

Early Generation Seed Case Study

Bangladesh Rice

JUNE 2019



Bangladesh Rice Case Study

Executive Summary

1. Market Dynamics
2. Leadership
3. Research & Varietal Development
4. Demand Planning & Operations
5. Financial Sustainability
6. Enabling Environment

Appendix

Acronyms



ABBREVIATIONS	DESCRIPTION
BADC	Bangladesh Agricultural Development Corporation
BARC	Bangladesh Agricultural Research Council
BARI	Bangladesh Agricultural Research Institute
BJRI	Bangladesh Jute Research Institute
BINA	Bangladesh Institute of Nuclear Agriculture
BRRRI	Bangladesh Rice Research Institute
BSMRAU	Bangabandhu Sheikh Mujibur Rahman Agricultural University
DAE	Department of Agricultural Extension
EGS	Early Generation Seed
HYVs	High Yielding Varieties
IRRI	International Rice Research Institute
ISTA	International Seed Testing Association
MoA	Ministry of Agriculture
NARS	National Agricultural Research System
SRTI	Sugar Research Institute Of Bangladesh
OPV	Open Pollinated Variety
NSB	National Seed Board
PS	Private Sector
SCA	Seed Certification Agency
SPC	Seed Promotion Committee
SRR	Seed Replacement Rate

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**Thank you
for your time
and support
in the development
of this case study
on the
Bangladesh Rice
EGS System**

Stakeholders Consulted

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Ms. Fawzia Yesmin	Director, Agribusiness	Ispahani Seed Ltd

A background image of a lush green rice field with tall stalks and developing grain heads. A dark blue horizontal band is overlaid across the middle of the image, containing the title text.

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.

EGS System Pain Points (1 of 2)

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 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

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

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.

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)¹ monitored closely and designated as *notified/controlled crops*

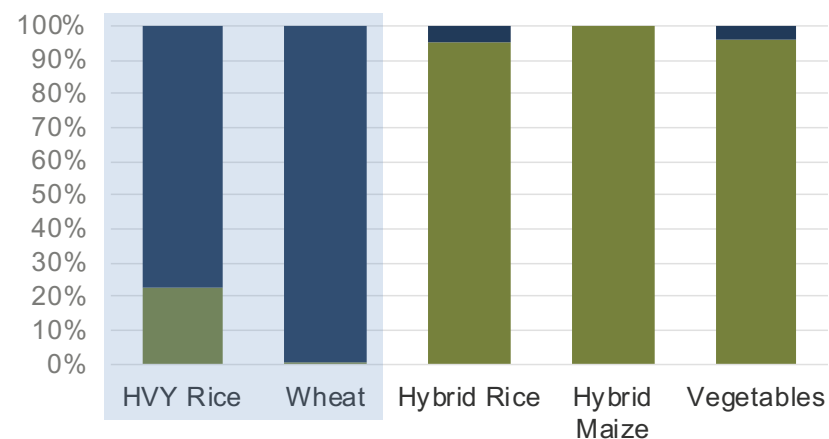
Varietal release of *notified/controlled* crops is subject to an evaluation and testing process by the Technical Committee on Seeds, while varieties of all other crops are registered prior to being sold without the stringent need for testing and approval.²

Rigid policies and impractical rules have throttled varietal development/R&D activity in the private sector.³

Comparatively, Maize is not a notified crop, and almost 100% of seeds are supplied by the private sector with a SRR of 100%.⁴

Controlled Crops vs Other Crops
Seed Market Share

■ Private ■ Public



(1) (2) The National Seed Policy Draft, Ministry of Agriculture, Bangladesh

(3) Deepthi and Others (2018). Seed industry and seed policy reforms in Bangladesh: impacts and implications. International Food and Agribusiness Management Review. Volume 21 Issue 7, 989-1001

(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

India Study States ¹	SRR	Private		Public		Saved Seed
		OPV	Hybrid	OPV	Hybrid	
Telangana	89%	59%	1%	29%	0%	11%
Chhattisgarh	49%	3%	7%	39%	0%	51%
Punjab	34%	22%	3%	9%	0%	66%
BANGLADESH²	28%	5%	6%	17%	0%	72%

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

Policy Decisions Stymie High SRR in Bangladesh

Private-sector policy, a key difference between Bangladesh & India

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 taken¹

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.

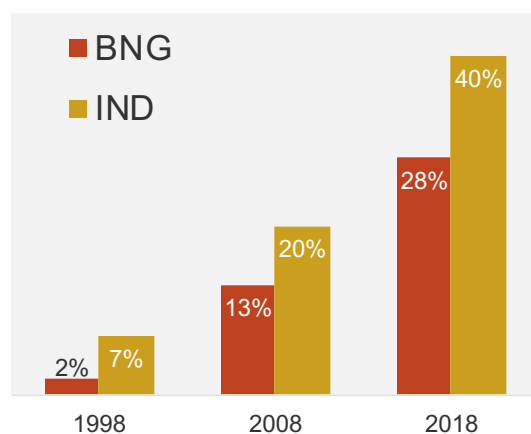
Of India's 48% SRR, 12% of the overall market is served by a new proprietary OPV seed segment.

These OPV products are predominantly selections/improvements made from public material because of the R&D and marketing capabilities of the private seed sector.

Private Sector More Active in India

Bangladesh's seed sector failing to keep pace

Seed Replacement Rate
SRR (%)



Country & Year	Public Inbred (OPV)		Private Improved / Researched (OPV)	Private Hybrid		Farmer-saved Seed
	Distributed by Public	Distributed by Private		Imports	Domestic Production	
IND	1998	7%	1%	0%	0%	93%
	2008	16%	2%	0%	3%	80%
	2018	18%	2%	12%	8%	60%
BNG	1998	2%	0%	0%	0%	98%
	2008	9%	1%	0%	1%	87%
	2018	17%	5%	0%	1%	72%

(1) SRR Data, Seednet India Portal, Ministry of Agriculture and Farmers Welfare, Government of India

(2) Agricultural Statistics at a Glance 2017, Ministry of Agriculture and Farmers Welfare, Government of India, Page No. 375-377

(3) International Rice Research Institute Official Estimates

(4) David J. & Others (2016). Towards better metrics and policymaking for seed system development: Insights from Asia's seed industry. Agricultural Systems, 147, 111-122

(5) Lutfur Rahman & Others (2004) Market-led Initiatives for Seed Production and Product Processing in Bangladesh, Bangladesh Journal of Political Economy Vol. 20, No 1

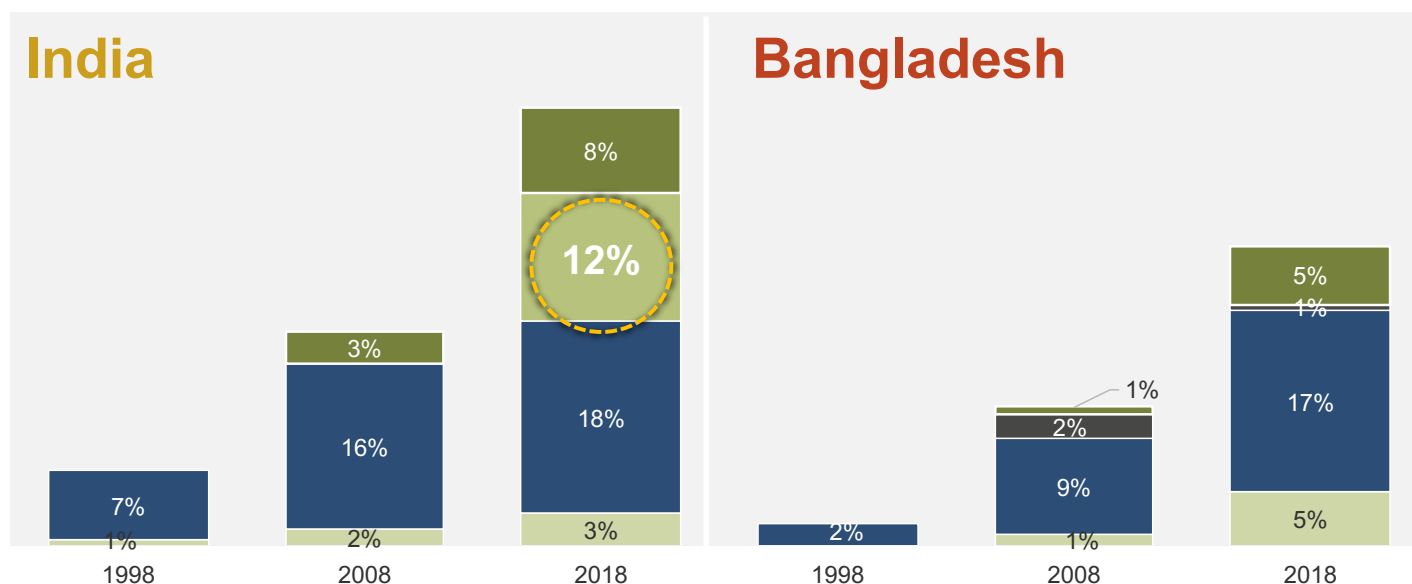
(6) Sarwer report. Public-Private Seed Sector in Bangladesh (Final draft)

EXECUTIVE SUMMARY

Bangladesh & India Rice Seed Market Structure

Proprietary OPV segment is the key difference

- Private Hybrid Domestic Production
- Private Hybrid Imports
- Proprietary OPV
- Public Inbred (OPV) Distributed by Public
- Public Inbred (OPV) Distributed by Private



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
 (2) Agricultural Statistics at a Glance 2017, Ministry of Agriculture and Farmers Welfare, Government of India, Page No. 375-377
 (3) International Rice Research Institute Official Estimates
 (4) Sarwer report.Public-Private Seed Sector in Bangladesh (Final draft)



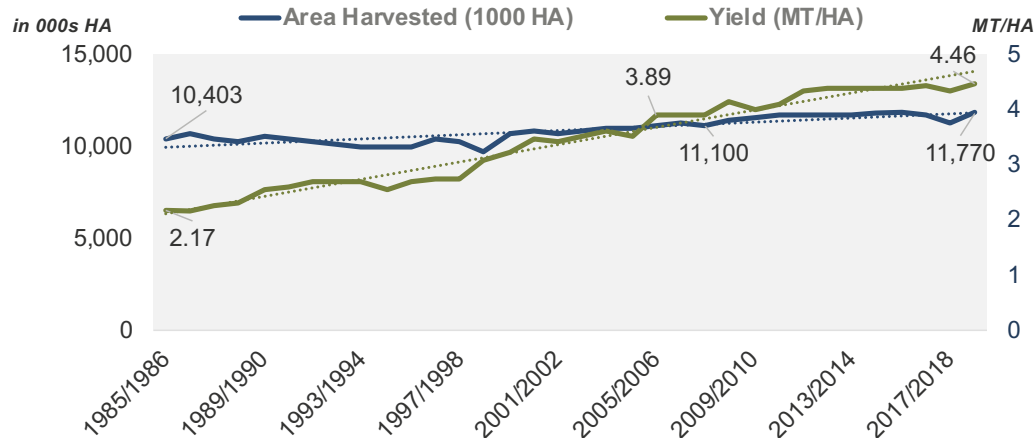
Market Dynamics

Production and Productivity Trends

Yield doubled between 1988 and 2018, while area remained constant

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

Bangladesh rice area, yield, productivity trend



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.

Nationally Important, Politically Sensitive

Rice security in Bangladesh equates with food security

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.

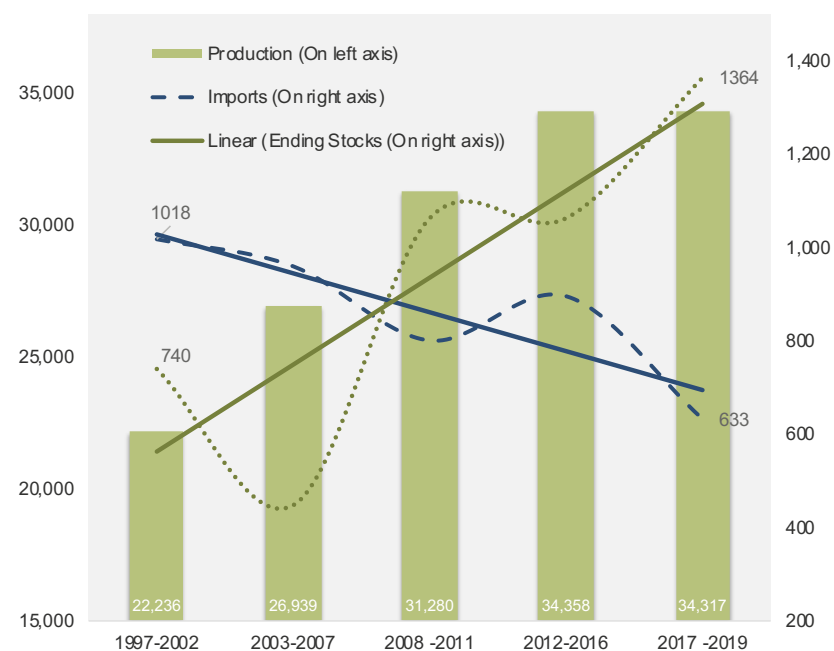
Rice security is not only an economic issue but also an important parameter for determining social and political stability.

