India: Seed Hub for Asia and Africa

A Knowledge Report by ***Sathguru Management Consultants***

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MESSAGE BY DR. P SATEESH KUMAR - GOVERNING COUNCIL MEMBER, NSAI

Dr. P Sateesh Kumar
Governing Council Member,
National Seed Association of India

Seed industry in India today has traversed its foundation stages and is currently at an inflection point to scale up into growth phase. While the learning curve has been steep at times, today we are the part of a vibrant seed industry with strong foundation to take-off into the growth phase.

The progress achieved since the new policy on seed development 1988 and national seed policy 2002 in terms of developing capacities by Indian Seed Industry in terms of R &D, product development, supply chain management and quality assurance has been phenomenal which has positioned India as the fifth largest seed industry globally. Both public and private sector has played a vital role in laying a strong foundation to Indian seed industry, which is poised to become an important global player in the future. Indian industry has also been highly agile in adopting new varieties and hybrids which have delivered value.

There remains a huge potential to reach out to the Asian & African countries for expanding the market and reaching out to farming communities. It is observed that while India's seed export to the world during 2001-11 increased by over four times, export to the South Asian countries increased by a whopping 17 times, realizing a CAGR of 33 % compared to a CAGR of 16% in case of seed export of the world. These figures are a mere indication of the fact that with aligned goals and policies greater convergence is possible. The Seed systems in sub-Saharan Africa are dominated by informal supply system; with partnerships and introduction of quality centric seeds, custom seed production in vegetable crops, the chronic problems of hunger and malnourishment can be fought.

The Knowledge Report for Enhancing Seed Exports from India, 2015 by Sathguru Management Consultants provides a snapshot of the dynamics of Indian Seed Industry and its emerging export opportunities. I commend the efforts of Sathguru Management Consultants Team for bringing this industry research report. We acknowledge the efforts of the Secretariat in Organizing the Workshop on Seed export and bringing all the relevant stake holders under one umbrella.

MESSAGE BY SATHGURU HEAD

K Vijayaraghavan,
Chairman and Head,
Sathguru Management Consultants

Indian economic growth has witnessed remarkable advancement over the last two decades. While the initial growth increase was triggered by economic reforms and a change in foreign direct investment policy that attracted global investment, a key driver of more inclusive growth is an innovation system that can apply solutions to challenges in health, agriculture, energy and environmental products, among others. Such innovation-driven commercialization efforts should also help ensure long-term competitive advantage to domestic enterprises as developing countries open their markets even more to global players. While many industrialized economies have implemented innovation policies and deployed resources focused on cutting-edge frontier research and its commercialization, some emerging economies have explicitly attempted to accelerate the technology catch-up process to benefit from technologies that are already developed and accessible.

Public and Private enterprises requires a set of steps to build and create access to new technologies and emerging markets. Most seed technologies applications typically need to be adapted and verified to meet specific needs in heterogeneous local contexts - need adaptation and verification to local biological variations including climate, soil type, and genetic variations in plants, animals and humans, as well as new technologies tested and modified under laboratory and field conditions to deliver value in the new marketplace. Critical is to select and secure rights of usage and aggregating appropriate complementary pieces of technologies developed in the public and private innovation system within or target country into an accessible package to adapt to meet specific needs.

Developing the sustainable ecosystem of introducing new products, production processes, organizational and marketing technologies into the market driven by dynamic interactions between developers/adopters, channel players and growers. Important to strengthen required education and skills, and nurturing cohorts of mentors with scientific, entrepreneurial and managerial capabilities to support enterprises in ensuring that the new products and market penetration takes root in the overseas markets. Aligning with the regulations and compliance frameworks required to ensure process and product quality and enhance stakeholder understanding of new technologies so that local communities have the needed confidence to adopt and influence based on informed decisions.

Public systems in Africa and developing countries could possess the inter-disciplinary research skills to create new knowledge, the private sector can create a deeper understanding of market needs and the economic relevance of products developed by application of technologies generated from public research. In most countries with a sound patent regime, the patent filings from the private sector far outweigh those from the public sector. Devising an entry strategy approach wherein the public sector invests largely in technology risk-related and the private sector invests largely in market risk-related.

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INSIGHT DASHBOARD

Global Market Arena

Over the last decade, global seed industry has tripled in size reaching **USD 45 billion** and is estimated to grow at same rate crossing **USD 92 billion by 2020**. **USA, France, China, Brazil** and **India** are top markets contributing to **66 per cent** of total global market together. **Corn, Soybean and vegetables** accounts for more than **75 per cent** of total global seed market. International seed export has grown **three times** over last decade reaching **USD 10 billion**. Major export growth came from **Hybrid Corn, soybean and vegetables**. **Europe and North America** leads the export market while Asia is picking up at exponential growth rate and Africa is just entering into trade business. **Asia Pacific region** is projected to be **fastest growing market** with India and China leading the region.

