Early Generation Seed Case Study
Bangladesh Rice

JUNE 2019
Bangladesh Rice Case Study

Executive Summary
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2. Leadership
3. Research & Varietal Development
4. Demand Planning & Operations
5. Financial Sustainability
6. Enabling Environment

Appendix
## Acronyms

<table>
<thead>
<tr>
<th>ABBREVIATIONS</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>BADC</td>
<td>Bangladesh Agricultural Development Corporation</td>
</tr>
<tr>
<td>BARC</td>
<td>Bangladesh Agricultural Research Council</td>
</tr>
<tr>
<td>BARI</td>
<td>Bangladesh Agricultural Research Institute</td>
</tr>
<tr>
<td>BJRI</td>
<td>Bangladesh Jute Research Institute</td>
</tr>
<tr>
<td>BINA</td>
<td>Bangladesh Institute of Nuclear Agriculture</td>
</tr>
<tr>
<td>BRRI</td>
<td>Bangladesh Rice Research Institute</td>
</tr>
<tr>
<td>BSMRAU</td>
<td>Bangabandhu Sheikh Mujibur Rahman Agricultural University</td>
</tr>
<tr>
<td>DAE</td>
<td>Department of Agricultural Extension</td>
</tr>
<tr>
<td>EGS</td>
<td>Early Generation Seed</td>
</tr>
<tr>
<td>HYVs</td>
<td>High Yielding Varieties</td>
</tr>
<tr>
<td>IRRI</td>
<td>International Rice Research Institute</td>
</tr>
<tr>
<td>ISTA</td>
<td>International Seed Testing Association</td>
</tr>
<tr>
<td>MoA</td>
<td>Ministry of Agriculture</td>
</tr>
<tr>
<td>NARS</td>
<td>National Agricultural Research System</td>
</tr>
<tr>
<td>SRTI</td>
<td>Sugar Research Institute Of Bangladesh</td>
</tr>
<tr>
<td>OPV</td>
<td>Open Pollinated Variety</td>
</tr>
<tr>
<td>NSB</td>
<td>National Seed Board</td>
</tr>
<tr>
<td>PS</td>
<td>Private Sector</td>
</tr>
<tr>
<td>SCA</td>
<td>Seed Certification Agency</td>
</tr>
<tr>
<td>SPC</td>
<td>Seed Promotion Committee</td>
</tr>
<tr>
<td>SRR</td>
<td>Seed Replacement Rate</td>
</tr>
</tbody>
</table>
Thank you for your time and support in the development of this case study on the Bangladesh Rice EGS System

### Stakeholders Consulted

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. Humnath Bhandari</td>
<td>IRRI Representative for Bangladesh and Agricultural Economist</td>
<td>International Rice Research Institute</td>
</tr>
<tr>
<td>Mr. Md. Ashraf Ali</td>
<td>Manager-Project Coordination</td>
<td>International Rice Research Institute</td>
</tr>
<tr>
<td>Dr. Md. Shahjahan Kabir</td>
<td>Director General</td>
<td>Bangladesh Rice Research Institute</td>
</tr>
<tr>
<td>Dr. Tamal Lata Aditya</td>
<td>Director (Research)</td>
<td>Bangladesh Rice Research Institute</td>
</tr>
<tr>
<td>Dr. Mohammad Khalequzzaman</td>
<td>Chief Scientific Officer &amp; Head</td>
<td>Bangladesh Rice Research Institute</td>
</tr>
<tr>
<td>Dr. Md. Zakir Hossain</td>
<td>Deputy Director (Quality Control)</td>
<td>Seed Certification Agency</td>
</tr>
<tr>
<td>Mr. Mohammed Masum</td>
<td>Chairman</td>
<td>Supreme Seed Company Ltd.</td>
</tr>
<tr>
<td>Mr. Sudhir Chandra Nath</td>
<td>Head of Business (Seed)</td>
<td>ACI Seed Ltd</td>
</tr>
<tr>
<td>Ms. Fawzia Yesmin</td>
<td>Director, Agribusiness</td>
<td>Ispahani Seed Ltd</td>
</tr>
</tbody>
</table>
Executive Summary
### Early Generation Seed (EGS) System

**Key success factors in Bangladesh rice**

#### 1. Significance for food security and rural prosperity

Rice security is not just an agricultural and economic issue; it is central to social and political stability in Bangladesh and therefore receives political and administrative priority and attention. Delivering green revolution technologies (irrigation, fertilizer and HYV seeds) is a national priority.

#### 2. Proactive funded public sector managing/regulating the rice seed system

Public sector have clear roles and responsibilities within a structured seed system. BRRI leads varietal development and breeder seed production. BADC manages seed multiplication (foundation and certified) and distribution of improved varieties. DAE is charged with agricultural extension and informs BADC’s demand forecasting process. SCA is responsible for seed quality assurance.

#### 3. Increasing private sector role

Key value chain stakeholders recognize the need for an active private sector to meet Bangladeshi farmers’ seed requirements. The public sector is working to improve private sector capacity by developing new, differentiated germplasm. Efforts are also underway to remove policy bottlenecks (i.e., IP around OPV varieties) and gradually phase out subsidies to ensure a more level playing field. Over 100 private seed companies are involved in OPV and hybrid rice seeds multiplication and distribution.

#### 4. Strong collaboration with international institutes

BRRI and the government have multiple programs underway with major international agencies focused on rice and rice seed systems. About 80% of the current mega varieties were developed with direct or indirect IRRI contribution. Currently, BRRI collaborates and receives grants-in-aid from more than 10 international organizations and is managing these collaborations proficiently.

#### 5. Active involvement of NGOs in seed multiplication

A number of NGOs are engaged in rice seed multiplication and distribution, including distribution of affordable seeds to remote villages. Among the international NGOs, BRAC has had a meaningful impact on the Bangladeshi seed sector. It leads commercial market share for OPV and hybrid rice, and is active in varietal development, policy advocacy, and seed distribution.

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**Success hinges on broad collaboration & participation**
Regulation & subsidy constrain private sector

1. Breeder seed shortage persists despite large production volumes by BRRI

Numerous studies and on-the-ground feedback point to a shortage of breeder seed. However, an increase in production may not be needed.

BRRI already produces 150% of the breeder seed required, based on assumed seed multiplication ratios at the foundation and certified seed level.

The issue is that BRRI cannot provide differentiated access to breeder seed, which results in many ill-capacitated seed producers purchasing breeder seed and multiplying it once (vs. twice) before selling as certified seed.

BRRI has drafted and proposed a policy reform, which would enable preferential access to breeder seed to customers (namely BADC and seed companies) with the capacity and resources to follow the seed class system.

Stakeholders also point the absence of regulation at the foundation seed multiplication stage in the private sector as a gap/missing link.

2. Public and private sectors compete in certified seed market

BADC holds 65% market share of improved rice seed. It is able to sell at low prices (over head cost not factored in) because BADC receives recurring government funding to support its operations.

These subsidies create an uneven playing field for the private sector. As a result, most private sector companies prefer to invest in hybrid businesses in which BADC is unable to compete. This has led to an underinvestment by the private sector in expanding their OP offerings – especially of new varieties released by BRRI – which could better serve farmers’ needs than the older mega varieties (BR-28 and BR-29).

The newly released public sector (BRRI, BINA, agri Universities) varieties have low extension and sales promotional activities in the villages.

3. Seed policy reforms hinder emergence of private sector

Although Bangladesh has enacted various seed policy reforms since the 1990s to attract the private sector, the seed sector remains less developed than most states in India, where reforms were aimed at developing an active seed sector with strong R&D investment and research. In Bangladesh, reforms were focused on promoting private seed enterprises in seed marketing and distribution, regulating seed quality for domestically produced seeds, and facilitating seed imports into the country. The recent reforms focus on private seed enterprises as R&D investment are still in rudimentary stages. As a result, most of the R&D investment in the seed sector still occurs in the public sector. Out of the hundreds of registered private seed companies, only 4 to 5 have comprehensive proprietary R&D programs.

Apart from hybrid and OPV rice seed, which are key revenue drivers for commercial seed companies, maize and vegetable seeds fill out companies’ product portfolios.
EGS System Pain Points (2 of 2)

Additional constraints

4. Limited adoption of modern varieties
Mega varieties released in the 1990s (BR-28 and BR-29) are the market leaders despite the release of many new, improved OPV varieties. This points to shortcomings in the seed system’s ability to develop, market, and/or deploy improved varieties to farmers.

5. Overregulation due to notified status
Rice is one the five nationally important crops monitored closely and designated as notified, resulting in rigid policies and impractical rules that stifle private sector varietal R&D. The private-sector share of rice varieties is ~26% Maize, by comparison, is not a notified crop, and almost 100% of its seeds are supplied by the private sector.

6. Absence of plant variety protection laws
The absence of plant variety protection laws (drafted but yet to be enacted) limits the incentive of seed companies to invest in R&D or attract multinational joint ventures. Private sector R&D investment is purposed toward the hybrid segment.

7. Lack of robust demand assessment/forecasting
The lack of an attentively managed and widely accessible data system on actual cropped varietal acreage and private seed supply makes it difficult to develop longer-term production plans for breeder and foundation seed.

8. Rudimentary infrastructure
Seed supply is constrained by seed processing, drying, and preservation capacity. BADC has storage capacity of 150,000 MT for all crops. Although the government has encouraged the private sector to collaborate with BADC and contract it for processing and/or storage services, the extent to which this is happening is believed to be low. Seed dealer and marketing network infrastructure and capabilities remain less developed.
Shortage of Breeder Seed
25% of private sector demand being met

<table>
<thead>
<tr>
<th>Varieties</th>
<th>Demand 2016-17 (MT)</th>
<th>Demand 2017-18 (MT)</th>
<th>Production</th>
<th>Shortage (%)</th>
<th>Demand 2016-17 (MT)</th>
<th>Demand 2017-18 (MT)</th>
<th>Production</th>
<th>Shortage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>45</td>
<td>43</td>
<td>126</td>
<td>69%</td>
<td>357</td>
<td>426</td>
<td>157</td>
<td>67%</td>
</tr>
<tr>
<td>BRRI dhan28</td>
<td>30</td>
<td>28</td>
<td>53</td>
<td>78%</td>
<td>217</td>
<td>224</td>
<td>59</td>
<td>76%</td>
</tr>
<tr>
<td>BRRI dhan29</td>
<td>10</td>
<td>9</td>
<td>22</td>
<td>76%</td>
<td>83</td>
<td>119</td>
<td>28</td>
<td>78%</td>
</tr>
<tr>
<td>BRRI dhan58</td>
<td>0</td>
<td>2</td>
<td>16</td>
<td>12%</td>
<td>18</td>
<td>29</td>
<td>22</td>
<td>27%</td>
</tr>
<tr>
<td>BR26</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>51%</td>
<td>11</td>
<td>16</td>
<td>8</td>
<td>52%</td>
</tr>
<tr>
<td>BRRI dhan50</td>
<td>0</td>
<td>1</td>
<td>6</td>
<td>57%</td>
<td>15</td>
<td>12</td>
<td>7</td>
<td>43%</td>
</tr>
<tr>
<td>Others</td>
<td>4</td>
<td>3</td>
<td>22</td>
<td>-29%</td>
<td>13</td>
<td>26</td>
<td>31</td>
<td>-10%</td>
</tr>
</tbody>
</table>

The private sector, which includes large and SME-sized seed companies plus traders who function as small rice dealers are able to access 25% of the breeder seed they apply for.

In 2017-18, total demand was 469 MT, while actual production was only 157 MT, i.e., a 67% shortage.

BRRI cites the current level of breeder seed production are about 150% of actual rice seed requirement, based on calculations of seed multiplication ratios and the generation system of seed multiplication.

BRRI sees the shortage as the result of breeder seed being irrationally used as foundation seed. They point to the absence of the foundation seed multiplication stage as the reason for the shortages. Absence of regulation encourages smaller companies to directly multiply T/L seed from breeder seed.

Private seed companies/traders say that centralized procurement, collection, testing, processing, and sales drives up their cost of procuring breeder seed.