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.

Rice Production vs. Import (1000 MT)



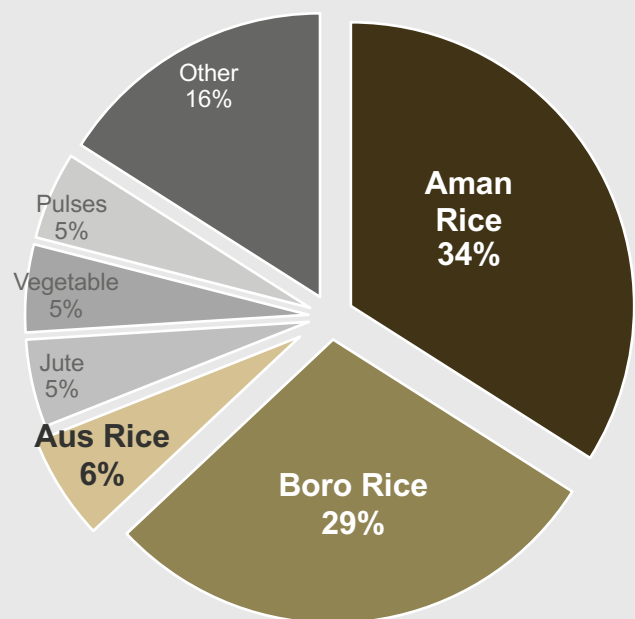
Sources:

- a) United States Department of Agriculture, Foreign Agricultural Service
- a) J. Timsina & Others (2018). Can Bangladesh produce enough cereals to meet future demand? Agricultural Systems, 163, 36-44
- a) Context Expert Analysis
- a) M S Kabir & Others (2015). Rice Vision for Bangladesh: 2050 and Beyond. Bangladesh Rice J. 17 (2), 1-18.

70% of Cropped Area Seeded to Rice

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

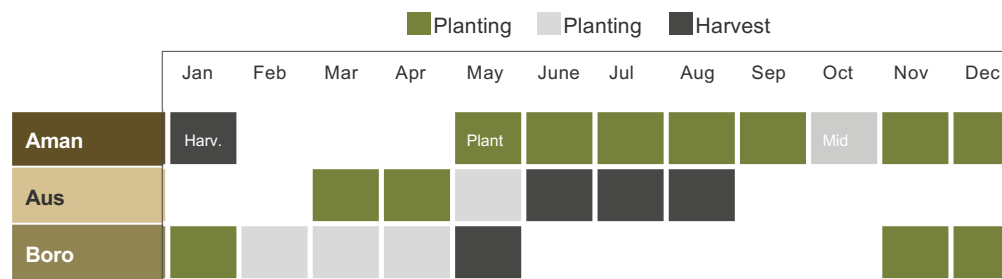
Bangladesh Cropped Area Share (%)



Rice area and production 2017 to 2019

Rice by season	Area (1,000 HA), Production (1,000 MT)					
	2017/18		2018/19		2019/20 (F)	
	Area	Production	Area	Production	Area	Production
Aman (Monsoon)	5,700	12,500	5,873	13,500	5,880	13,600
Aus (Pre-monsoon)	1,100	2,350	1,145	2,500	1,175	2,600
Boro (Winter)	4,472	17,800	4,752	18,909	4,775	19,100

Rice crop calendar



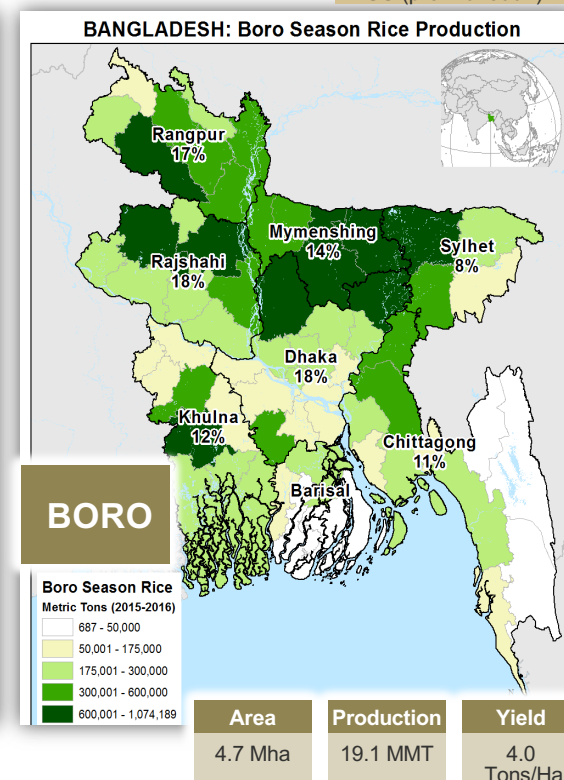
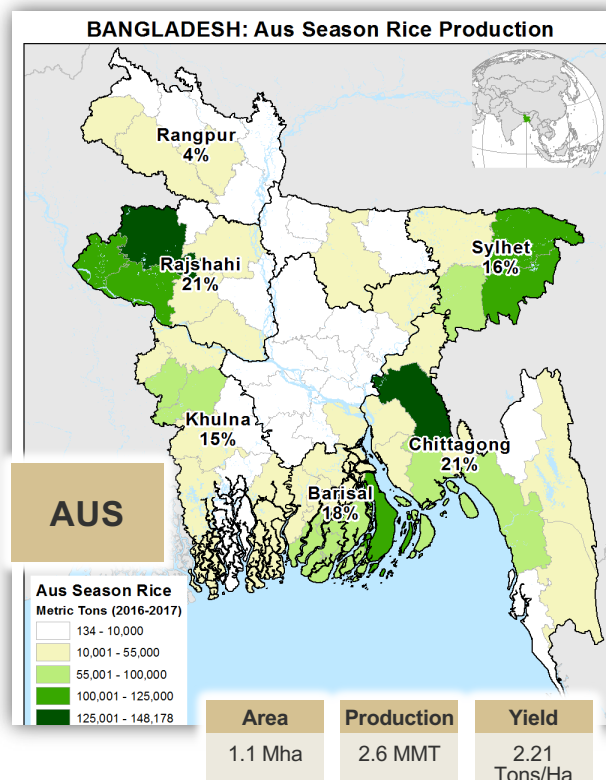
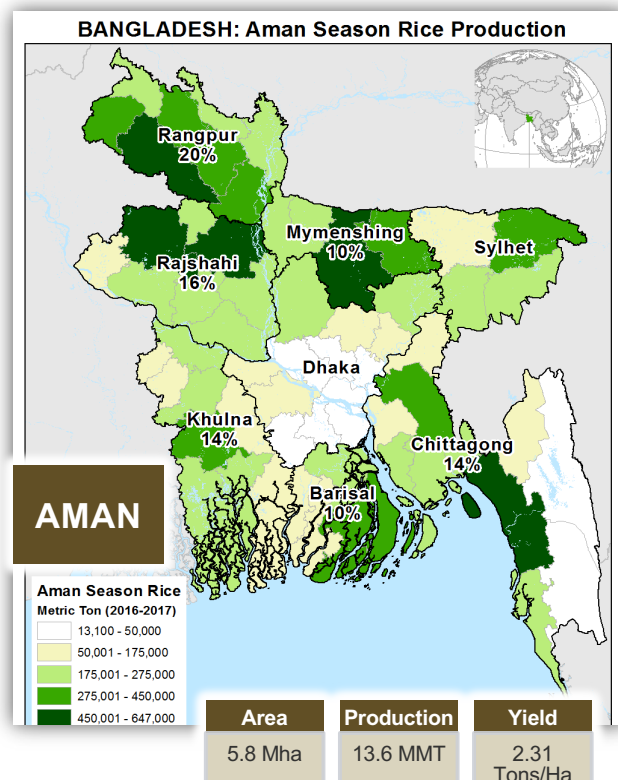
Sources:

- 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)

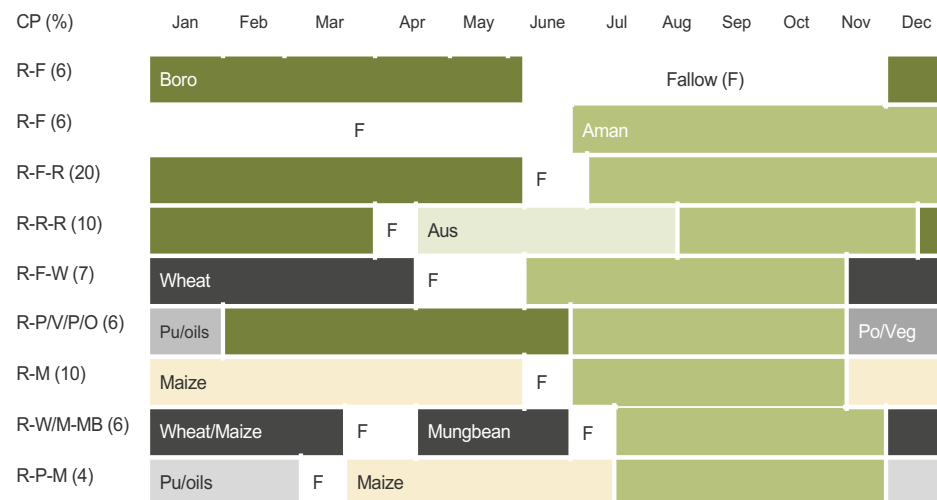


Source: Bangladesh Bureau of Statistics

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



Rice-rice (R-R), rice-wheat (R-W), and rice-maize (R-M) are the dominant systems

Name	Crops	Share (%)
R-F-R	Boro Rice – Fallow – Aman Rice	20
R-F	Boro/Aman Rice - Fallow	12
R-R-R	Boro Rice – Aus Rice – Aman Rice	10
R-M	Aman Rice – Rabi Maize	10
R-F-W	Boro Rice – Fallow – Wheat	7
R-Pu/Veg/Oils-M/R	Aman Rice – Pulses/Veg/Oilseeds	7
R-P/V/P/O-R	Aman Rice – Pulses/Vegetables/Oil – Boro Rice	6
R-W/M-MB	Aman Rice – Wheat/Maize – Mungbean	6
R-P-M	Aman Rice – Potato –Kharif Maize	4

Season Wise Rice Seed Supply Varied

Three seasons, with Boro dominating the commercial season

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.

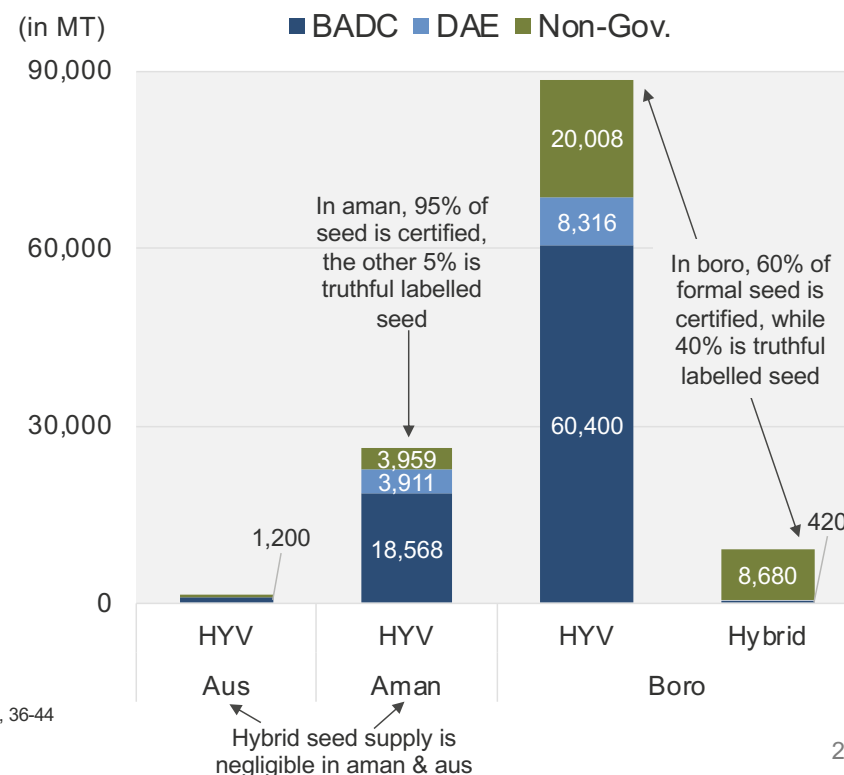
Later, when flooding caused a shortage in quality rice seeds for the 1998/99 season, the government allowed the private sector to import rice hybrid seeds from China. This segment now remains with the private sector.

