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# Potential Impacts of Seed-Sharing Agreements and their Implications for Seed Policies in South and Southeast Asia

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## 1. Introduction

The establishment of CGIAR-centres in the 1960s led to inter-country movement of crop germplasm through international research networks. Subsequently, multi-lateral agreements and agencies such as SAARC, ASEAN, etc. have also facilitated sharing of knowledge and research material among member-countries in the 1970s and 80s. Many less developed countries in South and South-East Asia were substantially benefited in the 1960s, 70s and 80s from free access of improved crop varieties and elite germplasm through these international and multi-lateral networks and agreements. For instance, the IRRI's first high yielding variety, IR-8 of rice and CIMMYT's first wheat varieties of Kalyana Sona and Sonalika have brought revolutionary progress in in Asia. In subsequent years, many countries in Asia have freely accessed large number of improved germplasms of other country-origin and used for further breeding programs. Nearly one-thirds of India's rice varieties that were released until 2000, and half of the total released rice varieties by 2017 have genes of rice germplasm received from IRRI or other countries. Similarly, above 90 percent of Nepal's rice varieties were developed using germplasm of other countries. Further large number of widely grown rice varieties in Bangladesh, Nepal, Pakistan and Myanmar have been introduced from India through informal channels such as cross-border exchange of seeds, marketing of seeds by private companies, etc. However, it may be noted that access to new crop varieties and their release for farmers by any country is formally allowed only from CGIAR system. Further improved germplasm of crops from other countries received through CGIAR's networks are extensively utilized in many countries in its breeding program for development of new crop varieties.

The need of formal arrangements for seed sharing of crop varieties among countries was first time debated with the IRRI's initiative in 2013. The primary objective of this initiative is to ensure food and nutritional security through climate-friendly approach of seed sharing of well-adapted crop varieties among countries with similar production systems for enhancement of food production in the region. As a result, India and Bangladesh have signed an agreement, first of its for sharing of seeds of released crop varieties along with varietal evaluation data at the initiative of IRRI in 2013 at Dhaka Keeping in view of agro-ecological and bio-physical similarities of agriculture systems in South and South-

East Asia, this IRRI's initiative received wider attention and some countries have started entering seed sharing agreements over the past eight years.

## **2. Objectives and research design**

The key objectives of the present study are to (a) understand the nature and scope of various seed sharing agreements, (b) to document and analyze the benefits so far realized by farmers in various member-countries under seed-sharing agreements and (c) estimate the expected potential impacts of seed sharing agreements on varietal releases and their adoption in member countries. The implications of the potential impacts of seed sharing agreements on seed policies in member countries will be brought out for further augmentation of the seed-sharing process among member countries.

The tracking-tracing approach is adopted to collect the required data and information from various stakeholders for the study. It is carried out primarily based on available data on seed sharing agreements from various documents such as agreement copies, review meeting reports, and annual reports of research institutions and Ministries of Agriculture of member countries. Further personal contacts online with a few key stakeholders of member countries are attempted to gather some relevant information.

## **3. Nature and scope of seed sharing agreements: Summary**

The first formal seed agreement was signed between India and Bangladesh in 2013 (Dhaka Agreement). This covered only paddy for sharing of seeds of released varieties along with varietal features and their testing data in multi-location trials. Once a country accesses this information and data from other member country vice versa, related to released crop varieties. After critical assessment of varietal features of donor-country *vis-a-vis* farmers' requirements (drought tolerance, submergence tolerance, biotic stress tolerance, grain quality, etc.,) of recipient country, then a suitable variety of one country (donor) can be officially notified or registered in other country (recipient).

After Dhaka agreement in 2013, similar agreement was extended to cover Nepal in 2014 (Kathmandu Agreement), Cambodia and Sri Lanka (Siem Reap Agreement) in 2017 and Bhutan, and Myanmar (Thimpu Agreement) in 2018 (Table 1). These multi-country agreements initially covered rice and later extended to other cereals and food crops including Potato. The Siem Reap Agreement of 2018 extended seed sharing to many crops other than paddy, such as other cereals, pulses, oilseeds, vegetables, etc. These agreements have facilitated a formal sharing of crop varieties and their features among the member countries. As a result, the sharing of released crop varieties and their seeds along with varietal evaluation data was started formally among the countries.