Source: Bangladesh Rice Research Institute Data & Stakeholder Interviews
Overregulation Restricts Development

Private sector share of OPV rice at ~26%, vs. 100% for maize

Rice is among five nationally important crops (rice, wheat, jute, potato, and sugarcane) monitored closely and designated as notified/controlled crops.

Varietal release of notified/controlled crops is subject to an evaluation and testing process by the Technical Committee on Seeds, while varieties of all other crops are registered prior to being sold without the stringent need for testing and approval.

Rigid policies and impractical rules have throttled varietal development/R&D activity in the private sector.

Comparatively, Maize is not a notified crop, and almost 100% of seeds are supplied by the private sector with a SRR of 100%.

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(1) (2) The National Seed Policy Draft, Ministry of Agriculture, Bangladesh
(4) Context Expert Analysis
Seed Replacement Rate in Bangladesh Lags India

Institutional EGS system alone unable to achieve high SRR

Bangladeshi and Indian rice seed systems benefit from the existence of robust public sector-led systems for breeder seed production and supply. However, the average SRR in India (~40%*) is significantly higher than in Bangladesh (28%).¹

**Comparative Analysis: SRR & Structure of Rice Seed Markets in Bangladesh & Study States in India**

<table>
<thead>
<tr>
<th>India Study States¹</th>
<th>SRR</th>
<th>Private</th>
<th>Public</th>
<th>Saved Seed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>OPV</td>
<td>Hybrid</td>
<td>OPV</td>
</tr>
<tr>
<td>Telangana</td>
<td>89%</td>
<td>59%</td>
<td>1%</td>
<td>29%</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>49%</td>
<td>3%</td>
<td>7%</td>
<td>39%</td>
</tr>
<tr>
<td>Punjab</td>
<td>34%</td>
<td>22%</td>
<td>3%</td>
<td>9%</td>
</tr>
<tr>
<td>BANGLADESH²</td>
<td>28%</td>
<td>5%</td>
<td>6%</td>
<td>17%</td>
</tr>
</tbody>
</table>

*India SRR ranges between 40% to 48% if considered informal seed distribution

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¹ Context Expert Analysis
² Seed Indent & Allocation Data, Seednet India Portal, Ministry of Agriculture and Farmers Welfare, Government of India
³ International Rice Research Institute Official Estimates
The key differentiator between Bangladesh & India has been seed policy decisions leading to the part played by private sector. Both countries undertook seed sector reforms in the 1990s, but distinctly different approaches were taken.

**Bangladesh**

- Bangladesh shifted its policy toward tighter regulation of five notified crops, including rice, and strengthened public sector varietal development and R&D capacity.
- For non-notified crops, reforms focused on facilitating seed imports to meet farmer seed requirements quickly.
- The private sector was given a secondary role in the multiplication and distribution of seed, with BADC retaining its preferential status.
- Seed policy reforms encouraged the private sector to engage in marketing of publicly developed modern varieties of rice, and imports of hybrid seeds.
- R&D capabilities and investment within the private sector – especially for OPV – has remained stunted, with an estimated 5 companies having R&D capacity.
- For a private seed company, starting a seed distribution and marketing program relying on imports or public sector R&D was relatively easy and profitable compared to starting a breeding and research program from scratch.

**India**

- In India, policy reforms encouraged the private sector across all crops, with R&D and germplasm development given special attention and public budgetary support.
- R&D capabilities and international collaborations were built up rapidly by the private sector.
- Of India’s 48% SRR, 12% of the overall market is served by a new proprietary OPV seed segment.
- These OPV products are predominantly selections/improvements made from public material because of the R&D and marketing capabilities of the private seed sector.

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(1) Context Expert Analysis
(2) Indent & Allocation Seeds Data, Seednet India Portal, Ministry of Agriculture and Farmers Welfare, Government of India
(4) International Rice Research Institute Official Estimates
Private Sector More Active in India
Bangladesh’s seed sector failing to keep pace

Seed Replacement Rate
SRR (%)

<table>
<thead>
<tr>
<th>Country &amp; Year</th>
<th>Public Inbred (OPV)</th>
<th>Private Improved / Researched (OPV)</th>
<th>Private Hybrid</th>
<th>Farmer-saved Seed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Distributed by Public</td>
<td>Distributed by Private</td>
<td>Imports</td>
<td>Domestic Production</td>
</tr>
<tr>
<td>IND</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>7%</td>
<td>1%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>2008</td>
<td>16%</td>
<td>2%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>2018</td>
<td>18%</td>
<td>2%</td>
<td>12%</td>
<td>0%</td>
</tr>
<tr>
<td>BNG</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>2%</td>
<td>0%</td>
<td>12%</td>
<td>0%</td>
</tr>
<tr>
<td>2008</td>
<td>9%</td>
<td>1%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td>2018</td>
<td>17%</td>
<td>5%</td>
<td>0%</td>
<td>1%</td>
</tr>
</tbody>
</table>

(1) SRR Data, Seednet India Portal, Ministry of Agriculture and Farmers Welfare, Government of India
(3) International Rice Research Institute Official Estimates
(6) Sarwer report/Public-Private Seed Sector in Bangladesh (Final draft)
In the last decade, India’s private sector developed a proprietary OPV segment because of stronger R&D capabilities, enhanced brand equity, and farmers’ willingness to pay the higher incremental cost of improved OPV rice. These products are primarily improvements made from public material.

(1) SRR Data, Seednet India Portal, Ministry of Agriculture and Farmers Welfare, Government of India
(3) International Rice Research Institute Official Estimates
(4) Sarwer report, Public-Private Seed Sector in Bangladesh (Final draft)
Market Dynamics
Production and Productivity Trends

Yield doubled between 1988 and 2018, while area remained constant

<table>
<thead>
<tr>
<th>Country</th>
<th>Area (Mha)</th>
<th>Production (MMT)</th>
<th>Yield (Hg/ha)</th>
<th>% of Total Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>43.79</td>
<td>112.91</td>
<td>3.87</td>
<td>22%</td>
</tr>
<tr>
<td>China</td>
<td>30.74</td>
<td>148.87</td>
<td>6.92</td>
<td>28%</td>
</tr>
<tr>
<td>Indonesia</td>
<td>12.25</td>
<td>37.00</td>
<td>4.76</td>
<td>11%</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>11.27</td>
<td>32.65</td>
<td>4.35</td>
<td>6%</td>
</tr>
<tr>
<td>Thailand</td>
<td>10.75</td>
<td>20.57</td>
<td>2.9</td>
<td>4%</td>
</tr>
<tr>
<td>Others</td>
<td>54.15</td>
<td>143.01</td>
<td>-</td>
<td>29%</td>
</tr>
<tr>
<td>Total</td>
<td>162.96</td>
<td>495.02</td>
<td>4.53</td>
<td>100%</td>
</tr>
</tbody>
</table>

Bangladesh is ranked fourth in the world in rice area and production. Rice area has remained relatively constant for the past three decades, while average yield has more than doubled.

Rice occupies >70% of Bangladesh’s cropped area.

Agriculture, therefore, is synonymous with rice in Bangladesh.

MARKET DYNAMICS

Bangladesh rice area, yield, productivity trend

Source: Foreign Agricultural Service, Official USDA Estimates & Bangladesh Bureau of Statistics
Bangladesh faces food security challenges due to its high population, diet changes, and limited area for expanding crop land and cropping intensity.

Natural calamities such as drought, flooding, and cyclones affect Bangladesh. With climate change and rising sea levels, its delta location is expected to see more flooding and salinization of agricultural lands, especially near the southern coast.

Rice security is not only an economic issue but also an important parameter for determining social and political stability.

Since independence in 1971, rice production has risen three-fold, from 11 MMT to a peak of 34 MMT in 2014-15. In recent years, the country has gained self-sufficiency in rice production and also entered the export market.

Population is expected to reach 215.4 million in 2050, requiring 44.6 MMT of clean rice. With the increased pace of production in the last five years, production could reach 47.2 MMT by 2050. 2.6 MMT is now being set as the target for clean rice surplus every year leading to 2050 and beyond.

A number of measures, such as guaranteeing minimum cropped areas; accelerating the rate of genetic gain in varietal development; and intensifying stakeholder collaboration to speed adoption of promising new rice varieties will all help Bangladesh achieve its rice vision for 2050 and beyond.

Sources:
1) United States Department of Agriculture, Foreign Agricultural Service
2) J.Timsina & Others (2018). Can Bangladesh produce enough cereals to meet future demand?. Agricultural Systems, 163, 36-44
3) Context Expert Analysis
70% of Cropped Area Seeded to Rice

Bangladesh grows rice through the year in 3 seasons: Aus, Aman & Boro

Rice area and production 2017 to 2019

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Aman (Monsoon)</td>
<td>5,700</td>
<td>12,500</td>
<td>5,873</td>
<td>13,500</td>
<td>5,880</td>
<td>13,600</td>
</tr>
<tr>
<td>Aus (Pre-monsoon)</td>
<td>1,100</td>
<td>2,350</td>
<td>1,145</td>
<td>2,500</td>
<td>1,175</td>
<td>2,600</td>
</tr>
<tr>
<td>Boro (Winter)</td>
<td>4,472</td>
<td>17,800</td>
<td>4,752</td>
<td>18,909</td>
<td>4,775</td>
<td>19,100</td>
</tr>
</tbody>
</table>

Rice crop calendar

Sources:

a) United States Department of Agriculture, Foreign Agricultural Service, Bangladesh Grain and Feed Annual Report Number: BG 1903
a) FAO/GIEWS, FAO/WPF CFSAM 2008
a) Bangladesh Bureau of Statistics
Rice Seasons in Bangladesh and Major Districts
Boro contributes 54% of production with 29% of the area

AMAN (monsoon)
BORO (winter)
AUS (pre monsoon)

Source: Bangladesh Bureau of Statistics
Complex Cropping Patterns in Bangladesh

Rice-rice, rice-wheat, and rice-maize systems most common

Cropping systems in Bangladesh are complex, highly intensive and diverse.

### Table: Cropping Systems in Bangladesh

<table>
<thead>
<tr>
<th>Name</th>
<th>Crops</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-F-R</td>
<td>Boro Rice – Fallow – Aman Rice</td>
<td>20</td>
</tr>
<tr>
<td>R-F</td>
<td>Boro/Aman Rice - Fallow</td>
<td>12</td>
</tr>
<tr>
<td>R-R-R</td>
<td>Boro Rice – Aus Rice – Aman Rice</td>
<td>10</td>
</tr>
<tr>
<td>R-M</td>
<td>Aman Rice – Rabi Maize</td>
<td>10</td>
</tr>
<tr>
<td>R-F-W</td>
<td>Boro Rice – Fallow – Wheat</td>
<td>7</td>
</tr>
<tr>
<td>R-Pu/V/P/O (6)</td>
<td>Aman Rice – Pulses/Veg/Oilseeds</td>
<td>7</td>
</tr>
<tr>
<td>R-M (10)</td>
<td>Potato – Kharif Maize</td>
<td>4</td>
</tr>
<tr>
<td>R-W/M-MB (6)</td>
<td>Aman Rice – Wheat/Maize – Mungbean</td>
<td>6</td>
</tr>
</tbody>
</table>

Rice cultivation has three seasons: aus/kharif 1 (mid-March to mid-July); aman/kharif 2 (June to December); and boro/rabi (mid-November to mid-May). While aman is a rain-fed crop, boro and aus crops are primarily cultivated under irrigation.

In irrigated conditions (boro and aus), farmers prefer purchasing quality seeds instead of using saved seeds. During the post-reform period, expansion in the irrigated rice area created steady demand for quality seeds and attracted private sector participation.

Prior to the reforms, BADC was the sole supplier of quality seeds for all rice segments. Although suitable boro rice seeds were available from China prior to 1993, the private sector was not allowed to participate because of the crop’s regulated status.

Later, when flooding caused a shortage in quality rice seeds for the 1998/99 season, the government allowed the private sector to import rice hybrid seeds from China. This segment now remains with the private sector.