Indian Market Arena

Indian seed industry is ranked at **5th** with overall size of **USD 2.2 billion**. **Cotton** is the largest segment in value terms with Bt cotton driving the growth. **Hybrid Corn, Hybrid Rice and Vegetables** to drive the future growth. Indian seed industry estimated to grow at **12-13 per cent** crossing **USD 3 billion** mark by **2020**. **ASEAN countries** are top export destinations accounting for more than **60 per cent** of total seed export from India. **Corn and Rice** top the crop segment with more than **50 per cent** share in total seed export.

Crops

ASEAN countries are top export destinations for **Rice seed** export. **Cotton seed** is majorly exported to pro-Bt nations like **Myanmar, South Korea. North America** is the top export destination for **Soybean seed** export accounting for more than **50 per cent**. **Pakistan** alone accounts for **60 per cent of sunflower seed** import from India.

Geography

SAARC countries are top export destinations for **Corn seed** export. **Africa** is going to be major export market for both hybrid and OPV seeds from India. **Harmonization of Plant quarantine** laws across SAARC is critical for seed exchange. **Exclusive R & D programs** for export oriented seed production to tap Western developed markets.

SECTOR OVERVIEW

OVERVIEW OF SEED SECTOR

GLIMPSE OF GLOBAL SEED MARKET

Global seed industry has transformed significantly over the past two decades, with farmers adopting high value seeds replacing farm saved seeds contributing to overall increase of crop productivity and seed business value. Advances in seed technology have accelerated through marker-assisted breeding, genetic transformation and nanotechnology. Seed sector witnessed an exponential growth curve due to introduction of Genetically Modified hybrids in Corn, Cotton, Soybean and Canola crops comprising around 82, 68, 30 and 25 per cent of the respective seed business value.

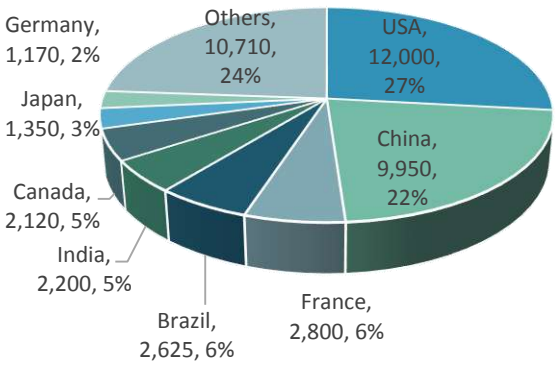
Asia-Pacific region is projected to be the fastest growing market due to large population, untapped natural resources and growing acceptance to improved seed technologies.

Since 2000, the global industry is almost tripled in size reaching USD 45 billion in 2012 (ISF, 2013). The global seed market is expected to reach USD 92 billion in 2020, at a compound annual growth rate of 9.4 percent from 2015 to 2020. Though North America dominates the overall global seed industry with 32 per cent of the total share, the major growth is seen in Asia-pacific and Africa region.

LEADING SEED MARKETS: CHINA, USA, FRANCE AND BRAZIL CONTRIBUTING USD 30 BILLION

The United States (27 per cent) and China (20 per cent) account for half of the market despite only 20 per cent arable land. North America dominates the sector with USA and Canada ranking in top five countries, attributed to cultivation adoption of advanced high value traits in the commercial crops like Corn and soybean. USA grows 80 per cent of total world's soybean production and of which more than 80 per cent is genetically modified. USA's share in global Corn production is 37 per cent with 88 per cent being genetically modified. China's seed sector is dominated by rice, corn and vegetable seeds which places it at second position. France ranks at third with major contribution of cereals, cotton and vegetable seeds.

Fig 1: Top 10 Seed Markets (USD Mio)



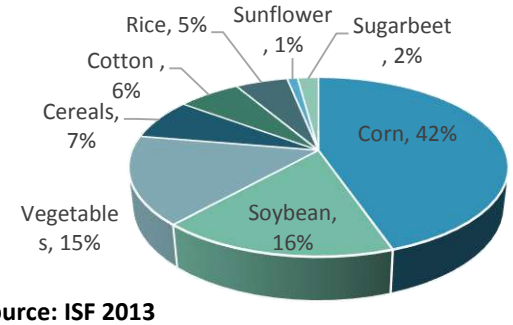
Source: ISF 2013

Indian seed sector is ranked at fifth place with major growth coming from GM cotton, rice and vegetable seeds.

LEADING CROP SEGMENTS: CORN, SOYBEAN AND VEGETABLES CONTRIBUTING 75 PER CENT

The crop-wise profile of seeds at global level places corn at top with 42 per cent share, followed by soybean, vegetable as whole, cereals, cotton and rice. Both Corn and Soybean seeds consist of about 80 per cent of genetically modified seeds on a global average. Next big growth is expected to come from increasing adoption of genetically modified corn seeds in Asia-pacific region (APAC), cotton seeds in Africa, hybrid rice seeds in APAC and increased cultivation of quality vegetable seeds across globe.

