreneurs' contribution was about 22.7 percent. This is indicative of predominance of OSSC in production of certified seeds. During kharif 2012-13, total 4,989 MT of Certified rice seed was produced.

About 70 rice varieties were cultivated during kharif 2013 for seed purposes which includes both Foundation as well as certified seeds. Similarly, more than 20 varieties were raised for seed purpose during rabi 2012-13. However, only 15 varieties contributed more than 94 percent of the certified rice seed produced and tagged during kharif 2013, and only 5 varieties constituted more than 92 percent of the rice seed produced and tagged in rabi 2012-13.

It is revealed that out of the 15 varieties that occupied major rice seed production share in Odisha during 2012-13, seed growers had produced more of MTU-7029 (Swarna) than that of other varieties which constituted more than 25 percent of the certified seeds produced followed by MTU-1001 (24.57 percent), Pooja (17.62 percent), MTU-1010 (6.64 percent), Ranidhan (5.36 percent), Lalat (3.42 percent), Pratikshya (2.39 percent) and others contributed less than 2 percent of the certified seeds. Among the varieties, new generation varieties like Swarna Sub-1 and Sahabhazi are stress tolerant to submergence and drought respectively. Other new generation varieties are Pratikshya, Ranidhan, RGL-2538, RGL-2537, Sarala, MTU-1010 and MTU-1001, developed after 1995.

Major issues and challenges

Small farms with highly scattered and fragmented plots seem to cause a major limitation in the use of improved technology in rice seed production. On such farms, it is difficult to measure the effectiveness of new seeds and technology. This is because many farmers and seeds growers do not know how to isolate the production of one seed from another: sometimes this causes mixing of varieties and results in genetic impurity. Besides, there are high post-harvest losses due to inclement weather and defective infrastructure causing failure in germination.

The state suffers from weak implementation strategy in rice seed production and many hindrances – timely availability of Breeder and Foundation seeds to growers, timely availability of fertiliser and pesticides, specific institution credit sanction to the seed growers, specific insurance scheme for rice seed growers, timely processing, timely payment of dues along with poor infrastructure in handling such a high volume of rice seed production in the state.

Seed marketing mainly rests with two public sector organisations viz. OSSC and OAIC. OAIC does not have any logistic arrangements to procure, process and market seeds and mainly operates through its seed entrepreneurs and dealer networks. Whereas OSSC, though has its own infrastructure, is handicapped to market seeds of its own due to poor staffing, inadequate storage and transportation facilities and generally market its rice seeds through its own outlets, dealer networks and Primary Agricultural Co-operative Society (PACS). It is noted that due to official apathy, many a times, OSSC is not able to timely market the seeds through PACS. Also due to delayed arrival of seeds at the sale points as well as due to lack of availability of desired variety, farmers resort to sow their own harvested seed, thereby limiting the use of quality seeds at the farm front.

Financial support for facilitating rice seed industry in the state is still weak. Many of the stakeholders lack experience in rice seed production, seed distribution and marketing. Seed quality control is not effectively ensured due to lack of logistics and staff constraints. There is poor information flow related to timely availability of seeds and of desired variety. Lack of adequate infrastructure for bulk handling of rice seeds for quality control and marketing including processing, transportation, storage and distribution are also observed.

Farmers across the state using Certified HYV have ventilated their concern about public channels; quality is not their only concern, other concerns include lack of timely supply, inadequacy of supply and other malpractices. Due to these and other difficulties, dependence of farmers on private dealers is increasing. Quality of seeds produced and distributed by various public and private channels is not found to be good, one exception being Swarna Masuri. Private seed growers and dealers assure the quality of Swarna Masuri, which is the most preferred variety in the state. Dealers also reported that about 60 percent of total production of this variety is marketed in Jharkhand and Bihar. Generally, motivation to get higher profit is the only explanation behind this.

Though OSSC has taken strong steps to increase the availability of rice seed at farm front, it lacks the storage capacity to store the large volume of seed being processed at its units. Many other state-level developments and issues impact seed production, marketing and distribution in the state. These are briefly described below:

- Many of the seed growers are constrained to keep unprocessed seeds in their own premises for a long period of time before processing units have the capacity to lift stocks. Seed growers get returns for their seeds only when it is processed and stored. Immediately after processing, farmers are paid Rs 1,250 per quintal; the rest Rs 500 is paid after four to five months. This causes serious problems for the farmers in the state. Though OSSC is a major producer of rice seed, its storage capacity is less than 50 percent of the total processed seed in the state.
- There has been increase in supply of total seed over the years. It is observed that the percentage share of supply of MTU-1001, Pooja, Rani and MTU-1010 is increasing whereas the share of Lalat, CR-1009, CR-1018, Naveen, Pratikshya and Swarna is decreasing. However, because of policy decision of the government not to promote Swarna, there have been deliberate attempt to reduce the supply of Swarna in the seed chain.³ Total seed supplied in the state was 5,121 MT in kharif 2013.
- It is noted that SRR in the state has increased significantly over the last few years, rising from a little over 8 percent in 2007-08 to about 22 percent in 2011-12. This is an important development and needs to be further strengthened. Increase in SRR is primarily because of increasing level of awareness among farmers about HYVs.
- Coastal and tribal areas have low SRR compared to other areas. In these areas, long duration crops are grown. Inadequate infrastructure often results in lack of timely availability and accessibility to quality seeds in the state. It is observed that small and marginal farmers have not replaced Swarna variety for about 15 years.
- Seed availability in the state has increased impressively, primarily because of increasing contribution of private sector seed growers. At present, over 38,700 ha of land is under the production of certified seeds.
- It is also observed that small and marginal farmers, constituting about 82 percent of all farmers, are not using modern varieties (HYVs).⁴ These calls for initiatives to focus on small and marginal farmers, if improvement in SRR is desired.
- Two major bottlenecks in seed production in the state arise from the fact that seed certification agencies are understaffed and have inadequate seed certification infrastructure.

- On the production front, there is lack of training, non-lifting of produced seeds.
- Farmers' saved seeds appear to be the most important source of HYV rice seeds at 57 percent; the government provides 31 percent; 12 percent comes from other sources.
- To ensure increased accessibility and increase SRR to 35 percent (as planned) seed should be made available at farmers' doorsteps.
- It is suggested that if quality standards are met with adequate supervision, Odisha has potential to produce enough for the state and for export.

West Bengal

In West Bengal, HYV rice seed is gaining prominence. Out of the 6.5 million hectares under rice cultivation, HYV accounts for more than 90 percent of total area. It is also noted that area under HYV in all the seasons is increasing in absolute number. In rabi season popularly referred as Boro season, HYV rice seed account for almost hundred percent. HYV area in kharif has experienced steady increasing trend – the share is above 80 percent. In pre kharif, the trend is sluggish; the share of HYV rice seeds is stagnating around 30 percent.

HYV preference in the state largely depends on seed research and administrative measures towards awareness building. Agriculture extension services, spread of knowledge and sharing of experience in the state have resulted in preference for certified seeds. Indeed, the demand for different varieties of seed would vary with prevailing practice. Seasonality of demand is also an important aspect.

Available information suggests SRR is showing an increasing trend. According to available estimates, the ratio ranges from 29 to 31.5 percent.

West Bengal Seed Development Corporation (WBSDC) produces about one-fifth of total certified seeds, government farms about one-tenth, and approximately the same quantity is produced by the two state agricultural universities. In comparison, the contribution of NGOs is about 10 percent; private agencies contribute about one-third and the rest (about 20 percent) comes from other government agencies. There are indications that co-operatives have started a playing increasing role in producing and distributing certified seeds. This is evident from the fact that the number of cooperatives during the past decade increased from about 9 to over 15. However, efficacy of these cooperatives is yet to be evaluated. In the state, approximately 85 seed-producing companies are in operation. It appears that seed growers are able to produce about 134,000 MT of seed.

Major issues and challenges

In West Bengal, HYV rice seed has emerged as a dominant choice and traditional varieties are losing significance for small farmers. Some farmers usually having larger operational holding cultivate some superior quality rice (for example, scented rice Khatal Bhog in Balurghat) for home consumption during the Aman season.

Farmers have strong preference for certified seeds. The degree of adoption varies across agricultural season – in general during the Boro only certified seeds are used. However, land cultivated is relatively small in Boro. During the kharif – preference for certified seed is also very high – it averages about 85 percent. Some traditional Aman varieties are also cultivated, particularly for household consumption.

Variation in SRR is reported based on seasons. Seed replacement is about cent percent for Boro. This is primarily because of use of hybrid seeds by farmers. Besides, some farmers also reported using retained seed – but not more than one year old. During Aman and kharif seasons, seed replacement across different types of farmers varies widely. Farmers with relatively larger operational holding also reported considerably low replacement rate – it varied from 20 to 30 percent. Use of seeds not more than two year old is a dominant practice. This implies that replacement is done every third year. Farmers are in the habit of purchasing seeds from local seed dealers – retailers and distributors. Farmers of the entire region are dissatisfied with the seed distribution and marketing system. Untimely supply of HYV rice seeds and land suitability are the two significant areas of concern.

HYV rice seeds supplied by government and private agencies often suffer from contamination. This catapults into unsatisfactory quality of rice seeds. Farmers seem to be seriously concerned about the quality and suitability of HYV rice seeds supplied.

With local supplies being insufficient, it is noted that the state depends heavily on seed supply from outside the state. Supplies are reported mainly from Odisha and Andhra Pradesh. Official estimates suggest about 16 percent deficit during the year (2013); seed production in the state is reportedly 72,000 MT while estimated requirement with 29 percent seed replacement rate is 83,000 MT. One possible reason for this is seemingly inadequate research and development capacity in the state. Infrastructural bottleneck is cited to be other important reason. The situation is such that even if add government and private supplies, deficit in rice seed demand and supply persists. This creates preference for seeds from other states like Andhra Pradesh, Odisha and Maharashtra. It is, however, noted that seed market of the state is vibrant.

Summing up, it is observed that despite the progress made, there are several areas that need improvement with regard to making seeds available and accessible to a larger number of farmers, especially small and marginal ones. Some of these, as highlighted in the report, are given below:

- It is recorded that many of the traditional varieties have lost their presence in West Bengal. Presently, only 25 seed varieties are active and in use. The Swarna Masuri, Pratikshya, Satabdi, Lalat and Ranjit are the dominant breeds and are well accepted by farmers.
- Many farmers in West Bengal are not aware about different suitable varieties of HYV rice seed and information on these. Administrative issues are cited as the primary reason.
- Seed certification infrastructure is very weak in each of the districts of West Bengal, and at many times, farmers find it difficult to procure seed at the right time. The government should rectify this).
- It is important that SRR, which is about 30 percent in West Bengal, is further increased and sustained in the coming periods.
- To popularise and to generate greater awareness, the current practice of packaging in 30-kg packs needs to change. The government of West Bengal has already taken some initiatives toward addressing this issue. This year, the government facilitated distribution of 6-kg packs on a pilot scheme. It is suggested that 6-kg and 12-kg bags will attract small and marginal farmers towards HYV seeds.
- It is highlighted that adulteration of certified seeds is a major problem, and need immediate government attention.

- The private companies in the state have been playing a vital role in seed production. They fulfil about 80 percent of the total rice seeds requirements in the state. Their all-India contribution is 88 percent.

Besides, there are also instances of informal flow of rice seeds from Bangladesh. There are a number of varieties in West Bengal having their origin in Bangladesh (for example BR-11). Similarly, it is also revealed that some varieties from India (like Swarna Masuri and Parijat) which informally flow across the border have become quite popular in many areas because of their adaptability. To address the issue, there is need for formalisation of HYV rice seed trade with Bangladesh.

Bangladesh

Bangladesh is experiencing higher yield rate of rice compared to that of India. Currently, the yield is around the world average for the last 6-7 years. In 2011, rice yield in Bangladesh was 4.3 tons per hectare. A major role played in this is high SRR achieved by Bangladesh over the last few years. In 2010, SRR was estimated at 47.39 percent. This high replacement rate is probably because of 100 percent SRR realised during the Boro season. It is understood that hybrid seeds need complete replacement, in contrast to HYV seeds.

Demand-supply gap is found in rice seed sector despite increasing involvement of the private sector over the last few years. According to BADC (2011), 39 percent of demand was met in 2010-11. Of this supply (39 percent), Bangladesh Agricultural Development Corporation (BADC) provided 40 percent, Department of Agricultural Extension (DAE) 44 percent and private sector accounted for 16 percent. BADC has a long-term strategy regarding rice seed production, targeting to supply 62 percent of rice seed requirement by 2021. Evidence of demand-supply gap is noticed in Bangladesh. However, the country report reflects that supply of seed, although lower than the required amount, is close to demand in Boro season. The deficit is staggering in Aus and Aman seasons when only 13 and 24 percent of demand can be respectively met for 2009-10. The total deficit stood at 180,890 MT in 2009-10. In Boro season, popular varieties in Bangladesh are BRRI Dhan-28 (with yield of 5.1MT/ha), BRRI Dhan-29 (with yield of 6.1 MT/ha), IR-8 (with yield of about 6 MT/ha), BR-8 (with yield of 5.7 MT/ha), BINA-6 (with yield of 5.4 MT/ha). It is noted that BRRI Dhan-28 has gained popularity primarily because of its shorter life cycle.

Bangladesh is a net rice seed importer with an estimated import market size of \$5.9 million in 2010-11. It imports 90 percent of its total imports of rice seeds from China, though importing it from India would have cost the country far less. India's exports to Bangladesh remain negligible, accounting for less than 3 percent of its total exports. However, it is noted that rice seed import by Bangladesh is confined to hybrid seeds, and in the recent years import has declined.

With regard to HYV, it is observed that Bangladesh has around 65 varieties of HYV rice. Many of these varieties such as BR-11, BRRI Dhan-28 and BRRI Dhan-29 are also popular in Indian states like West Bengal, Assam and other parts of eastern India. As per anecdotal evidence, Assam Agricultural University has requested BRRI to provide seed of BRRI Dhan-29 as this variety is suitable for cultivation in Assam.

The marketing approach being followed by HYV seed producers in Bangladesh, including government agencies is distinct from that of India. In Bangladesh, BADC sells seed in 10-kg packs while the private companies sell seed in 1, 5 and 10-kg packages. In terms of price, surprisingly, it is noted that government rate is much higher than that of private companies. It costs Tk.360 for 10 kg from BADC and around Tk.200-250 for 10-kg packs from private companies.

Some other important features and challenges faced by Bangladesh seed industry, as presented in the country report include the following:

- Farmer prefers not to buy seed from any source and use own farm-kept seed. This seems to be on the grounds that buying seed from external sources poses uncertainty regarding availability and price. Farmers argued that it is preferable to use own preserved seed, albeit lower yield, than facing uncertainty.
- Discussion with seed dealers revealed that 7-8 years back farmers used their preserved seeds only. After long advocacy, farmers are now gradually buying seed from dealers, but still in very small amounts.
- Currently hybrid seeds are imported but not HYV seed. However, hybrid seeds are showing a declining trend in recent times. This is primarily on the ground of low market price and high cost of cultivation, as was indicated by farmers during interactions with the project team. Generation-related information of seed is not available in case of farmer-preserved seed. This is particularly true for informally traded Indian varieties. It is opined that usage of certified seed can significantly increase production of rice.

Informal Trade and its Impact on Rice Seed Availability and Accessibility

Informal flow of rice seed has direct impact on availability and accessibility in the two countries. Such occurrences boost local availability and perhaps also support increased accessibility. However, for this to happen, adaptability of seeds produced in India and Bangladesh is a pre-requisite. Evidence suggests that farmers on both sides of the border have developed a preference for HYV seed from across the border. Intrinsic adaptability of rice seed in local conditions seems to be the reason. Interactions with farmers and other stakeholders reveal that many of the varieties produced in India and Bangladesh, as indicated earlier, are popular in both the countries. Some of these include BR-11, BRRI Dhan-28 and BRRI Dhan-29 (Bangladeshi varieties in India); Swarna (including Guti and Sada), Parijat, Somsor, Swampa, Mamun (Indian varieties in Bangladesh).

It is noticed that informal flows are confined to the border areas of India and Bangladesh. It is worth mentioning that a number of FGDs and interviews with various stakeholders were conducted as a part of the field exercise. Places where field visits were conducted include Dakshin Dinajpur in West Bengal (near Hili border), Petrapole and Cooch Behar on Indian side, and Sona Masjid area of Chapai Nawabganj district, Hili land port (Hakimpur sub-district), Dinajpur and Benapole land port (Sharsha sub-district) area in Jessore district of Bangladesh. A number of meetings were conducted with important officials and traders, which include the officials of DAE, Upzila Agricultural Officers, seed dealers and journalists.

The issue of informal trade in HYV rice seed was the focus of discussion. It seems stakeholders on both sides of the border are aware of this. Interactions also brought about and identified most informally traded rice seed varieties. A list of some specific varieties traded informally and adapted by farmers is presented in the table (Table 2.2).

Table 2.2: Major Findings from the Field Exercise in Bangladesh			
Content	Jessore	Dinajpur	Chapai Nawabganj
1. Informally traded rice seed varieties	Swarna (including Lal Swarna, Guti Swarna), Miniket, Zira Miniket	Swarna, Swampa, Parijat, Mamun	Swarna (Guti and Sada), Parijat, Somsor
2. Certified seeds of Indian HYV	Certified seed of 30-kg bag are available	Certified seeds are unavailable but farmers produce locally	Certified seeds aren't available but farmers produce locally
3. Germination problem of Indian HYV	Germination problems not found	Germination problem for Indian HYV is lower than that of local HYV	Parijat variety has germination problem
4. Informal trade frequency	Frequent informal trade across borders	Occasionally trade between borders and farmers produce locally after taking from Indian neighbour	Informal trade is not regularly occurring
5. Trend of hybrid rice production	Hybrid is exhibiting decreasing trend	Uses of hybrid seeds is falling	Uses of hybrid seeds is falling
6. Last five years production of Indian HYV	Swarna, Miniket	Swarna, Swampa	Swarna, Parijat
7. Functionality of quarantine office	Quarantine office is fully functional	Quarantine office is fully functional	Not Visited
8. Seeds generation	Farmers are concerned about the seeds generation	Farmers are not concerned about seeds generation	Generation related information of seed is not available in case of farmers preserved seed
<i>Source: Field investigations</i>			

It is distinctly noted that Miniket and Swarna seeds are coming informally in Bangladesh at Benapole area of Jessore district with the 30-kg package. These are certified seeds from Indian authority are sold in the informal market at Tk.60 per kg. Field visit in Dinajpur district revealed that in Aman season, Swarna is cultivated on about 53 percent of total cultivated area. At Hakimpur sub-district of Dinajpur, total area under rice production is 7,196 hectare in Boro season. Of this area 5,646 hectare is under HYV of three Indian and four Bangladeshi varieties. BRRI Dhan-28, BRRI Dhan-29, Miniket and BRRI Dhan-49 are responsible for 17, 23, 14 and 12 per cent, respectively (Table 2.3).

Table 2.3: Cultivation of Indian and Local HYV in Bangladesh				
Season	Local HYV	%	Indian HYV	%
Chapai Nawabganj				
Aman	BRRI Dhan-34	1	Swarna	87.37
	BR-11	1		
Boro	BRRI Dhan-28	25.79	Parijat	35.97
	BRRI Dhan-29	14.22	Somsur	3.53
Jessore				
Aman	Bina-7	11.46	Swarna (Guti, Kolamocha, Bulet)	33.53
	BRRI Dhan-39	12.84		
Boro	BRRI Dhan-50	24	Miniket	27.90
	BRRI Dhan-28	21.23		
	BR-26	24.73		
Aus	BRRI Dhan-28	14.48	Miniket	28.30
Dinajpur				
Aman	BRRI Dhan-34	13.8	Swarna	53
	BRRI Dhan-50	20		
	BR-11	2		
Boro	BRRI Dhan-28	33		
	BRRI Dhan-29	27.5		
<i>Source: DAE District Offices, Ministry of Agriculture, Bangladesh and field work studies conducted in Bangladesh</i>				

Similarly, HYV rice seeds also informally flow from Bangladesh to India. This is noticed in parts of Bihar, Odisha and West Bengal as reflected in Table 2.4. Field study in West Bengal suggests that considerably large proportion of farmers have started cent percent replacement for Boro rice which consists of Indian as well as Bangladeshi varieties. Choices are again increasingly converging to a specific variety with spatial or regional variation. For example in FGD village in Cooch Behar farmers are mostly cultivating Hira (Bangladeshi hybrid rice variety).