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

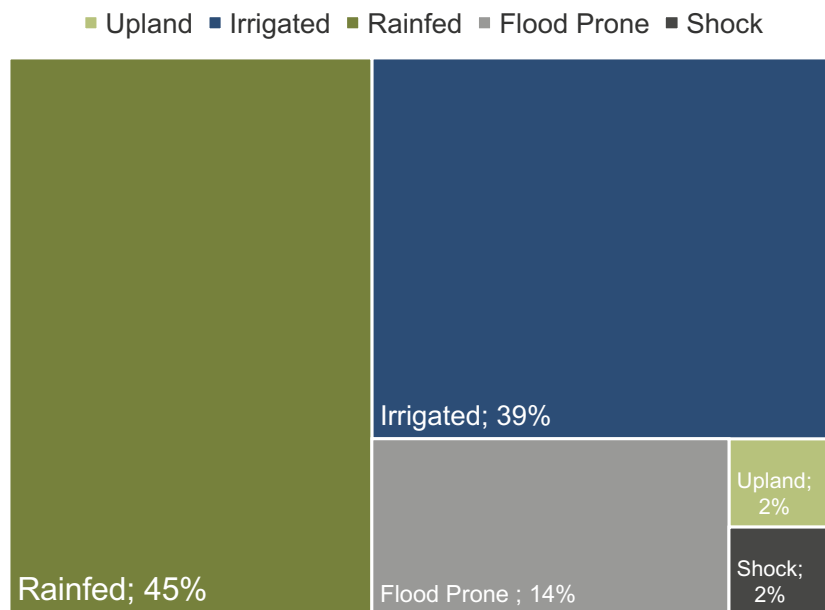
Rice Seed Supply by Season (in MT)



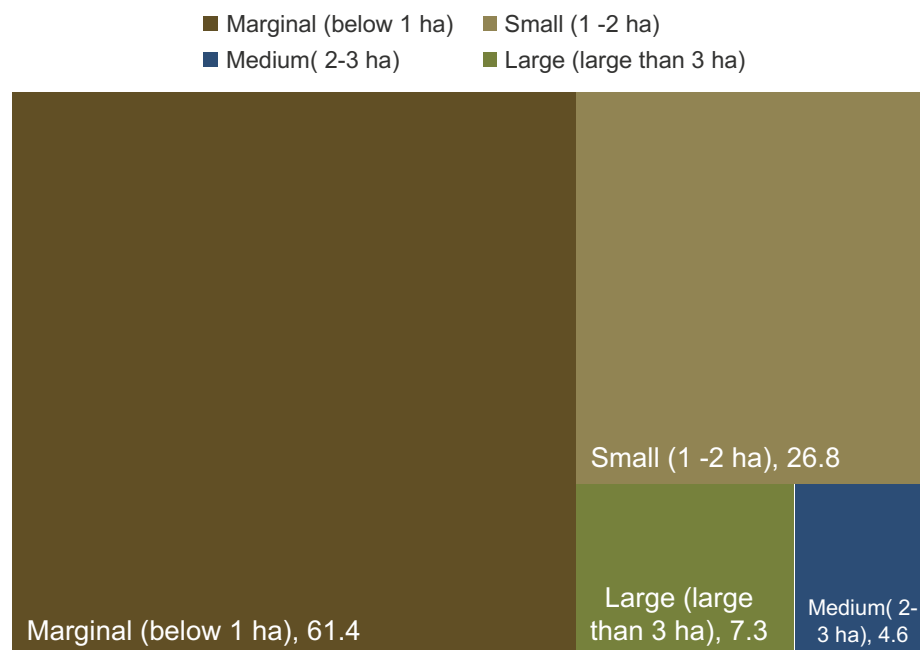
Major Rice Ecosystems and Contribution to Total Rice Production by Farm Size Segment

Marginal farmers and rainfed-irrigated ecosystems dominate

Proportion of production area by ecosystem



Distribution of production by farm size (%)



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

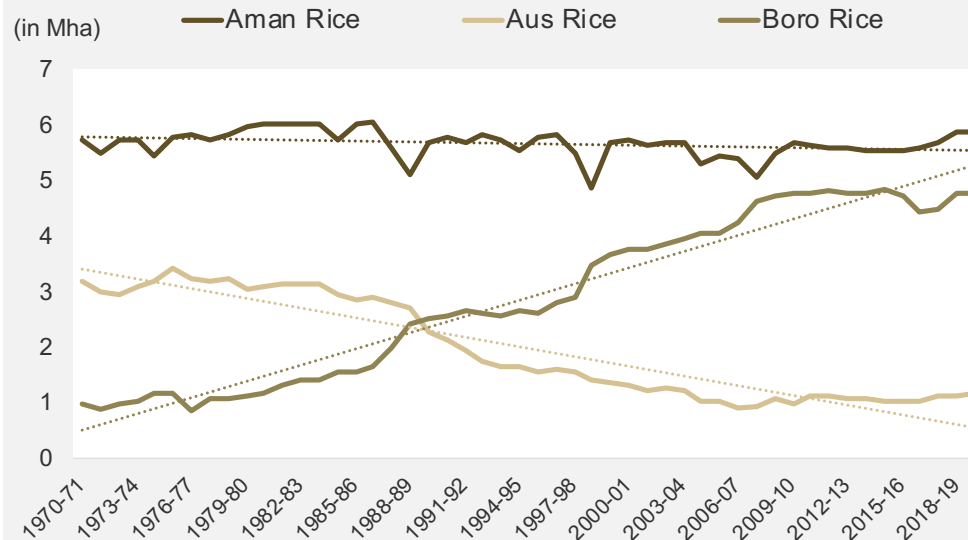
AMAN (monsoon)
BORO (winter)
AUS (pre monsoon)

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.

Area trend by season (Mha)



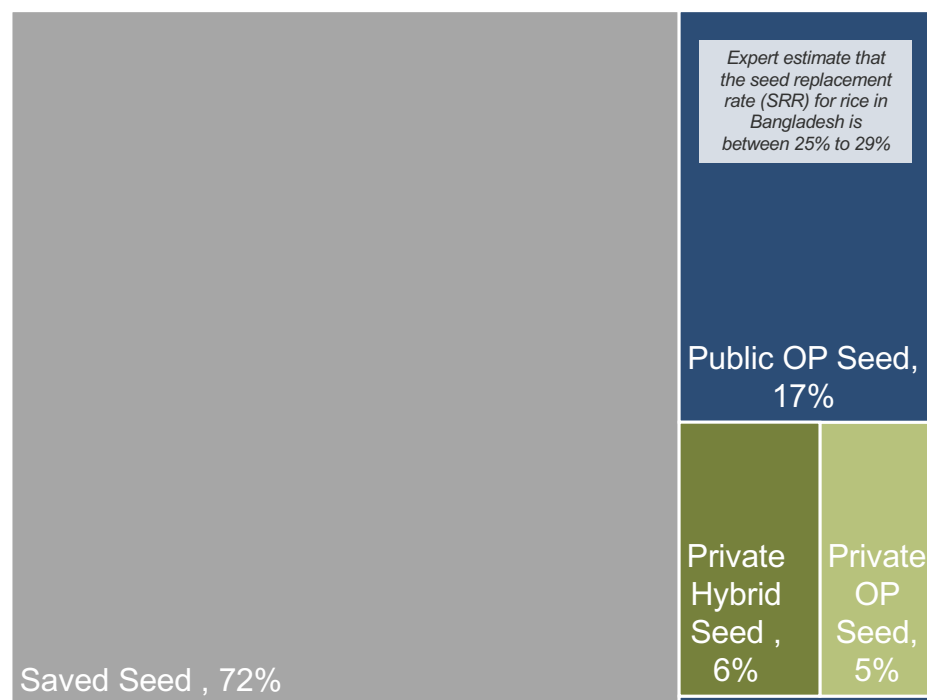
Sources:

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

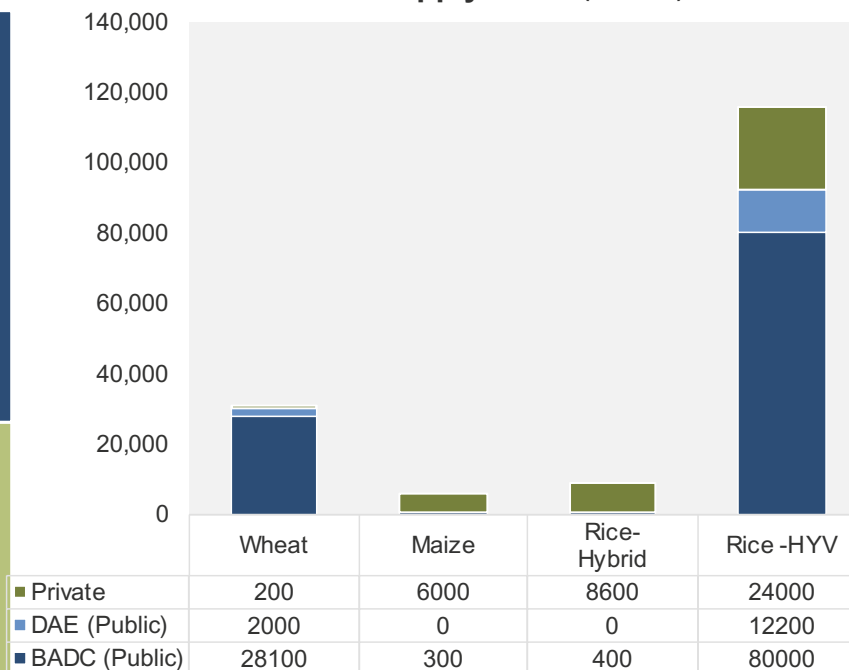
Bangladesh Seed Supply Scenario

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

Rice Area % by Seed Supply Source



Grain Seed Supply in MT (2016-17)



Sources:

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

* 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.

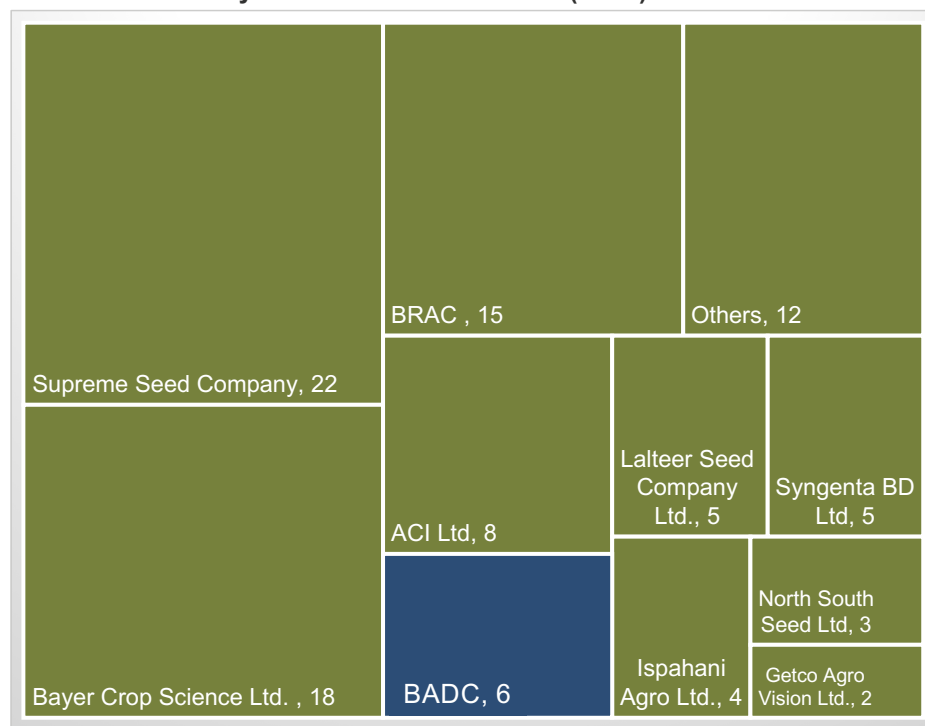
The annual supply of high yielding variety rice seeds is still only 28% of Bangladeshi requirement (SRR), which has resulted in more unorganized seed production and informal cross-border trade. This is further aggravated by the lack of formal trade and cooperation in HYV rice seeds between the two countries.