Fig 2: Crop Segments

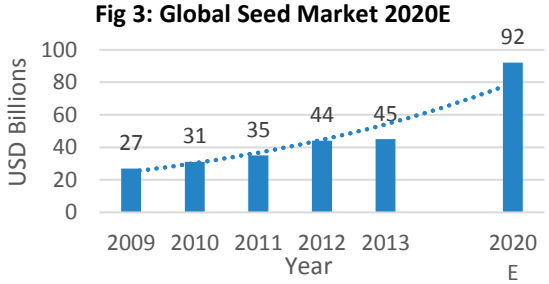


Source: ISF 2013

MARKET GROWTH PROJECTION: ESTIMATED TO REACH USD 92 BILLION BY 2020

International Seed Federation (ISF) estimates that global seed market is expected to grow at an annual growth rate of 9.4 per cent over the next 5 years. Global commercial seed market has been predicted to reach USD 92 Billion by the year 2020, driven primarily by the increasing demand for food in tandem with the growing global population, rising standards in global farming, and extensive use of biotechnology in seed development.

Fig 3: Global Seed Market 2020E



Source: ISF and Sathguru Analysis

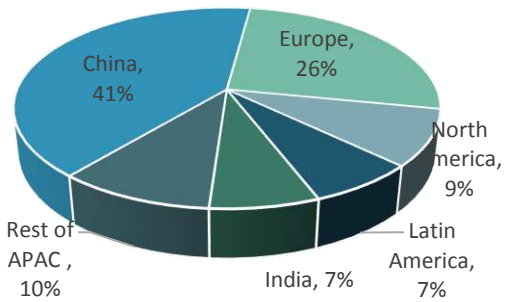
The value of the global vegetable seed market in the year 2012 was USD 6.75 billion. The Global vegetable seed market is expected to grow at the rate of 7 - 8 per cent per annum and reach USD 8.8 billion by the year 2020. Intensive research and development efforts conducted by seed companies have brought about evolved strains of seeds that display improved resistance to diseases and pests, and which are able to deliver enhanced yields and superior produce.

In last 10 years, global seed industry has grown by almost 100 per cent reaching $ 45 billion and is posed to see the same growth by 2020

FOCUS ON VEGETABLE SEED MARKETS

Asian vegetable seed market is the largest where China and India are the major players in the region. They both together occupy the 48 per cent of the global vegetable seed market share. Europe stands next with 26 per cent share and France being major vegetable seed exporting hub to rest of the world. The future growth in vegetable seed is seen coming from increased cultivation to meet growing demand in developing nations, rapid adoption of hybrid seeds and policy changes to allow GM seeds.

Fig 4: Global Vegetable Seed Market



Source: ISF and Sathguru Analysis

GLIMPSE OF INDIAN SEED MARKET

Indian seed industry is one of the most mature and vibrant one in the Global Seed Market. It is built on the foundations of strong public sector commitment to research and development that started in the 1960s under the Green Revolution. With support from international foundations, India established breeding centers for all major crops, a nationwide trial system and extension support. At present with the private sector dominating the market (with around 76 percent market share), there has been intense competition and a proliferation of companies. Today the private sector plays a dominant role both in R&D and marketing with the underlying infrastructure, technical skills, and production capacity; while germplasm has been the result of public investments over many decades.

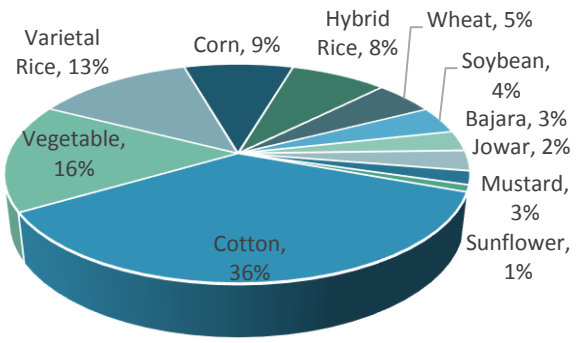
Rapid hybridization in vegetables, Rice and Corn to drive the growth

Hybrid seed market has grown at CAGR of 39.1 per cent between FY' 2007-2013

LEADING CROP SEGMENTS: COTTON, RICE AND VEGETABLE CONTRIBUTING 70 PER CENT IN VALUE TERMS

The contribution of varietal seeds to the overall commercial seeds in India has witnessed a steep decline from 72 percent in FY'2007 to 36.8 percent in FY'2013. The Indian seed market is majorly contributed by non-vegetable seeds such as Corn, Cotton, Paddy, Wheat, Sorghum, Sunflower and Millets. In FY'2013, non-vegetable seeds accounted for 82.2 percent with Cotton alone accounting for 36 percent.

Fig 5: Crop Segments

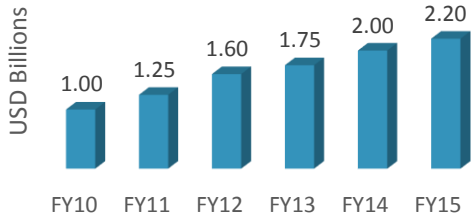


Source: Sathguru Analysis

MARKET GROWTH AND FORECAST: ESTIMATED TO GROW AT 14.6 PER CENT CROSSING USD 3 BILLION MARK BY 2020

India has evolved to become 5th largest seed industry in the world. Indian seed market has shown robust CAGR of 19 percent over last four years growing from USD 1 billion in 2010 to USD 2.2 billion in 2014. In value terms, the major growth has come from the increased adoption of Bt Cotton hybrids, single cross Corn hybrids and hybrid vegetables. The volume growth has mainly come through increased Seed Replacement Rate in crops like Paddy and Wheat.