Table 2.4: Formal/informal Flow of HYV rice seeds between states/countries					
State/country	Bangladesh	Bihar	Jharkhand	Odisha	West Bengal
Bangladesh	✓	✓	×	×	✓
Bihar	✓	✓	✓	×	×
Jharkhand	×	×	✓	×	×
Odisha	✓	✓	✓	✓	✓
West Bengal	✓	✓	×	×	✓
Other states (Andhra Pradesh)	×	×	✓	×	✓
<i>Source: Farmers' Focused Group Discussions conducted in four states in India and in Bangladesh (19-28 August, 2013)</i>					

The most dominant Bangladeshi variety is BR-11 with yields of 3.92 MT per hectare. It might be noted that this variety was developed in 1981 which possess several desirable features for farmers like weed competitiveness or milling recovery.

Endnotes

- 1 Source: <http://krishi.bih.nic.in/Seed.html>, 2014.
- 2 For more details, see First Agricultural Road Map: Major Achievements, available at http://krishi.bih.nic.in/roadmapEN/Road%20Map%20Pdf_book/Page_3-12.pdf.
- 3 It can be noted that six rice “mega varieties” – flood-tolerant versions of high-yielding local rice varieties, popular with farmers and consumers – were tried and tested on farmers’ fields across the region by IRRI. The first variety developed, Swarna-Sub1, showed high survival under submerged conditions compared to the original variety Swarna, and gave yield advantages of one to three tons per hectare over Swarna when submerged. It can be recalled that Swarna is the number one rice variety in India producing a high yield, good grain eating quality and requires 25 percent less nitrogen, as widely claimed by the farmers. For details, see, IRRI, Scuba rice: breeding flood-tolerance into Asia’s local mega rice varieties, available at: http://r4d.dfid.gov.uk/PDF/Outputs/IRRI/DFID_impact_case_study_SUB1rice_FINAL%5B1%5D.pdf.
- 4 About 83.8% of farm holdings belong to small and marginal farmers in the state of Odisha as per a government report. Source: www.planningcommission.nic.in/plans/planrel/53rdndc/orrissa.doc.

3

Addressing Some Major Issues and Challenges

From the above analysis, it is abundantly clear that seed market in India (especially four eastern states) and Bangladesh suffer from various issues and challenges that adversely impact functioning of the seed market in the two countries. Both the countries encounter resource and technical constraints with regard to making HYV rice seeds available and accessible. Several initiatives at the state and country level are required to address these issues for improving availability and accessibility of HYV rice seeds. There is also need for looking at these issues at bilateral level. In addition to initiatives at the national and bilateral level, cross-border trade and knowledge-sharing also appears to be a potential way out. Some of the main suggestions to address the issues and challenges (availability and accessibility) in India and Bangladesh are as follows.

Supply

India presents a mixed picture with regard to improvement in SRR. While some states and some areas have recorded relatively higher SRR, there are several others who are lagging behind. In some areas of states like Bihar, Jharkhand and Odisha SRR is observed to be quite low. This is seemingly because of low level of awareness, especially among small and marginal farmers. There is a need for creating greater awareness on use and benefits of HYV rice seeds in these areas. On the other hand, Bangladesh needs to sustain and further strengthen its existing SRR, which has improved and reached a level of over 47 percent. As a pre-requisite, this will require sufficient and sustained production and an efficient marketing and distribution system.

At the state level, to maintain desired SRR of 25 percent as envisaged by the National Seed Plan of India, the states in India urgently need to expand their HYV rice seed production. To produce sufficient quantity of HYV rice seed, an increased area is needed to be brought under rice seed cultivation in every Indian state. This calls for constant efforts to promote rice seed cultivation among the progressive farmers in all the rice-producing states. Increased involvement of farmers (users of seeds) and linking seed production with livelihood-related schemes could be an important initiative.

Infrastructure

Seed testing for germination and purity is another important check for supply of quality HYV rice seeds to the farmers. This is true for farmers both in India and Bangladesh. As per the prevailing practices with regard to government extension services, each of the three districts

should have one seed-testing laboratory to maintain quality check at laboratory level. It is, however, noted that generally, seed-testing laboratories even if fully operational, are inadequate to cater to vast amount of HYV rice seeds that are now currently being traded and used in the states (for example, a major rice seed-producing state such as Odisha has only three main seeds testing laboratories: in Bhubaneswar, Rayagada and Baragarh). These need significant improvement.

Both in India and Bangladesh state seeds certification are the controlling authority in production and certification of seeds. These are currently found to be understaffed. Infrastructure facilities at their disposal are inadequate to facilitate production and certification of enormous quantities of rice seed.

There is need for adequate staffing of seed certification agencies of both India and Bangladesh. This arises primarily because of increased workload. For example, in India while one certification officer should ideally monitor 600 ha annually, he is required to monitor an area of 1,000 ha. Understaffing creates difficulties and impacts preservation of quality seed.

Godown facility to store rice seed in various Indian states and also Bangladesh is very limited. This causes adulteration and loss of quality seed. There is urgent need to increase the storage capacity to keep the seeds in sound condition.

Increased Role of Private Sector

Public production and marketing of seed may well have been a necessary initial step to (a) demonstrate the existence of a market, and (b) to make seed available pending the development of private sector seed companies. But now it needs to be recognised that the private sector has emerged a big player in the seed industry in both India and Bangladesh. There is every reason to suggest that private sector companies should be encouraged to compete, and one expects that if freed from the more onerous public sector bureaucratic procedures, they may be able to contribute in a bigger way. There is, in fact, need for further strengthening of their role in production, certification, marketing and distribution of seeds.

One expects that the role of the private sector would change with formalisation of the rice seed trade. In Bangladesh, private enterprises by following the present regulation of the National Seed Board can make imported seeds available to domestic market. For formalisation, it is essentially required that prices and packaging are kept at competitive level. The role of the private sector becomes crucial as it can also cater to the HYV rice seed market through joint initiatives by private companies of the two countries.

It is important to ensure that there are no unnecessary barriers to entry of private firms into the industry; that government need not impose regulations that prevent the private sector from functioning efficiently; and that private companies have equal access to improved seeds and germplasm produced from the research system. It is not necessary to have an active pro-private policy stance; but it is essential not to have an anti-private sector stance.

Production and use of truthfully labelled seeds (TLS) is another area where private sector can play an important role. As a pre-requisite, it is required that first the governments of the two countries agree to accept its importance and take initiatives. Once this is officially accepted, private seed producers and exporters can enter into some arrangements to promote TLS in both the countries.

Initiatives at National, Bilateral and Regional Levels

There is need for creating a highly professional and independent Seed Certification Authority to establish standards for germination, purity and genetic composition. A truly rigorous Seed Certification Authority is perhaps the most important indicator of a mature seed industry. In India certification is optional, and this has worked well; but farmers need to have the option of buying certified seed from various sources.

At least for the next one to two decades, the bulk of non-hybrid seed planted in India is likely to be farm saved. For this reason, while development and release of new varieties are important, equally important is improvement and strengthening of government extension and other seed-related services for advising farmers on minimising weed contamination, seed cleaning and storage as well as germination testing. It is noted that even though Seed Village Schemes are operating in India since 2005, their functional effectiveness is jeopardised because of lack of staff for training and motivating farmers at the grassroot level.

One aspect of the policy framework is that policies treat all kinds of seed universally in terms of approval. All notified crop seed like rice has to undergo two seasons of field testing whether it is certified by origin country or international bodies or not certified at all. This provision while safeguarding farmers' interest, makes the registration process quite lengthy. Therefore, policy makers needs to come out with a procedure that continues to safeguard the farmers' interest and at the same time makes the registration process transparent and efficient so that the extra cost caused by delay due to slow decision-making can be avoided.

4

Need for Cooperation between India and Bangladesh

As highlighted in the preceding sections, it is understood that the seed industry in India and Bangladesh is shrouded with several issues and challenges. It ranges from physical and economic availability to accessibility; inadequate demand and also inadequate supply; inefficiency in production, marketing and distribution; inadequate infrastructure reinforced by and lack of technical and financial resources. The combined effect of these is a market situation which often results in a significant gap between demand and supply. This gap is sometimes artificial and manipulated to suit and favour the vested interest involved in the informal trade in rice seed across the border.

Any attempt to address all the highlighted issues calls for several initiatives on the part of governments in India and Bangladesh. Such measures need to include improvement in infrastructure for production, streamlining of supply chain, adequate government support, policies and regulations.

Bilateral cooperation can contribute and help India and Bangladesh to substantially address the issue of lack of availability and accessibility to quality seeds. Trade can be a very important component of cooperation, one potential way to improve HYV seed availability. Some of the other avenues to enhance bilateral cooperation between Bangladesh and India in rice seed trade can be to harmonise standards, certification process and quarantine laws; develop regional/bilateral seed bank; establish joint body for research and development in agriculture; allow seed trade in Border Haats as a short-term measure; and share genes of existing varieties at government level so that each country can release the varieties of the other.

There is substantial opportunity to extend cooperation for development and maintenance of harmonised seed system of India and Bangladesh. This could help in making seeds of improved varieties available suitable for every agro-climatic zone/condition. In addition, this may be particularly useful in meeting the seed shortages caused by natural calamities. There is also scope for exchanging varieties at government level to formalise the unregistered seed variety cultivation occurring in both countries so that farmers are ensured quality input.

Initiatives like SAARC Seed Bank to form collective self-reliance in agriculture with respect to attaining seed security and also contribute to harmonised seed testing, certification and trade can be initiated. The initiatives to harmonise standards, certification and registration process need to be accelerated to promote greater private sector participation and enhanced regional cooperation.

International research organisations like International Rice Research Institute (IRRI) can play an important and facilitator role. It is understood that on many occasions, parental lines from IRRI are used to develop local varieties. The same has been done by Bangladesh and India –

release of Swarna Sub-1 in different names (BRRI Dhan-51 in Bangladesh and Swarna Sub-1 in India) is one such example. Same parental line is indicative of adaptability and suitability of such varieties in both the countries. One potential, but unexplored, reason for informal trade between the two countries could be this. Benefit gained by poor farmers, as revealed by farmers during FGDs conducted under this project on both sides of the border is another indication of adaptability of such varieties.

In the light of potential benefits to farmers and other stakeholders, one can argue that formalisation of trade and increased cooperation in rice seed between the two countries could go a long way in addressing the issue of seed availability and accessibility. While formal trade in HYV rice seed can help increase availability and accessibility, cooperation can help the two countries in developing better varieties in lesser period, say 2-3 years compared to 10-15 years spent on development and release of varieties. And again, the ultimate beneficiary will be small and marginal farmers as the poor farmers will be assisted from increased availability and accessibility to quality seeds which are required for higher yield.

Table 4.1: Rice seed varieties introduced from similar sources (IRRI) in India and Bangladesh		
<i>Lines</i>	<i>Country</i>	<i>Status</i>
Swarna Sub-1	Bangladesh	Released in 2010 as BRRI Dhan-51
	India	Released in 2010 as Swarna Sub-1
<i>Source: Initial project report from Bangladesh</i>		

Initiatives to increase cooperation and knowledge sharing at the bilateral level also hold critical importance. This is not only because of prevailing informal flow of rice seeds between the two countries, but also because of other reasons. Evidences suggest that countries opting for bilateral or regional cooperation in seed have benefited from this. It could hold true in case of India and Bangladesh as well. Inputs gathered during interactions with several stakeholders are clear pointers – increased cooperation and knowledge sharing would bring in greater efficiency in the seed market in the two countries.

Dynamics and Potential for Mutual Benefit

As indicated in the preceding section, increased cooperation in rice seeds between India and Bangladesh is very likely to be mutually beneficial. There are a number of examples to prove that such cooperation at the bilateral and regional levels results in improvement in the domestic seed market. For example, an initiative in Eastern and Central Africa (ECA) in 2002 covering Kenya, Tanzania and Uganda to rationalise and harmonise the regulatory and legal frameworks governing the seed industry helped the region to overcome seed scarcity and inefficiency in the marketing and distribution system. ECA's seed industry, which was previously small, fragmented and fraught with bottlenecks, transformed itself into a vibrant industry.¹

Further, in 2004 the initiative expanded to cover other countries, namely Burundi, DR Congo, Eritrea, Ethiopia, Rwanda, Madagascar and Sudan. As a result, local seed production in Uganda, Kenya and Tanzania tripled from 43,000 to about 122,000 tonnes between 2002 and 2008. The initiative also facilitated access to better seeds through trade. Seed imports into the region increased

significantly by nearly 70 percent from 9,000 to about 15,000 tonnes, while exports from Kenya and Uganda increased from less than 1,000 to more than 3,000 tonnes in the same period.

There are many other examples to support the argument that cooperation between India and Bangladesh in seeds, particularly rice seeds, would be beneficial to both of them.

Potential Areas for Cooperation

Considering the type of challenges faced in rice seed, potential areas for cooperation between India and Bangladesh could be identified as the following:

- Joint development of HYV rice seeds, especially those which are adaptable in both the countries;
- Agreement on testing and release of adaptable rice seeds varieties;
- Capacity building leading to mutual recognition of quarantine certificates issued by the authorities in the two countries;
- Formalisation of trade (this, in fact, would flow from the first three).

Various action points and potential areas for cooperation could be suggested to promote cooperation in rice seeds between the two countries. These can be broadly clubbed under two headings:

- Action points for increasing cooperation and knowledge sharing in rice seed, and
- Actions points for formalisation of trade in rice seed.

The former seems intended for creating an enabling environment for cooperation and collaboration for increased rice seed production through knowledge sharing; the latter is more focused on making rice seed available and accessible to a larger number of farmers, especially small and marginal ones.

Each of the two action points could be disaggregated into a number of sub-action points. For addressing the issue of cooperation, the following are desired:

- Identifying areas of cooperation (*this could include identifying of varieties which could be equally adaptable to both the countries; identifying varieties for joint development; identifying geographical areas where jointly developed varieties could be cultivated by farmers*);
- Identifying institutions for cooperation (*this could potentially include government departments; research and development institutions engaged in development of varieties such as Central Rice Research Institute (CRRI) in India and Bangladesh Rice Research Institute (BRRI) in Bangladesh; trade and industry associations; among others*);
- Within HYV rice seed, there is also need to clearly understand the stages at which cooperation between the two countries would be most beneficial. For example, cooperation can be planned from the stage of nucleus seed, and this can go to the extent of cooperation in seed certification. Considering the sensitivity of HYV rice seed for both the countries, and as discovered during interactions with stakeholders, it can be noted that cooperation at some stages could be more acceptable than others.

Initiatives highlighted above need to be focused and time-bound to achieve desired results. This is, however, also dependent on and integrated with initiatives for formalisation of trade.

Formalisation of trade is a complex issue, and would call for several initiatives. It requires both the countries to fully understand seed development and production processes, and identifies areas for cooperation. To start with, firstly it needs to be recognised by the two governments that

there is need for trade and that such a trade would be beneficial for both the countries. Some potential initiatives for facilitating formalisation of trade include the following:

- Mutual acceptance of seed production, processing and certification (this calls for mutual acceptance of certificates of laboratory testing, seed labelling among others)
- Agreement to allow testing and registration of varieties
- Mutual recognition to quarantine certificates
- Mutual recognition of sanitary and phyto-sanitary requirements and certifications

Issues Need to be Explored for Facilitating Cooperation

Since cooperation between the two countries in HYV rice seed is at a very nascent stage, agreement might not be an easy task. In fact, several areas need to be explored and understood which are sensitive for both the countries. Some of such concerns are briefly delineated hereunder.

Policies and regulations

Analysis of current policies shows nothing that can deter import of rice seed and its replication in Bangladesh for commercial purposes. The registration process is standard for all countries and applicable even for public companies. It can be assumed that generalised trade barriers and trade facilitation recommendations for Bangladesh-India is applicable for rice seed trade also. Bangladesh imports fruit, maize and vegetables seed from India, and does not impose any customs or import duty on seed.

The regulatory framework does not fully explain why there exists informal seed trade between India and Bangladesh. Farmers through their network might be interested in a particular variety from other side of the border. In the absence of institutional framework required for supply of that seed and easy availability, widespread smuggling can make these seeds available. Therefore, informal trade takes place between the two countries. India also has in place regulations and policies that regulate rice seed import. It is neither possible nor convenient for a small, medium or large farmer to complete the processes required for importing seed legally.

Also, Enabling Agricultural Trade (EAT) a project funded by USAID found that it takes 860 days to register a proprietary staple grain variety through five procedures. Different market structures of Indian states make it difficult for the external sector to enter the market.²

Regulations and policies relating to rice seed import

As indicated above, it can be noted that both the countries impose policies and regulations which are very difficult to be followed by traders. However, exact nature of issues remains unknown. It has been suggested that an exercise trying to import some quantity of seed from Bangladesh to India and vice versa would reveal all the trade barriers pertaining in this sector, as it would be very effective and helpful for this ongoing study.

Some known barriers that are currently affecting the flow of exports from Bangladesh to India and vice versa include:

- Classification
- Laboratory testing and chemical testing
- Labelling requirements
- Registration
- Quarantine requirements
- Sanitary and Phyto-Sanitary (SPS) requirements

It might be noted that for primary agricultural products, India requires bio-security; SPS import permits, which Bangladeshi exporters see as a complex process. While importing all kinds of food products, India sends the samples of export consignments to testing laboratories located at places far from the customs points, which causes delay in the export process and results in undesirable demurrage.

Harmonisation of seed laws and regulations

The term 'harmonisation' has recently gained wider popularity and acceptance. It is described as adjustment of differences and inconsistencies among different measurements, methods, procedures, schedules and specifications. It is usually purposive and amounts to making adjustments in domestic law, rules and regulations in a country to make it consistent with similar provisions and requirements in other countries. The objective is to promote cooperation between two or more countries.

Harmonisation could be considered a major tool for facilitating cooperation and trade between countries. Gainful experiences from such harmonisation are many, as noted earlier. In the case of seed for India and Bangladesh, harmonisation will relate to making laws, rules and regulations in the two countries consistent with each other. Primarily this will require changes in rule and policies making seeds from one country acceptable in the other, and could cover issues such as quarantine, local testing and release of varieties produced in other.

Harmonisation will also be required in seed standards and certification procedures. Considering that there is minor variation in the requirements for seed certification in the two countries, one can hope that the task will not be very challenging (Table 4.1).³

Two important observations emerge from the two tables above. First, rice seed standards of the two countries are very similar. This might make the process of harmonisation easier. Secondly, rice seed standards set forth by India easily fit into the requirements in Bangladesh. In fact, it appears, there is no requirement for bringing in much change. On the other hand, Bangladesh will be required to make a little adjustment for exporting HYV seeds to India.

Issues related to Intellectual Property Rights

Intellectual Property Rights (IPR) relating to development and release of HYV rice seed continues to be a contentious issue at the global level. It might be also true in case of India and Bangladesh. Both India and Bangladesh have put in place their IPR regimes, consistent with WTO and their local requirements. Variety rice seed is a typical issue which allows farmers to reap benefit from seed-embedded technological progress through its repeated use.

Discussions with stakeholders revealed that IPR and related issues might be one of most important reasons which hinder formal trade in rice seeds between the two countries. Newly released rice seed varieties are usually subject to patent, royalty, copyright, and therefore import or export of seed might not be a workable solution. Further, it can be noted that varietal development in both countries is supported by the public sector. Resolving the IPR related issue, therefore, requires government-to-government negotiations.

There is need for both the governments to have an appropriate framework which, while protecting the interests of the developers, facilitates cooperation between the two countries. Fortunately for the farmers, the governments in the two countries have started discussions on how to promote cooperation in varietal development, recognition of varieties, seed exchange, greater opening for cooperation.