	LOCAL HYV	%	INDIAN HYV	%
Chapai Nawabganj				
Aman	BRRI Dhan-34	1	Swarna	87
	BR-11	1		
Boro	BRRI Dhan-28	26	Parijat	36
	BRRI Dhan-29	14	Somsur	4
Jessore				
Aman	Bina-7	11	Swarna (Guti,Kolamocho,Bulet)	34
	BRRI Dhan-39	13		
Boro	BRRI Dhan-50	24	Miniket	28
	BRRI Dhan-28	21		
	BR-26	24		
Aus	BRRI Dhan-28	14	Miniket	28
Dinajpur				
Aman	BRRI Dhan-34	14	Swarna	53
	BRRI Dhan-50	20		
	BR-11	2		
Boro	BRRI Dhan-28	33		
	BRRI Dhan-29	28		

Competitive Hybrid Rice Seed Market

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

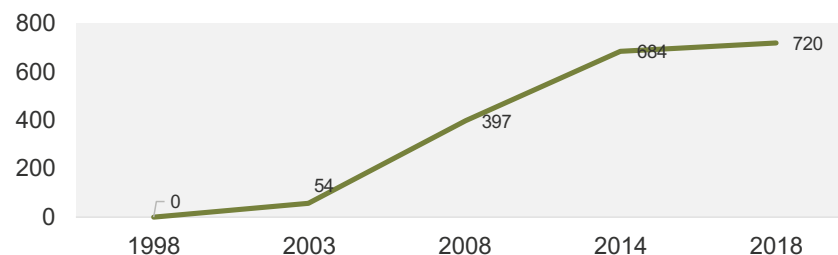
Private Hybrid Seed Market Share (2018): 9000 MT



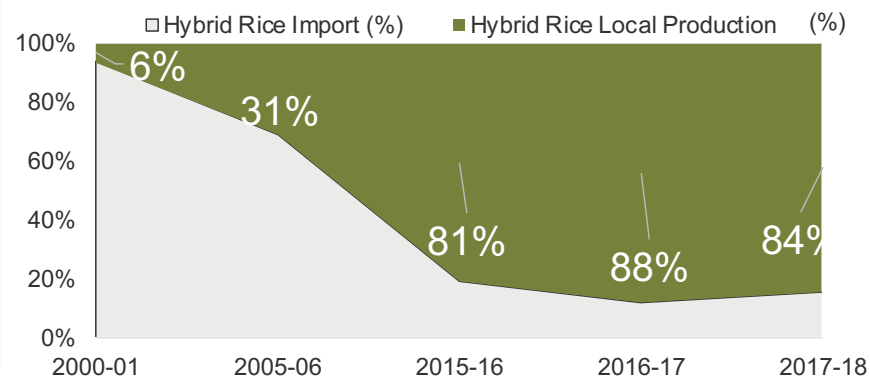
Sources:

- a) Context Expert Analysis
- b) PQW, Department of Agricultural Extension
- c) Sudhir Chandra Nath (ACI Seed Business)

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



Hybrid Rice Import vs. Local Production Trend



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

**Impact of Cyclones on Aman Rice
Southern Bangladesh**

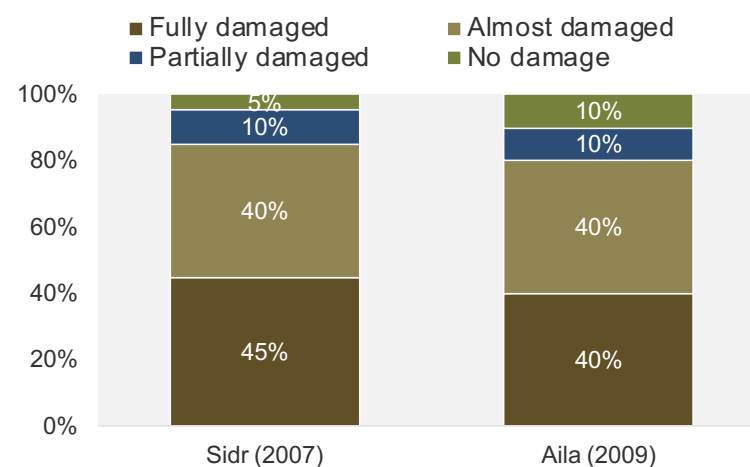


Illustration: 2007 begun on a bleak note for Bangladesh, with 53,000 hectares (ha) of the May to November single-crop *boro* areas of Netrakona, Brahmanbaria, and Kishoreganj districts completely destroyed. Farmers did not get even 10% of the normal yield. Then came two waves of floods in August and 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:

- a) M.Z. Hossain, M.T. Islam, T. Sakai and M. Ishida (2008) Impact of Tropical Cyclones on Rural *Infrastructures* in Bangladesh. Agricultural Engineering International: the CIGR Ejournal. Vol. X.
b) Context Expert Analysis

Floods in Bangladesh are a Normal Phenomenon

Bangladesh lies in the delta of three of the largest rivers in the world

In a normal year, 20-25% of the country is inundated by river spills and drainage congestion.

Most of Bangladesh lies in the delta of three of the largest rivers in the world – the Brahmaputra, the Ganges, and the Meghna. These rivers have a combined peak discharge in the flood season of 180,000 m³/s (the second highest in the world, after the Amazon) and according to Bangladesh Water Development Board (BWDB), carry about two billion tons of sediment each year.

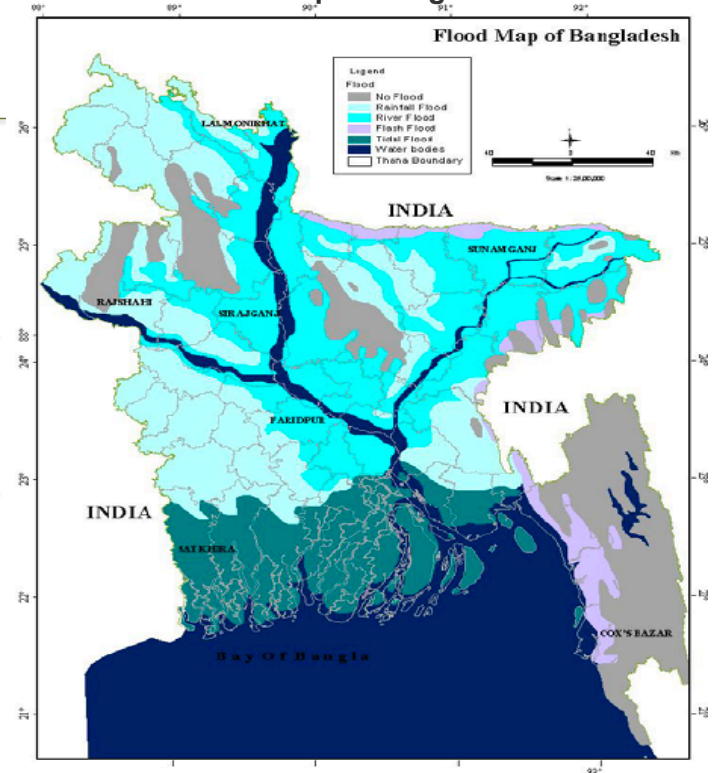
The topography of the country is mostly low and flat. Two-thirds of the country is less than 5 meters above sea level and is susceptible to river and rainwater flooding and, in low lying coastal areas, to tidal flooding during storms.

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:

- a) M.Z. Hossain, M.T. Islam, T. Sakai and M. Ishida (2008) Impact of Tropical Cyclones on Rural *Infrastructures* in Bangladesh. Agricultural Engineering International: the CIGR Ejournal. Vol. X.
b) Context Expert Analysis