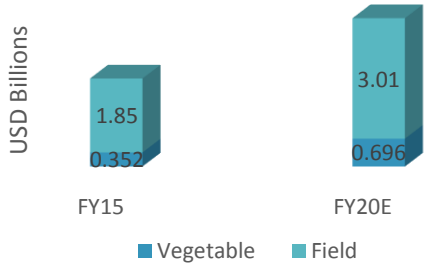
Fig 6:Indian Seed Market growth



Source: Sathguru Analysis

The overall Indian seed market is expected to grow at 11 percent annually while Indian vegetable seed market is expected grow at 14.6 percent. In 2020, Indian field crop market would cross USD 3 billion mark while vegetable seeds market would reach USD 700 million.

Fig 7: Indian Seed market forecast

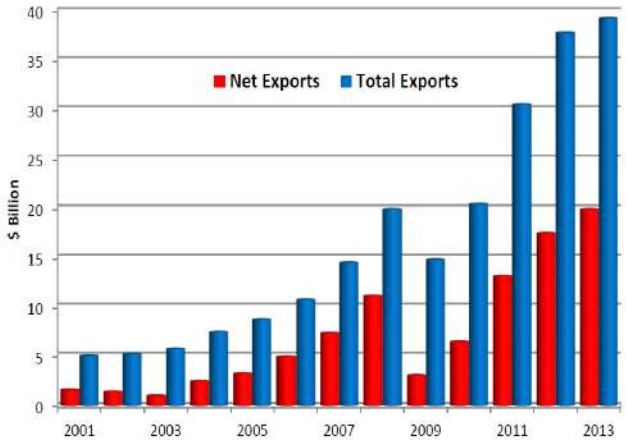


Source:ISF and Sathguru Analysis

INDIA: GLOBAL FOOD BASKET

The agrarian culture and varied regional climate in India have made a significant contribution to the global food basket. In the past decade, India has emerged as a major agricultural exporter, with exports climbing from just over USD 5 billion in 2003 to a record of more than USD 39 billion in 2013. India became the world's seventh-largest exporter of agricultural products in 2013, surpassing Australia. In terms of net exports, India is now the world's sixth-largest player, with net exports double those of the EU-28. The Indian government's support for both production and exports has contributed to the rapid growth in shipments, which are increasingly destined for developing nations including least-developed nations (as classified by the United Nations).

Fig 8: India Emerges as a largest exporter of Agricultural crops



Source: DGFT

EXPORT MARKET GROWTH: RANKS TOP IN THE WORLD WITH ANNUAL GROWTH RATE OF 21 PER CENT

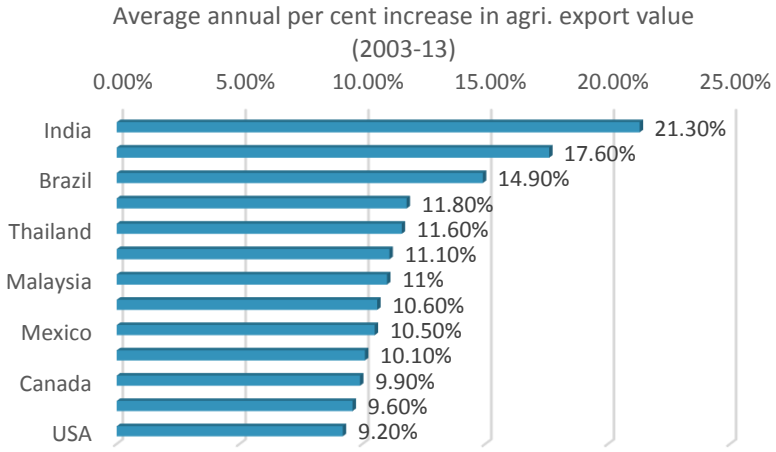
Table 1 : Major Agricultural produce Export

Product	2009 Export Value (Billion USD)	2013 Export Value (Billion USD)	Increase
Rice	USD2.4	USD7.1	↑195%
Buffalo	USD0.9	USD4.0	↑344%
Cotton	USD1.2	USD3.8	↑216%
Soybean	USD1.4	USD2.7	↑92%
Guar Gum	USD0.2	USD2.4	↑1100%
Corn	USD0.5	USD1.2	↑140%
Wheat	USD0.1	USD1.0	↑900%
Other Products	USD8.2	USD17.1	↑108%
Total	USD14.8	USD39.3	↑165%

India has become a very important player on the global market, especially for Rice, Cotton, Sugar, and Beef (buffalo). In addition to these products, India has also become a sizeable exporter of Soybean meal, guar gum, Corn and wheat as well as a diverse range of other products.