Table 4.2: Seed Standards of Rice for Bangladesh		
Factors	Standards for each class	
	Foundation	Certified
Pure seed (minimum % by wt)	97.0%	96.0%
Inert matter (maximum % by wt)	2.0%	3.0%
Other seed (maximum % by wt)	1.00	1.00
a. Other crop seed (maximum no. in total, whole sample will be tested)	5/kg	10/kg
b. Total weed seed (maximum no.; whole sample will be tested)	8/kg	10/kg
Germination (minimum %)	80%	80%
Moisture content (maximum %)	12%	12%
Isolation distance (meter)	3.00	3.00
Other crop plants (maximum % by no.)	0.10	0.20
Other varieties (maximum % by no.)	0.10	0.50
Weed plants (obnoxious, maximum by no.)	0.01	0.02
Plants infested by seed borne diseases (maximum % of infected plants)	10.00	20.00
General conditions: If the field crops are severally damaged or lodged and irregularly flowered that makes crop assessment difficult, the trueness of variety and varietal purity will be rejected.		
Source: IRRI's Rice Knowledge Bank, available at http://www.knowledgebank.irri.org/qualityseedcourse/index.php/module-5-planning-and-management-of-seed-production/6-seed-certification-system-awareness		
Seed Standards of Rice for India		
Factors	Standards for each class	
	Foundation	Certified
Pure seed (minimum)	98.0%	98.0%
Inert matter (maximum)	2.0%	2.0%
Huskless seeds (maximum)	2.0%	2.0%
Other crop seeds (maximum)	10/kg	20/kg
Other distinguishable varieties (maximum)	10/kg	20/kg
Total weed seeds (maximum)	10/kg	20/kg
Objectionable weed seeds (maximum)	2/kg	5/kg
Seeds infected by paddy bunt (<i>Neovossiahorrida</i> maximum)	0.10%	0.50%
Germination (minimum)	80%	80%
Moisture (maximum)	13.0%	13.0%
For vapour-proof containers (maximum)	8.0%	8.0%
Isolation distance (meter)	3.00	3.00
Source: The Central Seed Certification Board, Department of Agriculture & Co-operation, Ministry of Agriculture, Government of India, 2013, available at http://agricoop.nic.in/imagedefault/seed/INDIAN_MINIMUM_SEED_CERTIFICATION_STANDARDS.pdf		

Are trading barriers more stringent on the Indian side?

The trading barriers are more rigid and greater in number from Indian side came up during discussion with several stakeholders. Bangladesh imports a wide array of products from India through formal and informal process. It is argued that from Bangladesh side there are minimal trade barriers. But in case of India, due to the federal government system facilitating trade requires much longer authorisation and certification from a number of bodies.

Informal flow of rice seeds from across the border takes place because of the existing regulatory framework in India and Bangladesh. Besides, the porous border covering about 4,500 km makes it easy for farmers to access seeds available across the border through their network and contacts. The demand is based on farmers' perception relating adaptability of a particular variety in the local conditions. Seemingly, in the absence of institutional framework for formal flow of rice seeds and their easy availability, farmers opt for this channel.

Potential demand for Bangladesh-produced seeds in India and vice versa

There is no published or recorded estimate of potential demand for Indian rice seed varieties in Bangladesh and vice versa, even though some hybrid and HYV rice seeds have made their presence felt on both sides of the border. However, when one considers informal flow of HYV rice seed from India to Bangladesh and vice versa, a rough understanding on the potential demand could be mapped.

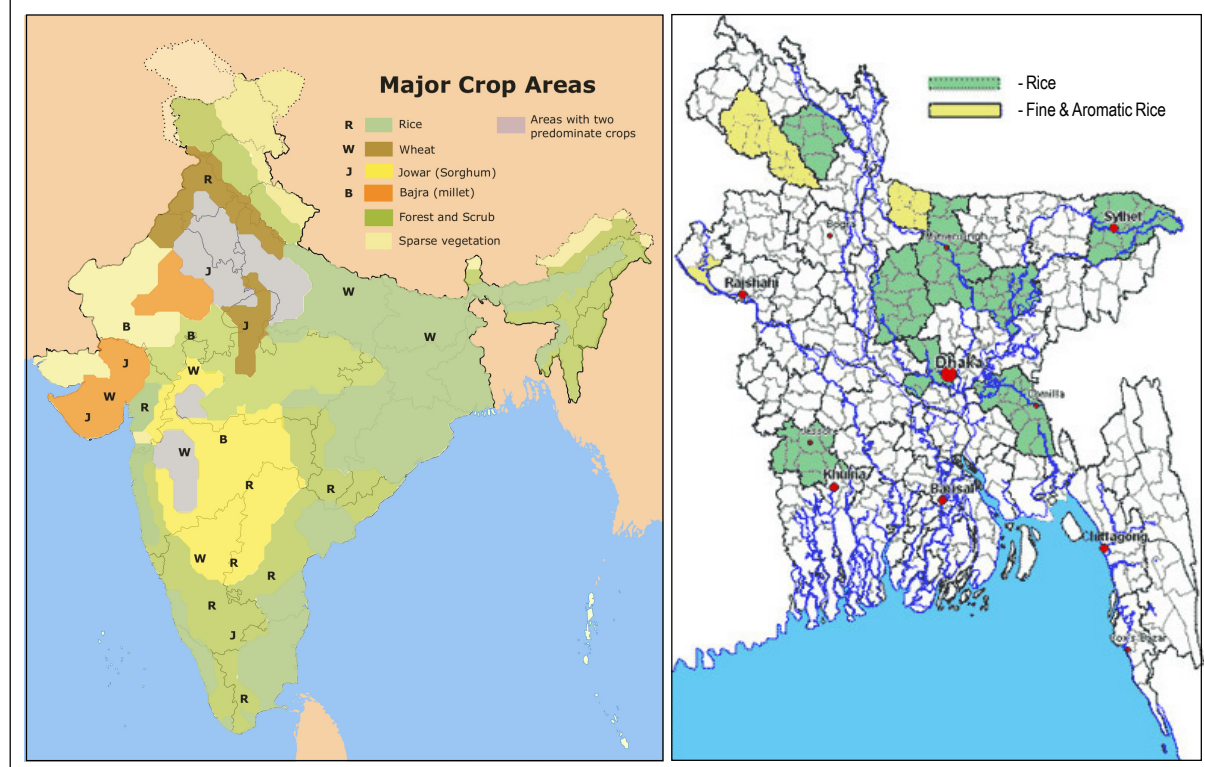
During the field visits and interactions with farmers and other stakeholders in India and Bangladesh, it was discovered that there are a number of rice seeds which informally cross borders (a list of such varieties is given in Section II) from India to Bangladesh and vice versa. Presence of these varieties, directly or indirectly reflects adaptability, acceptability and also potential for formal trade. It is, however, worth mentioning that such informal movement is not limited to four states in India (which are covered under this project), rather transcends to other states like Assam and Tripura. Going by this, potential seems much higher. Overall, the present demand in the four select states of India and Bangladesh is estimated at slightly lower than one million metric tonne.

In the four select states, current trend in demand for HYV rice seed shows demand at about 83,742 MT for the kharif season (2013).⁴ This is, however, at a SRR of less than 25 percent for all the four states *vis-à-vis* over 47 percent for Bangladesh. The aggregate demand for HYV rice seed could almost double if a similar SRR is achieved in these states. Further, HYV rice seed is also used in rabi season, and this can add to the total demand.

Potential for natural trade (could be formal or informal) in HYV rice seed, with rice being a staple food in the two countries, is usually guided by factors like border proximity and its length, similarity in taste and preferences, availability of rice seeds closer to the rice-producing centres and price. Adaptability is another factor, though this is linked to taste and preference. If such a scenario exists, trade occurs naturally. In case of lack of formal arrangement, informal trade develops as a phenomenon. This is exactly the case with HYV rice seed developed and used in the two countries, a qualitative indicator of potential.

As demonstrated in Figure 4.1, that shows the maps of both the countries, the potential and scope for cooperation is clear. Most of rice-producing states in eastern India border Bangladesh; it applies other way round also. This implies that rice-producing regions in Bangladesh and eastern India have a geographical proximity and have a great scope and potential to benefit from one another. In all these areas, quality rice seeds will be a recurring requirement, to be met on a continuous basis for sustainable rice production. Such proximity also implies that these areas have a similar agro-climatic condition, and therefore, farmers in the region can immensely benefit from cooperation between the two countries.

Figure 4.1: India's and Bangladesh's Rice Growing Areas



Farmers in Bangladesh could gain from India's economy of scale, and quality rice seeds at affordable prices might become a trading norm between the two countries.

Is the trade flow in rice seed likely to be uni-directional?

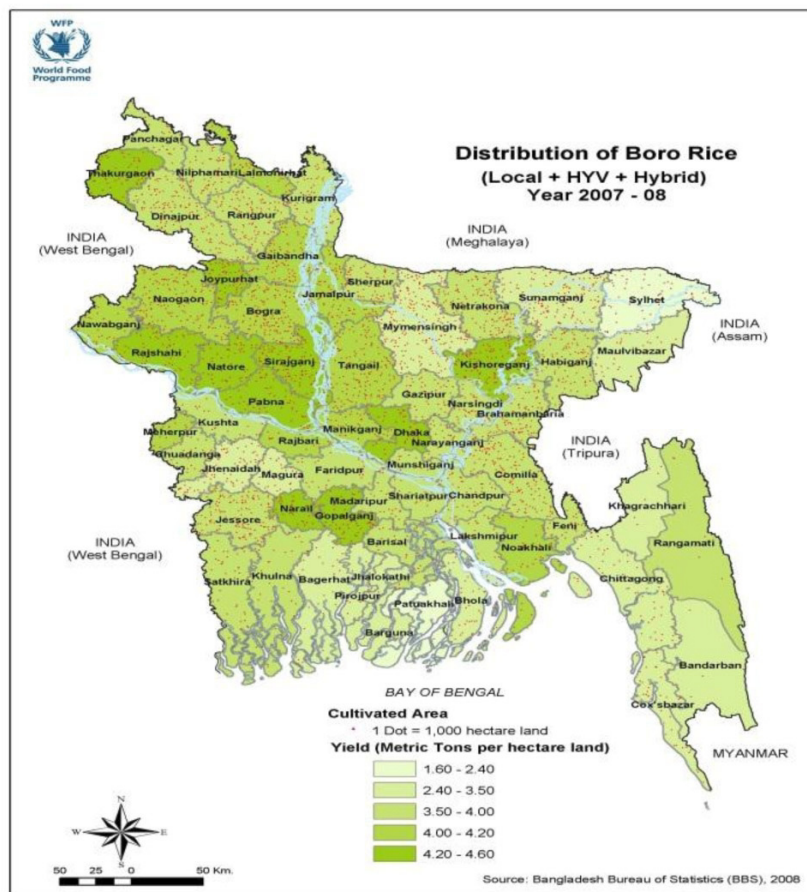
Available literature and research team interactions with stakeholders reflect that suitable varieties will continue to be in demand, irrespective of whether these are produced locally, and traded. What has happened in eastern states in India and bordering areas of Bangladesh is a good example. One can cite several reasons for this. Out of 45 million ha of total area under rice production in India, 6 million (upland) ha are concentrated in eastern India comprising of Chhattisgarh, Eastern Uttar Pradesh, Bihar, Odisha, West Bengal and Assam. These states together constitute about 13.5 percent (upland) of total area under rice in the country. It is also noted that these states suffer from various issues, such as rain-fed crop, drought, and lack of disease- and pest-resistant varieties. These together lead to low yields. Besides, about 15 percent area of the total area under rice is subjected to flooding particularly in eastern states – Bihar, West Bengal, Odisha, Assam, Tripura and Manipur.

Similar agro-climatic conditions exist in many parts of Bangladesh. In many areas of the country, rice yields are observed to be very low (Figure 4.2).

A note prepared by the Directorate of Rice Development shows that non-availability of location-specific HYV seeds is a major challenge faced by farmers in eastern states of India.⁵ This compels them to use local traditional varieties continuously due to lack of awareness about HYV. In such a scenario, facilitation of trade and knowledge sharing between the two countries could help fill up the gap.

Any varieties that could be developed to suit these conditions will have a natural advantage over other varieties. It could be mentioned that some flood-tolerant varieties developed by Bangladesh could be useful in these conditions. Similarly, many areas in Bangladesh could potentially benefit from increased cooperation between the two countries.

Figure 4.2: Variations in rice yields in Bangladesh



Despite a certain advantage enjoyed by India in quantity terms, the scope of uni-directional flow of HYV rice seeds from India to Bangladesh looks very unlikely. Research team interactions with farmers show that in all the four select states except Odisha, farmers have developed a preference for Bangladeshi seeds.

Will seed industry in the importing country suffer economic losses?

Increased cooperation and knowledge sharing might lead to a win-win situation for both the countries, as economy of scale is likely to make seed market in the two countries more focused, efficient, and goal oriented. Considering the challenges faced by the two countries with regard to ensuring availability and accessibility, and also preference for rice seed produced in India in Bangladesh and vice versa, gains from trade are unlikely to be one sided. Besides, as noted above, many eastern and states are seed deficit in India.

It is also likely that a normal trend will follow, as in other areas of trade: The country with better infrastructure and farmer-friendly policy might benefit more in the short period. Such one-sided gain, however, will disappear in the longer period. Moreover, cooperation will usher in an

era of higher efficiency and competitiveness in seed market in the two countries. In both the cases, the real beneficiary, again, will be farmers in both the countries.

Difference in the cost of rice seed production between the two countries

Though the research team is yet to access any data relating to cost of production of HYV rice seed either in India or in Bangladesh, if the market price of HYV rice seeds is any indication, there is not much difference in cost of production. It is observed that similar HYV of rice seed (such as BRRI Dhan-51 and BRRI Dhan-52 in Bangladesh and Swarna in India) are sold in the two markets at almost similar rates. Besides, it needs mentioning that pricing of products like seeds usually follows an end-user demand and paying capacity. Any newly developed seeds that are priced higher in comparison to other available seeds are least likely to achieve a sustainable demand and growth.

With regard to domestic capacity, it can be noted that since economies of scale make the seed industry in India more competitive, India might gain more in the immediate term. However, any arrangement to enhance cooperation will open up several other avenues for domestic producers. For example, seed producers in Bangladesh could enter into some collaboration with Indian producers and vice versa and thus gain in the long run.

Whatever advantage in the cost of production one country can have in the near term, these are all likely to be neutralised in the long run.

Other potential measures

Other potential initiative could be regionalisation of WTO-SPS. It might be noted that both India and Bangladesh are parties to the WTO-SPS Agreement. The Agreement on Sanitary and Phytosanitary Measures clearly advocates for regionalisation of SPS for promoting trade. Article 6 of the agreement states that “members shall ensure that their sanitary or phytosanitary measures are adapted to the sanitary or phytosanitary characteristics of the area – whether all of a country, part of a country, or all or parts of several countries – from which the product originated and to which the product is destined.”

With regard to regionalisation of SPS, India has taken some initiatives. These have been, however, limited to a few crops, such as vegetables. It remains to be explored whether such an initiative could be extended to cover crops such as HYV rice seed. However, considering the proximity between India and Bangladesh and the porous border the two countries share with each other, regionalisation of SPS is possibly a viable option for increased cooperation in HYV rice seed.

Endnotes

- 1 Association for Strengthening Agricultural Research in Eastern and Central Africa, <http://www.asareca.org/old2011/index.php?page&as=304>.
- 2 For more details on EAT project, see: <http://eatproject.org/#abouteat>.
- 3 For more details on need for harmonisation of seed laws and regulation, see Suresh P Singh and Neha Jain, (2014), Harmonisation of Seed Certification Processes in Bangladesh and India, CUTS Jaipur.
- 4 Seednet India Portal, <http://seednet.gov.in/>
- 5 *Rice Productivity Analysis in India*, Directorate of Rice Development available at <http://drd.dacnet.nic.in/Productivity%20Analysis%20-%202005.htm>.

5

Conclusion and Recommendations

When one talks of food in South Asia, especially India and Bangladesh, rice occupies a place of prominence, as it is a staple food for a majority of people. In case of rice production, both the countries are almost similarly placed – while India is self-sufficient and recently become the largest exporter of rice in the world, Bangladesh has also made substantial progress towards self-sufficiency.

At the same time, it is also a fact that there are a large number of people in the two countries, who find it difficult to access food on a regular basis, and many suffer from hunger and malnutrition.

Given this contrasting scenario of self-sufficiency in rice and prevalence of poverty, hunger and malnutrition, it is worth noting that the present status might not be a real reflection of actual scenario. It is expected that with increasing per capita income and governments' greater focus on alleviation of poverty, demand for rice is likely to increase significantly in the coming periods.

To meet growing demand for food, it is essential that that adequate quality and good quality rice seeds are made available and accessible to a large number of farmers, especially small and marginal ones. Ensuring availability and accessibility of quality rice seeds might be a challenging task for both the countries. There is, therefore, need for preparing a framework for fuller cooperation. Such a framework needs to include the (expanded) role of private sector and NGOs.

Benefits and Constraints to Increased Cooperation

One expects that many of the issues could be effectively addressed through cooperation and knowledge sharing between the two countries. Some major ones include the following:

- Increased availability and accessibility to quality seeds
- Improvement in quality of seeds
- Increased SRR
- Reduction in demand supply gap for quality seeds
- Higher crop yields and production
- Enhanced level of food security and livelihood opportunities
- Enlargement of market size
- Increased R&D and innovation

Critical Factors for Facilitating Trade and Making Trade Flow Stable

Success and sustenance of cooperation and trade in rice seeds between the two countries will depend on more than one factor. Some of these include:

- Political willingness on both sides
- Mutual acceptance of seed testing procedures by the two countries
- Agreement to test seeds' adaptability and release

- Production capacity of the two countries
- Adaptability of seeds to specific climatic conditions
- Respect for rules and regulations by people involved in the seed trade
- Farmers' preference for HYV seeds and their level of awareness

Recommendations

National level

Need for creating greater awareness on suitability of HYV rice seeds

Farmers' awareness on type of HYV rice seed suitable to a particular region and their use appears to be very low, even though there has been an improvement in recent years. This is true for both India and Bangladesh. Besides, in India, there are instances of some small and marginal farmers using a single (saved) seed variety for as many as 15 years. There is, thus, need for creating more awareness among such farmers and also there is need for making seed available to them at affordable prices. A campaign such as 'Beej Badlo, Bhagya Badlo' (change seed, change fate) could be a good initiative.

Need for improvement in SRR

Lack of farmers' awareness coupled with other factors, such as inadequate extension services by governmental agencies has resulted in low SRR, which in turn leads to low rice yield. This is a common phenomenon in both India and Bangladesh. A fresh perspective is required to understand issues at the grassroot level to identify solutions. There are several instances of private sector and NGOs making interventions to improve the situation. Governments of both the countries need to ensure that such initiative are sustained and further strengthened in areas suffering from low SRR.

Need for improvement in seed infrastructure

Inadequate seed infrastructure appears to be a major hurdle in improving the seed scenario in the two countries. In India, it is noted that many of the seed certification offices are overburdened and understaffed. This is because, while their area of operation has increased, no additional manpower has been put in place to carry increased workloads.

Need for increasing the role of private sector and NGOs

Seed dynamics has significantly changed over the last few decades. Seed production and certification seems constrained by lack of government capacity to produce and market seeds. That is precisely why there is need for bringing in private sector and NGOs.

Bilateral level

Need for identifying areas of cooperation

Adequate availability and accessibility to quality rice seeds is a major issue in both India and Bangladesh. Cooperation between the two countries might help addressing many of the factors that constrain availability. It is, therefore, important that areas of cooperation are identified. These could include selection and development of varieties that are adaptable in both the countries and identification of areas suitable for such varieties.

Need for harmonisation of seed laws, policies and regulations

One major reason for variety rice seeds produced in one country not officially acceptable in other is lack of harmonisation in seed standards and certifications. There is need for harmonisation of acts, policies and regulations, and also mutual recognition and acceptance of seed certification and quarantine-related procedures (see Annexure 3 for Seed Acts and policies of India and Bangladesh). It is understood that both the countries are in the process of revising their seed acts (see Annexure 4 for India's proposed Seed Bill 2004). This, however, calls for strong political will and a holistic approach to understand the issue with an extended perspective covering the countries.