Most of the rice hybrids are for boro rice, and there are currently several private sector players investing in R&D of new hybrid rice varieties. Aman varieties are long-duration type and mostly grown under rain-fed conditions. Since farmers rely on farmer-saved seeds for aman season, there is less seed demand from the market, thus limiting the participation of private seed companies, even after the reforms. However, a multinational company – Bayer – recently developed an aman hybrid rice seed.

Sources:
(a) J.Timsina & Others (2018). Can Bangladesh produce enough cereals to meet future demand?. Agricultural Systems, 163, 36-44
(b) Sarwer report.Public-Private Seed Sector in Bangladesh (Final draft)
(c) Context Expert Analysis
Major Rice Ecosystems and Contribution to Total Rice Production by Farm Size Segment

Marginal farmers and rainfed-irrigated ecosystems dominate

Proportion of production area by ecosystem

- Rainfed: 45%
- Irrigated: 39%
- Flood Prone: 14%
- Upland: 2%
- Shock: 2%

Distribution of production by farm size (%)

- Marginal (below 1 ha): 61.4%
- Small (1-2 ha): 26.8%
- Medium (2-3 ha): 7.3%
- Large (large than 3 ha): 4.6%
- Upland: 2%
- Irrigated: 39%
- Rainfed: 45%
- Flood Prone: 14%
- Shock: 2%

Sources:
(a) J. Timsina & Others (2018). Can Bangladesh produce enough cereals to meet future demand?. Agricultural Systems, 163, 36-44
(b) Bangladesh Bureau of Statistics
(c) Context Expert Analysis
An Emerging Trend in Rice

Aus season growth being promoted as overall area is stagnant

The government of Bangladesh (GOB) has a long-term plan to expand rice cultivation in the pre-monsoon (aus) rice season (March-August), in order to take advantage of the rainy season when no supplementary irrigation is required.

In order to persuade farmers, the GOB announced seed and input support to farmers producing rice in the aus season in FY (July-June) 2019-20.

The support package of BDT 41.8 million (US$0.5 million) to cultivate 61,354 hectares of aus paddy (representing only 4.49% of the total 13,65,412 hectares of targeted aus rice cultivation area) is expected to benefit 459,226 farmers in 64 districts.

Sources:
a) United States Department of Agriculture, Foreign Agricultural Service, Bangladesh Grain and Feed Annual Report Number : BG 1903
b) Bangladesh Bureau of Statistics
Bangladesh Seed Supply Scenario

Only 28% is bought seed* with 72% farmer-saved seeds

Sources:
- a) International Rice Research Institute Official Estimates
- b) Sarwer report, Public-Private Seed Sector in Bangladesh (Final draft)
- c) Context Expert Analysis

* Expert estimate that the seed replacement rate (SRR) for rice in Bangladesh is between 25% to 29%

About 70,000 MT of local variety rice seeds were also estimated to be used but not included here.
Informal Seed Markets Along Border

Large quantity of seed enters border districts from India

Bangladesh shares a long, porous border with India, with farmers having family and cultural ties across the border. There is a lot of informal material exchange outside the legal framework. A BMGF field study in Jessore, Dinajpur, and Nawabganj districts revealed the following observations:

Swarna and Miniket variety seeds in 30 kg packages enter Bangladesh informally at the Benapole area of Jessore district (Bangladesh packet is sold in 10 kg packet). These are Indian certified seeds, which are sold in the informal market at Tk.60 per kg.

Field visits in Dinajpur district revealed that in aman season, Swarna is cultivated on about 53% 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%, respectively.

The annual supply of high yielding variety rice seeds is still only 28% of Bangladeshi requirement (SRR), which has resulted in more unorganized seed production and informal cross-border trade. This is further aggravated by the lack of formal trade and cooperation in HYV rice seeds between the two countries.

<table>
<thead>
<tr>
<th>MARKET DYNAMICS</th>
<th>LOCAL HYV</th>
<th>%</th>
<th>INDIAN HYV</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapai Nawabganj</td>
<td>Aman</td>
<td>BRRI Dhan-34</td>
<td>1</td>
<td>Swarna</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BR-11</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Boro</td>
<td>BRRI Dhan-28</td>
<td>26</td>
<td>Parijat</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BRRI Dhan-29</td>
<td>14</td>
<td>Somsur</td>
</tr>
<tr>
<td>Jessore</td>
<td>Aman</td>
<td>Bina-7</td>
<td>11</td>
<td>Swarna (Guti, Kolamocha, Bulet)</td>
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<tr>
<td></td>
<td></td>
<td>BRRI Dhan-39</td>
<td>13</td>
<td></td>
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<tr>
<td></td>
<td>Boro</td>
<td>BRRI Dhan-50</td>
<td>24</td>
<td>Miniket</td>
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<tr>
<td></td>
<td></td>
<td>BRRI Dhan-28</td>
<td>21</td>
<td></td>
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<td></td>
<td></td>
<td>BR-26</td>
<td>24</td>
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<tr>
<td></td>
<td>Aus</td>
<td>BRRI Dhan-28</td>
<td>14</td>
<td>Miniket</td>
</tr>
<tr>
<td>Dinajpur</td>
<td>Aman</td>
<td>BRRI Dhan-34</td>
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<td>Swarna</td>
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<td></td>
<td></td>
<td>BRRI Dhan-50</td>
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<td>BR-11</td>
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<td></td>
<td>Boro</td>
<td>BRRI Dhan-28</td>
<td>33</td>
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<tr>
<td></td>
<td></td>
<td>BRRI Dhan-29</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

Source: CUTS/BMGF Study / Rice Seeds: A Study of Availability and Accessibility in Bangladesh and India
Competitive Hybrid Rice Seed Market

*In-country seed production is replacing imports in a flat market*

**Private Hybrid Seed Market Share (2018): 9000 MT**

- Supreme Seed Company, 22
- ACI Ltd., 8
- Bayer Crop Science Ltd., 18
- BRAC, 15
- Lalteer Seed Company Ltd., 5
- Syngenta BD Ltd., 5
- Ispahani Agro Ltd., 4
- BADC, 6
- Others, 12

**Bangladesh hybrid adoption area (in 1000 ha): 6% of Rice Area**

**Hybrid Rice Import vs. Local Production Trend**

- Hybrid Rice Import (%)
- Hybrid Rice Local Production (%)

**Sources:**
- a) Context Expert Analysis
- b) PQW, Department of Agricultural Extension
- c) Sudhir Chandra Nath (ACI Seed Business)
Bangladesh’s Rice Crop Is Vulnerable
*Cyclones and floods frequently slash rice production*

In Bangladesh, damage caused by natural disasters is one of the main sources of crisis. Every year, natural calamities such as floods, cyclones, erosion, and droughts cause extensive damage to crops.

Between 1960 and 2010, Bangladesh experienced 52 severe cyclones, with an approximate storm surge damage of 40%, the highest in the world.

The 2007 cyclone (Sidr) destroyed ~1.9 MMT of the *aman* crop, escalating prices and testing the government’s ability to procure rice.

In 2015, BRAC Executive Director Mahbub Hossain cited rice shortages of 1.9 MMT annually due to natural disasters.

**Illustration:** 2007 begun on a bleak note for Bangladesh, with 53,000 hectares (ha) of the May to November single-crop *boro* areas of Netrakona, Brahmanbaria, and Kishoreganj districts completely destroyed. Farmers did not get even 10% of the normal yield. Then came two waves of floods in August and September. In the first wave, the monsoon-swollen Brahmaputra and Meghna inundated nearly two-thirds of the country, damaging crops on more than 607,000 ha. When floodwater receded, farmers began transplanting *aman* paddy seedlings. Soon, a second wave of flood brought their work to naught and inundated 809,400 ha. The agricultural damage from the second flood was beyond recovery, as the deadline for planting *aman* paddy had passed by then.

**Sources:**
b) Context Expert Analysis
Floods in Bangladesh are a normal phenomenon and affect about 80% of land. Four types of flooding occur in Bangladesh: 1) Flash floods caused by overflowing of hilly rivers in eastern and northern Bangladesh (in April-May and in September-November), 2) Rain floods caused by drainage congestion and heavy rains, 3) Monsoon floods in the flood plains of major rivers (during June-September), 4) Coastal floods due to storm surges.

Sources:

b) Context Expert Analysis
Leadership
Rice Seed Deployment Value Chain Overview

Actors and functions by seed class

**SEED CLASS**
- Breeder seed
  - Maintenance
  - Production
  - Multiplication
  - Distribution
- Foundation seed
  - Multiplication
  - Production
  - Distribution
- TL/Certified seed
  - Producing
  - Drying
  - Processing
  - Grading
  - Distributing

**FUNCTION**
- Breeder seed
- Foundation seed
- TL/Certified seed

**ACTORS**
- BRRI, BINA, and universities
- BADC
- NGOs
- Seed co’s
- BADC via contract growers, seed companies, and NGOs
- Wholesalers/Seed dealers
- Retailers
- Rice farmers

**INSTITUTIONS**
- Ministry of Agriculture – policy regulation
- Seed Certification Agency (SCA)
- Dept. of Agricultural Extension (DAE)
Organizational Structure of the Rice Seed System

Bangladesh has a comprehensive system including Public, Private & NGO actors

Ministry of Agriculture

NSB
Policy, regulation, monitoring, implementation of seed policy

Technical Committee

Seed Promotion Committee

Public

SCA
Certification, quality control, implementation of seed rules & act

NARS:
BAR, BRRI, BUR, BSR, BNA, BAU, BMRAU...
Varietal seed development & research

BADC
Production, processing, marketing of rice seed

DAE
Introduces farmers to the new varieties & extension work

Private

Seed companies
Production and marketing of seeds of different crops

Seed associations
Collaborate with different stakeholders & liaises with MOA; protect private sector interest in seed industry

Seed traders/seed shop
Sell seeds to farmers

NGOs
More than 100 NGOs participate in the seed business

Farmers
Buys Seed/Uses home saved seed

Source: Dr. Md. Shafayet Hossain (BADC), Dr. Mohammad Khalequzzaman (BRRI), Dr. Md. Zakir Hossain (SCA)
Organizational Leadership Throughout Value Chain

*Individual components are working at different levels of efficiency*

**Classes of seed:**
- Varietal Development
- Breeder
- Foundation
- Certified
- Truthful Labelled Seed

**Quality control:**
- Breeders and Seed Certification Agency
- Producer, BRRI/NARS scientists, and SCA
- Producer, SCA (optional scientists)
- Producer (optional BRRI), SCA (market monitoring)

**Producer:**
- NARS (BRRI, BINA, BAU, BSMRAU, and other universities)
- BADC, NGOs, and private sector
- BADC, DAE, NGOs, and private sector
**Organizational Structure – Public Value Chain**

**Leadership Summary**

<table>
<thead>
<tr>
<th>ORGANIZATION</th>
<th>VALUE CHAIN ROLE</th>
<th>MAJOR FUNDING SOURCES</th>
<th>FINANCIAL SUSTAINABILITY</th>
</tr>
</thead>
</table>
| **A** National Agricultural Research and Extension System (NARS) (incl. BRRI, BAU, BINA, SMRAU, and other universities) | – Varietal development and R&D  
– Spearheading role in national agriculture programs’ varietal licensing  
– Production and maintenance of breeder seeds | – Government grants  
– Breeder seed sales | **SUBSIDIZED BY THE PUBLIC SECTOR**  
Source: Dr. Md. Shafayet Hossain (BADC), Dr. Mohammad Khalequzzaman (BRRI), Dr. Md. Zakir Hossain (SCA) |
| **B** Seed Certification Agency (SCA) | – Quality control / breeder, foundation, and certified seed certification  
– Varietal registration | – Government grants  
– Certification charges | **FINANCIALLY SUSTAINABLE**  
– Certified/quality seed sales  
– Equity and debt  
– Grants (for NGOs) |
| **C** Bangladesh Agricultural Development Corporation (BADC) | – Foundation and certified seed production  
– Distribution of seeds of foundation & certified seed  
– Provide service to stakeholders | – Government grants  
– Foundation & certified/quality seed sales | |
| **D** Department of Agricultural Extension (DAE) | – Dissemination of agricultural innovations  
– Production & distribution of quality seeds  
– Resolution of farmer issues | – Government grants  
– Certified/quality seed sales | |
| **E** Private sector and NGOs | – Foundation and certified seed production  
– Distribution of seeds  
– Varietal development and R&D | | |
Ministry of Agriculture (MoA) is the highest body for regulating the country’s seed sector through its Seed Wing established in 1992. The MOA is responsible for developing and implementing policies, regulations, and programs for the seed sector. All organizations engaged in Bangladesh’s seed system fall under the purview of the MOA.