Flood map of Bangladesh

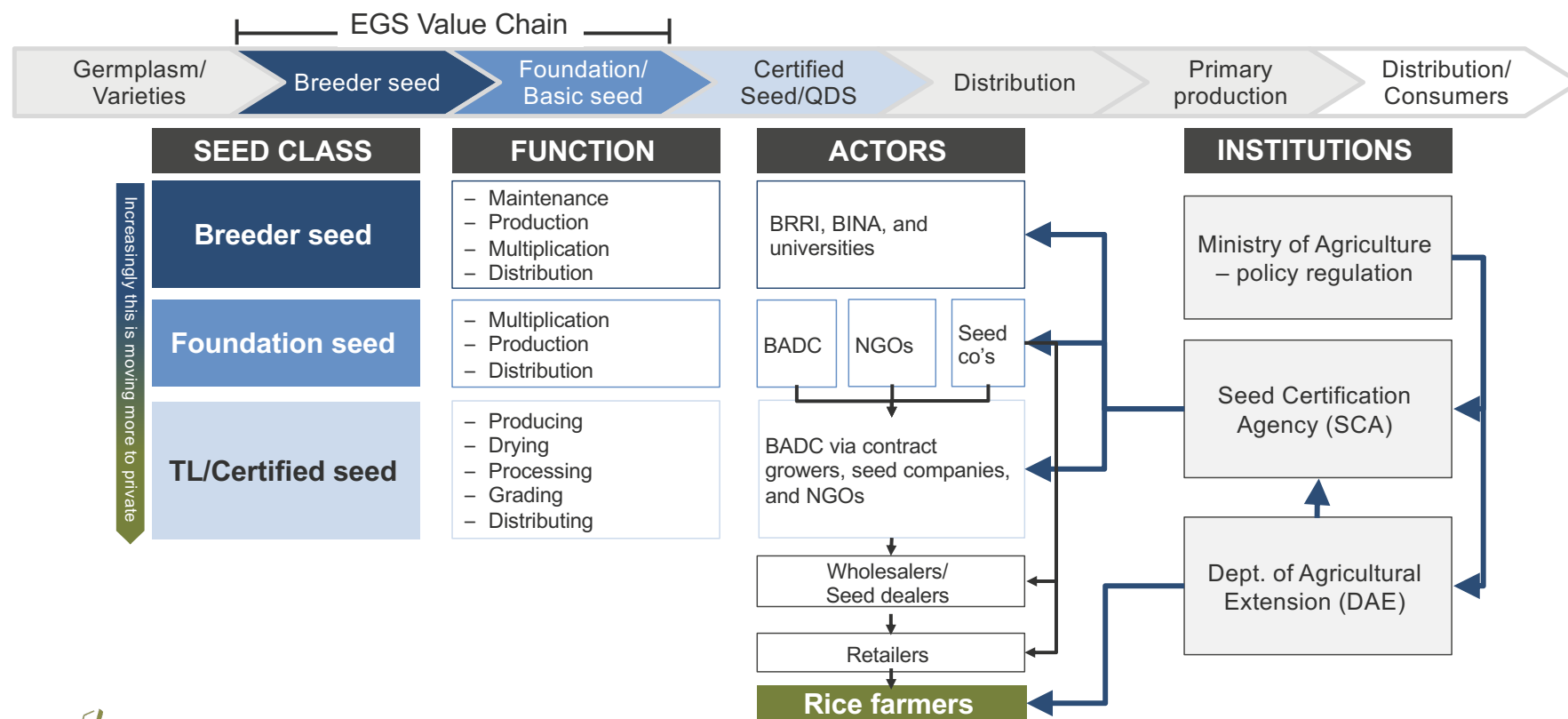




Leadership

Rice Seed Deployment Value Chain Overview

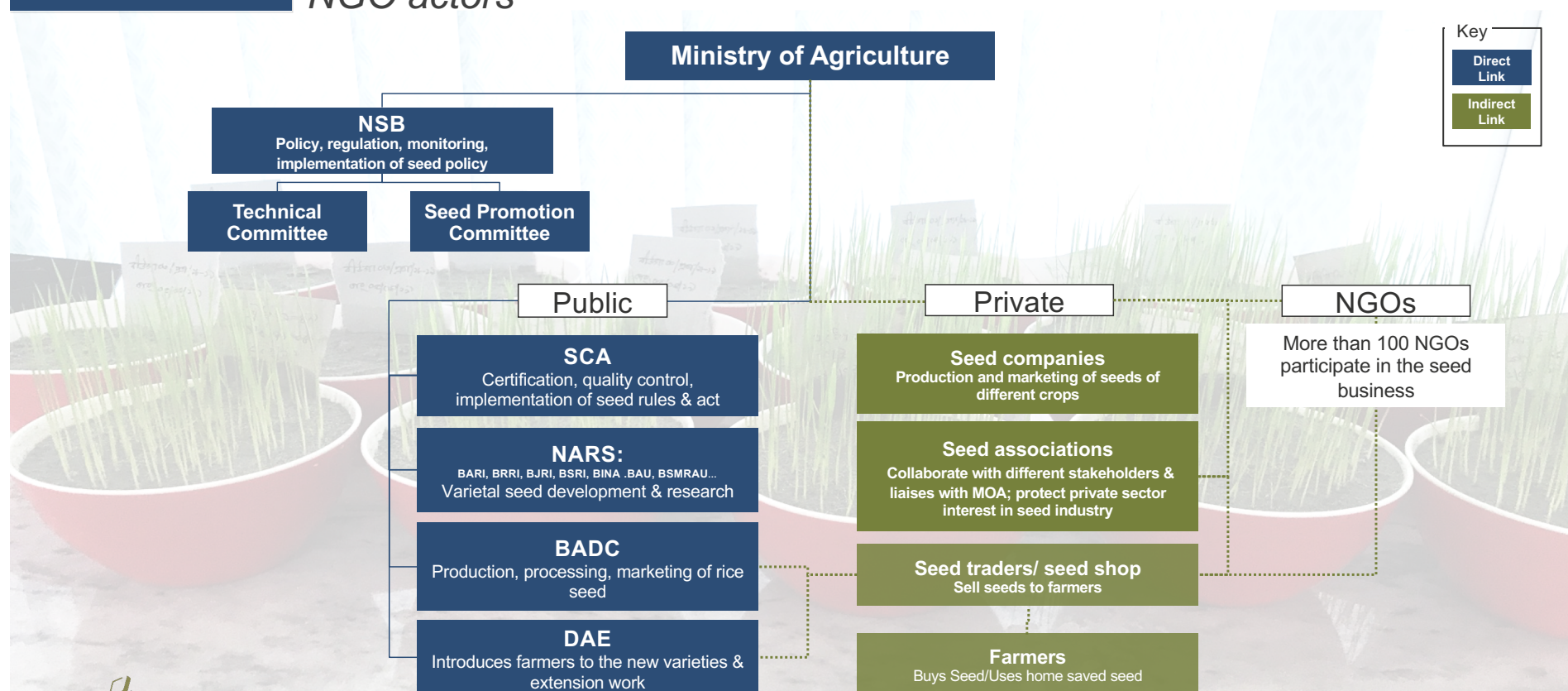
Actors and functions by seed class



LEADERSHIP

Organizational Structure of the Rice Seed System

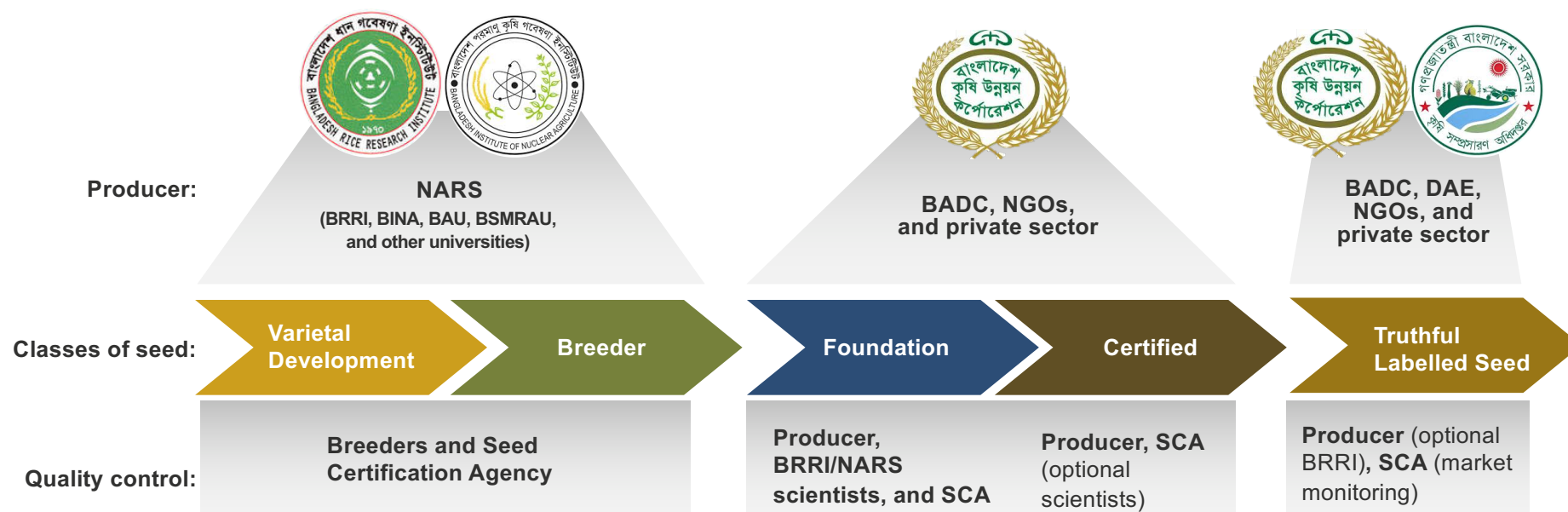
Bangladesh has a comprehensive system including Public, Private & NGO actors








LEADERSHIP

Organizational Leadership Throughout Value Chain

Individual components are working at different levels of efficiency



Organizational Structure – Public Value Chain Leadership Summary

ORGANIZATION	A National Agricultural Research and Extension System (NARS) (incl. BRRI, BAU, BINA, SMRAU, and other universities)	B Seed Certification Agency (SCA)	C Bangladesh Agricultural Development Corporation (BADC)	D Department of Agricultural Extension (DAE)	E Private sector and NGOs
	 				
VALUE CHAIN ROLE	<ul style="list-style-type: none"> – Varietal development and R&D – Spearheading role in national agriculture programs' varietal licensing – Production and maintenance of breeder seeds 	<ul style="list-style-type: none"> – Quality control / breeder, foundation, and certified seed certification – Varietal registration 	<ul style="list-style-type: none"> – Foundation and certified seed production – Distribution of seeds of foundation & certified seed – Provide service to stakeholders 	<ul style="list-style-type: none"> – Dissemination of agricultural innovations – Production & distribution of quality seeds – Resolution of farmer issues 	<ul style="list-style-type: none"> – Foundation and certified seed production – Distribution of seeds – Varietal development and R&D
MAJOR FUNDING SOURCES	<ul style="list-style-type: none"> – Government grants – Breeder seed sales 	<ul style="list-style-type: none"> – Government grants – Certification charges 	<ul style="list-style-type: none"> – Government grants – Foundation & certified/quality seed sales 	<ul style="list-style-type: none"> – Government grants – Certified/quality seed sales 	<ul style="list-style-type: none"> – Certified/quality seed sales – Equity and debt – Grants (for NGOs)
FINANCIAL SUSTAINABILITY	SUBSIDIZED BY THE PUBLIC SECTOR				FINANCIALLY SUSTAINABLE

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

Ministry of Agriculture (MoA)

Highest body in the seed system



The Seed Regulatory Framework

- The National Seed Policy (NSP), 1993
- The Seeds Ordinance, 1977
- The Seeds (Amendment) Act, 1997
- The Seeds (Amendment) Act, 2005
- The Seeds Act 2018
- The Seed Rules, 1998

The NSP allowed the private sector and NGOs to enter seed production and marketing sectors to increase the supply of quality seeds. Agricultural research Institutes, universities, and others involved in varietal development supply breeder seeds to BADC, private sector, and NGOs for production of foundation seed and certified seed.

Funding Sources:



Government grants

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.

Seed Wing (SW) of MoA

The SW implements seed-related policies and regulations, renders registration to the applicant crop varieties and seed dealers, and oversees all public sector seed programs. The SW is led by a Director General who is assisted by one Chief Seed Technologist and two Assistant Seed Technologists. The SW also serves as the Secretariat of the NSB.

National Seed Board (NSB)

The NSB provides recommendations on seed regulations, seed standards, and formulation and implementation of MoA policy decisions, including whether to commercially release or register new seed varieties. NSB decisions concerning variety release are published in the official gazette. The Secretary of the MOA is the Chairman of the Board, and the Director General of the SW at MOA is its Member Secretary. The NSB generally meets twice a year. It has two committees: Technical and Seed Promotion.

Technical Committee (TC)

Formed by the MOA, the TC advises NSB regarding variety development, release, and notification based on information generated through trials and tests provided by the SCA as well as private sector. It also provides advice, opinion, and recommendations to the NCB in other aspects of overall seed sector administration.

Seed Promotion Committee (SPC)

The SPC, also formed by the MOA, determines and recommends the varieties and quantities of seeds of different crops the BADC may produce every year. The recommendations are based on the Department of Agricultural Extension's (DAE) assessments and historical trend on seed sales, as well as on performance data of the released varieties. SPC coordinates and monitors all the activities of production and supply of quality seeds in the public and private sectors.

Sources:

- Dr. Md. Shafayet Hossain (BADC), Dr. Mohammad Khalequzzaman (BRRI), Dr. Md. Zakir Hossain (SCA)
- Pradeep, & Others (2012). Value chain analysis of rice seeds in Bangladesh. Los Baños (Philippines): International Rice Research Institute. 46 p.
- Sarwer report. Public-Private Seed Sector in Bangladesh (Final draft)

National Seed Policy (NSP)

Variety release, multiplication, imports and quality

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.



Seed Certification Agency (SCA)

Well-defined mandate, with people & resources being upgraded slowly

Tests done for seed quality control

- Moisture test
- Purity test
- Germination test
- Seed health test
- These 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.

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.

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)



Expanded Role & Seed Certification Process

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

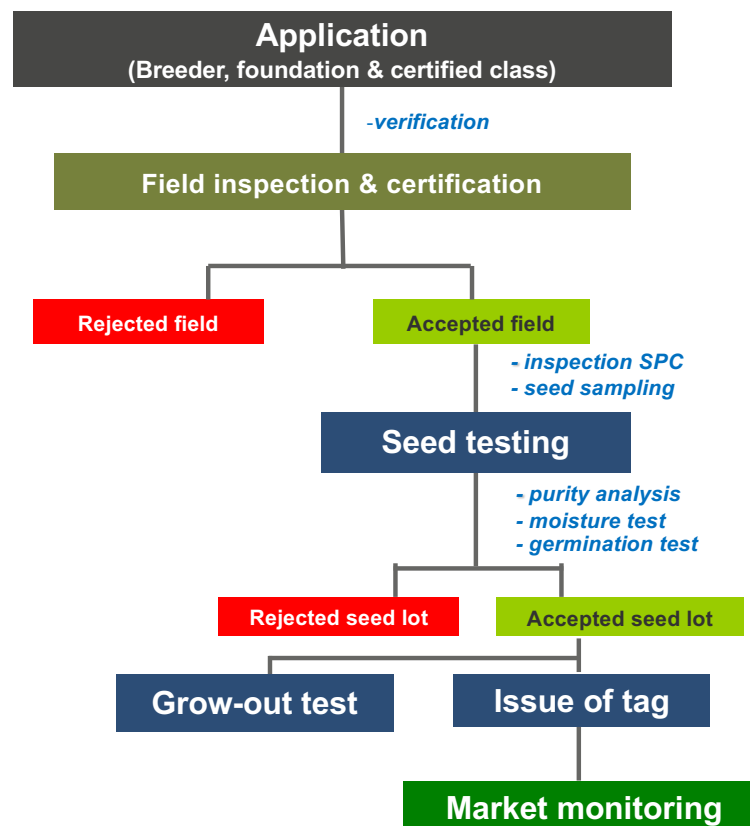
Coordinate the variety evaluation and release mechanism for notified crops

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)



LEADERSHIP

National Agricultural Research System (NARS)

Well-developed rice research system

BRRRI Logo



DIRECTOR GENERAL (CEO)

DIRECTOR (RESEARCH)

- CASR
- 19 Research divisions
- 11 Regional Stations

DIRECTOR (Admin. & CS)

- Administration
- Common Services
- Accounts & Finance
- Planning and Evaluation
- Publication and public relation

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.

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

Coordinated by Bangladesh Agricultural Research Council (BARC).

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.

Funding Sources



Government grants

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:

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

Sarwer (Research Paper)

National Agricultural Research System (NARS): *National Seed Policy Directives for NARS*

The NSP provides the following guidelines/directives for the NARS:

Varietal development by NARS should anticipate the increase in irrigated high-input, high-output cropping systems and adapt their crop species and variety selection criteria accordingly. With an increasing demand of food per unit area 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)

BADC Logo



DAE Logo



Funding Sources:



- Government grants
- Foundation and certified/quality seed sales

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.