Need for formalisation of trade

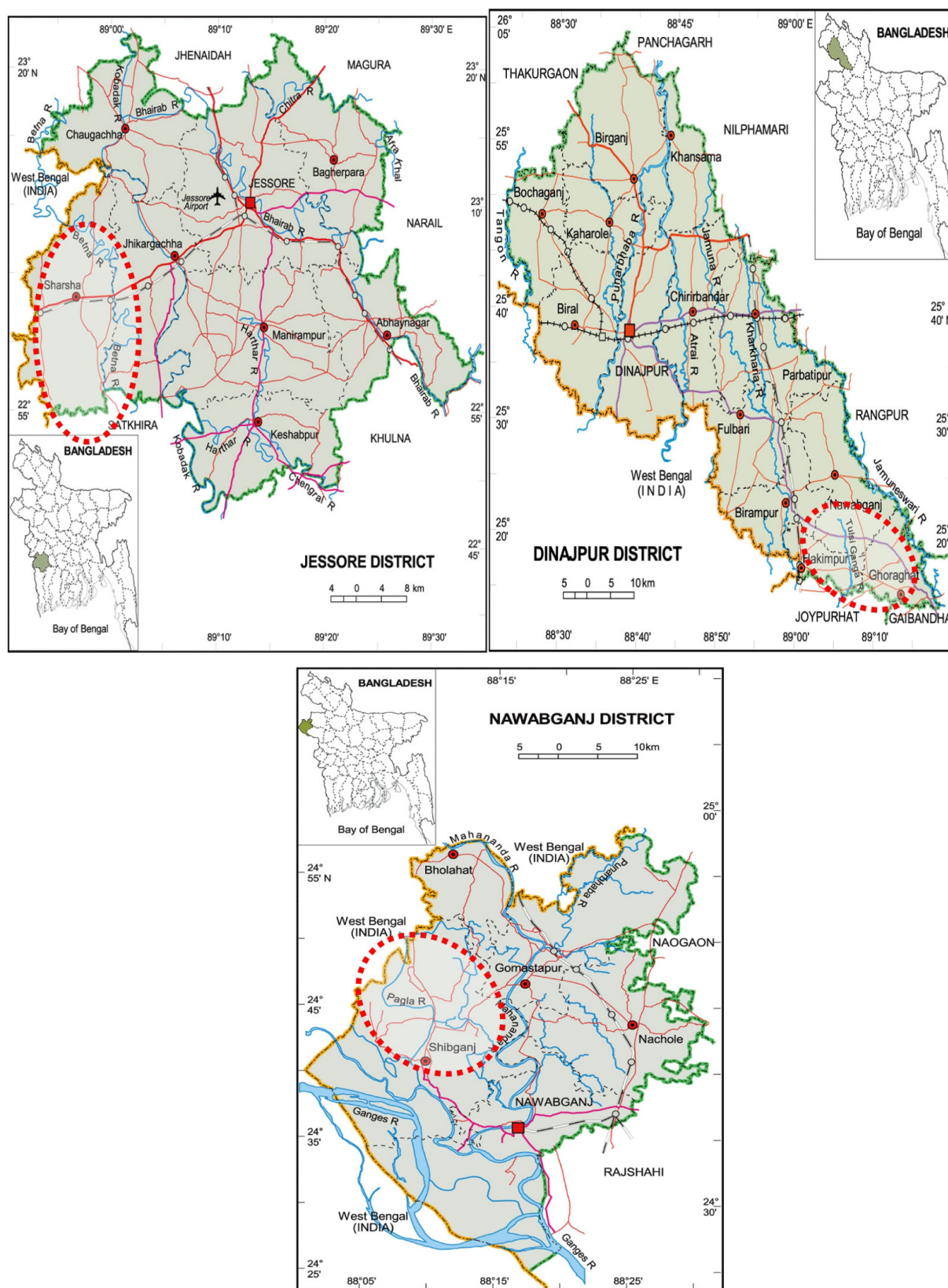
Despite HYV rice seed not being in the negative list of products maintained by both the countries, no formal trade is occurring. Such a development results in informal flow of rice seeds across the border. On the part of Bangladesh, one possible reason for this could be that Bangladesh has put HYV rice seed in the list of five notified crops. De-notification of rice seed from this list could perhaps pave the way for formalisation of trade. Besides, the two countries can also take some initiative relating to mutual acceptance and testing of TLS. This requires greater involvement of the private sector. Once this is officially accepted, private seed producers and exporters can enter into some arrangements to promote TLS in both the countries.


Annexures

Annexure 1a: Map of Three FGD areas in Bihar (India)

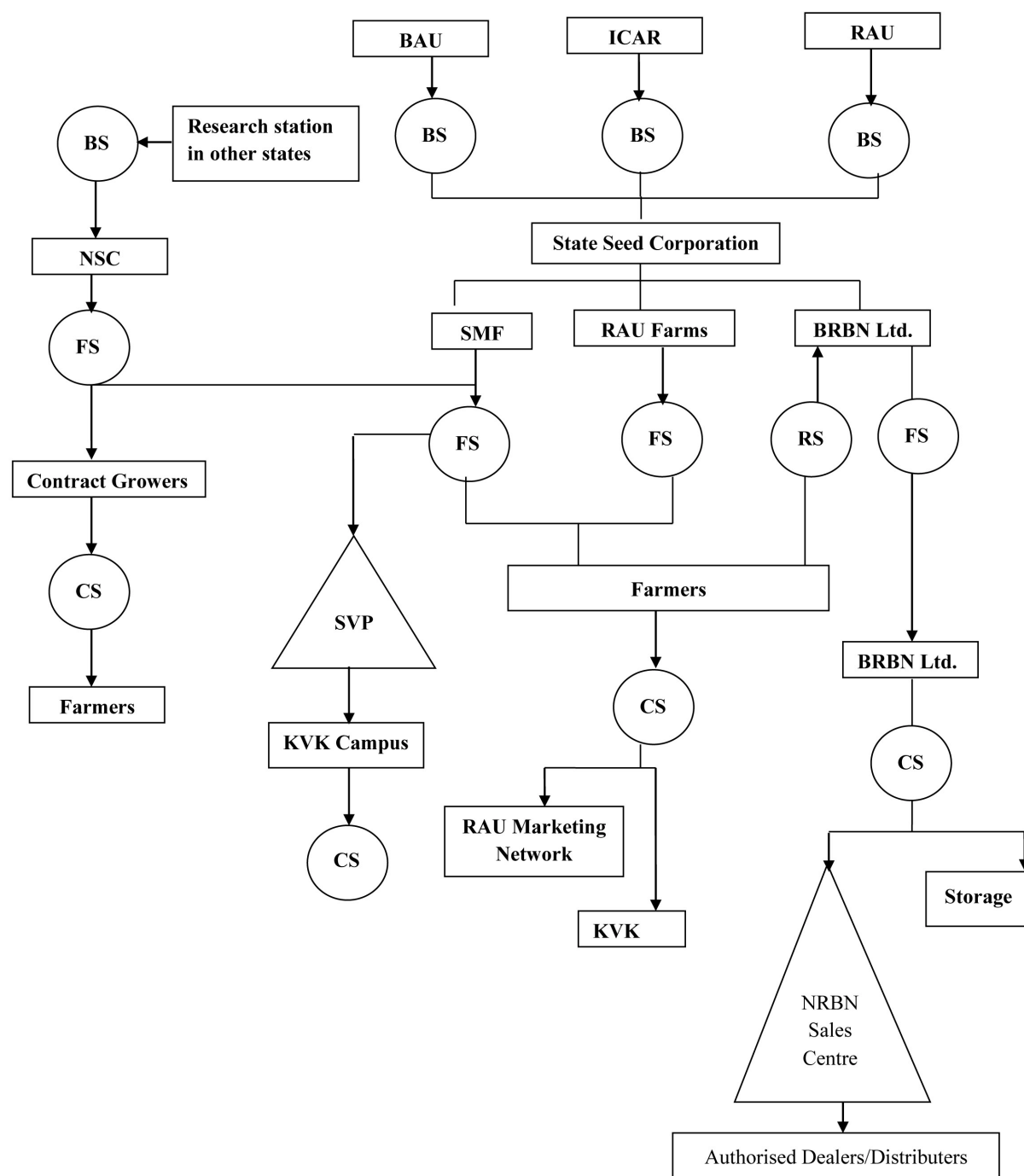


Annexure 1b: Map of Three FGD Areas in Bangladesh



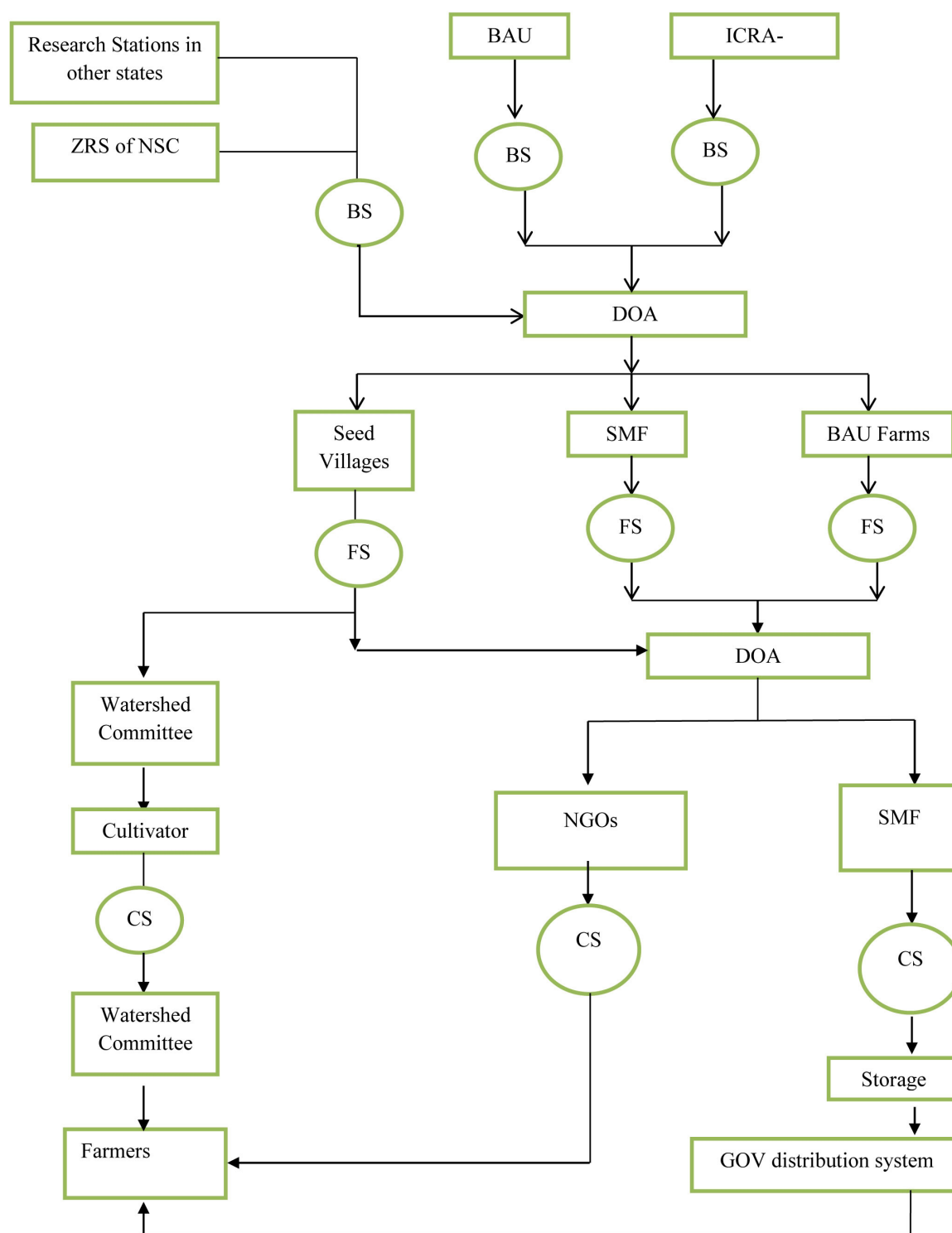
 = land port area and upazila level meetings

Annexure 2a: Rice Seeds Flow Map in Bihar (India)



Abbreviations: BAU: Bihar Agriculture University; ICAR: Indian Council of Agricultural Research; RAU: Rajendra Agriculture University; KVK: Krishi Vikas Kendra; SMF: Seed Multiplication Farms; SVP: Seed Village Programme; BRBN: Bihar Rajya Beej Nigam

Annexure 2b: Rice Seeds Flow Map in Jharkhand (India)



Abbreviations: ZRS: Zonal Research Station; BAU: Birsa Agriculture University, Ranchi; ICAR: Indian Council of Agricultural Research; DOA: Directorate of Agriculture; SMF: Seed Multiplication Farm; BS: Breeder Seed; FS: Foundation Seed

The flowchart illustrates the seed production and distribution system in India, showing the flow from research stations to various seed production and distribution channels.

Research Stations and Initial Processing:

- Research stations in other states** feed into **DAC** (Directorate of Agricultural Cereals).
- DAC** feeds into **BS** (Breeding Station).
- OUAT** (Orissa University of Agriculture and Technology) feeds into **BS**.
- BS** feeds into **FS** (Field Station).
- OUAT** also feeds into **FS**.
- FS** feeds into **CS** (Community Seed).
- CS** feeds into **OUAT**.

Seed Production and Distribution Channels:

- OUAT** feeds into **B** (Breeding).
- B** feeds into **TL** (Top Level).
- TL** feeds into **CRR Seed** (Central Rice Research Station).
- B** feeds into **OSSC** (Orissa Seed Storage and Control).
- OSSC** feeds into **Private Farms (MOU)** (Memorandum of Understanding).
- Private Farms (MOU)** feeds into **BS**.
- BS** feeds into **OAIC** (Orissa Agricultural Incentive Commission).
- BS** feeds into **Research stations in and outside states**.
- BS** feeds into **Contract seed growers**.
- BS** feeds into **Private farms (MOU-28 nos)**.
- BS** feeds into **Registered seed growers (5000)**.
- BS** feeds into **OSSC farms**.
- BS** feeds into **DDA-DAPP (Schemes)** (District Development Agency - District Agricultural Produce Processing).
- BS** feeds into **Storage facility (37)**.
- BS** feeds into **Block Seed Sale Centers (2 centers in each block)**.
- BS** feeds into **Registered seed dealers (1,093)**.
- BS** feeds into **Seed Distributors/Retailers**.
- BS** feeds into **Seed Dealers (OAIC)**.
- BS** feeds into **Research/Hybrid seed**.
- BS** feeds into **MNC/National Seed Companies research**.
- BS** feeds into **Progeny**.
- BS** feeds into **Contract growers**.
- BS** feeds into **MNC/National Seed Companies processing**.

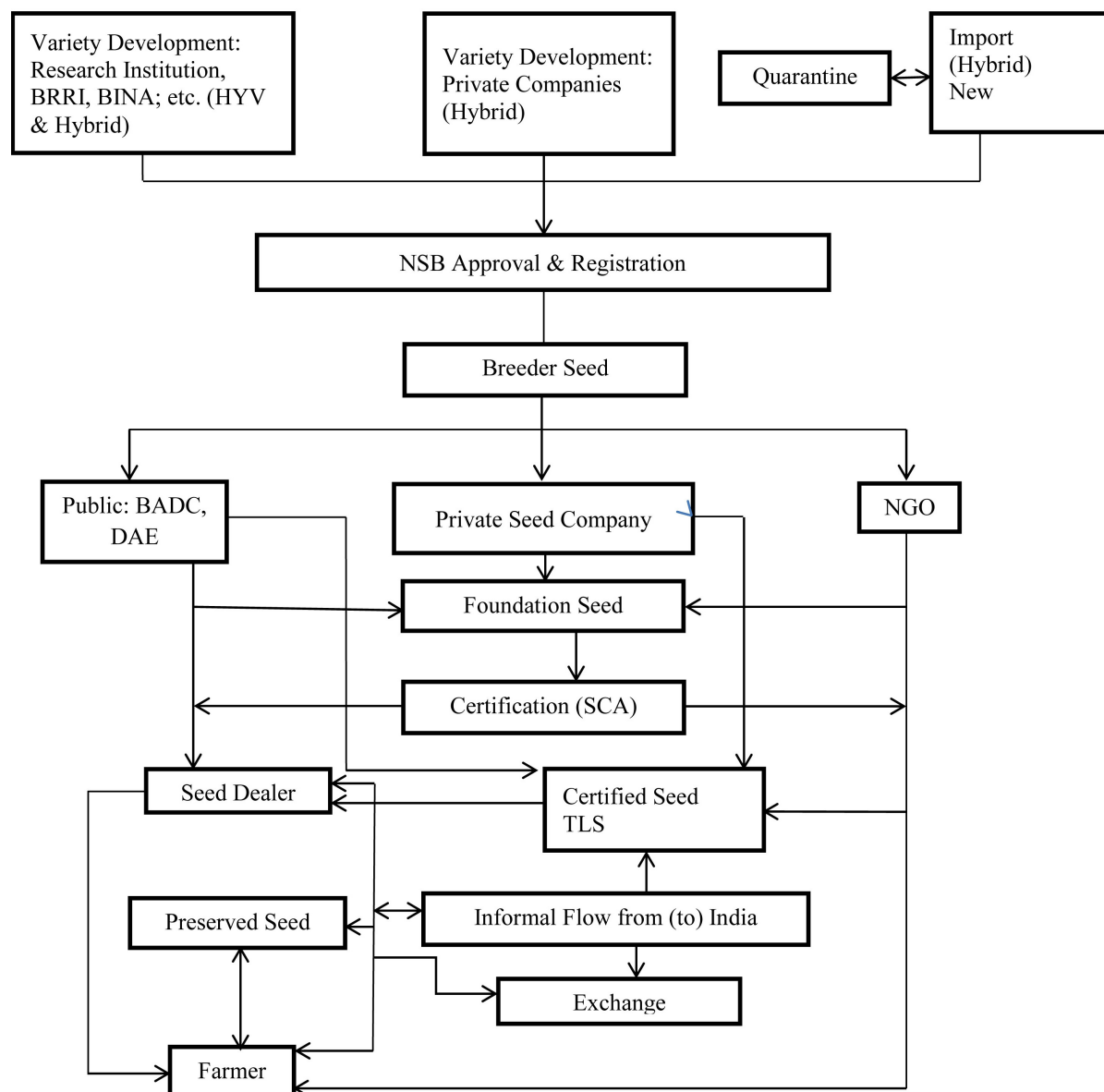
Seed Production and Distribution Channels (Continued):

- OUAT** feeds into **FS**.
- FS** feeds into **Private farms (MOU-28 nos)**.
- FS** feeds into **Registered seed growers (5000)**.
- FS** feeds into **OSSC farms**.
- FS** feeds into **DDA-DAPP (Schemes)**.
- FS** feeds into **Storage facility (37)**.
- FS** feeds into **Block Seed Sale Centers (2 centers in each block)**.
- FS** feeds into **Registered seed dealers (1,093)**.
- FS** feeds into **Seed Distributors/Retailers**.
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- FS** feeds into **Research/Hybrid seed**.
- FS** feeds into **MNC/National Seed Companies research**.
- FS** feeds into **Progeny**.
- FS** feeds into **Contract growers**.
- FS** feeds into **MNC/National Seed Companies processing**.

Seed Production and Distribution Channels (Final):

- OUAT** feeds into **FS**.
- FS** feeds into **Private farms (MOU-28 nos)**.
- FS** feeds into **Registered seed growers (5000)**.
- FS** feeds into **OSSC farms**.
- FS** feeds into **DDA-DAPP (Schemes)**.
- FS** feeds into **Storage facility (37)**.
- FS** feeds into **Block Seed Sale Centers (2 centers in each block)**.
- FS** feeds into **Registered seed dealers (1,093)**.
- FS** feeds into **Seed Distributors/Retailers**.
- FS** feeds into **Seed Dealers (OAIC)**.
- FS** feeds into **Research/Hybrid seed**.
- FS** feeds into **MNC/National Seed Companies research**.
- FS** feeds into **Progeny**.
- FS** feeds into **Contract growers**.
- FS** feeds into **MNC/National Seed Companies processing**.