**Funding Sources:**
- Government grants

**Sources:**
(a) Md. Shafayet Hossain (BADC), Mohammad Khalequzzaman (BRRI), Md. Zakir Hossain (SCA)
(c) Sarwer report. Public-Private Seed Sector in Bangladesh (Final draft)
**Variety Release**

The variety release and variety notification functions are 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 of major research institutions (BARI, BRRI, BJRI, SRTI), SCA, DAE, BADC, private sector seed growers, and farmers associations.

**Maintenance Breeding**

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

**Seed Multiplication**

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

**Import of Seeds**

- Except for 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.
- The Plant Quarantine Regulations provided under the Destructive Insect and Pest Act 1966 (as amended in 1989) are to be reviewed and reformed in order to simplify 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.

**Seed Quality Control**

Seed quality will be ensured by requiring seeds in labelled containers/packages to meet the standards specified on the label. 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.

*Source: National Seed Policy Documents*
Seed Certification Agency (SCA)

**Mandate**

The SCA (part of the MoA) is mandated to certify breeder and foundation seed and maintain quality assurance. The certification of seed by the SCA is optional and upon request.

- Certifies seeds produced by the public and private sectors through field verification and inspection of field and seed processing and preservation activities and conducting laboratory tests of seeds before placing certification tags.
- Collects samples and tests quality of seed already offered for sale, thus monitoring the quality of seed in the market. SCA conducts pre-release Distinctness, Uniformity, and Stability (DUS) and Value for Cultivation and Use (VCU) tests of candidate varieties before NCB release.
- Has 32 field offices and two seed testing laboratories, which are regarded as official seed testing laboratories of the country but are not yet accredited by the International Seed Testing Association (ISTA).
- Abides the standards presented in the “Seed Standard and Field Standards of seed crops” published in Bangladesh Gazette, 2010 approved in 70th NSB meeting, applicable for certified, foundation, and breeder seeds.

**Tests done for seed quality control**

- Moisture test
- Purity test
- Germination test
- Seed health test
- This activities are done primarily at each Seed Promotion Committee (SPC) and finally at the Central Seed Testing Laboratory, Dhaka
- For foundation and certified seed, SCA provides certification on the basis of field and seed standard.

**Funding Sources:**

- Government grants
- Certification & other charges

**SCA’s primary constraints are:**

1. Frequent turnover of skilled manpower due to transfers back to parent cadre, DAE.
2. Lack of accreditation from International Seed Testing Association (ISTA), which is a prerequisite for international trade.
3. Weak implementation of DAE quarantine rules for seed imports due to manpower, infrastructure, resource constraints.
4. Lack of phenotyping and advanced testing facilities.
5. Insufficient logistic support and manpower.

**Sources:**

a) Dr. Md. Zakir Hossain (SCA)
b) Sarwer report. Public-Private Seed Sector in Bangladesh (Final draft)
The new policy expands role of SCA to include:

- Advise seed producers on production, processing, and quality control of seeds
- Carry out post-market quality control through inspection and testing
- Collect data/information on seed production, processing, and quality control for use by the NSB
- Certify all breeder and foundation seed of controlled crops
- Certify seeds for seed enterprises as a service, if resources permit
- Coordinate the variety evaluation and release mechanism for notified crops
- Advise NSB on the denotification of varieties for reasons of poor performance or disease and pest susceptibility
- Help DAE in the promotion and use of improved seed of HYVs among farmers
- Collect samples of truthfully labelled seeds throughout the country and check their declared standards through appropriate tests

Source: Dr. Md. Zakir Hossain (SCA)
National Agricultural Research System (NARS)

Well-developed rice research system

The Bangladesh Rice Research Institute (BRRI), the Bangladesh Institute of Nuclear Agriculture (BINA) in the national agricultural research and extension system (NARS), and several agricultural universities play a key role in the development, evaluation, and release of rice varieties. The functions and activities of these institutions are influenced by the policy regulations of MoA. These institutions have a mandate to produce, process, and distribute breeder seed to the Bangladesh Agricultural Development Corporation (BADC), private seed companies and processors, and those NGOs with a mandate to produce foundation seed, certified seed, and truthfully labelled seed.

Coordinated by Bangladesh Agricultural Research Council (BARC).

The Bangladesh Agricultural Research Council (BARC) headed by an Executive Chairmen administers, supervises and monitors the activities in the NARS network.

Under the NARS network, six national research institute and public sector universities are involved in development of new improved varieties of crops which are released and registered by the NSB.

Bangladesh Rice Research Institute (BRRI)

- BRRI is a major component of NARS, focusing on research and development in relation to rice production.
- BRRI produces breeder seed on its own farms. It performs all its own postharvest activities (drying, processing, grading, and storage), using its own infrastructure at its headquarters in Gazipur. It also distributes and sells breeder seed to BADC, private seed companies, and NGOs engaged in rice seed production and marketing.
- BRRI produces around 150 MT of different high yielding varieties of rice breeder seed each year. Its biggest client is BADC, which purchases 50%, with the remaining 50% being sold to private seed companies and NGOs across the country.
- BRRI meets around 90% of BADC’s demand, but barely 25% of private-sector demand. Some 90% of the private seed companies use breeder seed to produce foundation seed, which is sold directly to farmers for commercial rice growing; they do not produce certified seed or TLS.

Sources:
a) Dr. Md. Zakir Hossain (SCA)
b) Sarwer report. Public-Private Seed Sector in Bangladesh (Final draft)

Sarwer (Research Paper)
The NSP provides the following guidelines/directives for the NARS:

Variatel 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 due to 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, NARS will:

- Reorient its plant breeding programs to develop varieties that respond to sustainable high-input, high-output technology, emphasizing diversified crops such as oilseeds, pulses, cereals (other than rice), vegetables, fruits, etc. that fit into rice-based cropping systems. NARS will respond to farmers' current demands for varieties and crops.

- Design breeding programs keeping in mind the opportunity of importing improved seed in order to economically obtain improved varieties.

- Develop adequate maintenance breeding units at its regional/central research stations.

- Coordinate variety development programs between scientists and institutes in both public and private sectors by developing common objectives and testing procedures.

Sources:
(a) National Seed Policy Document, Ministry of Agriculture, Bangladesh
(b) Sarwer report.Public-Private Seed Sector in Bangladesh (Final draft)
**BADC and DAE Roles**

*(Bangladesh Agricultural Development Corporation and Department of Agricultural Extension)*

### Bangladesh Agricultural Development Corporation (BADC)

- Established in 1962, BADC is the largest seed producer and supplier in the country.
- It is mandated to provide technical support to private sector seed enterprises through services for their seed processing, preservation, and quality control, and its registered contract seed growers through training and supervisions.
- BADC multiplies breeder seed procured from NARS for production of foundation and certified seed for distribution to contract seed producers and farmers (at subsidized prices), respectively. It primarily focuses on producing OP seed varieties.
- A state-owned enterprise, BADC has 31 seed multiplication farms, 28 seed processing centers, 12 cold storage warehouses, and 100 seed sale centers.
- With the largest rice seed drying, processing, grading, and storage facilities in the country (a few private seed companies and NGOs have similar, but more limited facilities), BADC makes these facilities available to small and medium seed companies.

### Department of Agricultural Extension (DAE)

- Responsible for disseminating agricultural innovations, such as new seed varieties and other technologies to farmers.
- DAE builds awareness through its block supervisors and model farms countrywide.
- Responsible through its Plant Protection Wing (PPW) for enforcing phytosanitary requirements for seed imports at 27 entry points (two seaports, three airports, 21 land ports, and one rail port).
- Monitors farmers’ response/demand for varieties and transmits these preferences to the NSB so that adjustments to production of breeder and foundation seed can be made.
- Promotes new varieties to farmers through demonstration plots and advises NSB on developments in the seed sector.
- Creates suitable career structure for seed technologists in all agencies to achieve staff continuity and retention of experience.
- Improves facilities at entry points for laboratory testing and post-entry quarantine testing.

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**Funding Sources:**

- Government grants
- Foundation and certified/quality seed sales
Since 1965, the International Rice Research Institute (IRRI) has worked with Bangladesh. Its first initiative in Bangladesh was a Ford Foundation program testing 303 rice varieties, which was also IRRI’s first international intervention on rice.

### Key Contributions

- **Conserved rice genetic diversity** – 7,133 rice germplasms from Bangladesh are currently stored at the IRRI Genebank.

- **Better rice varieties** – Bangladesh has released 108 improved rice varieties, accounting for more than 80% of the total rice production. IRRI directly or indirectly contributed for the development of about 80% of these varieties.

- **Stronger research capacity** – Since 1965, IRRI supported 229 Bangladeshi scholars, fellows, and interns and 893 on-the-job trainees.

- **Conservation of natural resources** – Improved technology and management practices enhanced efficient use of resources. For example, water-efficient technologies reduced water consumption by 15%–30% without compromising rice yield.

- **Higher productivity** – Rice yield increased from 1.7 t/ha in 1971 to 4.4 t/ha now.

- **Mechanized farming** – Modernized farm machinery services have been introduced, combined with farmer education.

- **Better resilience to climate change** – Flood, drought, salinity tolerant rice varieties, and climate-smart agricultural practices increased farmers’ resilience to climate change.

- **Improved rural livelihood** – The use of innovative rice science increased rice yield, minimized production risks, widened market access, boosted rice profitability, and increased income of rural household.

- **PETRRA** – The Poverty Elimination Through Rice Research Assistance or PETRRA project was managed by the International Rice Research Institute (IRRI) in close collaboration with BRRI. Building the seed net, improving seed health, and variety development hybrids) were important contributions by PETRRA.
Private Seed Sector Overview

Relatively few companies conduct their own R&D

There are ~100 larger companies, approximately 15 of whom sell seeds on a national scale and have established their own seed production and processing facilities. These national companies are establishing internal R&D departments, which are in different stages of development.

Only 4-5 companies conduct their own seed research comprehensively, which is primarily focused on vegetables, maize, and rice hybrid seed varieties. Because most private seed businesses do not have research departments, many purchase breeder seeds from NARS institutes for seed multiplication.

Some companies import and sell foreign seed varieties, or produce hybrid varieties from imported parent lines (acquired through licensing agreements) for domestic and export sale.

A few companies have seed testing laboratories, but none to date have ISTA accreditation. A number of seed companies have developed seed marketing network through seed dealers, but in most cases, they use BADC seed dealers in their marketing network.

Seed dealers are the link between farmers and seed suppliers. They also act as extension agents to popularize quality seed. Currently, there are more than 17,500 registered seed dealers.

Some of the larger companies are Lal Teer Seed Company Ltd., Supreme Seed Company Ltd., Getco Agro Vision, Partex Agro Ltd., Rahim Afroz Ltd., Metal Seed Ltd., and ACI Seed and are also engaged in R & D activities on seeds. Multinational seed companies Bayer Crop Science Ltd., McDonald, Syngenta BD Ltd., Namdhari, Mollica Seed Company, etc. also have operations here.

Sources:
(b) Sarwer report. Public-Private Seed Sector in Bangladesh (Final draft)
(c) Context Expert Analysis

PRIVATE SECTOR FACILITIES
– A GLIMPSE

– Dehumidified storage facilities: 11,000MT
– Ambient storage facilities: 35,000MT
– Seed grading facilities: 50,000MT
– Experienced QC professionals: 100+
– > 33,000 registered seed dealers & 160,000 retailers
– > 7,000 skilled seed contract growers
– > 1,200 experienced seed production professionals

Source: ACI SC Nath
Private Sector Seed Companies

Supreme Seed Ltd. and ACI Limited lead within private sector

**Supreme Seed Ltd:** Market leader in hybrid rice (~25% market share hybrid rice)

Supreme Seed was founded in the year 1978. It specializes in production, processing, marketing, and breeding of field crop and vegetable seeds. It is currently working toward further genetic improvements, infrastructure, and resource development. The company sells about 2000 MT of hybrid rice, mostly developed and produced domestically. All of its rice hybrids are produced on large owned or leased farms and not by outgrowers as in most other Asian countries. Supreme Seed also sells OPV rice and other crops such as vegetable seeds and corn.