India is the second largest producer of sugar in the world and the government has aimed to increase the exports from 1.3 MT in 2013 to an average of 2 MT in 2014 and 2015.

Fig 9: Export growth rate over past decade

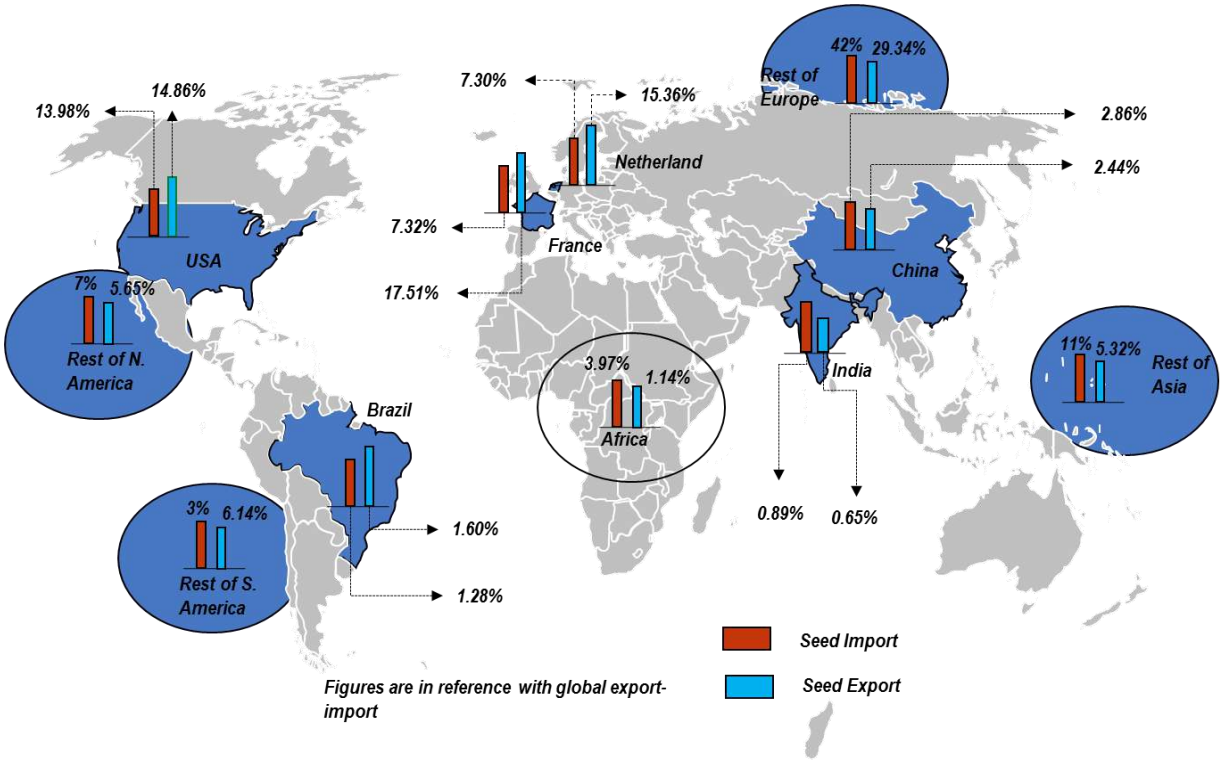


India's export growth over the past decade has been the highest of any country, with an annual rate of more than 21 percent. By comparison, Brazil's annual exports grew 15 percent over the past decade, China's grew 12 percent and the United States' grew 9 percent. India's exports in 2014 have remained roughly at previous year's record level. From January-May, Rice exports are up by 10 percent compared to last year, Cotton up by 2 percent, Bovine meat (buffalo) up by 18 percent, and wheat up by 75 percent. However Soybean meal, Guar gum and Corn exports are down from previous year.

OVERVIEW OF SEED EXPORT

GLOBAL EXPORT

Fig 10: Major Export-Import markets



The globalization, commercialization of agriculture, patent protection systems and Intellectual rights over plant varieties has given a great push to international seed trade. The growth history of global seed trade can be explained in two phases : 1) During early 80's, growing demand for improved varieties and hybrids in developing nations to increase the overall farm productivity opened whole new market for western developed nations, 2) Over the period of time, low cost of production and favorable seed policy reforms in developing nations lured both big multinational and domestic firms to come up with the concept of production hub giving rise to multi-country seed exchange

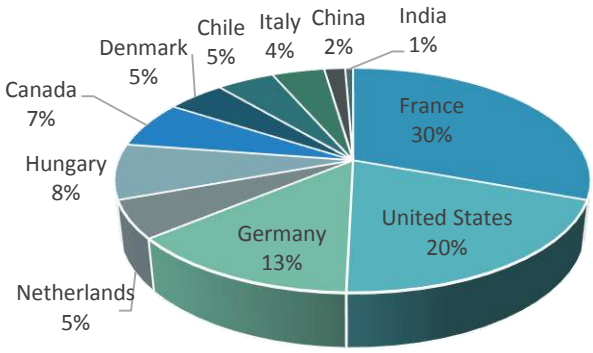
Over the last decade, the international seed trade grew three times reaching USD 10 billion. This growth is because of high demand for improved seeds globally and dwindling land availability for seed production in established markets making leading companies to look beyond their traditional production bases. During the same period, many of the multinational seed companies acquired or tied up with biotech firms around the globe focusing on developing region specific traits.