International Rice Research Institute

More than a half-century of partnership with Bangladesh

Funding Sources:

Access Agriculture, Asian Development Bank, Bill & Melinda Gates, International Center for Tropical Agriculture, International Maize and Wheat Improvement Centre, CGIAR System Organization, Chinese Academy of Agricultural Sciences, DKT International, German Federal Ministry for Economic Cooperation and Development, HarvestPlus, Hybrid Rice Development Consortium Members, International Fund for Agricultural Development, International Initiative for Impact Evaluation, International Rice Research Institute Fund Limited, Kansas State University, United Nations Environment Programme, United States Agency for International Development, University of California – Berkeley, Virginia Polytechnic Institute and State University

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.
- **PETRRRA** – The Poverty Elimination Through Rice Research Assistance or PETRRRA 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 PETRRRA.

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:

- (a) Pradeep, Md. Khairul, Md. Rafiqul, Debashish, and Christian (2012). Value chain analysis of rice seeds in Bangladesh. Los Baños (Philippines): International Rice Research Institute. 46 p
- (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.



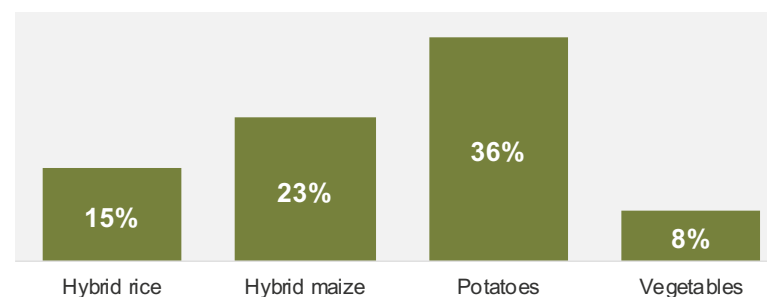
BRAC – International NGO with fully integrated seed business and market leadership

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 Market Position (% Share)



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



Research & Varietal Development

Varietal Release Process and Agencies

NSB plays key role in variety release



NARS

Under National Agriculture Research System (NARS), Bangladesh Rice Research System (BRRRI) and Bangladesh Institute of Nuclear Agriculture (BINA) are the leading players in rice research and varietal development.

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

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.

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



TC

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, BRRRI, 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.



NSB

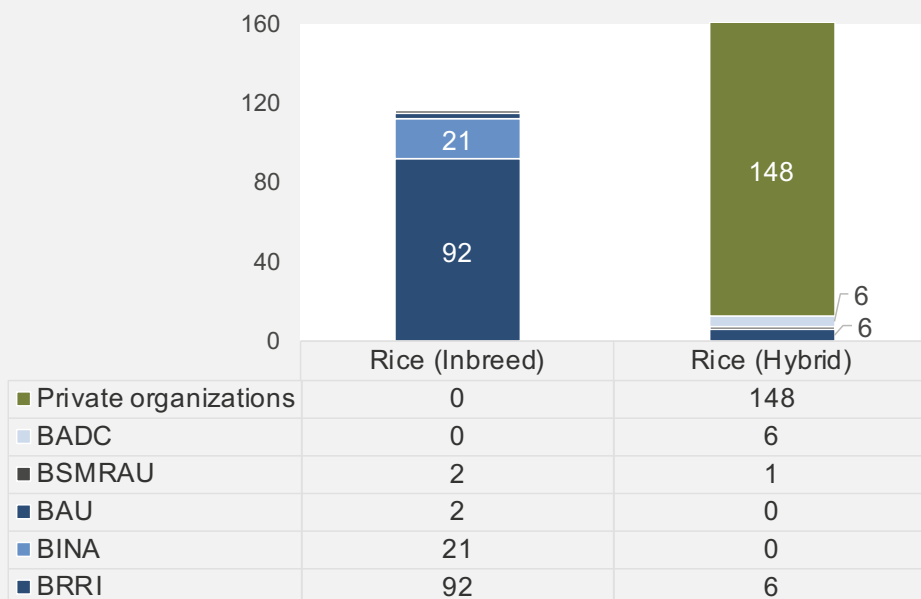
The National Seed Board (NSB) releases varieties of seeds under the provisions of the Seeds Ordinance.

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.

Varietal Development: Agencies

Public sector develops varieties, while private sector leads hybrids

Number of Varieties & Hybrids Released/Registered Through 2018



Sources:

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

Key Takeaways

In the rice (Inbred) / 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).

Active Varieties Maintained by BRRi

95 varieties (including 14 local) are now maintained

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

Season	Type	Number	Variety Name
Aman	Modern varieties	44	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
	Local improved varieties	8	Nizersail, Latisail, Rajasail, Kalijira, Kataribhog, Basmati-D, Patnai23, Tilockkachari
Boro	Modern varieties	37	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
	Local improved varieties	6	Hbj Boro II, Hbj Boro IV, Hbj Boro VI, Hbj Boro VIII, Purbachi, IR8

Source: BRRi Annual Report 2017-18

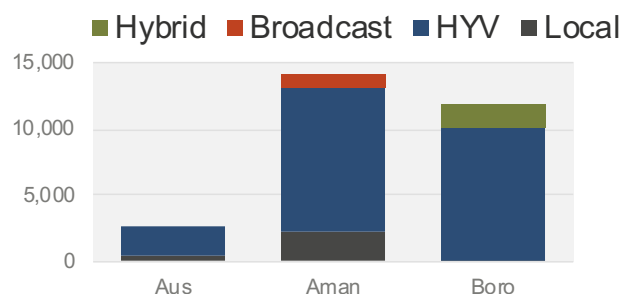
Seasonal Segments for Varietal Development

Room for hybrid market development in Aman & Aus

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

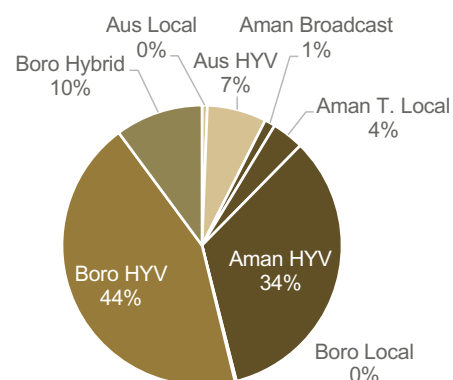
Seasonal rice
type

AREA
(000 acres)



Season &
rice type

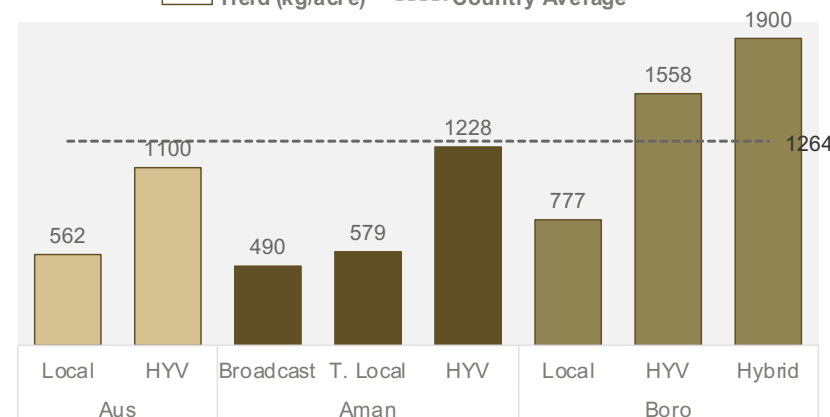
PRODUCTION
share



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

Yield comparison of different rice type area

Yield (kg/acre) ----- Country Average



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.

Adaptation Lag of Newly Released Varieties

Older-generation varieties remain widely used by farmers

BIRRI 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 BIRRI 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.



Demand Planning and Operations

Demand Planning and Operations

Rudimentary process attempts to involve all stakeholders



NSB Seed Promotion Committee (SPC) decides national seed production targets and plan in the presence of all key players.

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.



Top-down BS production plan done under SPC, with BRRRI solely responsible for production and distribution.

A breeder seed (BS) demand and production plan is done under the SPC. BRRRI is the sole player producing BS on its own facilities and distributing through the sustainable network. In the last 17 years, BRRRI client/BS indenters apply for increased from 20 to 873 and distribution increased from 4 MT to 126 MT.



Foundation and quality seed is multiplied at individual organization level, using out-growers.

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.



Smaller local companies and NGOs complain about shortage and high cost for BS.

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. BRRRI maintains this level of allotment & 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.

National Rice Seed Production Planning

A undeveloped system largely involving stakeholder consultations

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**

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.

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 BRRI/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*

Sources:

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

BRRI: Breeder Seed Production and Distribution

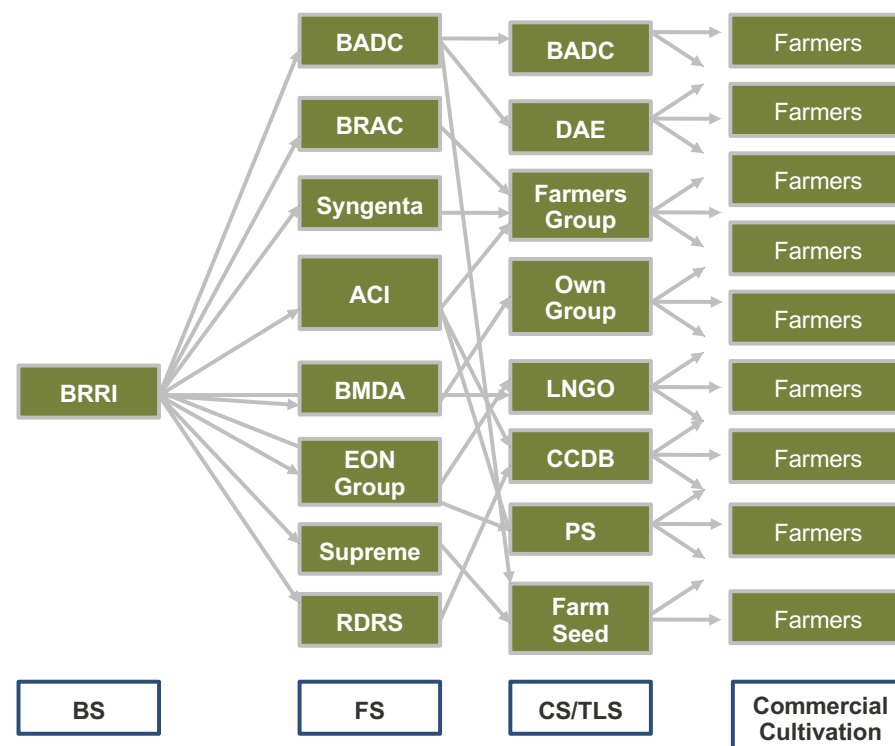
Seed network partners increased from three in 1998 to >1000 in 2018

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 IRRRI 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.

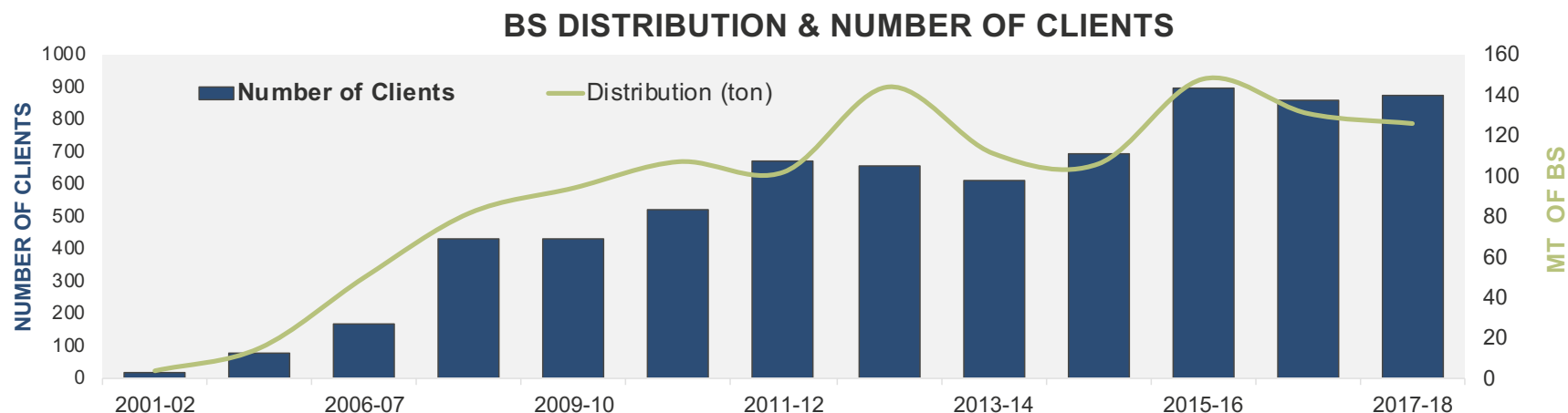


Sources:

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

BRRRI Production Up Dramatically in Last 20 Years

However, breeder seed demand still outpaces capacity



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

Increasing demand has led BRRRI to produce BS at all of its substations and then transported to BRRRI's Gazipur headquarters to be processed and graded. No buffer stocks of BS are maintained, nor does BRRRI 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 BRRRI with ever-increasing demand stretching the available capacity.