**PROCESSING:** Has two seed processing facilities. The facility in Trishal, Mymensingh, can process 10MT/hour, and the facility in Taraganj, Rangpur, can process 5MT/hour.

**STORAGE:** Has one dehumidified temperature-controlled seed storage facility of 4000MT at Trishal, Mymensingh and another seed storage facility of 1700MT in Taraganj, Rangpur.

**QUALITY CONTROL:** Has three seed testing laboratories: Trishal, Mymensingh; Taraganj, Rangpur; and Dhaka.

**ACI Seed Limited:** First private company likely to release OP variety (~7% market share hybrid rice)

ACI started its seed business in 2006 and has its own R&D stations at 1) Rural Development Academy, Bogra, Bangabandhu Sheikh Mujibur Rahman Agricultural University (BSMRAU), Gazipur 2) Central Research Station (CRS) Gazipur, Mawna 3) Bangladesh Agricultural University, Mymensingh. ACI entered a partnership with IRRI to initiate a state-of-the-art rice breeding program in Bangladesh. Bayer CropScience Ltd also partners with ACI on aman rice. ACI has own biotechnology research laboratory Advanced Seed Research and Biotech Center (ASRBC) in Gulshan, Dhaka. By 2022, ACI says it plans to market 40,000 MT of hybrid and self-pollinating rice seed annually for deployment on 1.8 million hectares, which would be ~16% of the country’s rice area. This would be a dramatic shift, increasing the private sector supply of rice seed, which is currently estimated at 2% annually.

**Current proportion of revenue from ACI’s seed**

- OP rice represents 33% of ACI’s overall business.
- Hybrid rice represents 45%.
- Vegetable and maize represent 12%,/misc. other seed at 10%.

Sources:
(a) Sudhir Chandra Nath (ACI Seed Business)
(b) Supreme Seed Company Limited Website
(c) Context Expert Analysis
Non-governmental organizations (NGOs)

Active NGO participation in seed supply is unique to Bangladesh

Strong NGO involvement in the seed supply chain is a unique feature of the seed system of Bangladesh. A number of NGOs participate in Bangladesh’s rice seed production and marketing, including BRAC, an international NGO with a large stake in the country. Some NGOs are also multiplying and selling seeds in the country. Proshika, Gono Kalyan Trust, TMSS, Jagarani Chakra Foundation (JCF) & Shushilan are other key NGOs active in seed business.

BRAC, which is based in Bangladesh, is one of the largest NGOs in the world, and is present in all 64 districts of Bangladesh, as well as 14 other countries in Asia, Africa, and the Americas. It employs more than 100,000 people and is partly self-funded through social enterprises that include dairy, seed, chicken, and other food or agriculture projects and a chain of retail stores called Aarong.

BRAC Seed and Agro Enterprise has three agricultural research and development centers in Gazipur, Bogra (Sherpur), and Dinajpur (Birol) conducting applied research on plant tissue culture, vegetables, rice, and maize. It has a soil-testing laboratory (capacity of testing around 3,000 soil samples/year. The researchers focus on R&D for new varieties that meet the needs of both regional farmers and consumers. **BRAC has developed five hybrid rice varieties, four hybrid maize varieties, 10 hybrid vegetable varieties, and three OP vegetable varieties. It has registered 12 hybrid rice exotic varieties through government authorities.**

With 22 production centres and about 7,000 contract farmers around the country, BRAC is the **largest producer of hybrid maize seed and second-largest producer of potato seed.** It has the largest market share for rice seed (hybrid and high-yielding varieties), maize seed, potato seed and vegetable seed. The seed and agro enterprise has five seed processing centers with a processing capacity of 12,000MT per year, along with 11 modern storage systems with the capacity of 4,400MT.

**BRAC’s seed and agro enterprise has built the value chain system of production and distribution through a wide network of 450 dealers and more than 4,500 sub-dealers around the country. BRAC Seed and Agro Enterprise is now marketing 26 hybrid varieties and 27 open pollinated varieties of vegetable seed, 13 hybrid varieties and 19 high-yield varieties of rice seed, 14 hybrid varieties of maize seed and 5 varieties potato seed. BRAC Seed and Agro Enterprise has 19% market share in hybrid rice, 23% in hybrid maize, 36% in potatoes (of organised seed supplied) and 8% in vegetables. In tandem, BRAC is also importing quality seeds regularly to increase the national production of high-yielding varieties invented across the globe.**

**Sources:**
(a) BRAC Website
(b) Sarwer report, Public-Private Seed Sector in Bangladesh (Final draft)
(c) Context Expert Analysis
## Varietal Release Process and Agencies

### NSB plays key role in variety release

<table>
<thead>
<tr>
<th>Agency</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NARS</td>
<td>Under National Agriculture Research System (NARS), Bangladesh Rice Research System (BRRI) and Bangladesh Institute of Nuclear Agriculture (BINA) are the leading players in rice research and varietal development.</td>
</tr>
<tr>
<td>SCA</td>
<td>Seed Certification Agency (SCA) conducts pre-release Distinctness, Uniformity and Stability (DUS) and Value for Cultivation and Use (VCU) tests of candidate varieties. Field trials are sometimes done by the private sector as well.</td>
</tr>
<tr>
<td>TC</td>
<td>Varieties of controlled crops (including rice) must be released by the Technical Committee (TC) of NSB headed by BARC Executive Vice Chairman and consisting of representatives of major research institutions (BARI, BRRI, BJRI, SRTI), SCA, DAE, BADC, private sector seed growers, and farmers associations. TC advises NSB regarding variety development, release, and notification, based on information generated through trials and tests conducted by the SCA and the private sector.</td>
</tr>
<tr>
<td>NSB</td>
<td>The National Seed Board (NSB) releases varieties of seeds under the provisions of the Seeds Ordinance. New varieties of controlled crop are subject to notification by the NSB, while other varieties of crops that are imported or locally developed by a private person, company, or agency must be registered with the NSB, giving prescribed cultivar descriptions, but not be subject to any other restrictions.</td>
</tr>
</tbody>
</table>

Private companies and other agencies are encouraged to undertake plant breeding programs and allowed to import breeder/foundation seeds of notified crops for variety development and promotion purposes.

SCA advises NSB on the de-notification of varieties for reasons of poor performance or disease and pest susceptibility.
**Varietal Development: Agencies**

*Public sector develops varieties, while private sector leads hybrids*

---

### Key Takeaways

- In the rice (Inbreed) / OP variety segment, NARS (BRRI and BINA) are the leading players.
- In hybrids, the private sector dominates.
- Local hybrid production by private sector has increased rapidly since 2015, reducing the volume of imports.

---

**Emerging public-private partnership model**

ACI, a private seed company, recently released the first proprietary OP variety developed in partnership with a public university (Rajshahi University).

---

**Number of Varieties & Hybrids Released/Registered Through 2018**

<table>
<thead>
<tr>
<th>Source</th>
<th>Rice (Inbreed)</th>
<th>Rice (Hybrid)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private organizations</td>
<td>0</td>
<td>148</td>
</tr>
<tr>
<td>BADC</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>BSMRAU</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>BAU</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>BINA</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td>BRRI</td>
<td>92</td>
<td>6</td>
</tr>
</tbody>
</table>

*Sources:*

- (a) Sudhir Chandra Nath (ACI Seed Business)
- (b) BRRI Annual Report 2017-18
- (c) Context Expert Analysis
**Active Varieties Maintained by BRRI**

95 varieties (including 14 local) are now maintained

<table>
<thead>
<tr>
<th>Season</th>
<th>Type</th>
<th>Number</th>
<th>Variety Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aman</td>
<td>Modern varieties</td>
<td>44</td>
<td>BR4, BR5, BR10, BR11, BR21, BR22, BR23, BR24, BR25, BRRI dhan27, BRRI dhan30, BRRI dhan31, BRRI dhan32, BRRI dhan33, BRRI dhan34, BRRI dhan37, BRRI dhan38, BRRI dhan39, BRRI dhan40, BRRI dhan41, BRRI dhan42, BRRI dhan43, BRRI dhan44, BRRI dhan46, BRRI dhan48, BRRI dhan49, BRRI dhan51, BRRI dhan52, BRRI dhan53, BRRI dhan54, BRRI dhan56, BRRI dhan57, BRRI dhan62, BRRI dhan66, BRRI dhan70, BRRI dhan71, BRRI dhan72, BRRI dhan73, BRRI dhan75, BRRI dhan76, BRRI dhan77, BRRI dhan78, BRRI dhan79, BRRI dhan80</td>
</tr>
<tr>
<td></td>
<td>Local improved varieties</td>
<td>8</td>
<td>Nizersail, Latisail, Rajasail, Kalijira, Kataribhog, Basmati-D, Patnai23, Tilockkachari</td>
</tr>
<tr>
<td>Boro</td>
<td>Modern varieties</td>
<td>37</td>
<td>BR1, BR2, BR3, BR6, BR7, BR8, BR9, BR12, BR14, BR15, BR16, BR17, BR18, BR19, BR26, BRRI dhan28, BRRI dhan29, BRRI dhan35, BRRI dhan36, BRRI dhan45, BRRI dhan47, BRRI dhan50, BRRI dhan55, BRRI dhan58, BRRI dhan59, BRRI dhan60, BRRI dhan61, BRRI dhan63, BRRI dhan64, BRRI dhan65, BRRI dhan67, BRRI dhan68, BRRI dhan69, BRRI dhan74, BRRI dhan81, BRRI dhan84, BRRI dhan86</td>
</tr>
<tr>
<td></td>
<td>Local improved varieties</td>
<td>6</td>
<td>Hbj Boro II, Hbj Boro IV, Hbj Boro VI, Hbj Boro VIII, Purbachi, IR8</td>
</tr>
</tbody>
</table>

**Source:** BRRI Annual Report 2017-18
Seasonal Segments for Varietal Development

Room for hybrid market development in Aman & Aus

Sources:
(a) United States Department of Agriculture, Foreign Agricultural Service, Bangladesh Grain and Feed Annual Report Number: BG1903
(b) BRRI Annual Report 2017-18
(c) Context Expert Analysis

Boro season has highest yield across all types, and aus is lowest.

Hybrids are largely used in boro, room for hybrid development is high in other seasons.

The active number of seasonal varieties are aus 21, aman 41, and boro 41.
BRRI reports older-generation varieties (released before 1990) and traditional varieties are widely used by farmers, despite availability of new improved varieties for Bangladesh. This preference suggests older varieties’ satisfactory grain quality and yield, as well as farmers’ resistance to premium prices and change in general.

However, slow adoption of modern varieties also points to shortcomings in the seed system that will require attention, chiefly:

- Development of new varieties with traits superior enough to incentivize farmers and millers to change.
- A more efficient extension system that releases new varieties to farmers in a targeted manner and also targets millers and input dealers.
- Less dependency on BADC to fulfil the huge demand of rice seed for the whole country.

A study by BRRI for improving diffusion among different stakeholders highlighted:

- Farmers feel performance of newly released varieties did not satisfy their expectations;
- The seeds of varieties that performed a bit better in the local demonstrations were not sufficient, as BADC and others produced only the most dominant and popular varieties currently in vogue.
- BADC and private seed traders said the lack of information on location-specific demand for particular varieties — by season — resulted in insufficient supply of newly released varieties.
- Most actors in the rice seed value chain strongly recommended commercial cultivation of seed by progressive farmers as a strategy to ensure quality seed supply to farmers as a whole.
- Expert personnel and key informants suggested the following strategies to reduce adaptation lag of the newly released varieties:
  a. Large-scale demonstration of potential varieties in particular region in suited to cultivation.
  b. Arrangement of field days for farmers and private seed traders to see variety performance.
  c. Preparation and circulation of region- and season-specific production manuals to farmers and extension personnel at the field level.
  d. Developments & provision of smart-phone based applications to farmers and extension personnel.
  e. Creation and circulation of leaflets and stickers to familiarize farmers, extension personnel, and private traders with the traits and special characteristics of newly released varieties.