China and India together grow 50 per cent of global vegetable production but seeds are supplied by European nations.

LEADING EXPORT MARKETS: FRANCE AND USA ACCOUNTING 50 PER CENT OF TOTAL SEED EXPORT

According to the International Seed Federation (ISF), Europe ranks first (62 percent) in the global seed trade with two market leaders - France (17.5per cent) and Netherlands (15per cent). France majorly exports field crop seeds while Netherlands exports vegetable seeds to rest of world[1]. USA occupies third position in global seed trade and accounts for more than 70 per cent of North America's seed export. Kenya, South Africa and Morocco were the only African countries exporting seeds worth more than USD 1 Mio.

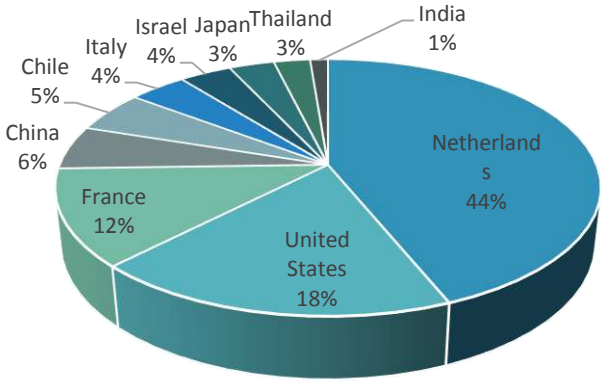
Fig 11: Top Field Crop Seed Exporters (Value)



Source: ISF and Sathguru Analysis

Until 2010, seeds trade from Africa was negligible with mere 4 per cent import and 1.1 per cent export out of total global seed import-export. The seed system was predominantly dependent on the external free of cost seeds and aids. No commercial player was able to set foothold due to unstable political and policy environment. Last five years have seen tremendous change in many Eastern African countries while western countries have just started to adopt favorable reforms. Cheap human resources and availability of large land tracks are creating huge opportunities for both seed export and import.

Fig 12: Top Vegetable Crop Seed Exporter (Value)



Source: APEDA

[1] France and Netherlands leverage on other countries such as Chile as seed production hub and are involved in lot of import –re-export of field and vegetable seeds.

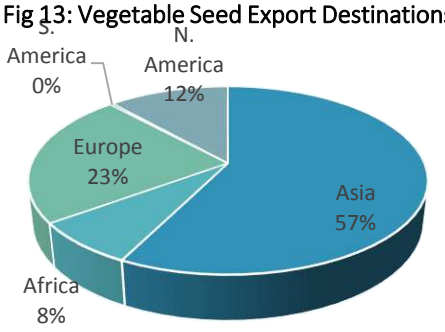
INDIAN EXPORT

Till late 1980s, India's international trade policy was focused on protecting domestic markets from overseas competition. Post 19991, India adopted Liberalization, Privatization and Globalization (LPG) of its economy. The importation of seeds were allowed in the year 1988 with the enforcement of New Policy on Seed Development. The New Policy on Seed Development greatly liberalized import of vegetable and flower seeds in general and seeds of other commodities to some extent and also encouraged the multinational seed companies to enter into the Indian Seed Market. However, export of seed from India reached new heights with the implementation of Export Import Policy, 2002-2007.

LOOKING BEYOND TRADITIONAL MARKETS! ONLY ASEAN NATIONS ACCOUNTING FOR MORE THAN 60 PER CENT OF TOTAL EXPORTS FROM INDIA (FC-70 PER CENT, VEG -57 PER CENT)

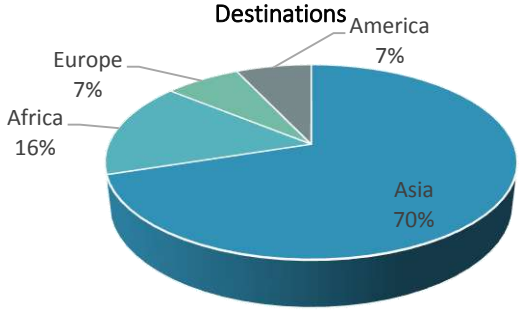
Today India ranks 26th on the global list with annual seed export of USD 138 million and 1.38 per cent share in overall global seed export. If the exports are segregated into field and vegetable crops seed, India exports field crop seeds to the tune of USD 71.4 million and vegetable crop seeds to USD 67 million. However, India's position is comparatively better in vegetable seed export having ranked in top 15 countries with share of 1.94per cent. If we look at the top destinations for vegetable and field crop export, most of the field crop seeds are exported to APAC region followed by Africa while significant volume of vegetable crop seeds are exported to Europe and North America.