Annexure 2d: Rice Seeds Flow Map in Bangladesh



Annexure 3a: The Seeds Act, 1966 (India)
(Act No. 54 of 1966)
An Act to provide for regulating the quality of certain seeds for sale and
for matters connected therewith

BE it enacted by Parliament in the Seventeenth Year of the Republic of India as follows:

Short Title, Extent and Commencement

1. (1) This Act may be called the Seeds Act, 1966. It extends to the whole of India.
1. (2) It shall come into force on such date as the Central Government may, by notification in the Official Gazette, appoint, and different dates may be appointed for different provisions of this Act, and for different States or for different areas thereof.

Definitions

2. In this Act, unless the context otherwise requires,
 1. “Agriculture” includes horticulture;
 2. “Central Seed Laboratory” means the Central Seed Laboratory established or declared as such under sub-section (1) of section 4;
 3. “Certification agency” means the certification agency established under Section 8 or recognised under Section 18;
 4. “Committee” means the Central Seed Committee constituted under sub-section (1) of Section 3;
 5. “Container” means a box, bottle, casket, tin, barrel, case, receptacle, sack, bag, wrapper or other thing in which any article or thing is placed or packed;
 6. “Export” means taking out of India to a place outside India;
 7. “Import” means bringing into India from a place outside India;
 8. “Kind” means one or more related species or sub-species of crop plants each individually or collectively known by one common name such as cabbage, maize, paddy and wheat;
 9. “Notified kind or variety” in relation to any seed, means any kind or variety thereof notified under Section 5;
 10. “Prescribed” means prescribed by rules made under this Act;
 11. “Seed” means any of the following classes of seeds used for sowing or planting-
 - I. seeds of food crops including edible oil seeds and seeds of fruits and vegetables;
 - II. cotton seeds;
 - III. seeds of cattle fodder;and includes seedlings, and tubers, bulbs, rhizomes, roots, cuttings, all types of grafts and other vegetatively propagated material of food crops or cattle fodder;

12. "Seed Analyst" means a Seed Analyst appointed under section 12;
13. "Seed Inspector" means a Seed Inspector appointed under section 13;
14. "State Government", in relation to a Union territory, means the administrator thereof;
15. "State Seed Laboratory", in relation to any State, means the State Seed Laboratory established or declared as such under sub-section (2) of section 4 for that State; and
16. "Variety" means a sub-division of a kind identifiable by growth, yield, plant, fruit, seed, or other characteristic.

Central Seed Committee

3. (1) The Central Government shall, as soon as may be after the commencement of this Act, constitute a Committee called the Central Seed Committee to advise the Central Government and the State Governments on matters arising out of the administration of this Act and to carry out the other functions assigned to it by or under this Act.

3. (2) The Committee shall consist of the following members, namely:

- i. a Chairman to be nominated by the Central Government;
- ii. eight persons to be nominated by the Central Government to represent such interests that Government thinks fit, of whom not less than two persons shall be representatives of growers of seed;
- iii. one person to be nominated by the Government of each of the States.

3. (3) The members of the Committee shall, unless their seats become vacant earlier by resignation, death or otherwise, be entitled to hold office for two years and shall be eligible for re-nomination.

3. (4) The Committee may, subject to the previous approval of the Central Government, make bye-laws fixing the quorum and regulating its own procedure and the conduct of all business to be transacted by it.

3. (5) The Committee may appoint one or more sub-committees, consisting wholly of members of the Committee or wholly of other persons or partly of members of the Committee and partly of other persons, as it thinks fit, for the purpose of discharging such of its functions as may be delegated to such sub-committee or sub-committees by the Committee.

3. (6) The functions of the Committee or any sub-committee thereof may be exercised notwithstanding any vacancy therein.

3. (7) The Central Government shall appoint a person to be the secretary of the Committee and shall provide the Committee with such clerical and other staff as the Central Government considers necessary.

Central Seed Laboratory and State Seed Laboratory

4. (1) The Central Government may, by notification in the Official Gazette, establish a Central Seed Laboratory or declare any seed laboratory as the Central Seed Laboratory to carry out the functions entrusted to the Central Seed Laboratory by or under this Act.

(2) The State Government may, by notification in the Official Gazette, establish one or more State Seed Laboratories or declare any seed laboratory as a State Seed Laboratory where analysis of seeds of any notified kind or variety shall be carried out by Seed Analysts under this Act in the prescribed manner.

Power to notify kinds or varieties of seeds

5. If the Central Government, after consultation with the Committee, is of opinion that it is necessary or expedient to regulate the quality of seed of any kind or variety to be sold for purposes of agriculture, it may, by notification in the Official Gazette, declare such kind or variety to be a notified kind or variety for the purposes of this Act and different kinds or varieties may be notified for different States or for different areas thereof.

Power to specify minimum limits of germination and purity, etc

6. The Central Government may, after consultation with the Committee and by notification in the Official Gazette, specify:

- a. the minimum limits of germination and purity with respect to any seed of any notified kind or variety;
- b. the mark or label to indicate that such seed conforms to the minimum limits of germination and purity specified under clause (a) and the particulars which such mark or label may contain.

Regulation of sale of seeds of notified kinds or varieties

7. No person shall, himself or by any other person on his behalf, carry on the business of selling, keeping for sale, offering to sell, bartering or otherwise supplying any seed of any notified kind or variety, unless:

- a. such seed is identifiable as to its kind or variety;
- b. such seed conforms to the minimum limits of germination and purity specified under clause (a) of section 6;
- c. the container of such seed bears in the prescribed manner, the mark or label containing the correct particulars thereof, specified under clause (b) of section 6; and
- d. he complies with such other requirements as may be prescribed.

Certification agency

8. The State Government or the Central Government in consultation with the State Government may, by notification in the Official Gazette, establish a certification agency for the State to carry out the functions entrusted to the certification agency by or under this Act.

Grant of certificate by certification agency

9. (1) Any person selling, keeping for sale, offering to sell, bartering or otherwise supplying any seed of any notified kind or variety may, if he desires to have such seed certified by the certification agency, apply to the certification agency for the grant of a certificate for the purpose.

9. (2) Every application under sub-section (1) shall be made in such form, shall contain such particulars and shall be accompanied by such fees as may be prescribed.

9. (3) On receipt of any such application for the grant of a certificate, the certification agency may, after such enquiry as it thinks fit and after satisfying itself that the seed to which the application relates conforms to the minimum limits of germination and purity specified for that seed under clause (a) of section 6, grant a certificate in such form and on such conditions as may be prescribed.

Revocation of certificate

10. If the certification agency is satisfied, either on a reference made to it in this behalf or otherwise, that:

- a. the certificate granted by it under section 9 has been obtained by misrepresentation as to an essential fact; or
- b. the holder of the certificate has, without reasonable cause, failed to comply with the conditions subject to which the certificate has been granted or has contravened any of the provisions of this Act or the rules made thereunder;

then, without prejudice to any other penalty to which the holder of the certificate may be liable under this Act, the certification agency may, after giving the holder of the certificate an opportunity of showing cause, revoke the certificate.

Appeal

11. (1) Any person aggrieved by a decision of a certification agency under section 9 or section 10, may, within thirty days from the date on which the decision is communicated to him and on payment of such fees as may be prescribed, prefer an appeal to such authority as may be specified by the State Government in this behalf:

Provided that the appellate authority may entertain an appeal after the expiry of the said period of thirty days if it is satisfied that the appellant was prevented by sufficient cause from filing the appeal in time.

(2) On receipt of an appeal under sub-section (1), the appellate authority shall, after giving the appellant an opportunity of being heard, dispose of the appeal as expeditiously as possible.

(3) Every order of the appellate authority under this section shall be final.

Seed Analysts

12. The State Government may, by notification in the Official Gazette, appoint such persons as it thinks fit, having the prescribed qualifications, to be Seed Analysts and define the areas within which they shall exercise jurisdiction.

Seed Inspectors

13. (1) The State Government may, by notification in the Official Gazette, appoint such persons as it thinks fit, having the prescribed qualifications, to be Seed Inspectors and define the areas within which they shall exercise jurisdiction.

13. (2) Every Seed Inspector shall be deemed to be a public servant within the meaning of section 21 of the Indian Penal Code (45 of 1860) and shall be officially subordinate to such authority as the State Government may specify in this behalf.

Powers of Seed Inspector

14. (1) The Seed Inspector may:

- a. take samples of any seed of any notified kind or variety from:
 - i. any person selling such seed; or
 - ii. any person who is in the course of conveying, delivering or preparing to deliver such seed to a purchaser or a consignee; or

- iii. a purchaser or a consignee after delivery of such seed to him;
- b. send such sample for analysis to the Seed Analyst for the area within which such sample has been taken;
- c. enter and search at all reasonable times, with such assistance, if any, as he considers necessary, any place in which he has reason to believe that an offence under this Act has been or is being committed and order in writing the person in possession of any seed in respect of which the offence has been or is being committed, not to dispose of any stock of such seed for a specific period not exceeding thirty days or, unless the alleged offence is such that the defect may be removed by the possessor of the seed, seize the stock of such seed;
- d. examine any record, register, document or any other material object found in any place mentioned in clause (c) and seize the same if he has reason to believe that it may furnish evidence of the commission of an offence punishable under this Act; and
- e. exercise such other powers as may be necessary for carrying out the purposes of this Act or any rule made thereunder.

14. (2) Where any sample of any seed of any notified kind or variety is taken under clause (a) of sub-section (1), its cost, calculated at the rate at which such seed is usually sold to the public, shall be paid on demand to the person from whom it is taken.

14. (3) The power conferred by this section includes power to break-open any container in which any seed of any notified kind or variety may be contained or to break-open the door of any premises where any such seed may be kept for sale:

Provided that the power to break-open the door shall be exercised only after the owner or any other person in occupation of the premises, if he is present therein, refuses to open the door on being called upon to do so.

14. (4) Where the Seed Inspector takes any action under clause (a) of sub-section (1), he shall, as far as possible, call not less than two persons to be present at the time when such action is taken and take their signatures on a memorandum to be prepared in the prescribed form and manner.

14. (5) The provisions of the Code of Criminal Procedure, 1898 (5 of 1898), shall, so far as may be, apply to any search or seizure under this section as they apply to any search or seizure made under the authority of a warrant issued under section 98 of the said Code.

Procedure to be followed by Seed Inspectors

15. (1) Whenever a Seed Inspector intends to take sample of any seed of any notified kind or variety for analysis, he shall:

- a. give notice in writing, then and there, of such intention to the person from whom he intends to take sample;
- b. except in special cases provided by rules made under this Act, take three representative samples in the prescribed manner and mark and seal or fasten up each sample in such manner as its nature permits.

15. (2) When samples of any seed of any notified kind or variety are taken under sub-section (1), the Seed Inspector shall:

- a. deliver one sample to the person from whom it has been taken;

- b. send in the prescribed manner another sample for analysis to the Seed Analyst for the area within which such sample has been taken; and
- c. retain the remaining sample in the prescribed manner for production in case any legal proceedings are taken or for analysis by the Central Seed Laboratory under sub-section (2) of section 16, as the case may be.

15. (3) If the person from whom the samples have been taken refuses to accept one of the samples, the Seed Inspector shall send intimation to the Seed Analyst of such refusal and thereupon the Seed Analyst receiving the sample for analysis shall divide it into two parts and shall seal or fasten up one of those parts and shall cause it, either upon receipt of the sample or when he delivers his report, to be delivered to the Seed Inspector who shall retain it for production in case legal proceedings are taken.

15. (4) Where a Seed Inspector takes any action under clause (c) of sub-section (1) of section 14:

- a. he shall use all despatch in ascertaining whether or not the seed contravenes any of the provisions of section 7 and if it is ascertained that the seed does not so contravene, forthwith revoke the order passed under the said clause or, as the case may be, take such action as may be necessary for the return of the stock of the seed seized;
- b. if he seizes the stock of the seed, he shall, as soon as may be, inform a magistrate and take his orders as to the custody thereof;
- c. without prejudice to the institution of any prosecution, if the alleged offence is such that the defect may be removed by the possessor of the seed, he shall, on being satisfied that the defect has been so removed, forthwith revoke the order passed under the said clause.

15. (5) Whereas Seed Inspector seizes any record, register, document or any other material object under clause (d) of sub-section (1) of section 14, he shall, as soon as may be, inform a magistrate and take his orders as to the custody thereof.

Report of Seed Analyst

16 (1) The Seed Analyst shall, as soon as may be after the receipt of the sample under sub-section (2) of section 15, analyse the sample at the State Seed Laboratory and deliver, in such form as may be prescribed, one copy of the report of the result of the analysis to the Seed Inspector and another copy thereof to the person from whom the sample has been taken.

16 (2) After the institution of a prosecution under this Act, the accused vendor or the complainant may, on payment of the prescribed fee, make an application to the court for sending any of the samples mentioned in clause (a) or clause (c) of sub-section (2) of section 15 to the Central Seed Laboratory for its report and on receipt of the application, the court shall first ascertain that the mark and the seal or fastening as provided in clause (b) of sub-section (1) of section 15 are intact and may then despatch the sample under its own seal to the Central Seed Laboratory which shall thereupon send its report to the court in the prescribed form within one month from the date of receipt of the sample, specifying the result of the analysis.

16 (3) The report sent by the Central Seed Laboratory under sub-section (2) shall supersede the report given by the Seed Analyst under sub-section (1).

16 (4) Where the report sent by the Central Seed Laboratory under sub-section (2) is produced in any proceedings under Section 19, it shall not be necessary in such proceedings to produce any sample or part thereof taken for analysis.

Restriction on export and import of seeds of notified kinds or varieties

17. No person shall, for the purpose of sowing or planting by any person (including himself), export or import or cause to be exported or imported any seed of any notified kind or variety, unless:

- a. it conforms to the minimum limits of germination and purity specified for that seed under clause (a) of section 6; and
- b. its container bears, in the prescribed manner, the mark or label with the correct particulars thereof specified for that seed under clause (b) of section 6.

Recognition of seed certification agencies of foreign countries

18. The Central Govt. may, on the recommendation of the Committee and by notification in the Official Gazette, recognise any seed certification agency established in any foreign country, for the purposes of this Act.

Penalty

19. If any person:

- a. contravenes any provision of this Act or any rule made thereunder; or
- b. prevents a Seed Inspector from taking sample under this Act; or
- c. prevents a Seed Inspector from exercising any other power conferred on him by or under this Act;

he shall, on conviction, be punishable:

- i. for the first offence with fine which may extend to five hundred rupees, and
- ii. in the event of such person having been previously convicted of an offence under this section, with imprisonment for a term which may extend to six months, or with fine which may extend to one thousand rupees, or with both.

Forfeiture of property

20. When any person has been convicted under this Act for the contravention of any of the provisions of this Act or the rules made thereunder, the seed in respect of which the contravention has been committed may be forfeited to the Government.

Offences by companies

21. (1) Where an offence under this Act has been committed by a company, every person who at the time the offence was committed was in charge of, and was responsible to the company for the conduct of the business of the company, as well as the company, shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly:

Provided that nothing contained in this sub-section shall render any such person liable to any punishment under this Act if he proves that the offence was committed without his knowledge and that he exercised all due diligence to prevent the commission of such offence.

21. (2) Notwithstanding anything contained in sub-section (1), where an offence under this Act has been committed by a company and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any neglect on the part of, any director, manager, secretary or other officer of the company, such director, manager, secretary or other officer shall also be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

Explanation. – For the purpose of this section,

- a. “company” means any body corporate and includes a firm or other association of individuals; and
- b. “director”, in relation to a firm, means a partner in the firm.

Protection of action taken in good faith

22. No suit, prosecution or other legal proceeding shall lie against the Government or any officer of the Government for anything which is in good faith done or intended to be done under this Act.

Power to give directions

23. The Central Government may give such directions to any State Government as may appear to the Central Government to be necessary for carrying into execution in the State any of the provisions of this Act or of any rule made thereunder.

Exemption

24. Nothing in this Act shall apply to any seed of any notified kind or variety grown by a person and sold or delivered by him on his own premises direct to another person for being used by that person for the purpose of sowing or planting.

Power to make rules

25. (1) The Central Government may, by notification in the Official Gazette, make rules to carry out the purpose of this Act.

25. (2) In particular and without prejudice to the generality of the fore-going power, such rules may provide, for:

- a. the functions of the Committee and the travelling and daily allowances payable to members of the Committee and members of any sub-committee appointed under sub-section (5) of section 3;
- b. the functions of the Central Seed Laboratory;
- c. the functions of a certification agency;
- d. the manner of marking or labelling the container of seed of any notified kind or variety under clause (c) of Section 7 and under clause (b) of section 17;
- e. the requirements which may be complied with by a person carrying on the business referred to in section 7;
- f. the form of application for the grant of a certificate under section 9, the particulars it may contain, the fees which should accompany it, the form of the certificate and the conditions subject to which the certificate may be granted;
- g. the form and manner in which and the fee on payment of which an appeal may be preferred under section 11 and the procedure to be followed by the appellate authority in disposing of the appeal;
- h. the qualifications and duties of Seed Analysts and Seed Inspectors;

- i. the manner in which samples may be taken by the Seed Inspector, the procedure for sending such samples to the Seed Analyst or the Central Seed Laboratory and the manner of analysing such samples;
- j. the form of report of the result of the analysis under sub-section (1) or sub-section (2) of section 16 and the fees payable in respect of such report under the said sub-section (2);
- k. the records to be maintained by a person carrying on the business referred to in section 7 and the particulars which such records shall contain; and
- l. any other matter which is to be or may be prescribed.

25. (3) Every rule made under this Act shall be laid as soon as may be after it is made, before each House of Parliament while it is in session for a total period of thirty days which may be comprised in one session or in two successive sessions, and if, before the expiry of the session in which it is so laid or the session immediately following, both Houses agree in making any modification in the rule or both Houses agree that the rule should not be made, that rule shall, thereafter have effect only in such modified form or be of no effect, as the case may be; so however, that any such modification or annulment shall be without prejudice to the validity of anything previously done under that rule.

Annexure 3b: The Seeds Ordinance, 1977 (Bangladesh)

[Published in the Bangladesh Gazette, Extraordinary, dated the 19th July, 1977]

GOVERNMENT OF THE PEOPLE'S REPUBLIC OF BANGLADESH MINISTRY OF LAW AND PARLIAMENTARY AFFAIRS

NOTIFICATION

Dacca, the 19th July, 1977

No. 617-Pub.- The following Ordinance made by the President of the People's Republic of Bangladesh, on the 13th July, 1977, is hereby published for general information:

Ordinance No. XXXIII of 1977

AN

ORDINANCE

to provide for regulating the quality of certain seeds for sale and for matters connected therewith.

Whereas it is expedient to provide for regulating the quality of certain seeds for sale for matters connected therewith;

Now, therefore, in pursuance of the Proclamations of the 20th August, 1975, and the 8th November, 1975, and in exercise of all powers enabling him in that behalf, the President is pleased to make and promulgate the following Ordinance:-

- 1. Short title** - This Ordinance may be called the Seeds Ordinance, 1977.
- 2. Definitions** - In this Ordinance unless there is anything repugnant in the subject or context,
 - (a) "Agriculture" means food and fibre crop production and includes horticulture;
 - (b) "Board" means the National Seed Board constituted under sub-section (1) of section 3;
 - (c) "Certification Agency" means a Seed Certification Agency established under section 8;
 - (d) "Container" means a box, bottle, tin, barrel, case, receptacle, sack, bag, wrapper or other thing on which any article or thing is placed or packed;
 - (e) "Export" means taking out of Bangladesh to a place outside Bangladesh;
 - (f) "Import" means bringing into Bangladesh from a place outside Bangladesh;
 - (g) "Kind" means one or more related species or sub-species or crop plants each individually or collectively known by one common name, such as, cabbage, paddy and wheat;
 - (h) "Notified kind or variety", in relation to any seed, means any kind or variety thereof notified under section 5;
 - (i) "Prescribed" means prescribed by rules made under this Ordinance;

- (j) “Seeds” means any of the following classes of seeds used for sowing or planting:
 - (i) seeds of food crops including edible oil seeds and seeds of fruits and vegetables;
 - (ii) jute seeds;
 - (iii) cotton seeds;
 - (iv) seeds of cattle fodder;
 and includes seedlings, and tubers, bulbs, rhizomes, root cuttings, all types of grafts and other vegetatively propagated materials of food crops or cattle fodder;
- (k) “Seed Analyst” means a Seed Analyst appointed under section 12;
- (l) “Seed Inspector” means a Seed Inspector appointed under section 13;
- (m) “Seed Laboratory” means the Government Seed Laboratory established or, as the case may be, declared under section 4; and
- (n) “Variety” means a sub-division of a kind identifiable by growth, yields, plant, fruit, seed or other characteristics.