Source: BRRI Annual Report 2017-18
Demand Planning and Operations
### Demand Planning and Operations

*Rudimentary process attempts to involve all stakeholders*

<table>
<thead>
<tr>
<th>NSB Seed Promotion Committee (SPC) decides national seed production targets and plan in the presence of all key players.</th>
<th>The Seed Promotion Committee of NSB decides the national seed production targets in the presence of representatives from MoA, BADC, DAE, NARS, SCA, and the private sector. The DAE transmits farmer preferences to the NSB of older and new varieties. The committee emphasizes multiplication of newly released varieties, as well as maintenance of different varieties as per specific demand.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top-down BS production plan done under SPC, with BRRI solely responsible for production and distribution.</td>
<td>A breeder seed (BS) demand and production plan is done under the SPC. BRRI is the sole player producing BS on its own facilities and distributing through the sustainable network. In the last 17 years, BRRI client/BS indenters apply for increased from 20 to 873 and distribution increased from 4 MT to 126 MT.</td>
</tr>
<tr>
<td>Foundation and quality seed is multiplied at individual organization level, using out-growers.</td>
<td>Foundation (FS) and quality seed is multiplied at the individual organization level by BADC, NGOs and private companies using out-growers. BADC, (rice market share of 65%) predominantly manages the country’s seed multiplication and distribution of improved varieties, as per demand and SPC recommendations. 90% of BADC seeds are produced by contract/out-growers. Larger private companies have similar processes. Small players are not well organized and indulge in ad-hoc methods.</td>
</tr>
<tr>
<td>Smaller local companies and NGOs complain about shortage and high cost for BS.</td>
<td>The trader-small rice dealers cum seed multipliers segment is allotted only 25% of their demand or need which is a sore point. They also believe centralized procurement, collection, testing, processing, and sales of BS pushes up their cost. BRRI maintains this level of allotment &amp; shortage seed is due to the absence of FS multiplication by this segment. These players multiply TL seeds directly from BS as it is not restricted nor regulated.</td>
</tr>
</tbody>
</table>
National Rice Seed Production Planning

A undeveloped system largely involving stakeholder consultations

Factors considered while deciding national seed production targets:

- Variety requirement assessed by DAE
- Trends of BADC seed sales
- Resources available for seed production
- Long-term production targets

NARS recommendations based on varietal extent, focus on popularizing newly released varieties and maintenance of different varieties as per current estimation of demand.

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**National Seed Production Plan**

Seed Promotion Committee of NSB decides on national seed production targets in presence of representatives from MoA, BADC, DAE, NARS, SCA and Private Sector.

**Breeder Seed Plan**

Breeder Seed Production plan preparation supervised by Seed Promotion Committee

The breeder seed indent is factored into the breeder seed plan along with national targets.

**Deadline for breeder seed application:**

- **Boro:** 15th October
- **Aman:** 15th May
- **Aus:** 28th February

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**Sources:**
(a) Dr. Mohammad Khalequzzaman (BRRI)
(b) Bangladesh Rice Research Institute Website
(c) Context Expert Analysis

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**Dr. Md. Shafayet Hossain, Deputy Director, BADC: Constraints**

- Insufficient facilities & technical manpower in BADC & SCA. Seed wings of BADC & SCA has not been strengthened and monitoring, quality control and regulatory system have not been improved as per expectation. Private sector cannot yet utilize processing and preservation facilities of BADC during peak periods
- Farmer preferences not being met sufficiently; desired varieties with specific biotic & abiotic stress tolerance/grain qty not available/ reach farmers
- Lack of updated statistics on crop wise cultivable land & private sector seed. It is difficult to ascertain the quantity of the seed supplied by the private sector. (No established system to collect information from the PS). Without such figure planning for seed supply becomes erratic. Absence of demand assessment or forecasting mechanism
- Unstable market price of produced paddy & other crops /Injudicious and high seed price unaffordable to the farmers
- Seed companies & dealers have access to breeder seed without any restriction in the seed rules. Many of them receive Breeder Seed from BRRU/BINA but most of them have nothing except dealership license from MoA
- Improper seed production and marketing plans/Contract growers can’t get their seed payment in time
- Complexity in taking quick decisions & traditional seed marketing systems
BRRI: Breeder Seed Production and Distribution

*Seed network partners increased from three in 1998 to >1000 in 2018*

BRRI is the sole player producing BS at its own facilities and distributing through the sustainable seed network.

The private sector was not interested in growing or selling rice seed until national seed rules took effect in 1998, after which NGOs and private sector agencies began approaching BRRI for breeder seed.

A formal system called the sustainable seed network was established at BRRI. It was supported by IRRI and started under a PETRRA project (Poverty Elimination Through Rice Research Assistance) funded by the United Kingdom Department for International Research (DFID).

The number of partners in the network increased from three in 1998 to >1000 in 2018.

**Sources:**
(a) Dr. Mohammad Khalequzzaman (BRRI)
(b) Bangladesh Rice Research Institute Website
(c) Context Expert Analysis
BRRI Production Up Dramatically in Last 20 Years

However, breeder seed demand still outpaces capacity

In the last 17 years, BRRI BS distribution increased from 4 MT to 126 MT.

Increasing demand has led BRRI to produce BS at all of its substations and then transported to BRRI’s Gazipur headquarters to be processed and graded. No buffer stocks of BS are maintained, nor does BRRI have suitable storage infrastructure.

BS requires certification from the SCA; to obtain this, its standards must be maintained every step of the way.

The network has placed a heavy load on BRRI with ever-increasing demand stretching the available capacity.

BRRI has proposed a three-tier structure (yet to be ratified) to determine allotment of BS based on the capacities of organizations requesting it.

Sources:
(a) Dr. Mohammad Khalequzzaman (BRRI)
(b) Bangladesh Rice Research Institute Website
(c) Context Expert Analysis
**Shortage Hits Private Sector Hardest**

*Only 25% of private sector demand is now met*

<table>
<thead>
<tr>
<th>Varieties</th>
<th>2016-17 (MT)</th>
<th></th>
<th></th>
<th>2017-18 (MT)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Demand</td>
<td>Production</td>
<td>Shortage (%)</td>
<td>Demand</td>
<td>Production</td>
<td>Shortage (%)</td>
</tr>
<tr>
<td></td>
<td>BADC</td>
<td>Private</td>
<td></td>
<td>BADC</td>
<td>Private</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>357</td>
<td>126</td>
<td>69%</td>
<td>43</td>
<td>426</td>
</tr>
<tr>
<td>BRRI dhan28</td>
<td>30</td>
<td>217</td>
<td>53</td>
<td>78%</td>
<td>28</td>
<td>224</td>
</tr>
<tr>
<td>BRRI dhan29</td>
<td>10</td>
<td>83</td>
<td>22</td>
<td>76%</td>
<td>9</td>
<td>119</td>
</tr>
<tr>
<td>BRRI dhan58</td>
<td>0</td>
<td>18</td>
<td>16</td>
<td>12%</td>
<td>2</td>
<td>29</td>
</tr>
<tr>
<td>BR26</td>
<td>1</td>
<td>11</td>
<td>6</td>
<td>51%</td>
<td>1</td>
<td>16</td>
</tr>
<tr>
<td>BRRI dhan50</td>
<td>0</td>
<td>15</td>
<td>6</td>
<td>57%</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>Others</td>
<td>4</td>
<td>13</td>
<td>22</td>
<td>-29%</td>
<td>3</td>
<td>26</td>
</tr>
</tbody>
</table>

Private sector/trader-small rice dealers and seed multipliers are able to access 25% of the breeder seed they apply for.

In 2017-18, total demand was 469 MT, while actual production was only 157 MT, i.e., a 67% shortage.

BRRI cites the current level of breeder seed production are about 150% of actual rice seed requirement, based on calculations of seed multiplication ratios and the generation system of seed multiplication.

BRRI sees the shortage as the result of breeder seed being irrationally used as foundation seed. They point to the absence of the foundation seed multiplication stage as the gap/missing link as the reason for the shortages. Absence of regulation encourages smaller companies to directly multiply T/L seed from breeder seed.

Private seed companies/traders say that centralized procurement, collection, testing, processing, and sales drives up their cost for procuring breeder seed.

**Sources:**

(a) Bangladesh Rice Research Institute Data & Interview with Dr. Mohammad Khalequzzaman (BRRI)

(b) Context Expert Analysis
BS Distribution by Season and Agency

Breeder seed use % by agency is inverse of quality seed market share

BS Distribution Quantity by Entity Type (MT)

- Private
- NGO
- Government

Number of Breeder Seed Demanders by Sector and Season

( # of unique agencies/orgs.)

<table>
<thead>
<tr>
<th>Season</th>
<th>Private</th>
<th>NGO</th>
<th>Government</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boro 2017-18</td>
<td>860</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td>Aus 2018</td>
<td>12</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>T. Aman 2018</td>
<td>255</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Private companies play an increasing role and currently source more BS than the public sector. *Though BADC supplies >65% of quality seed, BS allotment does not reflect this. At 31% it is inverse of market share.*

Sources:
- a) BRRI Annual Report 2017-18
- b) Context Expert Analysis
BADC Seed Multiplication

90% of seeds produced by contract growers

BADC manages seed multiplication (foundation and certified) and distribution of improved varieties based on demand and SPC recommendations.

The SPC recommends the varieties and quantities of seeds for different crops to the BADC each year.

BADC procures BS from research organizations mainly from BRRI, BINA, etc. and multiplies at its own farm or with out-growers.

90% of the total seed volume is produced by out-growers.

BADC payment to out-growers is often delayed.

**BADC Contract Growing Zone Totals**

<table>
<thead>
<tr>
<th>Description</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contract growing zones for all crops</td>
<td>75</td>
</tr>
<tr>
<td>Contract farmers/out-growers</td>
<td>71,537</td>
</tr>
<tr>
<td>Command area (ha)</td>
<td>87,208</td>
</tr>
</tbody>
</table>

Source: Dr. Md. Shafayet Hossain (BADC)
BADC’s Vast Seed Network spans Bangladesh

*Network spans production, processing, preservation and marketing*

- **Production**
  - Cereal seed multiplication farm 24
  - Buffer stock of seed 10
  - Contract growing zone 15
  - Rice, wheat & maize seed centers 12
  - Cereal processing centers 16
  - Cereal processing centers 12
  - Regional sales centers 22
  - Upazila seed sales centers 36
  - Zila seed sales centers 42
  - Seed dealers 8052

- **Marketing**
  - Farmers

- **Seed Standard**
  - Field standard
  - Seed standard
  - Quality seed

- **Demand Planning and Operations**

Source: Dr. Md. Shafayet Hossain (BADC)
BADC: Rice Seed Distribution

Seed production slated to increase 14% in 2020-21

Rice Seed Distribution by season (MT)

<table>
<thead>
<tr>
<th>Name</th>
<th>Land (Lac ha)</th>
<th>Current Distribution</th>
<th>Seed Production Projection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2017-18</td>
<td>2018-19</td>
<td>2020-21</td>
</tr>
<tr>
<td>Aus</td>
<td>10.25</td>
<td>1,936</td>
<td>2,100 2,700</td>
</tr>
<tr>
<td>Aman</td>
<td>55.71</td>
<td>17,847</td>
<td>22,000 28,000</td>
</tr>
<tr>
<td>Boro</td>
<td>46.85</td>
<td>67,309</td>
<td>68,000 69,000</td>
</tr>
<tr>
<td>Total Rice Seed</td>
<td>112.27</td>
<td>87,092</td>
<td>92,100 99,700</td>
</tr>
</tbody>
</table>

Source: Dr. Md. Shafayet Hossain (BADC)
Department of Agricultural Extension (DAE)

Key role in farmer support and knowledge sharing

The DAE plays a role in diffusing knowledge about HYVs to farmers and providing them with technical support.

Its share in rice seed market is 10-11%, supplying around 13,000 MT of HYV quality rice seed procured from BADC. The DAE also facilitates seed production and sales efforts by large progressive farmers.