Fig 13: Vegetable Seed Export Destinations



Source: APEDA and Sathguru Analysis

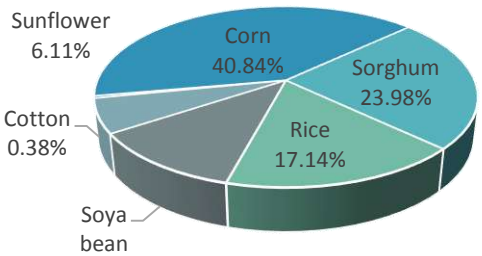
Fig 14: Field Crop Seeds Export Destinations



Source: ITC and Sathguru Analysis

Field crop seeds export includes, Corn seed which has largest share, with the annual export value of USD 29 Mio, followed by Sorghum (USD 17.1 Mio), Rice (USD 8.2 Mio), Soybean (USD 8.2 Mio), Sunflower (USD 4.3 Mio) and Cotton (USD 0.27 Mio). Individual crop export is discussed in-detail in later part of report.

Fig 15: Crop Segments



Source:ITC and Sathguru Analysis

CROP OVERVIEW

CROP SEED EXPORT – A DEEP DIVE

Rice

Total Rice seeds exported in 2013 – USD 12.34 Mio
Top importers – Bangladesh, Nepal

Corn

Total Corn seed exported in 2013 – USD 29.1 Mio
Top importers – Bangladesh, Thailand

Cotton

Total Cotton seed exported in 2013- USD 0.27 Mio
Top Importers – Myanmar, Korea

Soybean

Total soybean seeds exported in 2013- USD 8.2 Mio
Top importers – Canada, USA

Sunflower

Total Sunflower seeds exported in 2013 – USD 4.3 Mio
Top importers – Pakistan, UK

Tomato

Total Tomato seeds exported in 2013 – USD 11.58 Mio
Top importers – Netherlands, USA

Cabbage

Total Cabbage seeds exported in 2013 – USD 1.01 Mio
Top importers – Pakistan, Senegal

Melons

Total Melons seeds exported in 2013 – USD 0.81 Mio
Top importers – USA, Netherlands

Other Vegetable

Other major Vegetables are Okra, Hot Pepper, Onion, and Radish
Top Importers – Pakistan, Bangladesh

FIELD CROP – HYBRIDS TO DRIVE THE EXPORT

India exports more than USD 70 Mio worth field crop seeds to the countries all over the globe. It majorly incudes Corn, Rice, Cotton, Sorghum, Soy bean, Sunflower and other minor millets. In this study we will explore more on top five field crops- Rice, Corn, Cotton, Soy bean and Sunflower because of their commercial importance from Indian trade point of view.

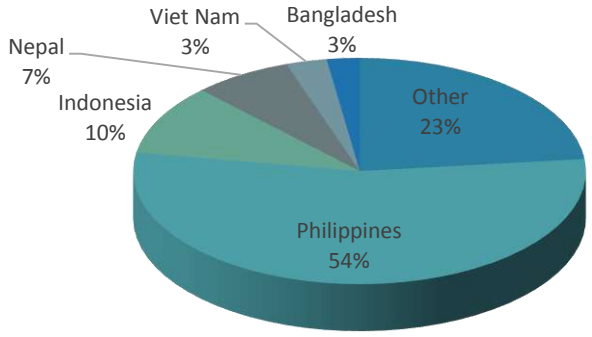
1. RICE

Rice is the most important cereal crop because more than half the world's population subsists wholly or partially on Rice as a staple food. The growth in demand for Rice is correlated to population growth. Out of total Rice produced globally, 80 percent is produced and consumed in Asia. Per capita Rice consumption in Asia is seven times than that in USA. There are number of challenges to keep pace with demand from a burgeoning world population. The productivity of Rice, in major producing regions like South and South East Asia is consistently low at 60 per cent of its estimated potential. Additionally, infusion of hybrid seeds at 5-10 per cent and seed replacement ratio of 10-15 per cent are lowest in Rice when compared with other crops.

Tanzania is one of the largest rice producing country in Africa 1.3 Million Ha. Poor productivity (1.40MT) is the major concern.

ASEAN MARKETS - TOP EXPORT DESTINATIONS

Fig 16: Top export Destinations (Value)



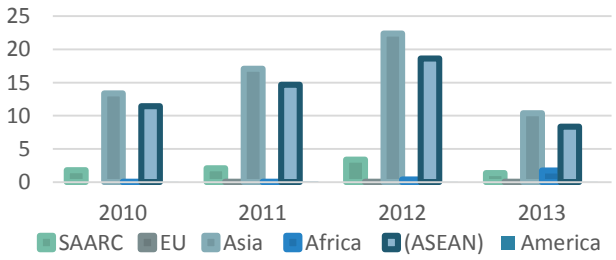
Source: ITC and Sathguru Analysis

potential considering agro climatic similarities with India.

Asia, specifically South East Asia is a potential market for Indian Rice seeds. However India is yet to explore the potential markets among SAARC countries because of trade issues and quarantine rules for pests and disease.