3. National Seed Board - (1) The Government shall, as soon as may be after the commencement of this Ordinance, constitute a Board to be called the National Seed Board to advise the Government on matters arising out of the administration of this Ordinance and to carry out the other functions assigned to it by or under this Ordinance.

- (2) The Board shall consist of the following members, namely:
 - (a) the Secretary to the Government, Ministry of Agriculture (Agriculture Division), ex-officio, who shall also be the Chairman of the Board; and
 - (b) fifteen persons to be appointed by the Government.
- (3) The members shall elect one person from amongst themselves to be the Secretary of the Board.
- (4) The Government shall provide the Board with such clerical and other staff as may consider necessary.
- (5) The Government shall, by notification in the official Gazette, publish the names or designations of all the members of the Board and thereupon the Board shall be deemed to be constituted.
- (6) Members of the Board shall, subject to the provisions of sub-sections (7) and (8), hold office for a term of three years, and shall be eligible for reappointment.
- (7) The Government may, at any time, terminate the appointment of a member of the Board without assigning any reason.
- (8) When a member of the Board dies, resigns or otherwise ceases to be a member, the vacancy shall be filled by fresh appointment and any person so appointed shall hold office for the unexpired term of his predecessor.
- (9) No person shall be, or shall continue to be, a member who:
 - (a) is or at any time has been convicted of an offence which, in the opinion of the Government, is an offence involving moral turpitude; or
 - (b) is of unsound mind and stands so adjudged by a competent court; or
 - (c) is or has at any time been adjudged insolvent; or

(d) absents himself from three consecutive meetings of the Board without leave of absence from the Chairman.

(10) The Board may appoint one or more committees consisting wholly of members of the Board or wholly of other persons or partly of members of the Board and partly of other persons, as it thinks fit, for the purpose of discharging such of its functions as may be delegated to such committee or committees by the Board.

(11) The Board may, subject to the previous approval of the Government, make by-laws for regulating its own procedure and the procedure of a committee appointed by it under sub-section (10) and the conduct of all business to be transacted by it or a committee.

(12) No act or proceeding of the Board shall be invalid merely on the ground of the existence of any vacancy in, or any defect in the constitution of the Board.

4. Government Seed Laboratory - The Government may establish a seed laboratory to be called the Government Seed Laboratory or declare, by notification in the official Gazette, any seed laboratory as the Government Seed Laboratory for the purposes of this Ordinance.

5. Power to specify kinds or varieties of seeds - If the Government after consultation with the Board, is of opinion that it is necessary or expedient to regulate the quality of seed of any kind or variety to be sold and used for the purposes of agriculture, it may, by notification in the official Gazette, specify such kind or variety to be a notified kind or variety for the purposes of this Ordinance, and different kinds or varieties may be notified for different areas.

6. Powers to specify minimum limit of germination and purity, etc. - After consultation with the Board, the Government may, by notification in the official Gazette, specify -

- (a) the minimum limits of germination and purity with respect to any seed of any notified kind or variety;
- (b) the mark or label to indicate that such seed conforms at least to the minimum limits of germination and purity specified under clause (a) and the particulars which such mark or label may contain.

7. Regulation of sale of seeds of notified kinds or varieties - No agency or certified seed grower or certified seller of seed shall carry on the business of selling, keeping for sale, offering to sell, bartering or otherwise supplying any seed of any notified kind or variety, unless -

- (a) such seed is identifiable as to its kind or variety;
- (b) such seed conforms at least to the minimum limits of germination and purity and the container of such seed bears, in the prescribed manner, the mark or label containing the correct particulars thereof specified under clauses (a) and (b) of section 6; and
- (c) he complies with such other requirements as may be prescribed.

8. Seed Certification Agency - The Government may, by notification in the official Gazette, establish a Certification Agency to be called the Seed Certification Agency to carry out the functions entrusted to it by or under this Ordinance.

9. Grant of certificate by the Certification Agency - (1) Any person selling, keeping for sale, offering to sell, bartering or otherwise supplying any seed of any notified kind or variety may, if

he desires to have such seed certified by the Certification Agency, apply to the Certification Agency for grant of a certificate for the purpose.

- (2) Every application under sub-section (1) shall be made in such form, shall contain such particulars and shall be accompanied by such fees as may be prescribed.
- (3) On receipt of any such application for the grant of a certificate, the Certification Agency may, after such enquiry as it thinks fit and after satisfying itself that the seed to which the application relates conforms at least to the minimum limits of germination and purity specified for that seed under clause (a) of section 6, grant a certificate in such form and on such conditions as may be prescribed.

10. Revocation of certificate - If the Certification Agency is satisfied, either on a reference made to it in this behalf or otherwise, that –

- (a) the certificate granted by it under section 9 has been obtained by misrepresentation as to any essential fact, or
 - (b) the holder of the certificate has, without reasonable cause, failed to comply with the conditions subject to which the certificate has been granted or has contravened any of the provisions of this Ordinance or the rules made thereunder,
- then, without prejudice to any other penalty to which the holder of the certificate may be liable under this Ordinance, the Certification Agency may, after giving the holder of the certificate an opportunity of showing cause, revoke the certificate.

11. Appeal - (1) Any person aggrieved by a decision of the Certification Agency under section 9 or section 10 may, within thirty days from the date on which the decision is communicated to him and on payment of such fees as may be prescribed, prefer an appeal to such authority as may be specified by the Government in this behalf:

Provided that the appellate authority may entertain an appeal after the expiry of the said period of thirty days if it is satisfied that the appellant was prevented by sufficient cause from filling the appeal in time.

- (2) On receipt of an appeal under sub-section (1), the appellate authority shall, after giving the appellant an opportunity of being heard dispose of the appeal as expeditiously as possible.
- (3) Every order of the appellate authority under this section shall be final.

12. Seed Analyst - The Government may, by notification in the official Gazette, appoint such persons as it thinks fit, having the prescribed qualifications, to be Seed Analyst and define the areas within which they shall exercise jurisdiction.

13. Seed Inspectors - (1) The Government may, by notification in the official Gazette, appoint such persons as it thinks fit, having the prescribed qualifications, to be Seed Inspectors and define the areas within which they shall exercise jurisdiction.

- (2) Every Seed Inspector shall be deemed to be a public servant within the meaning of section 21 of the Penal Code (Act XLV of 1860) and shall be officially subordinate to such authority as the Government may specify in this behalf.

14. Powers of Seed Inspectors

- (1) The Seed Inspector may -
 - (a) take samples of any seed of any notified kind or variety from -
 - (i) any person selling such seed; or
 - (ii) any person who is in the course of conveying, delivering or preparing to deliver such seed to a purchaser or a consignee; or
 - (iii) a purchaser or a consignee after delivery of such seed to him;
 - (b) send such sample for analysis to the Seed Analyst for the area within which such sample has been taken;
 - (c) exercise such other powers as may be necessary for carrying out the purposes of this Ordinance or any rule made thereunder.
- (2) Where any sample of any seed of any notified kind or variety is taken under clause (a) of sub-section (1), its cost, calculated at the rate at which such seed is usually sold to the public, shall be paid on demand to the person from whom it is taken.
- (3) The power conferred by this section includes power to break open any container in which any seed of any notified kind or variety may be contained or to break open the door of any premises where any such seed may be kept for sale:

Provided that the power to break open the door shall be exercised only after the owner or any other person in occupation of the premises, if he is present therein, refuses to open the door on being called open to do so.
- (4) Where the Seed Inspector takes any action under clause (a) of sub-section (1), he shall, as far as possible, call not less than two persons to be present at the time when such action is taken and take their signatures on a memorandum to be prepared in the prescribed form and manner.
- (5) The provisions of the Code of Criminal Procedure, 1898 (Act V of 1898) shall, so far as may be, apply to any search or seizure made under this section as they apply to any search or seizure made under the authority of a warrant issued under section 98 of the said Code.

15. Procedure to be followed by Seed Inspectors

- (1) Whenever a Seed Inspector intends to take sample of any seed of any notified kind or variety for analysis, he shall -
 - (a) give notice in writing, then and there, of such intention to the person from whom he intends to take sample;
 - (b) except in special cases provided by rules made under this Ordinance, take three representative samples in the prescribed manner and mark and seal or fasten up each sample in such manner as its nature permits.
- (2) When samples of any seed of any notified kind or variety are taken under sub-section (1), the Seed Inspector shall -
 - (a) deliver one sample to the person from whom it has been taken;
 - (b) send in the prescribed manner another sample for analysis to the Seed Analyst for the area within which such sample has been taken; and

- (c) retain the remaining sample in the prescribed manner for production in case any legal proceedings are taken or for analysis by the Seed Laboratory under sub-section (2) of section 16, as the case may be.
- (3) If the person from whom the samples have been taken refuses to accept one of the samples, the Seed Inspector shall send intimation to the Seed Analyst of such refusal and thereupon the Seed Analyst receiving the sample for analysis shall divide it into two parts and shall seal or fasten up one of those parts and shall cause it, either upon receipt of the sample or when he delivers his report, to be delivered to the Seed Inspector who shall retain it for production in case legal proceedings are taken.
- (4) Where a Seed Inspector takes any action under clause (c) of sub-section (1) of section 14 -
 - (a) he shall use all despatch in ascertaining whether or not the seed contravenes any of the provisions of section 7 and if it is ascertained that the seed does not so contravene, forthwith revoke the order passed under the said clause or, as the case may be, take such action as may be necessary for the return of the stock of the seed seized;
 - (b) if he seized the stock of the seed, he shall, as soon as may be, inform a Magistrate and take his orders as to the custody thereof;
 - (c) without prejudice to the institution of any prosecution, if the alleged offence is such that, the defect may be removed by the possessor of the seed, he shall, on being satisfied that the defect has been so removed, forthwith revoke the order passed any record, register, document or any other material object under clause (d) of sub-section (1) of section 14, he shall, as soon as may be, inform a Magistrate and take his orders to the custody thereof.

16. Report of Seed Analyst

- (1) The Seed Analyst shall, as soon as may be, after the receipt of the sample under sub-section (2) of section 15, analyse the sample at the Seed Laboratory and deliver, in such form as may be prescribed, one copy of the report of result of the analysis to the Seed Inspector and another copy thereof to the person from whom the sample has been taken.
- (2) After the institution of a prosecution under this Ordinance the accused may, on payment of the prescribed fee, make an application to the court for sending any of the samples mentioned in clause (a) or clause (c) of sub-section (2) of section 15 to the Seed Laboratory for its report, and on receipt of the application, the court shall first ascertain that the mark and the seal or fastening as provided in clause (b) of sub-section (1) of section 15 are intact and may then despatch the sample under its own seal to the Seed Laboratory which shall thereupon send its report to the court in the prescribed form within one month from the date of receipt of the samples, specifying the result of the analysis.
- (3) The report sent by the Seed Laboratory under sub-section (2), shall supersede the report given by the Seed Analyst under sub-section (1).
- (4) Where the report sent by the Seed Laboratory is produced in any proceedings, it shall not be necessary to produce in such proceedings any sample or part thereof taken for analysis.

17. Import and export of seeds - No person shall export or import or cause to be exported or imported any seed of any notified kind or variety unless it conforms at least to the minimum limits of germination and purity and the container of such seeds bears, in the prescribed manner, the mark or label containing the correct particulars thereof specified for that seed under section 6.

18. Recognition of Seed Certification Agencies of foreign countries - On the recommendation of the Board, the Government may, by notification in the official Gazette, recognise any seed certification agency established in any foreign country for the purposes of this Ordinance.

19. Penalty - If any person contravenes any provision of this Ordinance or any rule made thereunder, or prevents a Seed Inspector from taking sample under this Ordinance or prevents him from exercising any other power conferred on him by or under this Ordinance, he shall, on conviction, be punishable -

- (a) for the first offence, with fine which may extend to Taka five hundred; and
- (b) in the event of such person having been previously convicted of an offence under this section, with imprisonment for a term not more than thirty days and fine which may extend to Taka one thousand.

20. Forfeiture of property - When any person has been convicted under this Ordinance for the contravention of any of the provisions of this Ordinance or the rules made thereunder, the seed in respect of which the contravention has been committed may, if the court so orders, be forfeited to the Government.

21. Offence by companies - (1) When an offence under this Ordinance has been committed by a company, every person who at the time the offence was committed was in charge of, and was responsible to, the company for the conduct of the business of the company as well as the company shall be deemed to be guilty of the offence and shall be liable to be proceeded against and punished accordingly:

Provided that nothing contained in this sub-section shall render any such person liable to any punishment under this Ordinance if he proves that the offence was committed without his knowledge or that he exercised all due diligence to prevent the commission of such offence.

- (2) Notwithstanding anything contained in sub-section (1) where an offence under this Ordinance has been committed by a company and it is proved that the offence has been committed with the consent or connivance of, or is attributable to any neglect on the part of, any director, manager, secretary or other officer of the company, such director, manager, secretary or other officer shall also be deemed to be guilty of that offence and shall be liable to be proceeded against and punished accordingly.

Explanation - For the purposes of this section, -

- (a) “company” means anybody corporate and includes a firm or other association of individuals; and
- (b) “director”, in relation to a firm, means partner in the firm.

22. Protection of action taken in good faith - No suit, prosecution or other legal proceeding shall lie against the Government or any officer of the Government for anything which is in good faith done or intended to be done under this Ordinance.

23. Power to make rules - (1) The Government may, by notification in the official Gazette, make rules to carry out the purposes of this Ordinance.

(2) In particular, and without prejudice to the generality of the foregoing power, such rules may provide for:

- (a) the functions of the Board and the travelling and daily allowances payable to members of the Board and of the committee;
- (b) the functions of the Seed Laboratory;
- (c) the functions of the Certification Agency;
- (d) the manner of marking or labelling the container of seed of any notified kind or variety;
- (e) the requirements which may be complied with by a person carrying on the business referred to in section 7;
- (f) the form of application for the grant of a certificate under section 9, the particulars it may contain, the fees which shall accompany it, the form of certificate and the conditions subject to which the certificate may be granted;
- (g) the form and manner in which and the fee on payment of which an appeal may be preferred under section 11 and the procedure to be followed by the appellate authority in disposing of the appeal;
- (h) the qualifications and duties of Seed Analysts and Seed Inspectors;
- (i) the manner in which samples may be taken by the Seed Inspectors, the procedure for sending such samples to the Seed Analysts or the Seed Laboratory and the manner of analysing such samples;
- (j) the form of report of the result of the analysis, and the fees payable in respect of such report;
- (k) the records to be maintained by a person carrying on the business referred to in section 7 and the particulars which such records shall contain; and
- (l) any other matter which is to be or may be prescribed.

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Dacca,
The 13th July, 1977.

ZIAUR RAHMAN, BU, psc
MAJOR GENERAL,
President.

A. K. TALUKDAR
Deputy Secretary.

BGP. – 97/98-5813B-550-21-5-98.

Annexure 3c: National Seeds Policy 2002 (India)

1. VARIETAL DEVELOPMENT AND PLANT VARIETY PROTECTION
 - 1.1 The development of new and improved varieties of plants and availability of such varieties to Indian farmers is of crucial importance for a sustained increase in agricultural productivity.
 - 1.1.1 Appropriate policy framework and programmatic interventions will be adopted to stimulate varietal development in tune with market trends, scientific-technological advances, suitability for biotic and abiotic stresses, locational adaptability and farmers' needs.
 - 1.2 An effective *sui generis* system for intellectual property protection will be implemented to stimulate investment in research and development of new plant varieties and to facilitate the growth of the Seed Industry in the country.
 - 1.2.1 A Plant Varieties & Farmers' Rights Protection (PVP) Authority will be established which will undertake registration of extant and new plant varieties through the Plant Varieties Registry on the basis of varietal characteristics.
 - 1.2.2 The registration of new plant varieties by the PVP Authority will be based on the criteria of novelty, distinctiveness, uniformity and stability.
 - 1.2.3 The criteria of distinctiveness, uniformity and stability could be relaxed for registration of extant varieties, which will be done within a specified period to be decided by the PVP Authority.
 - 1.2.4 Registration of all plant genera or species as notified by the Authority will be done in a phased manner.
 - 1.2.5 The PVP Authority will develop characterisation and documentation of plant varieties registered under the PVP Act and cataloguing facilities for all varieties of plants.
 - 1.3 The rights of farmers to save, use, exchange, share or sell farm produce of all varieties will be protected, with the proviso that farmers shall not be entitled to sell branded seed of a protected variety under the brand name.
 - 1.4 The rights of researchers to use the seed/planting material of protected varieties for bonafide research and breeding of new plant varieties will be ensured.
 - 1.5 Equitable sharing of benefit arising out of the use of plant genetic resources that may accrue to a breeder from commercialisation of seeds/planting materials of a new variety, will be provided.
 - 1.6 Farmers/groups of farmers/village communities will be rewarded suitably for their significant contribution in evolution of a plant variety subject to registration. The contribution of traditional knowledge in agriculture needs to be highlighted through suitable mechanisms and incentives.
 - 1.7 A National Gene Fund will be established for implementation of the benefit sharing arrangement, and payment of compensation to village communities for their contribution to the development and conservation of plant genetic resources and also to promote conservation and sustainable use of genetic resources. Suitable systems will be worked out to identify the contributions from traditional knowledge and heritage.

- 1.8 Plant Genetic Resources for Food and Agriculture Crops will be permitted to be accessed by Research Organisations and Seed Companies from public collections as per the provisions of the 'Material Transfer Agreement' of the International Treaty on Plant Genetic Resources and the Biological Diversity Bill.
- 1.9 Regular interaction amongst the Private and Public Researchers, Seed Companies/Organisations and Development Agencies will be fostered to develop and promote growth of a healthy seed industry in the country.
- 1.10 To keep abreast of global developments in the field of Plant Variety Protection and for technical collaboration, India may consider joining Regional and International Organisations.
- 1.11 The PVP Authority may, if required, resort to compulsory licensing of a protected variety in public interest on the ground that requirements of the farming community for seeds and propagating material of a variety are not being met or that the production of the seeds or planting material of the protected variety is not being facilitated to the fullest possible extent.

2. SEED PRODUCTION

- 2.1 To meet the Nation's food security needs, it is important to make available to Indian farmers a wide range of seeds of superior quality, in adequate quantity on a timely basis. Public Sector Seed Institutions will be encouraged to enhance production of seed towards meeting the objective of food and nutritional security.
- 2.2 The Indian seed programme adheres to the limited three generation system of seed multiplication, namely, breeder, foundation and certified seed. Breeder seed is the progeny of nucleus seed.
 - 2.2.1 Nucleus seed is the seed produced by the breeder to develop the particular variety and is directly used for multiplication as breeder seed.
 - 2.2.2 Breeder seed is the seed material directly controlled by the originating or the sponsoring breeder or Institution for the initial and recurring production of foundation seed.
 - 2.2.3 Foundation seed is the progeny of breeder seed. Foundation seed may also be produced from foundation seed. Production of foundation seed stage-I and stage-II may thus be permitted, if supervised and approved by the Certification Agency and if the production process is so handled as to maintain specific genetic purity and identity.
 - 2.2.4 Certified seed is the progeny of foundation seed or the progeny of certified seed. If the certified seed is the progeny of certified seed, then this reproduction will not exceed three generations beyond foundation stage-I and it will be ascertained by the Certification Agency that genetic identity and genetic purity has not been significantly altered.
- 2.3 Public Sector Seed Production Agencies will continue to have free access to breeder seed under the National Agriculture Research System. The State Farms Corporation of India and National Seeds Corporation will be restructured to make productive use of these organisations in the planned growth of the Seed Sector.
- 2.4 Private Seed Production Agencies will also have access to breeder seed subject to terms and conditions to be decided by Government of India.