The DAE monitors farmers’ response/demand for varieties and communicates these preferences to the NSB so that adjustments to BS and FS production can be made.

Rice Quality Seed Supplied (MT)

<table>
<thead>
<tr>
<th>Year</th>
<th>BADC</th>
<th>DAE</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-14</td>
<td>78510</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2014-15</td>
<td>76928</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2015-16</td>
<td>80400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2016-17</td>
<td>87064</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2017-18</td>
<td>88000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources:

a) Dr. Md. Shafayet Hossain (BADC), Dr. Mohammad Khalequzzaman (BRRI), Dr. Md. Zakir Hossain (SCA)
b) Sarwer report. Public-Private Seed Sector in Bangladesh (Final draft)
Financial Sustainability
Overview – Financial Sustainability

New initiatives aim to level public/private playing field

<table>
<thead>
<tr>
<th>Financial Sustainability</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dominant public seed sector enjoys government subsidy, not focused on cost recovery</td>
<td>BRRI and BADC receive government grants and their overhead expenditure and infrastructure costs are wholly subsidized. Public organizations are seen to provide a service to the country and therefore are not focused on cost recovery. Illustrating this is the fact that BADC hybrid seed price is just one-half that of the private sector price.</td>
</tr>
<tr>
<td>Hybrid seed production more profitable than OPV</td>
<td>Production and marketing of hybrid rice seeds is more profitable than OPVs. The private sector therefore focuses on hybrids, and OPV remains the domain of the public sector.</td>
</tr>
<tr>
<td>GOB incentivizes private sector through tax exemptions and concessionary duties</td>
<td>A government industrial support program has made private sector investment in the seed industry eligible for significant incentives such as tax exemption (tax holidays), concessionary duty on imported capital machinery, facilities for full repatriation of invested capital, profits and dividends, and income tax exemption up to three years for expatriate employees. Joint venture operation is allowed and easy to undertake.</td>
</tr>
<tr>
<td>Subsidies that drove low seed prices and increased penetration need to be phased out to level the playing field</td>
<td>Government programs to encourage farmers to switch to purchased seed and better varieties has been supported by subsidy programs that lowered seed prices. Subsidies need to be phased out to create a level playing field between the public and private sectors. The seed policy supports this move, but change is slow and subsidies still skew the market.</td>
</tr>
</tbody>
</table>
Rice Farmer Profitability is Negligibly Impacted by the Cost of Seed

<table>
<thead>
<tr>
<th></th>
<th>Small Farmers (Tk./ha)</th>
<th>Medium Farmers (Tk./ha)</th>
<th>Large Farmers (Tk./ha)</th>
<th>All Farmers (Tk./ha)</th>
<th>All Farmers US $/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VARIABLE COST</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Power tiller cost</td>
<td>1,730</td>
<td>1,820</td>
<td>1,888</td>
<td>1,796</td>
<td>$21</td>
</tr>
<tr>
<td><strong>Labor cost</strong></td>
<td>17,335</td>
<td>20,028</td>
<td>23,104</td>
<td>20,156</td>
<td>$239</td>
</tr>
<tr>
<td>Seed cost</td>
<td>554</td>
<td>429</td>
<td>540</td>
<td>517</td>
<td>$6</td>
</tr>
<tr>
<td>Fertilizer cost</td>
<td>1,787</td>
<td>2,029</td>
<td>2,193</td>
<td>1,959</td>
<td>$23</td>
</tr>
<tr>
<td>Manure cost</td>
<td>891</td>
<td>200</td>
<td>0</td>
<td>469</td>
<td>$6</td>
</tr>
<tr>
<td>Insecticides</td>
<td>217</td>
<td>200</td>
<td>245</td>
<td>219</td>
<td>$3</td>
</tr>
<tr>
<td>Irrigation charges</td>
<td>1,716</td>
<td>1,782</td>
<td>1,911</td>
<td>1,786</td>
<td>$21</td>
</tr>
<tr>
<td><strong>A. Total variable cost</strong></td>
<td>24,230</td>
<td>26,485</td>
<td>29,879</td>
<td>26,865</td>
<td>$318</td>
</tr>
<tr>
<td><strong>FIXED COST</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest on operating capital</td>
<td>2,944</td>
<td>3,514</td>
<td>2,234</td>
<td>2,907</td>
<td>$34</td>
</tr>
<tr>
<td>Land use cost</td>
<td>466</td>
<td>406</td>
<td>417</td>
<td>437</td>
<td>$5</td>
</tr>
<tr>
<td><strong>B. Total fixed cost</strong></td>
<td>3,410</td>
<td>3,920</td>
<td>2,652</td>
<td>3,344</td>
<td>$40</td>
</tr>
<tr>
<td><strong>C. Total cost</strong></td>
<td>27,640</td>
<td>30,405</td>
<td>32,531</td>
<td>30,246</td>
<td>$358</td>
</tr>
<tr>
<td><strong>D. Total return</strong></td>
<td>37,379</td>
<td>36,870</td>
<td>36,790</td>
<td>37,086</td>
<td>$439</td>
</tr>
<tr>
<td><strong>E. Net return</strong></td>
<td>10,293</td>
<td>6,894</td>
<td>4,799</td>
<td>7,329</td>
<td>$87</td>
</tr>
</tbody>
</table>

Profitability of Rice Production

Prices and profitability depend on govt policy and subsidy

The price of rice remains a sensitive factor for producers, consumers, and policy makers. Govt monitors and intervenes here recurrently as it affects poorer consumers who derive most of their calories from rice, and it matters to producers (i.e., farmers) for whom rice cultivation often accounts for a large share of total annual household income.

The share of seed cost has been 2%–5% of the total variable cost of production for the past two decades, ranging from 500 to 560 Tk/ha or around 6 USD/ha.

Net earnings for farmers in boro and aman are around 1 Tk/kg. In aus, earnings are less than 1 Tk/kg. Overall, aman is usually the most profitable season.

Comparative financial profitability of rice in different planting seasons

<table>
<thead>
<tr>
<th></th>
<th>Boro 2016/17</th>
<th>Aman 2017/18</th>
<th>Aus 2017/18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit price of grain (Tk/kg)</td>
<td>23</td>
<td>22</td>
<td>20</td>
</tr>
<tr>
<td>Unit cost of production (Tk/kg)</td>
<td>20</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Boro 2016/17</td>
<td>Aman 2017/18</td>
<td>Aus 2017/18</td>
</tr>
<tr>
<td>Unit price of grain (Tk/kg)</td>
<td>21</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td>Unit cost of production (Tk/kg)</td>
<td>21</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Boro 2017/18</td>
<td>Aman 2017/18</td>
<td>Aus 2017/18</td>
</tr>
<tr>
<td>Unit price of grain (Tk/kg)</td>
<td>19</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Unit cost of production (Tk/kg)</td>
<td>19</td>
<td>18</td>
<td>20</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th></th>
<th>Boro</th>
<th>Aman</th>
<th>Aus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tk/ha</td>
<td>10,887</td>
<td>12,947</td>
<td>4,925</td>
</tr>
<tr>
<td>US$/ha</td>
<td>131</td>
<td>156</td>
<td>59</td>
</tr>
<tr>
<td>Yield (kg/ha)</td>
<td>5,760</td>
<td>4,471</td>
<td>4,612</td>
</tr>
</tbody>
</table>

Sources:
(a) BRRI Annual Report 2017-18
(b) United States Department of Agriculture, Foreign Agricultural Service, Bangladesh Grain and Feed Annual Report Number: BG1903
(c) Context Expert Analysis
Rice Seed Prices

OPV and public sector seed prices are artificially low

<table>
<thead>
<tr>
<th>Seed Class</th>
<th>Price USD/kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breeder Seed</td>
<td>1.19</td>
</tr>
<tr>
<td>Foundation Seed</td>
<td>0.59</td>
</tr>
<tr>
<td>Quality Seed</td>
<td>0.45</td>
</tr>
</tbody>
</table>

Seed procurement and sales price of all classes of seed are fixed by NSB.

BADC out-growers’ net income is usually about 15% more than commercial grain cultivation (grain procurement prices and seed production yields are taken into account to ensure this).

BADC dealers get around 7% margin on seed prices.

### Comparative Seed Prices – Public & Private (2018)

<table>
<thead>
<tr>
<th>Price USD/kg</th>
<th>BADC</th>
<th>Private Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPV Seed</td>
<td>0.44</td>
<td>0.55 (to 0.60)</td>
</tr>
<tr>
<td>Hybrid Seed</td>
<td>2.38</td>
<td>3.57 (to 3.75)</td>
</tr>
</tbody>
</table>

**Dr Hossain:**

The cost of producing TLS is estimated to be around 0.30 USD per kg (Tk 25/kg) and the sale price is 0.45 USD per kg (Tk 38/kg); when the costs of transportation, processing, and storage are taken into account, the profit margin is only about 5%–10%, without considering any overhead.

The cost of production of hybrid seed is estimated at around 1.19 USD per kg (Tk 100/kg) and the sale price is around 3.57 USD per kg (Tk 300/kg).

When the transportation, processing, and storage costs are added, the profit margin is 20%–25%.

Hybrid seed production is more profitable then HYVs for all actors in the value chain.

Sources:

a) Dr. Md. Shafayet Hossain (BADC), Dr. Mohammad Khalequzzaman (BRRI), Dr. Md. Zakir Hossain (SCA)

b) Context Expert Analysis
**BRRI - Financial Information**

*Funded through government grants*

**Statement showing actual grants (income)**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>2015-16</th>
<th>2016-17</th>
<th>2017-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Grant: (Including Salary and Allowances)</td>
<td>7.9</td>
<td>11.2</td>
<td>12.3</td>
</tr>
<tr>
<td>Capital Grant</td>
<td>0.1</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>7.9</td>
<td>11.3</td>
<td>12.4</td>
</tr>
</tbody>
</table>

**Statement showing the approved budget allocation of BRRI for FY2018-19**

<table>
<thead>
<tr>
<th>Particulars</th>
<th>2018-19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary Support</td>
<td>4.7</td>
</tr>
<tr>
<td>Allowance Support</td>
<td>2.4</td>
</tr>
<tr>
<td>Goods &amp; Service Support</td>
<td>3.6</td>
</tr>
<tr>
<td>Special Grant</td>
<td>0.1</td>
</tr>
<tr>
<td>Other Grant</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>12.5</td>
</tr>
</tbody>
</table>

BRRI budget comes directly from the Ministry of Finance. Local needs and salaries of officers and staff are met from annual revenue budget from the same office.

BRRI also receives grants-in-aid from several international organizations and sources for the purchase of laboratory equipment, construction of facilities, training scientists, and to meet costs of expatriate scientists. These sources include Asian Development Bank (ADB); Canadian government through the Canadian International Development Agency (CIDA); International Development Research Council (IDRC); Ministry of Overseas Development Administration, UK; JICA, Japan; Agency for International Development (AID), USA; International Fund for Agricultural Development (IFAD); Korea International Cooperation Agency (KOICA); Bill and Melinda Gates Foundation; IRRI; and Norway Embassy.