BRRRI 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 (BRRRI)
- (b) Bangladesh Rice Research Institute Website
- (c) Context Expert Analysis

Shortage Hits Private Sector Hardest

Only 25% of private sector demand is now met

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

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:

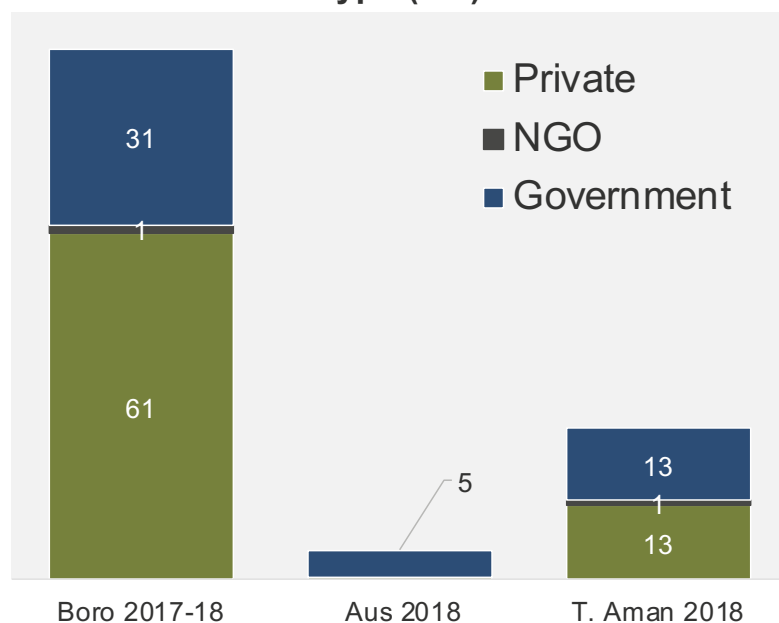
- (a) Bangladesh Rice Research Institute Data & Interview with Dr. Mohammad Khalequzzaman (BRRI)
- (b) Context Expert Analysis

BS Distribution by Season and Agency

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

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

BS Distribution Quantity by Entity Type (MT)



Number of Breeder Seed Demanders by Sector and Season
(# of unique agencies/orgs.)

Season	Private	NGO	Government
Boro 2017-18	860	7	12
Aus 2018	12	0	2
T. Aman 2018	255	6	7

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

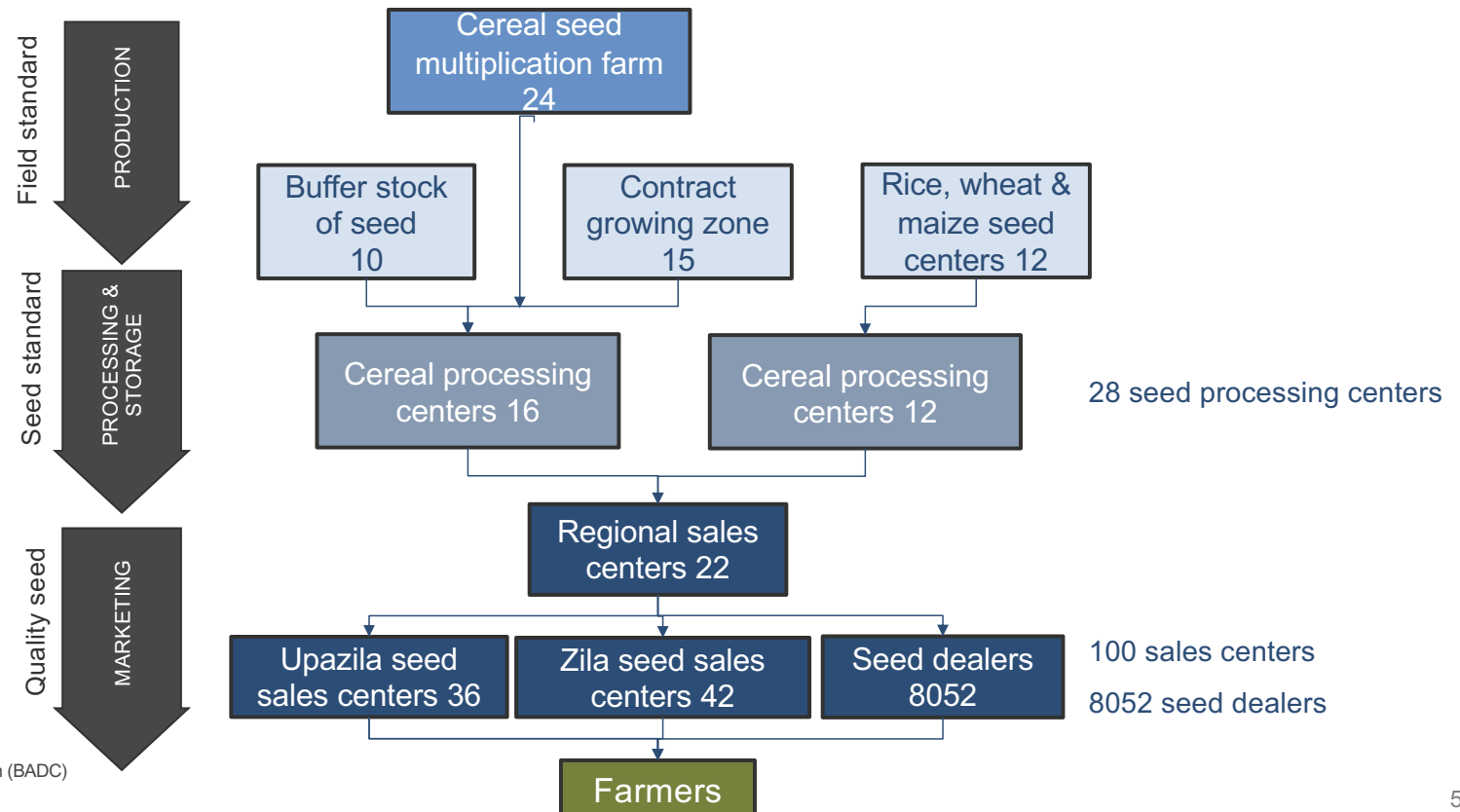
Contract growing zones for all crops	75
Contract farmers/out-growers	71,537
Command area (ha)	87,208



Source: Dr. Md. Shafayet Hossain (BADC)

BADC's Vast Seed Network spans Bangladesh

Network spans production, processing, preservation and marketing

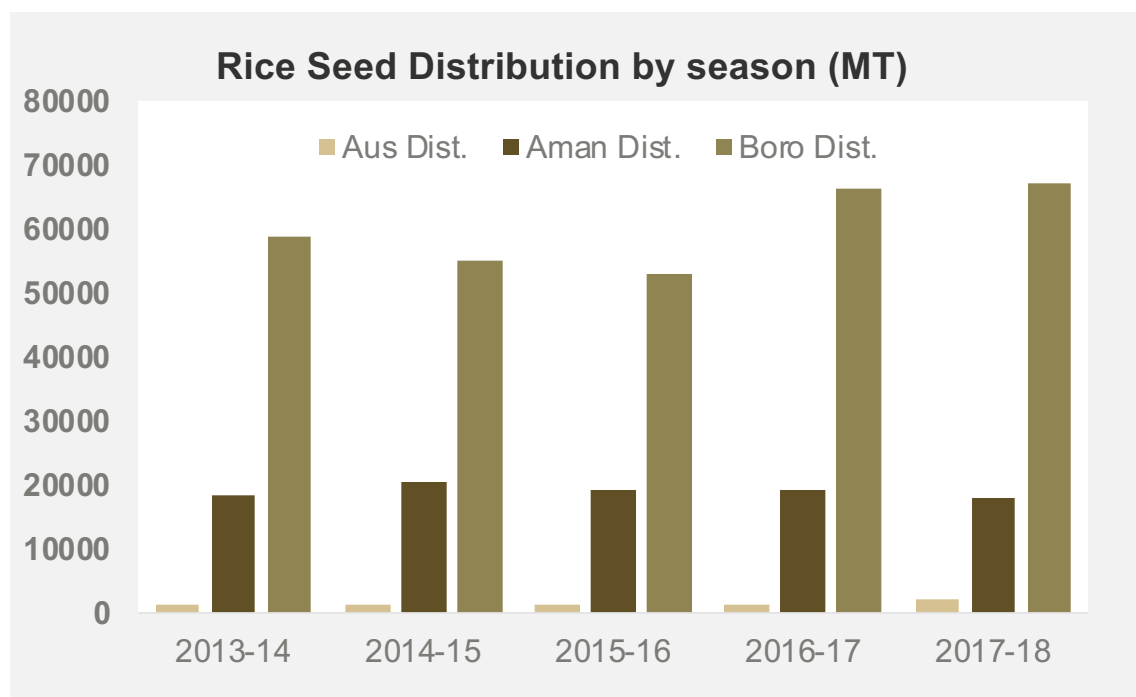


Source: Dr. Md. Shafayet Hossain (BADC)

BADC: Rice Seed Distribution

Seed production slated to increase 14% in 2020-21

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



Distribution & Projected Production Plan BADC (MT)

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

Source: Dr. Md. Shafayet Hossain (BADC)

Department of Agricultural Extension (DAE)

Key role in farmer support and knowledge sharing

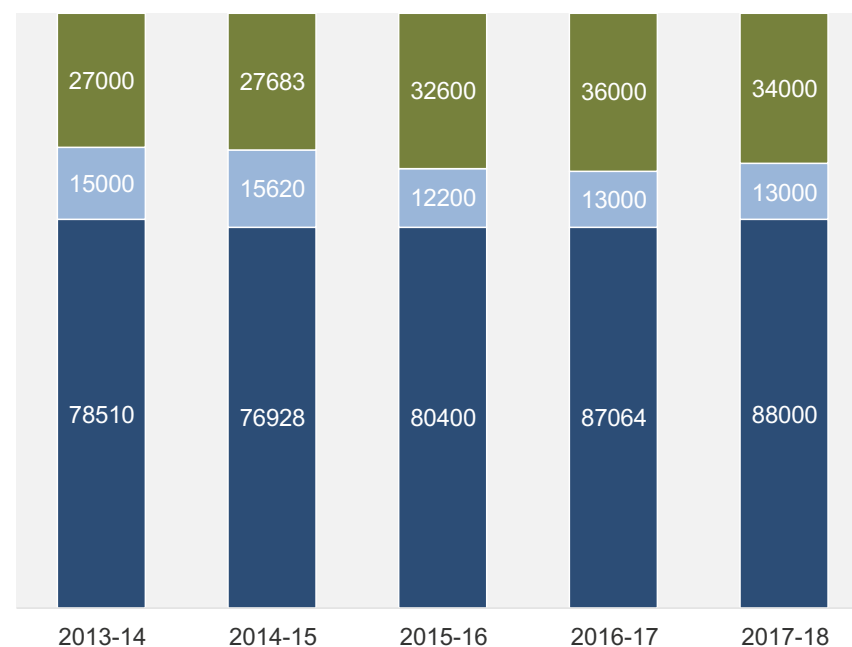
The DAE plays a role in diffusing knowledge about HYVs to farmers and providing them with technical support.

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)

■ BADC ■ DAE ■ Private



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



Dominant public seed sector enjoys government subsidy, not focused on cost recovery

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.



Hybrid seed production more profitable than OPV

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.



GOB incentivizes private sector through tax exemptions and concessionary duties

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.



Subsidies that drove low seed prices and increased penetration need to be phased out to level the playing field

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.