- 2.5 State Agriculture Universities/ICAR Institutes will have the primary responsibility for production of breeder seed as per the requirements of the respective States.
- 2.6 Special attention will be given to the need to upgrade the quality of farmers' saved seeds through interventions such as the Seed Village Scheme.
- 2.7 Seed replacement rates will be raised progressively with the objective of expanding the use of quality seeds.
- 2.8 DAC, in consultation with ICAR and States, will prepare a National Seed Map to identify potential, alternative and non-traditional areas for seed production of specific crops.
- 2.9 To put in place an effective seed production programme, each State will undertake advance planning and prepare a perspective plan for seed production and distribution over a rolling (five to six year) period. Seed Banks will be set up in non-traditional areas to meet demands for seeds during natural calamities.
- 2.10 The 'Seed Village Scheme' will be promoted to facilitate production and timely availability of seed of desired crops/varieties at the local level. Special emphasis will be given to seed multiplication for building adequate stocks of certified/quality seeds by providing foundation seed to farmers.
- 2.11 For popularising newly developed varieties and promoting seed production of these varieties, seed mini-kits of pioneering seed varieties will be supplied to farmers. Seed exchange among farmers and seed producers will be encouraged to popularise new/non-traditional varieties.
- 2.12 Seeds of newly developed varieties must be made available to farmers with minimum time gap. Seed producing agencies will be encouraged to tie up with Research Institutions for popularisation and commercialisation of these varieties.
- 2.13 As hybrids have the potential to improve plant vigour and increase yield, support for production of hybrid seed will be provided.
- 2.14 Seed production will be extended to agro-climatic zones which are outside the traditional seed growing areas, in order to avoid unremunerative seed farming in unsuitable areas.
- 2.15 Seed Banks will be established for stocking specified quantities of seed of required crops/varieties for ensuring timely and adequate supply of seeds to farmers during adverse situations such as natural calamities, shortfalls in production, etc. Seed Banks will be suitably strengthened with cold storage and pest control facilities.
 - 2.15.1 The storage of seed at the village level will be encouraged to facilitate immediate availability of seeds in the event of natural calamities and unforeseen situations. For the storage of seeds at farm level, scientific storage structures will be popularised and techniques of scientific storage of seeds will be promoted among farmers as an extension practice.
- 2.16 Seed growers will be encouraged to avail of Seed Crop Insurance to cover risk factors involved in production of seeds. The Seed Crop Insurance Scheme will be reviewed so as to provide effective risk cover to seed producers and will be extended to all traditional and non-traditional areas covered under the seed production programme.

3. QUALITY ASSURANCE

- 3.1 The Seeds Act will be revised to regulate the sale, import and export of seeds and planting materials of agriculture crops including fodder, green manure and horticulture and supply of quality seeds and planting materials to farmers throughout the country.
- 3.2 The National Seeds Board (NSB) will be established in place of existing Central Seed Committee and Central Seed Certification Board. The NSB will have permanent existence with the responsibility of executing and implementing the provisions of the Seeds Act and advising the Government on all matters relating to seed planning and development. The NSB will function as the apex body in the seed sector.
 - 3.2.1 All varieties, both domestic and imported varieties, that are placed on the market for sale and distribution of seeds and planting materials will be registered under the Seeds Act. However, for vegetable and ornamental crops a simple system of varietal registration based on “breeders declaration” will be adopted.
 - 3.2.2 The Board will undertake registration of kinds/varieties of seeds that are to be offered for sale in the market, on the basis of identified parameters for establishing value for cultivation and usage (VCU) through testing/trialling.
 - 3.2.3 Registration of varieties will be granted for a fixed period on the basis of multi-locational trials to determine VCU over a minimum period of three seasons, or as otherwise prescribed as in the case of long duration crops and horticultural crops. Samples of the material for registration will be sent to the NBPGR for retention in the National Gene Bank.
 - 3.2.4 Varieties that are in the market at the time of coming into force of the revised Seeds Act, will have to be registered within a fixed time period, and subjected to such testing as will be notified.
 - 3.2.5 The NSB will accredit ICAR, SAUs, public/private organisations to conduct VCU trials of all varieties for the purpose of registration as per prescribed standards.
 - 3.2.6 The NSB will maintain the National Seeds Register containing details of varieties that are registered. This will help the Board to coordinate and assist activities of the States in their efforts to provide quality seeds to farmers.
 - 3.2.7 The NSB will prescribe minimum standards (of germination, genetic characteristics, physical purity, seed health, etc.) as well as suitable guidelines for registration of seed and planting materials.
 - 3.2.8 Provisional registration would be granted on the basis of information filed by the applicant relating to trials over one season to tide over the stipulation of testing over three seasons before the grant of registration.
- 3.3 Government will have the right to exclude certain kinds or varieties from registration to protect public order or human, animal and plant life and health, or to avoid serious prejudice to the environment.
- 3.4 The NSB will have the power to cancel the registration granted to a variety if the registration has been obtained by misrepresentation or concealment of essential data, the variety is obsolete and has outlived its utility and if the prevention of commercial exploitation of such variety is necessary in the public interest.

- 3.5 Registration of Seed Processing Units will be required if such Units meet the prescribed minimum standards for processing the seed.
 - 3.6 Seed Certification will continue to be voluntary. The Certification tag/label will provide an assurance of quality to the farmer.
 - 3.6.1 The Board will accredit individuals or organisations to carry out seed certification including self-certification on fulfillment of criteria as prescribed.
 - 3.7 To meet quality assurance requirements for export of seeds, Seed Testing facilities will be established in conformity with ISTA and OECD seed certification programmes.
 - 3.8 The State Government, in conformity with guidelines and standards specified by the Board, will establish one or more State Seed Testing Laboratories or declare any Seed Testing Laboratory in the Government or non-Government Sector as a State Seed Testing Laboratory where analysis of seeds will be carried out in the prescribed manner.
 - 3.9 Farmers will be encouraged to use certified seeds to ensure improved performance and output.
 - 3.10 Farmers will retain their right to save, use, exchange, share or sell their farm seeds and planting materials without any restriction. They will be free to sell their seed on their own premises or in the local market without any hindrance provided that the seed is not branded. Farmers' right to continue using the varieties of their choice will not be infringed by the system of compulsory registration.
 - 3.11 Stringent measures would be taken to ensure the availability of high quality of seeds and check the sale of spurious or misbranded seeds.
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4. SEED DISTRIBUTION AND MARKETING
 - 4.1 The availability of high quality seeds to farmers through an improved distribution system and efficient marketing set-up will be ensured to facilitate greater security of seed supply.
 - 4.2 For promoting efficient and timely distribution and marketing of seed throughout the country, a supportive environment will be provided to encourage expansion of the role of the private seed sector. Efforts will be made to achieve better coordination between State Governments to facilitate free Inter-State movement of seed and planting material through exemption of duties and taxes.
 - 4.3 Private Seed Sector will be encouraged and motivated to restructure and reorient their activities to cater to non-traditional areas.
 - 4.4 A mechanism will be established for collection and dissemination of market intelligence regarding preference of consumers and farmers.
 - 4.5 A National Seed Grid will be established as a data-base for monitoring of information on requirement of seed, its production, distribution and preference of farmers on a district-wise basis.
 - 4.6 Access to term finance from Commercial Banks will be facilitated for developing efficient seed distribution and marketing facilities for growth of the seed sector.
 - 4.7 Distribution and marketing of seed of any variety, for the purpose of sowing and planting will be allowed only if the said variety has been registered by the National Seeds Board.

- 4.8 National Seeds Board can direct a dealer to sell or distribute seeds in a specified manner in a specified area if it is considered necessary to the public interest.

5. INFRASTRUCTURE FACILITIES

- 5.1 To meet the enhanced requirement of quality/certified seeds, creation of new infrastructure facilities along with strengthening of existing facilities, will be promoted.
- 5.2 National Seed Research and Training Centre will be set up to impart training and build a knowledge base in various disciplines of the seed sector.
- 5.3 The Central Seed Testing Laboratory will be established at the National Seed Research and Training Centre to perform referral and other functions as required under the Seeds Act.
- 5.4 Seed processing capacity will be augmented to meet the enhanced requirement of quality seed.
- 5.5 Modernisation of seed processing facilities will be encouraged in terms of modern equipment and latest techniques, such as seed treatment for enhancement of performance of seed, etc.
- 5.6 Conditioned storage for breeder and foundation seed and aerated storage for certified seed would be created in different regions.
- 5.7 A computerised National Seeds Grid will be established to provide information on availability of different varieties of seeds with production agencies, their location, quality etc. This network will facilitate optimum utilisation of available seeds in every region.
- 5.7.1 Initially, seed production agencies in the public sector would be connected with the National Seed Grid, but progressively the private sector will be encouraged to join the Grid for providing a clear assessment of demand and supply of seeds.
- 5.8 State Governments, or the National Seeds Board in consultation with the concerned State Government, may establish Seed Certification Agencies.
- 5.9 State Governments will establish appropriate systems for effective execution and implementation of the objectives and provisions of the Seeds Act.

6. TRANSGENIC PLANT VARIETIES

- 6.1 Biotechnology will play a vital role in the development of the agriculture sector. This technology can be used not only to develop new crops/varieties, which are tolerant to disease, pests and abiotic stresses, but also to improve productivity and nutritional quality of food.
- 6.2 All genetically engineered crops/varieties will be tested for environment and bio-safety before their commercial release, as per the regulations and guidelines of the Environment Protection Act (EPA), 1986.
- 6.3 The EPA, 1986, read with the Rules, 1989 would adequately address the safety aspects of transgenic seeds/planting materials. A list will be generated from Indian experience of transgenic cultivars that could be rated as environmentally safe.
- 6.4 Seeds of transgenic plant varieties for research purposes will be imported only through the National Bureau of Plant Genetic Resources (NBPGR) as per the EPA, 1986.

- 6.5 Transgenic crops/varieties will be tested to determine their agronomic value for at least two seasons under the All India Coordinated Project Trials of ICAR, in coordination with the tests for environment and bio-safety clearance as per the EPA before any variety is commercially released in the market.
- 6.6 After the transgenic plant variety is commercially released, its seed will be registered and marketed in the country as per the provisions of the Seeds Act.
- 6.7 After commercial release of a transgenic plant variety, its performance in the field, will be monitored for at least 3 to 5 years by the Ministry of Agriculture and State Departments of Agriculture.
- 6.8 Transgenic varieties can be protected under the PVP legislation in the same manner as non-transgenic varieties after their release for commercial cultivation.
- 6.9 All seeds imported into the country will be required to be accompanied by a certificate from the Competent Authority of the exporting country regarding their transgenic character or otherwise.
 - 6.9.1 If the seed or planting material is a product of transgenic manipulation, it will be allowed to be imported only with the approval of the Genetic Engineering Approval Committee (GEAC), set up under the EPA, 1986.
- 6.10 Packages containing transgenic seeds/planting materials, if and when placed on sale, will carry a label indicating their transgenic nature. The specific characteristics including the agronomic/yield benefits, names of the transgenes and any relevant information shall also be indicated on the label.
- 6.11 Emphasis will be placed on the development of infrastructure for the testing, identification and evaluation of transgenic planting materials in the country.

7. IMPORT OF SEEDS AND PLANTING MATERIAL

- 7.1 The objective of the import policy is to provide the best planting material available anywhere in the world to Indian farmers, to increase productivity, farm income and export earnings, while ensuring that there is no deleterious effect on environment, health and bio-safety.
 - 7.1.1 While importing seeds and planting material, care will be taken to ensure that there is absolutely no compromise on the requirements under prevailing plant quarantine procedures, so as to prevent entry into the country of exotic pests, diseases and weeds detrimental to Indian agriculture.
 - 7.1.2 All imports of seeds will require a permit granted by the Plant Protection Advisor to the Government of India, which will be issued within the minimum possible time frame.
- 7.2 All import of seeds and planting materials, etc. will be allowed freely subject to EXIM Policy guidelines and the requirements of the Plants, Fruits and Seeds (Regulation of Import into India) Order, 1989 as amended from time to time. Import of parental lines of newly developed varieties will also be encouraged.
- 7.3 Seeds and planting materials imported for sale into the country will have to meet minimum seed standards of seed health, germination, genetic and physical purity as prescribed.
- 7.4 All importers will make available a small sample of the imported seed to the Gene Bank maintained by NBPGR.

7.5 The existing policy, which permits free import of seeds of vegetables, flowers and ornamental plants, cuttings, saplings of flowers, tubers and bulbs of flowers by certain specified categories of importers will continue. Tubers and bulbs of flowers will be subjected to post-entry quarantine.

7.5.1 After the arrival of consignments at the port of entry, quarantine checks would be undertaken; which may include visual inspection, laboratory inspection, fumigation and grow-out tests. For the purpose of these checks, samples will be drawn and the tests will be conducted concurrently.

8. EXPORT OF SEEDS

8.1 Given the diversity of agro-climatic conditions, strong seed production infrastructure and market opportunities, India holds significant promise for export of seeds.

8.2 Government will evolve a long term policy for export of seeds with a view to raise India's share of global seed export from the present level of less than 1% to 10% by the year 2020.

8.2.1 The export policy will specifically encourage custom production of seeds for export and will be based on long-term perspective, dispensing with case to case consideration of proposals.

8.3 Establishment and strengthening of Seeds Export Promotion Zones with special incentives from the Government will be facilitated.

8.4 A data bank will be created to provide information on the International Market and on export potential of Indian varieties in different parts of the world.

8.5 A database on availability of seeds of different crops to assess impact of exports on domestic availability of seeds will be created.

8.6 Promotional programmes to improve the quality of Indian seeds to enhance its acceptability in the International Market will be taken up.

8.6.1. Testing and certification facilities will be established in conformity with international requirements.

9. PROMOTION OF DOMESTIC SEED INDUSTRY

9.1 Incentives will be provided to the domestic seed industry to enable it to produce seeds of high yielding varieties and hybrid seeds at a faster pace to meet the challenges of domestic requirements.

9.2 Seed Industry will be provided with a congenial and liberalized climate for increasing seed production and marketing, both domestic and international.

9.3 Membership to International Organisations and Seed Associations like ISTA, OECD, UPOV, ASSINSEL, WIPO, at the National level or at the level of individual seed producing agencies, will be encouraged.

9.4 Emphasis will be given to improving the quality of seed produced and special efforts will be directed towards improving the quality of farmers' saved seeds.

9.5 Financial support for capital investment, working capital and infrastructure strengthening will be facilitated through NABARD/ Commercial Banks/Cooperative Banks.

- 9.6 Tax rebate/concessions will be considered on the expenditure incurred on in-house research and development of new varieties and other seed related research aspects. In order to develop a competitive seed market, the States will be encouraged to remove unnecessary local taxation on sales of seeds.
- 9.7 To encourage seed production in non-traditional areas including backward areas, special incentives such as transport subsidy will be provided to seed producing agencies operating in these marginalised areas.
- 9.8 Reduction of import duty will be considered on machines and equipment used for seed production and processing which are otherwise not manufactured in the country.
- 10. STRENGTHENING OF MONITORING SYSTEM
- 10.1 The Department of Agriculture & Cooperation (DAC) will supervise the overall implementation and monitoring of the National Seeds Policy.
- 10.2 The physical infrastructure in terms of office automation, communication facilities, etc., in DAC will be augmented in a time-bound manner.
- 10.3 The technical capacity of DAC need to be augmented and strengthened to undertake the additional work relating to implementation of National Seeds Policy, implementation of PVP&FR Bill, Seeds Act, Import and Export of Seeds, etc.
- 10.4 Capacity building, including National and International training and participation in Seminars/ Workshops will be organized for concerned officials.

Annexure 3d: National Seed Policy-1993 (Bangladesh)

Ministry of Agriculture

Section - 12

নংকৃষি-১২/বীজ-১১০(২)৯২/৪২, তারিখ: ৮-৩-১৯৯৩ইং

Quality seed is considered to be the basic input for increasing agricultural output and thereby achieving self-sufficiency in food production. Effectiveness of other inputs like fertiliser and irrigation depends largely on good seed. But use of improved seed is still very limited. Two major reasons behind this fact are:

- a) Production and distribution of quality seed is insufficient in the public sector as compared to its demand; and
- b) Seed production in the private sector has not yet got the necessary support.

Development of facilities in public and private sectors for production of sufficient quantity of improved seed and for making them available to the farmers at appropriate time and at reasonable price has been suffering from lack of definite policy directives. At the same time, potentiality of technical assistance could not be explored due to absence of a clear government policy in this field. With a view to overcoming this critical situation the MoA has formulated a National Seed Policy for the country.

A committee, formed by the MoA, reviewed the seed policies of a number of neighboring countries and drafted a National Seed Policy drawing lessons and inputs from the experiences of countries having similar agro-ecological and socio-economic settings.

National Seed Policy provides for policy directives to increase production of improved seed both in the public and private sectors and for making best quality seeds available to the farmers on timely basis, and at competitive price. The seed policy has also provisions, among other things, for liberalisation of import of seed and seed processing machineries, strengthening of quality control and research system and maintaining a seed security arrangement. A major thrust of the seed policy has been on the institutional arrangement of the seed sector.

National Seed Board (NSB) has approved the draft of the National Seed Policy.

The Seed Policy of Bangladesh

1. Objectives of the seed policy

1.1. Overall objectives

The overall purpose of this policy is to make the best quality seeds of improved varieties of crops conveniently and efficiently available to farmers with a view to increasing crop production, farmer's productivity, per capita farm income and export earnings.

1.2. Specific objectives

- 1) To breed, develop and maintain improved crop varieties with special emphasis on those suitable for high-input and high-output agriculture.
- 2) To multiply and distribute, on a timely basis, to all farmers sufficient quantities of quality seed of improved high yielding varieties that are resistant or tolerant to disease and insect pests.

- 3) To promote farmer's acceptance and use of improved varieties of seeds.
- 4) To promote, through education, training and financial supports, balanced development of public and private sector seed enterprise.
- 5) To simplify the importation, for research and commercial purposes, of high quality seeds and planting materials.
- 6) To promote seed technology by providing training and technical supports to agricultural specialists and professionals, farmers and workers, and private seed growers and merchants in seed production, processing, storage and use of high quality seed.
- 7) To monitor, control and regulate the quality and quantity of seeds produced as well as development and commercialisation of the seed industry.

2. Strategy for seed development

To achieve the above objectives, the following strategies among others, are to be followed:

- 2.1. To strengthen the institutional capability of the public and private sector entities engaged in the seed industry.
- 2.2. To evolve and/or adapt seed technology to meet the needs of high-input and high-output agriculture.
- 2.3. To promote balanced development of the seed sector by providing equitable opportunities to the public and private sector at all stages of the seed industry from breeding to marketing of seeds.
- 2.4. To simplify procedures for import of high quality seeds and planting materials, both by the public and private sectors to enable farmers to have access to the best quality planting materials available in the world.
- 2.5. To strengthen seed certification, quality control and testing facilities to ensure availability of quality seeds to farmers.
- 2.6. To simplify procedures for effective observance of plant quarantine.

3. Development and promotion of improved seed varieties

- 3.1. Variety development programmes should, as a matter of priority, be focused on generation of high-input and high-output technologies.
- 3.2. The NARS will continue to pursue plant breeding programmes for all crops of national importance. However, special efforts will be made to evolve improved varieties for pulses, oil seeds, tuber crops, vegetables, fruits and spices.
- 3.3. Improved varieties of seeds and planting materials should be procured and introduced in the country by allowing their import, especially through private seed entrepreneurs. For this purpose, business contracts, including joint ventures, are to be encouraged between private enterprises and foreign seed companies.
- 3.4. Private persons, companies and other agencies will be encouraged to undertake plant breeding programs and will be allowed to import breeder/foundation seeds of notified crops for variety development and promotion purposes.

4. Approval and registration of varieties

- 4.1. New varieties of wheat, rice, jute, potato and sugarcane developed by private or public agencies will be subject to notification by the National Seed Board.
- 4.2. Varieties of all other crops developed by public research agencies will be subject to an internal review and approval by each respective agency and must be registered with National Seed Board before being released.
- 4.3. Varieties of crops, other than rice, wheat, jute, potato and sugarcane that are imported or locally developed by a private person, company or agency must be registered with the NSB giving prescribed cultivar descriptions, but will not be subject to any other restrictions.
- 4.4. In the event a variety of seed is found to be harmful or potentially harmful to the country's agriculture, the NSB will prohibit the sale of that variety.