**Sources:**

a) BRRI Annual Report 2017-18
b) Bangladesh Rice Research Institute Website
**BADC – Grants/Subsidies and Net Profits**

**Government Grant/Subsidy to BADC (USD million)**

- 2011-12: 33.1
- 2012-13: 34.7
- 2013-14: 25.6
- 2014-15: 27.2
- 2015-16: 37.0
- 2016-17: 44.6
- 2017-18: 51.8

**Reported Net Profit of BADC (USD million)**

- 2011-12: 0.0
- 2012-13: 2.6
- 2013-14: 0.4
- 2014-15: 0.7
- 2015-16: 0.0
- 2016-17: 0.0
- 2017-18: 1.9

Sources:
- Bangladesh Economic Review – 2018 (Finance Division) State-Owned Enterprises – Table 9.2: Government Grant/Subsidy

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BADC - Financial Information

<table>
<thead>
<tr>
<th></th>
<th>GoB</th>
<th>PA</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total expenditure under revenue (USD million)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crop (7 programs)</td>
<td>10.5</td>
<td>0.0</td>
<td>10.5</td>
</tr>
<tr>
<td>Irrigation (28 programs)</td>
<td>6.0</td>
<td>0.0</td>
<td>6.0</td>
</tr>
</tbody>
</table>

|                                |     |     |       |
| **Total expenditure for 19 projects under annual development program (USD million)** |     |     |       |
| Crop (10 projects)             | 28.4| 10.4| 38.8  |
| Irrigation (9 projects)        | 23.9| 0.9 | 24.7  |
| Total (54)                     | 68.8| 11.2| 80.0  |

1. Production of Improved Cereal Seeds Through Seed Multiplication Farms
2. Improved Cereal Seed Production Through Contract Growers
3. Procurement, Processing, and Distribution of Improved Cereal Seeds Program
4. Jute Seed Program
5. Agro Service Center
6. National Vegetable Seed Program
7. Buffer Stock of Seed and its Management Program
8. Integrated Quality Horticulture Development Project
9. Tuber Crops Development Project
10. Enhancing Quality Seed Supply Project
11. Establishment of Seed Multiplication Farm in Southern Coastal Region
12. Construction of Rubber Dam for Small and Medium Rivers for Increased Crop Production
13. Mujibnagar Integrated Agricultural Development Project
14. Integrated Agricultural Productivity Project
15. Integrated Agricultural Project in Peropur-Gopalgonj-Bagerhat
16. Maintenance, rehabilitation of BADC Existing Fertilizer Godowns (warehouses) and Strengthening of Fertilizer Management Activities Project
17. Establishment of Pulse and Oil Seed Multiplication Farm and Seed Processing Center at Subarnachar Upazilla in Noakhali District

There are 19 projects under the Annual Development Program (ADP) and 35 programs under revenue implemented by BADC. Out of 19 projects, 10 are under crop sub-sectors and nine are under irrigation sub-sectors. Out of 35 programs, seven are under crop sector and 28 are under irrigation sector.

Source: Bangladesh Agricultural Development Corporation Annual Report 2014-15, Pg No.99-102
Enabling Environment
Overview - Enabling Environment

Rigid policies prevent emergence of robust private sector

With rice being a notified crop, BADC with subsidy support has dominated market share (65%) and stifled the development of a profitable private sector. A cultural and historical tendency toward welfarism and socialism has influenced seed policies and driven subsidies, but policy measures are now underway to reform and promote the private sector.

An active and strong private sector is now recognized as necessary to meet Bangladeshi farmers’ seed needs, and the public sector is tasked with catalyzing the capacity of the private sector. Efforts are underway to remove policy bottlenecks and gradually phase out subsidies, and the private sector has adequate representation in regulatory bodies like NCB and committees on regulatory reform to advocate on behalf of industry interests.

BRRI and GOB have multiple programs with major international agencies focused on rice and the rice seed system. About 80% of the current mega varieties have IRRI contribution directly or indirectly in their development. BRRI has collaborations and currently receives grants-in-aid from more than 10 international organizations, and it maintains and advances these collaborations proficiently.

NGO participation is a unique and long-standing aspect of the Bangladeshi rice seed system, with NGOs engaged in seed multiplication and distribution and playing an essential role in getting reasonably priced seeds to farmers in remote villages. Among the NGOs, BRAC has a fairly large stake in the Bangladeshi seed sector, impacting activities throughout the value chain, including varietal development, policy advocacy, and seed distribution.
National Seed Policy (NSP)

Overview, varietal development and seed development strategy

The NSP 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 a timely basis and at competitive price. The NSP has provisions, among other things, for liberalization 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 NSP is on the institutional arrangement of the seed sector.

Strategy for Seed Development

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

Development and Promotion of Improved Seed Varieties

- Variety development programs are, as a matter of priority, be focused on generation of high-input and high-output technologies.
- The NARS will continue to pursue plant breeding programs 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.
- Improved varieties of seeds and planting materials should be procured and introduced 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.
- Private persons, companies, and other agencies will be encouraged to undertake plant breeding programs and allowed to import breeder/foundation seeds of notified crops for variety development and promotion purposes.

Source: National Seed Policy Documents
# Evolution of Fertilizer Marketing and Distribution Systems in Bangladesh Since the Mid-70s

<table>
<thead>
<tr>
<th>Year</th>
<th>Areas of Reform</th>
<th>Measures Taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid 70s</td>
<td>Fertilizer Distribution system</td>
<td>Replacing OMS (old Marketing System) by NMS (New Marketing System). From total public sector monopoly to largely competitive free marketing system.</td>
</tr>
<tr>
<td>1982-83</td>
<td>Pricing of fertilizer</td>
<td>Farm level prices were decontrolled by April 1983. Largely replaced the BADC’s retail trade of fertilizer.</td>
</tr>
<tr>
<td>1984-85</td>
<td>Privatization of sale of fertilizer</td>
<td>By July 1985, BADC closed almost all 423 Thana Sale Centres (TSCs). By mid 1988, 8000 wholesalers and dealers lifted (collection of fertilizer by the dealer from the distribution point) 97 percent of the total quantity of fertilizer sold from Primary Distribution Points (PDPs).</td>
</tr>
<tr>
<td>March, 1989</td>
<td>Private sector lifting from factory/farm ends</td>
<td>Government allowed direct sales of urea from all five factories beginning March 14, 1989. The government also allowed the distributors to lift TSP and MP from port/ factory.</td>
</tr>
<tr>
<td>1992</td>
<td>Privatization of import</td>
<td>The government excluded fertilizers from the list of restricted imports and allowed the private sector to import fertilizer. The subsidy on fertilizers was withdrawn completely in December 1992 and importation and distribution of fertilizer made open.</td>
</tr>
<tr>
<td>1995</td>
<td>Reversal of Urea Marketing policy</td>
<td>The open market system for domestically produced Urea experienced an asset back in 1995. Government decided to bring the market under its direct control to mitigate the ensuing crisis reintroducing controls on the marketing and distribution of Urea.</td>
</tr>
<tr>
<td>1996</td>
<td>Re-introduction of fertilizer subsidy.</td>
<td>The subsidy on the imported fertilizer was introduced for the first time.</td>
</tr>
<tr>
<td>2007</td>
<td>Urea Crisis</td>
<td>Introduction of slip system</td>
</tr>
<tr>
<td>2008</td>
<td>Urea Crisis</td>
<td>In the dealership policy 2008, by cancelling Upazila based system, provision was made for appointing at least one dealer for each union.</td>
</tr>
<tr>
<td>2009</td>
<td>Urea Crisis</td>
<td>In the new dealership policy introduced in 1st October 2009 modified dealership system ‘Farmers’ Register’, ‘Fertilizer Distribution Card’ and ‘Fertilizer Distribution Register’ were introduced.</td>
</tr>
<tr>
<td>2010</td>
<td>Open market sale re-introduced</td>
<td>‘Fertilizer Distribution Card’ and ‘Fertilizer Distribution Register’ are no longer prevailing. Farmers purchase urea from the sub-dealers at a price fixed by government while they buy non-urea fertilizers from the open market at market price.</td>
</tr>
<tr>
<td>2012</td>
<td>Substantial subsidy for non-urea fertilizer</td>
<td>Price of non-urea fertilizer drastically reduced. Price of TSP per Kg. subsidized from Tk. 80 to Tk. 22, MOP from Tk. 70 to Tk. 15 and DAP from Tk. 90 to Tk. 27.</td>
</tr>
</tbody>
</table>

**Source:** Titumir and Sarwar, 2006; Chowdhury and Uddin, undated; Barkat et al., 2010; and Jaim, 2012.
### Irrigation: Policies, Reforms, & Regulatory Situation

#### Policies, Reforms and Regulatory Situation, and Impact Regarding Irrigation System and Technology in Bangladesh

<table>
<thead>
<tr>
<th>Reference year</th>
<th>Policies/reforms/regulation</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1972-1977</td>
<td>Publicly owned DTWs and LLPs, rented out by BADC to individual farmers or groups. Rental charges were low (subsidized); STWs were sold without subsidy (Hossain 1988); Subsidized credit was given to rich persons to buy STWs (Palmer-Jones 1992); the operation of all types of irrigation equipment was subject to regulatory control by BADC.</td>
<td>Use of irrigation expanded; a huge financial burden of the government; often wealthy farmers and individuals enjoyed the benefit of government subsidy.</td>
</tr>
<tr>
<td>1978-1984</td>
<td>Reform begun in 1978-79; private sector was allowed to import and distribute STWs subject to regulations related to brands, horse power, water lifting capacity, fuel type etc.; subsidy on DTWs and LLPs was reduced;</td>
<td>By 1983, 43% of operating DTWs, 48%–56% of the LLPs and almost 100% of STWs were sold to private sector (individuals or groups); The coverage of irrigation increased from 1,689.1 ha in 1979-80 to 4,725.63 ha in 2004-05.</td>
</tr>
<tr>
<td>1985-1987</td>
<td>Government established a workable foreign exchange market and ended many non-tariff barriers (Gisselquist et al. 2002);</td>
<td>During the 1985–2000 period, total area under irrigation more than doubled: from 1.77 million ha in 1984/85 to 4.03 million ha in 1999/2000.</td>
</tr>
<tr>
<td>1988-1989</td>
<td>Unrestricted private imports were allowed and duties on imported machinery were removed; regulations on standardization of irrigation equipment were totally withdrawn (compulsory registration was suppressed); tariff cuts on diesel engines from irrigation from 15% to 0% (Gisselquest and Grether 2000);</td>
<td>From 1988 to 1996 operation of small pumps increased to 170%; 16% of gross cropped area were brought under new irrigation; retail price of diesel engines for irrigation fell by more than 50%; STWs occupies about 59% of total area irrigated as against 23% in 1986-87 (Chowdhury and Uddin undated)</td>
</tr>
<tr>
<td>2007-2009</td>
<td>Direct subsidy for irrigation on per acre of irrigated land; reduced the price of diesel during the Boro season</td>
<td>Reduced cost of production of Boro paddy.</td>
</tr>
<tr>
<td>2009</td>
<td>Subsidy for diesel operated irrigation pumps / engines were given. Farmers having less than 2 acres of land (irrespective of whether they were tubewell / pump owners or purchase irrigation water) were paid Taka 800 subsidy per person.</td>
<td>Small farmers were benefitted as a result of reduced irrigation cost.</td>
</tr>
<tr>
<td>2010 and at present</td>
<td>No subsidy on diesel or to the individual farmers for irrigation was given.</td>
<td>Irrigation cost increased, affected mostly the water purchasers.</td>
</tr>
</tbody>
</table>

Source: Hossain, 1988; Palmer-Jones, 1992; Gisselquest and Grether, 2000; Jaim (Field survey, 2012)
Evolving Public-Private Relationship

**Fear of Corporate Greed:** Discussions revealed a socialistic hangover from the past, and public sector officials have reservations about the private sector assuming a more prominent role. Whatever be the policy on paper, officials feel that if private seed companies get what they want, they will enjoy a monopoly business and increase prices accordingly. Public entities like BRRI and BADC see themselves as a “check” on corporate greed.

**OPV Investment Rides on Even Playing Field:** Private companies feel it’s not a level playing field in OP, which is why they prefer to invest in their hybrid lines. This is leading to underinvestment by the private sector in expanding OP offerings – especially new varieties released by BRRI – that could better serve farmers' needs than the older, mega varieties (BR-28 and BR-29).

**New Awareness Bridging the Public/Private Gap:** Increasingly, it is recognized that an active and strong private sector is imperative to meeting Bangladeshi farmers’ seed needs. Things are slowly changing, nudged by the political leadership/general economic climate that wants better services to the farmer which the public sector is not able to provide quickly nor efficiently. As per new law in 2018, the private sector can release their rice OP varieties.

Public sector is now being tasked with playing a catalytic role in improving the capacity of the private seed sector. Efforts are on to improve the private system, remove policy bottlenecks, gradually phase out subsidies, and hold regular consultations to improve the current system. The private sector has adequate representation in regulatory bodies like NCB and committees on regulatory reform to advocate on behalf of industry interests.

**Source:** Context Expert Analysis