Rice Farmer Profitability is Negligibly Impacted by the Cost of Seed

	Small Farmers (Tk./ha)	Medium Farmers (Tk./ha)	Large Farmers (Tk./ha)	All Farmers (Tk./ha)	All Farmers US \$/ha
VARIABLE COST					
Power tiller cost	1,730	1,820	1,888	1,796	\$21
Labor cost	17,335	20,028	23,104	20,156	\$239
Seed cost	554	429	540	517	\$6
Fertilizer cost	1,787	2,029	2,193	1,959	\$23
Manure cost	891	200	0	469	\$6
Insecticides	217	198	245	219	\$3
Irrigation charges	1,716	1,782	1,911	1,786	\$21
A. Total variable cost	24,230	26,485	29,879	26,865	\$318
FIXED COST					
Interest on operating capital	2,944	3,514	2,234	2,907	\$34
Land use cost	466	406	417	437	\$5
B. Total fixed cost	3,410	3,920	2,652	3,344	\$40
C. Total cost	27,640	30,405	32,531	30,246	\$358
D. Total return	37,379	36,870	36,790	37,086	\$439
E. Net return	10,293	6,894	4,799	7,329	\$87

Source: Md. Zohurul Islam & Others (2017). Profitability and productivity of rice production in selected coastal area of Satkhira district in Bangladesh. International Journal of Business, Management and Social Research. Vol. 03, Issue 01:148-153

Profitability of Rice Production

Prices and profitability depend on govt policy and subsidy

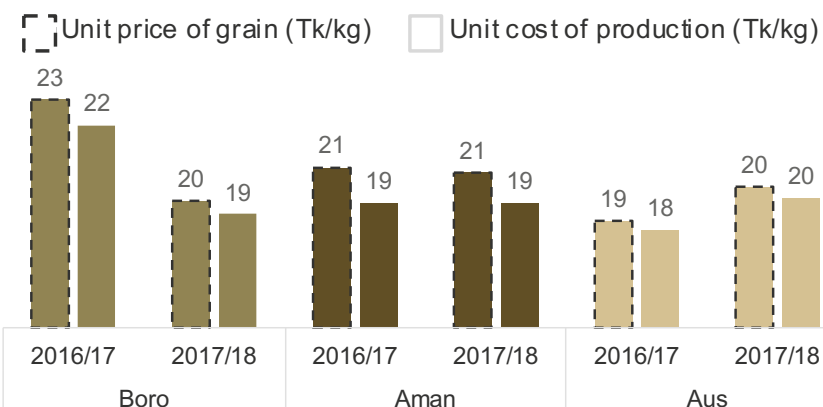
AMAN (monsoon)
BORO (winter)
AUS (pre monsoon)

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



Avg. Net Profits/returns Per Ha (2017)

	Boro	Aman	Aus
Tk/ha	10,887	12,947	4,925
US\$/ha	131	156	59
Yield (kg/ha)	5,760	4,471	4,612

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

OPV Seed Prices USD/kg (2018) – Public Sector

Seed Class	Price USD/kg
Breeder Seed	1.19
Foundation Seed	0.59
Quality Seed	0.45

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)

Price USD/kg	BADC	Private Companies
OPV Seed	0.44	0.55 (to 0.60)
Hybrid Seed	2.38	3.57 (to 3.75)

Dr Hossain:

The cost of producing TLS is estimated to be around 0.30 USD per kg (Tk 25/kg) and the sales 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 than HYVs for all actors in the value chain.

Sources:

- Dr. Md. Shafayet Hossain (BADC), Dr. Mohammad Khalequzzaman (BRRI), Dr. Md. Zakir Hossain (SCA)
- Context Expert Analysis

BRRI - Financial Information

Funded through government grants

Statement showing actual grants (income)

Particulars	USD Million		
	2015-16	2016-17	2017-18
General Grant: (Including Salary and Allowances)	7.9	11.2	12.3
Capital Grant	0.1	0.1	0.1
TOTAL	7.9	11.3	12.4

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

Particulars	USD Million	
	2018-19	
Salary Support	4.7	
Allowance Support	2.4	
Goods & Service Support	3.6	
Special Grant	0.1	
Other Grant	1.7	
TOTAL	12.5	

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.

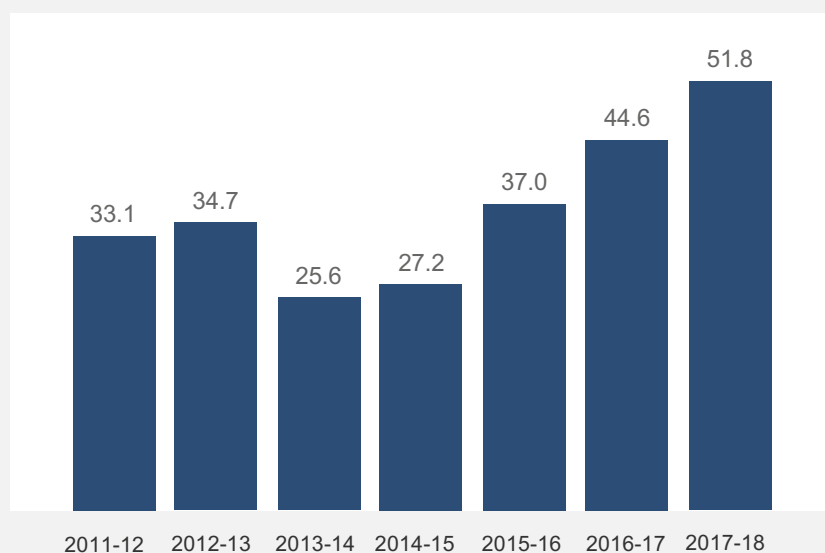
BRRI also receives grants-in-aid from several international organizations and sources for the purchase of laboratory equipment, construction of facilities, training scientists, and to meet costs of expatriate scientists. These sources include Asian Development Bank (ADB); Canadian government through 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:

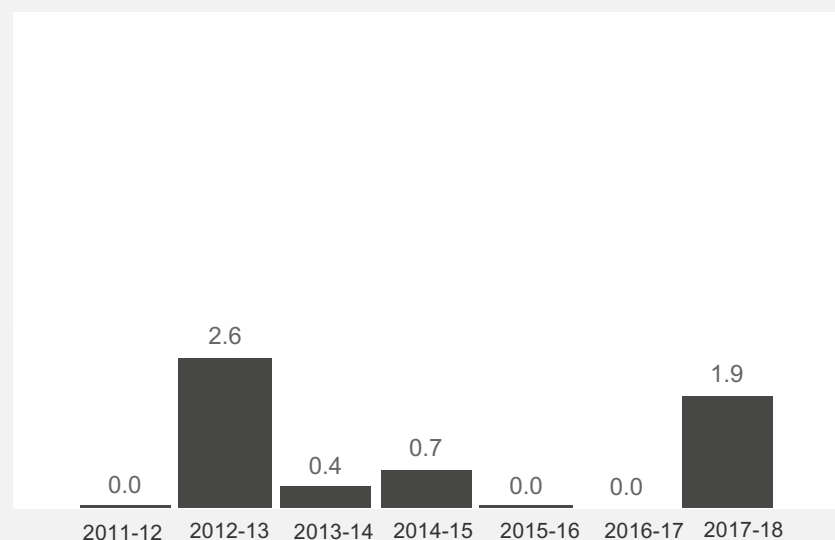
- a) BRRI Annual Report 2017-18
- b) Bangladesh Rice Research Institute Website

BADC – Grants/Subsidies and Net Profits

Government Grant/Subsidy to BADC (USD million)¹



Reported Net Profit of BADC (USD million)



(1) Govt Grant/Subsidy (In Crore Taka) ; 2011-12 = 279.30, 2012-13 = 292.94, 2013-14 = 216.06 , 2014-15 = 230.13, 2015-16 = 312.33, 2016-17 = 376.98, 2017-18 =437.70

Sources:

- a) Bangladesh Economic Review – 2018 (Finance Division) Appendix-21: Net Profit/Loss of State-owned Enterprises
- b) Bangladesh Economic Review – 2018 (Finance Division) State-Owned Enterprises – Table 9.2: Government Grant/Subsidy

BADC - Financial Information

GoB		PA	Total	<div><div></div><div><div>1. Production of Improved Cereal Seeds Through Seed Multiplication Farms</div><div>2. Improved Cereal Seed Production Through Contract Growers</div><div>3. Procurement, Processing, and Distribution of Improved Cereal Seeds Program</div><div>4. Jute Seed Program</div><div>5. Agro Service Center</div><div>6. National Vegetable Seed Program</div><div>7. Buffer Stock of Seed and its Management Program</div></div></div>
Total expenditure under revenue (USD million)				
Crop (7 programs)	10.5	0.0	10.5	
Irrigation (28 programs)	6.0	0.0	6.0	

Total expenditure for 19 projects under annual development program (USD million)				<div><div></div><div><div>1. Integrated Quality Horticulture Development Project</div><div>2. Tuber Crops Development Project</div><div>3. Enhancing Quality Seed Supply Project</div><div>4. Establishment of Seed Multiplication Farm in Southern Coastal Region</div><div>5. Construction of Rubber Dam for Small and Medium Rivers for Increased Crop Production</div><div>6. Mujibnagar Integrated Agricultural Development Project</div><div>7. Integrated Agricultural Productivity Project</div><div>8. Integrated Agricultural Project in Perojpur-Gopalganj-Bagerhat</div><div>9. Maintenance, rehabilitation of BADC Existing Fertilizer Godowns (warehouses) and Strengthening of Fertilizer Management Activities Project</div><div>10. Establishment of Pulse and Oil Seed Multiplication Farm and Seed Processing Center at Subarnachar Upazilla in Noakhali District</div></div></div>
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	

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.



Enabling Environment

Overview - Enabling Environment

Rigid policies prevent emergence of robust private sector



Rice is among five nationally important crops monitored closely and designated as notified crops.

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.



New national seed policy enables the private seed industry to find its footing and grow.

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.



Strong and active collaborations with international institutes are a plus.

BRRRI 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 IRRRI contribution directly or indirectly in their development. BRRRI has collaborations and currently receives grants-in-aid from more than 10 international organizations, and it maintains and advances these collaborations proficiently.



NGOs already actively participating in the rice seed chain.

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

Overall Objectives

The overall purpose of the NSP is to make the best quality seeds of improved varieties available to farmers in order to increase crop production, farmer productivity, per-capita farm income, and export earnings.

Approval and Registration of Varieties

New varieties of wheat, rice, jute, potato, and sugarcane developed by private or public agencies are subject to notification by the National Seed Board (NSB).

Varieties of *other* crops imported or locally developed by a private person, company, or agency must be registered with the NSB, but are not subject to other restrictions.

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.

Evolution of Fertilizer Marketing and Distribution Systems In Bangladesh Since the Mid-70s

CHANGES IN FERTILIZER MARKETING AND DISTRIBUTION SYSTEMS IN BANGLADESH SINCE MID-70S

Year	Areas of Reform	Measures Taken
Mid 70s	Fertilizer Distribution system	Replacing OMS (old Marketing System) by NMS (New Marketing System). From total public sector monopoly to largely competitive free marketing system.
1982-83	Pricing of fertilizer	Farm level prices were decontrolled by April 1983. Largely replaced the BADC's retail trade of fertilizer.
1984-85	Privatization of sale of fertilizer	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).
March, 1989	Private sector lifting from factory/ farm ends	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.
1992	Privatization of import	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.
1995	Reversal of Urea Marketing policy	The open market system for domestically produced Urea experienced 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. Urea
1996	Re-introduction of fertilizer subsidy.	The subsidy on the imported fertilizer was introduced for the first time.
2007	Urea Crisis	Introduction of slip system
2008	Urea Crisis	In the dealership policy 2008, by cancelling <i>Upazila</i> based system, provision was made for appointing at least one dealer for each union.
2009	Urea Crisis	In the new dealership policy introduced in 1st October 2009 modified dealership system 'Farmers' Register', 'Fertilizer Distribution Card' and 'Fertilizer Distribution Register' were introduced.
2010	Open market sale re-introduced	'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.
2012	Substantial subsidy for non-urea fertilizer	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.

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

Reference year	Policies/reforms/regulation	Impact
1972-1977	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.	Use of irrigation expanded; a huge financial burden of the government; often wealthy farmers and individuals enjoyed the benefit of government subsidy.
1978-1984	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;	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 1569.1 ha in 1979-80 to 4725.63 ha in 2004-05.
1985-1987	Government established a workable foreign exchange market and ended many non-tariff barriers (Gisselquist et al. 2002);	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
1988-1989	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% (Gisselquist and Grether 2000)	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)
2007-2009	Direct subsidy for irrigation on per acre of irrigated land; reduced the price of diesel during the Boro season	Reduced cost of production of Boro paddy.
2009	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.	Small farmers were benefitted as a result of reduced irrigation cost.
2010 and at present	No subsidy on diesel or to the individual farmers for irrigation was given.	Irrigation cost increased, affected mostly the water purchasers.

Source: Hossain, 1988; Palmer-Jones, 1992; Gisselquist and Grether, 2000; Jaim (Field survey, 2012)

Evolving Public-Private Relationship

Fear of Corporate Greed: Discussions revealed is 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.