5. Variety release

The variety release and variety notification functions will be separated. The NSB shall notify varieties of seeds under the provisions of the Seeds Ordinance. The release of varieties of controlled crops such as rice, wheat, jute, potato and sugarcane or those added by NSB, shall vest in a Technical Committee headed by Executive Vice-Chairman, BARC and consisting of representatives from major research institutions (BARI, BRRI, BJRI, BSRI), SCA, DAE, BADC, private sector Seed Growers and Farmers Associations.

6. Maintenance breeding

Maintenance breeding and breeder seed multiplication is to be improved and strengthened at the NARS. For this purpose, required facilities, equipment, trained personnel, etc. shall be provided at the respective research centres and stations.

7. Seed multiplication

- 7.1. Breeder and foundation seed, of all varieties will be made available through negotiation to duly registered seed producers both in the private and public sectors.
- 7.2. BADC will concentrate primarily on producing foundation seeds of rice, wheat, jute, potato and sugarcane on its own farms.
- 7.3. BADC will use farmers to multiply seeds on a contract basis and will gradually cease to grow certified seed on its own seed farms.

8. Import of seeds

- 8.1. Except appropriate plant quarantine safeguards, restrictions on importation of seeds are to be eliminated. Approved varieties of rice, wheat, jute, potato and sugarcane may be imported for commercial sale. However, registered seed growers will be permitted to import small quantities of seeds of rice, wheat, jute, potato and sugarcane for adaptability testing.
- 8.2. The Plant Quarantine Regulations provided under the Destructive Insect and Pest Act 1966 (as amended upto 1989) are to be reviewed and reformed with a view to simplifying procedures to facilitate import of high quality seeds and planting materials. Plant quarantine procedures will be made applicable to crop/plant species and not to specific varieties.

9. Seed regulations

9.1. Controlled crops

The NSB shall designate kinds and varieties of crops that are to be notified. Initially, rice, wheat, jute, potato and sugarcane will be the only notified crops. Release of the varieties of notified crops will be subject to evaluation and testing by the Technical Committee on seeds. Varieties of all other crops will have to be registered prior to being sold, but there will be no requirement for prior testing and approval.

9.2. Registration of varieties

Any variety, whether imported or developed in Bangladesh, must be registered with the National Seed Board. The registration will require the characteristics and attributes of the variety to be described. Registration will be a relatively easy process designed to facilitate legitimate identification. Except for controlled or notified crops, registration will not involve testing or any other procedure.

9.3. Registration of seed dealers

Any individual, company or agency that wishes to import seed, develop and register new seed varieties, or package seed in labelled containers must first be registered with the National Seed Board. Registration will be automatic by paying the prescribed fees.

9.4. Labelling of seeds

Anyone packaging seed in labelled containers must do so in accordance with requirements prescribed under the Seed Rules. The labelling requirements will specify variety of crops, lot number or batch identification, net weight or count, minimum germination percentage, physical purity, name and address of the company packaging the seed and the date of packaging.

9.5. Seed certification

Seed certification will be a service provided to private individuals, companies or public agencies who wish to assure their farmer-customers that their seeds are of high quality. Although seed certification will be voluntary, public sector breeder/foundation seeds will be certified as a matter of policy.

9.6. Seed quality control

Seed quality will be ensured by requiring seeds in labelled containers/packages to meet the standards specified on the level. Seed dealers who develop a good reputation will be protected by making it illegal for anyone to sell seeds in a labelled container that copies the name or trademark of any registered seed dealer.

10. Seed security

BADC and NARS will be required to maintain small stocks of improved varieties of rice, wheat and jute seeds so that when natural disasters occur, and seed supplies in an area are lost, seed of superior quality will be available for distribution. The amount of seed to be stored will be subject to further assessment and budgetary considerations.

11. Strengthening institutional capability of the seed sector

11.1. Strengthening NSB

11.1.1. The NSB will be strengthened through necessary amendments in the Seed Laws to establish it as the highest authority for policy making and planning for development of the national seeds system.

11.1.2. Reorganisation of NSB

The NSB will be reconstituted as follows to ensure representation of all concerned with the development of the seed industry:

1. Secretary, MOA	Chairman
2. Vice-Chairman, BARC	Member
3. Heads of National Research Institutions (BARI, BRRI, BJRI, BAU, BSRI, BINA, Cotton Board)	Member (7)
4. Director General, DAE	Member
5. Chairman, BADC	Member
6. Member Director (Seeds), BADC	Member
7. Representative of Seed Growers Association	Member
8. Representative of Seed Merchants Association	Member
9. Director, Seed Certification Agency	Member
10. Director, Plant Protection Wing, DAE	Member
11. Representative of Ministry of Finance	Member
12. Representative of Farmer's Association	Member
13. Director General (Seed), MOA	Member-Secretary

11.1.3. Creating a Seed Wing in the Ministry of Agriculture

A Seed Wing will be created in the Ministry of Agriculture, primarily to serve as a Secretariat for the NSB, and to perform among others, the following functions:

- 1) To help update policies and plan strategies for the development of the seed industry with special attention given to promoting private sector seed enterprises and to ensure implementation of such policies and strategies;
- 2) To monitor development and commercialisation of the seed sector;
- 3) To oversee and co-ordinate the production of breeder and foundation seeds by public and private seed enterprises to meet farmer's demands;
- 4) To promote human resource development in the seed sector through training, seminars and workshops;
- 5) To develop a permanent cadre of trained and experienced seed technologists in public sector institutes to ensure sustained growth of the seed industry;
- 6) To plan and promote seed technology research in the NARS, BAU and the private sector;
- 7) To plan and implement a seed security system including maintenance of buffer stocks of seeds.

11.2. Strengthening of BADC-Seed Wing

11.2.1. Reorganisation of the Seed Wing

- (a) The Seed Wing is to run on a commercial basis as far as possible and be given control over the planning and financing of its operation.
- (b) The Seed Wing will be reorganised to include such as Seed Production Division, Seed Conditioning, Processing and Storage Division, Seed Marketing Division with an internal quality control system, and an Administration Division.

11.2.2. Roles and functions

The role and function of the Seed Wing should include, among others, the following:

- (a) Foundation seed production of all publicly developed varieties of controlled crops.
- (b) Production of other kinds of seeds on a “level playing field” in competition with the private sector. BADC should gradually withdraw from production of those kinds of seeds undertaken by the private sector.
- (c) The Seed Wing should provide technical assistance and other support/services to promote the development of a private sector seed industry.

11.2.3. Seed pricing and subsidies

BADC's seed prices should reflect costs more closely and subsidies should be phased out gradually.

11.2.4. Resources and facilities

BADC's seed multiplication farms will be turned to other uses except those most suitable for foundation seed production. All production beyond the foundation seed class, and including foundation seed class if possible, will be done by contract growers. Excess facilities, especially those of smaller scale, will be made available on a lease basis to the private sector for growing seeds.

11.2.5. Marketing

The seed sale centres at the Upazila level will be phased out and replaced with a network of seed dealers. The regional and transit seed centres will be designated and developed as ‘lifting sites’ for private sector dealers.

11.2.6. Reserve seeds stocks

The Seed Wing will be given management and operational responsibility for seed security stocks with budget allocation for this purpose.

11.2.7. Local/improved/popular varieties

The BADC-Seed Wing will be authorised to purify and maintain local varieties for which there is substantial and steady demand. Purification and maintenance will be done on the seed farms.

11.2.8. BADC's role will be reoriented to promote development of the private sector seed industry by:

- (a) advising and training private seed producers to produce, process, store and market quality seeds;
- (b) advise private seed entrepreneurs to manage and finance their seed companies;
- (c) custom process, test and store, if convenient, seed of private entrepreneurs at BADC's facilities;

- (d) negotiate with private sector seed enterprises for potential take-over of BADC's Contract Growers Scheme;
- (e) providing seed-testing facilities to private seed entrepreneurs.

11.3. Support for seed businesses

11.3.1. The business of seed breeding, multiplication, production, processing, import & marketing should be declared as an agro-based industry under the Industrial Investment Schedule to make such companies eligible for various incentives, supports and concessions.

11.3.2. Individuals, companies or agencies engaged in the seed business should be allowed easy access to institutional credit at preferential rates of interest.

11.3.3. Foreign exchange

Importers of seeds and seed processing equipment will be made eligible for allotment of foreign exchange. Seed merchants will be allowed to enter into supplier's credit arrangements with foreign seed suppliers.

11.3.4. Access to facilities and equipment

Private sector seedsmen will be granted access to storage space, drying floors, dryers, cleaning equipment and related equipment and facilities that are in excess of BADC-Seed Wing needs. Access will be through custom services, lease, or lease-purchase arrangements.

11.3.5. Technical assistance and services

Technical assistance, training and services from BADC-Seed Wing, DAE, Research Institutes, NSTL, SCA and other public sector units involved in the seed industry will be made available to private sector seedsmen on request for a reasonable fee in connection with services such as seed testing, certification and inspection. The private sector will be granted access to or included in all donor-assisted and organised seed-related training courses, workshops and study tours. In cases where expert technical assistance is brought into Bangladesh under donor financed seed related projects, the technical assistance and services will also be made available to the private sector. The Bangladesh Seed Merchants Association and the Bangladesh Seed Producers Association will be used as a mechanism for communicating with the private sector.

11.3.6. Private sector representation in seed policy making

The private sector will be allowed representation in the National Seed Board, Variety Release Committee, and in any special committee constituted for or in the interest of seed production in Bangladesh.

11.3.7. Concessions and incentives

Favourable policies, incentives and support will be provided to promote private sector participation in the seed industry.

11.4. Strengthening of the Seed Certification Agency (SCA)

To facilitate implementation of the new Seed Policy, the role of SCA will be expanded beyond seed certification to include seed quality control and testing and enforcement of seed regulations. For this purpose the SCA will be strengthened by provision of expanded infrastructure and laboratory facilities, increased number of trained seed technologists and gradual development of a seed sub-cadre. The expanded role of SCA will be to:

- 1) advise seed producers on production, processing and quality control of seeds;
- 2) carry out post-market quality control through inspection, testing;

- 3) collect data/information on seed production, processing and quality control for use by the NSB;
- 4) certify all breeder and foundation seed of controlled crops;
- 5) certify seeds for seed enterprises as a service, if resources permit;
- 6) co-ordinate the variety evaluation and release mechanism for notified crops;
- 7) advise NSB on the denotification of varieties for reasons of poor performance of disease and pest susceptibility;
- 8) help DAE in the promotion and use of improved seed of HYV's among farmers;
- 9) collect samples of truthfully labelled seeds (TLS) throughout the country and check their declared standards through appropriate tests.

11.5. National Agriculture Research System (NARS)

Varietal development by NARS should anticipate the increase in irrigated high-input, high-output cropping systems and adapt their crop species and variety selection criteria accordingly. With an increasing demand of food per unit area by a fast expanding population, it is imperative that NARS respond by releasing seeds of high-input responsive crop varieties into the agricultural sector. In particular, the use of hybrids must be expanded. To achieve this, the NARS will:

- 1) re-orient its plant breeding programmes to develop varieties that respond to sustainable high-input, high-output technology especially emphasising diversified crops, such as oil seeds, pulses, cereals (other than rice), vegetables, fruits, etc. that fit into rice-based cropping systems. The NARS will need to respond to farmer's current demands for varieties and crops;
- 2) design breeding programmes keeping in mind the opportunity of importing improved seed which may be an economic way to obtain improved varieties;
- 3) develop adequate maintenance breeding units at their regional/central research stations;
- 4) co-ordinate variety development programmes between scientists and institutes in both public and private sectors by developing common objectives and testing procedures.

11.6. Department of Agricultural Extension (DAE)

DAE will be responsible for promoting newly involved superior crop varieties. For this purpose DAE will:

- 1) monitor the farmer's response/demand for varieties and transmit farmer's preferences to the NSB so that adjustments to production of breeder and foundation seed can be made;
- 2) promote new varieties among farmers through demonstration plots;
- 3) advise NSB on developments in the seed sector;
- 4) create a suitable career structure for seed technologists in all seed sector agencies so that staff continuity and retention of experience can be achieved;
- 5) improve facilities at entry points for laboratory testing and post-entry quarantine testing.

11.7. Agricultural Information Services (AIS)

AIS will facilitate dissemination and sharing of information from private and public sector seed agencies and enterprises with the farming public, particularly with respect to promotion of new varieties.

11.8. Bangladesh Agricultural University (BAU)

BAU will undertake the following:

- 1) Establish/strengthen a course in seed technology, which would cover all aspect of the seed industry from seed breeding to its multiplication and distribution, seed policy and seed industry development;
- 2) Develop its seed pathology laboratory as a National Seed Health Laboratory which will, besides supporting the university's teaching functions, regularly review the seed quarantine requirements and develop seed technology necessary for the production of healthy seed.
- 3) Promote the technology and production of inoculum for legume seeds in both public and private sectors.

Annexure 4: Major Provisions in India's Seed Bill 2004

(amended in 2010 and now popularly called Seed Bill 2010)

1. The Seed Bill 2004 aims at promoting the production and supply of quality of seeds and also to regulate its quality for sale, export and import.
2. The Seed Bill 2004 seeks to repeal and replace the existing Seed Act, 1966.
3. To comply with WTO obligations and to protect the farmers and smallscale agriculturist from monopolistic activities of commercial seed producers and seed suppliers, the Parliament proposed to go ahead for a new legislation on seeds and made an attempt to bring home several radical changes in the seed sector.
4. According to the Bill all varieties of seeds have to be registered and certified. The Bill proposed to be established a Central Seed Committee (CSC) for which the Secretary to the Government of India, Department of Agricultural and Co-operation, Ministry of Agriculture is the ex-officio Chairman.
5. The CSC is a prime controlling and regulating body under the Bill with several Government representatives as its members in the said body apart from two representatives from the farmers' sector and two from the seed industry. The Bill proposes for constitution of a sub-committee called Registration Sub-Committee which shall maintain a National Register of Seeds for all varieties of seeds. Any type of seed for sale must be registered with the Registration Sub-Committee and its nomenclature must be entered in the National Register of Seeds.
6. At State level, State Seed Committees and State Seed Certification Agencies will be established which are advisory in nature.
7. The Bill does not restrict the farmer's right to use or sell his farm seeds and planting material provided that he does not propose to sell the same under a brand name.
8. The provisions for compensation were introduced in the Bill. All the registered varieties and seed producers, distributors and vendors have to disclose the expected performance of the seeds under certain given conditions. In case of failure to perform the expected standards the farmer can claim compensation from the dealer, distributor or vendor under the Consumer Protection Act, 1986.
9. As a part of the regulatory method, the Bill also introduced Central and State Seed Testing Laboratories with required number of seed analysts.
10. Import of seeds would be subject to the Plant Quarantine (Regulation of Import into India) Order 2003 or any corresponding Order under the Destructive Insects and Pests Act, 1914. The Central Government can restrict export of seeds if it is deemed to affect the food security of the country.
11. The Bill allows self-certification of seeds by accredited agencies and also allows the Central Government to recognise certification by foreign seed certification agency.
12. Every seed producer and dealer and horticulture nursery must be registered with the concerned State Government.
13. The transgenic variety of seed must get clearance as per the provisions of Environmental Protection Act, 1986 for obtaining its registration.

14. The Bill proposes to increase the penalties to regulate the seed business. The Bill has enhanced the penalties that were prescribed under the existing Seed Act 4½ decades ago.

** (The Seed Bill 2004 was introduced in the Rajya Sabha on 9 December 2004, and has been referred to Parliamentary Standing Committee on Agriculture for submission of report)*

Changes Proposed By Standing Committee on Agriculture of Indian Parliament

After placing the Bill before the Rajya Sabha, the Standing Committee on Agriculture appointed a Parliamentary Committee under the Chairmanship of Prof. Ramgopal Yadav to study the Bill. His report submitted on 20 November 2006 recommends certain changes in the Bill.

- a) The Committee recommends that Plant Variety and Protection of Farmers' Right Act 2001 (hereinafter called as PVPFR Act) be made fully operative before the Seed Bill 2004 is passed.
- b) The Bill should not impose a condition that farmers' seeds also must conform to the minimum standards required to be maintained by commercial producers for registering their seeds. The Committee feels that such a restriction will seriously affect the rights of the farmers and recommended its deletion.
- c) The Committee suggested expansion of the definition of "farmers".
- d) The Committee discourages private participation in Seed Certification since it seriously conflicts with the interests of farmers who practice traditional system of exchange and sale of seeds. Thus it strongly recommends deletion of the self-certification provisions.
- e) Another notable feature recommended by the Committee is introduction of price regulatory mechanism in the Bill to ensure that farmers should not be charged arbitrary prices by seed producers and sellers.
- f) The Committee recommends enhancement of the penalties mentioned in the Bill. The Committee suggests increase in the penalty for contravention of provisions of law as a fine of Rs 50,000 which may be extended up to Rs 2 lakh and imprisonment which may be extended up to three months. Likewise, the penalty for supply of spurious and mis-branded seeds must be an amount of Rs 2 lakh which may be extended up to Rs 10 lakh and imprisonment of three months which may be extended up to one year.
- g) The Committee also recommends introduction of provisions banning the printing of misleading pictures on seed packages which may inspire and attract the innocent farmers to buy the said seeds and ultimately suffer losses.
- h) The Committee also recommends introduction of machinery to deal with compensation matters in the Bill itself. The Committee found fault with entrusting the task of dealing with compensation matters to the Consumer Forums constituted under the Consumer Protection Act.
- i) The Committee recommends introduction of seed crop insurance for providing compensation to the farmers whose seeds do not give the desired yield. The Committee further says that the compensation to the farmers should be based on the expected performance as mentioned by the seed producers on the label of the seed package and that the said certification agency should also be made liable in the compensation process in case seeds fail to give the promised results.

- j) The Committee opined that there are chances for misuse of powers by seed inspectors. The Committee suggests effective regulatory machinery over the powers of the seed inspector. The search and seizure provisions may be exercised by the seed inspector with the prior permission of the District Collector or/and Magistrate. The Committee also recommends exemption of farmers from provisions of search and seizure since they are not selling branded seeds, only farm seeds saved from their own production.
- k) The Committee further recommends that there should be at least one state representative from each agro-climatic zone instead of geographical zones on rotation basis and that the number of farmers' representatives must be increased to five, each one from different geographical zones.
- l) The Committee further recommends reduction of the registration period to 10 and 12 years instead of 15 and 18 years. The Committee suggests deletion of the provisions of re-registration since it will lead to monopoly of certain seed producers.
- m) The Committee recommends that seed testing includes seed germination and yield testing and there should be a pre-registration requirement. The Committee further recommends that the Bill should include provision for declaring the origin of the variety and its parental details by the person seeking registration to ensure that farmer-exempted varieties should not be misused by the said companies.
- n) The Committee also recommends that the foreign seed certification agency should be recognised only if the seeds certified by the said agency are tested on Indian soil to conform to the minimum requirements.
- o) The Committee further recommends deletion of restriction of period of two years mentioned in Section 45 of the Bill which is introduced for removal of difficulties.

About the RISTE Project

CUTS International is implementing a project entitled 'Addressing Barriers to Rice Seeds Trade between India and Bangladesh' (in short, RISTE Project) with the support of Bill and Melinda Gates Foundation. Its duration is 21 months, i.e. January 2013-September 2014. Besides Bangladesh, the project is being implemented in four states of Eastern India, viz. Bihar, Jharkhand, Odisha and West Bengal.

The goal of the project is to develop an enabling environment to promote seeds trade and knowledge-sharing in HYV rice seeds between India and Bangladesh.

The objectives of the project are to understand factors that drive demand and flow (production, marketing and use) of HYV rice seeds in Eastern Indian States and Bangladesh; to identify varieties with bilateral trade potential; understanding systemic enabling factors and challenges (institutions, laws, policies, regulations and practices) to bilateral knowledge-sharing and trade of seeds between India and Bangladesh, particularly on HYV rice seeds; and to facilitate formalisation and expansion of bilateral trade and knowledge-sharing on HYV rice seeds varieties between Bangladesh and India.

For details, please visit: www.cuts-citee.org/RISTE/