#### **4. Benefits realized until 2020**

##### *(a) Number varieties released*

One of the immediate benefits realized under seed sharing agreements is formal access of other country's crop varieties by the farmers in recipient country). It has been reported that ten rice varieties and one potato improved variety were released for farmers in different South Asian countries through seed-sharing agreements, which were originally developed and released in other member countries (Table 2). Six Bangladesh rice varieties were notified in India in 2017 for commercial cultivation, especially in eastern states. Three Indian rice varieties were released by Nepal in 2014 for circulation under the seed sharing agreement. Nepal also officially registered three more rice varieties (Sarju 52, Sawa Masuri and Ranjit Masuri) which were released in India in mid 1980s, but widely grown in Nepal for over the long period. Nepal availed seed sharing agreement to formalize the cultivation of these three old popular Indian varieties in Nepal. One potato variety, Yusi Maap of Bhutan (CIP line) was released in India in 2019 for cultivation (Table 2). Some of the crop varieties released through seed sharing agreements have been adopting by farmers in considerable area in member countries, especially Indian rice varieties in Nepal. However, it is reported based on initial experiences that Bangladeshi rice varieties in India have yet to pick up in eastern India. As large number of improved paddy varieties with wider

adaptability are made available in India, the farmers' acceptance of Bangladeshi varieties will be very limited unless these varieties out-perform significantly that local varieties.

*(b) Adoption rate and production gains*

By 2019, four countries in South Asia (India, Bangladesh, Nepal and Bhutan, and two in SE Asia (Myanmar and Cambodia) have been covered under seed sharing agreements, which are largely rice-growing countries except Bhutan. Thus, rice is a main focus of these agreements. As shown in table 3, all the member-countries covered under seed sharing agreements accounts for about 45 percent of Asia's rice area in 2020, Average paddy yield in the member countries is averaged at about 4 tons per hectare except in Cambodia. Average paddy yield in these countries is about 40 percent lower than that of East Asian countries. There is a huge potential to raise yield levels in member countries by 25 to 30 percent by technological consolidation with available improved varieties and without affecting environment base.

The benefits of seed sharing agreements have been started percolating to the farmers, mainly in Nepal. Thus, some more countries are expected to join with these agreements. The seed-sharing agreements are expected to play a vital role in some member countries where research infrastructure is relatively weak in coming years by accessing the suitable crop varieties from other countries where research system is fairly strong. Countries like Nepal, Cambodia, Sri Lanka, Myanmar, etc. will likely to be potential beneficiaries under seed sharing agreements. Any member country needs adaptable varieties in the event of any bio-calamities such as out-breaks of crop diseases and pests from other member countries without any additional research investments. Further the seed sharing agreements are likely avoid the duplication of research for varietal development in a low-income country, if similar varieties are already developed and released in other member countries.

Table 1: Details of different seed-sharing agreement: summary

S. No	Year	Agreement	Member-countries joined	Crops covered
1	2013	Dhaka agreement	India and Bangladesh	Paddy
2	2014	Katmandu agreement	Nepal	Paddy
3	2017	Siem Reap agreement	Cambodia, Sri Lanka	Paddy, other cereals, pulses, oilseeds, vegetables, Sugarcane and fiber crops
4	2018	Thimphu agreement	Bhutan and Myanmar	Paddy

Table 2: Crop varieties notified/registered in various member countries under seed sharing agreements

S. No	Recipient-Country	Crop	Variety	Donor-Country	Year of notification/registration
1	India	Paddy	Bina dhan 10, 11, 12, 17, BRRI dhan 69 and 75	Bangladesh	2016
2	Nepal	Paddy	DRR dhan 44, Sukha Dhan 5 & 6	India	2014
3	Nepal		Sarju 52, Sawa masuli and Ranjit masuli	India	2019
4	Nepal	Rice	Ciherang-Sub 1	Bangladesh	
5	India	Potato	Yusi maap	Bhutan	2019

Source: Yadav, 2019

Table 3: Area and yield of paddy in member countries of seed sharing agreement, 2020

<b>S. No</b>	<b>Country</b>	<b>Area (Million ha)</b>	<b>Yield (Tons/ha)</b>
1	India	45.00	4.08
2	Bangladesh	11.50	4.51
3	Bhutan	0.013	4.14
4	Nepal	1.47	3.78
5	Sri Lanka	1.09	4.57
6	Myanmar	6.92	3.79
7	Cambodia	3.27	2.90
8	South Asia	62.44	4.11
9	South east Asia	46.24	3.81
10	Asia	158.00	3.98
11	World	164.9	4.59

Source: FAOSTAT, 2020