Globally, Rice seed occupies around 5 percent of total seed market while it occupies total 21 percent of Indian seed market (Varietal – 13 percent and hybrid – 8 percent). When it comes to export, India majorly exports hybrid Rice seeds because of its premium price and demand. In 2013, India had exported Rice seed worth of USD 12.24 Mio, mainly to Asian and African countries. Philippines is the largest importer of Indian Rice seed (USD 6.6 Mio) followed by Indonesia (USD 1.2 Mio) and Nepal (USD 0.86 Mio). Even Bangladesh and Vietnam hold good export

Fig 17: Indian Rice Seed Export Trend (USD Mio)



Source: Sathguru Analysis

Table 2: Region wise Top Rice Seed Importers					
SAARC	ASEAN	Africa	Asia	America	EU
Bangladesh	Philippines	Ethiopia	Philippines	United States of America	Ireland
Nepal	Viet Nam	Niger	Bangladesh	Canada	United Kingdom
	Indonesia	Ghana	Nepal		

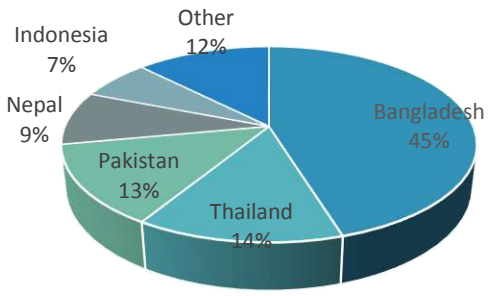
2. CORN

Corn is the most widely grown crop in the North America, specifically the United States which produces around 37per cent of the world's harvest. Other top producing countries include China, Brazil and the European Union. India produced 22 million tons of Corn grain in 2012 and out of which 18 million tons was locally consumed. Historical yield growth for Corn has been driven by the success of technological innovations and intensification. The continuing advances in genetic modification (GM) and marker-assisted breeding are expected to accelerate this growth to meet the future increase in demand. In 2012, 88per cent of the Corn grown in the United States was genetically modified. GM Corn was also grown in 17 countries of which the major producers are Argentina, Brazil, Canada and Philippines. Asian countries are increasingly positioning themselves towards GM and this may indicate a potential acceleration of the technology in the region.

Of the 184 million hectares of global maize planted in 2014, 30% were biotech maize.

SAARC MARKETS - TOP EXPORT DESTINATIONS

Fig 18: Top Export Destinations (Value)

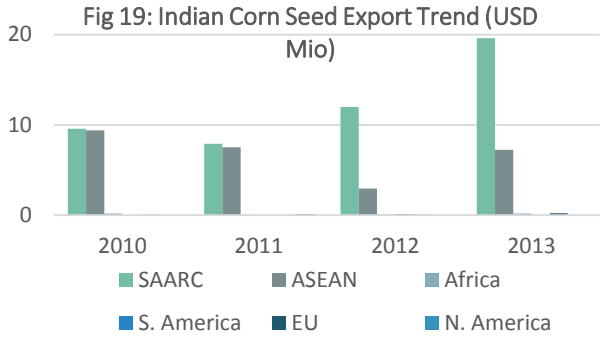


Source: ITC and Sathguru Analysis

Mio and Nepal USD 2.6 Mio. India also exported Corn seeds worth of USD 0.18 Mio to Africa (majorly Zambia and Mozambique) and USD 0.2 Mio to European Union (majorly Belgium and Portugal). China imported around USD 0.17 Mio worth of Corn seeds from India in 2013.

Most of the Asian countries grow tropical non-GM Corn. In India, Cotton is the only GM crop grown commercially. However India and many other countries are considering Corn as the next GM crop for wide cultivation and the field trials are in advanced stage. Out of total USD 29 Mio worth of Corn seeds exported from India in 2013, 97 percent was exported to Asian countries. Bangladesh ranks first with annual import worth of USD 15 Mio, followed by Thailand USD 4 Mio, Pakistan USD 3.9

Fig 19: Indian Corn Seed Export Trend (USD Mio)



Souce: Sathguru Analysis

Table 3: Region wise Top Corn Seed Importers					
SAARC	ASEAN	Africa	N. America	S. America	EU
Bangladesh	Philippines	Ethiopia	Canada	Brazil	United Kingdom
Pakistan	Thailand	Nigeria			Belgium

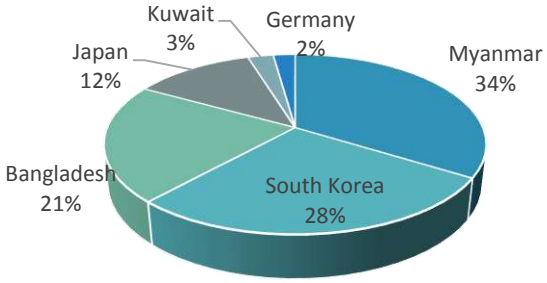
3. COTTON

China is the largest producer of Cotton and most of it is used domestically. While USA is the largest exporter of Cotton. Cotton is one of the most cultivated crops in India, with great economic importance attached to it. The Cotton cultivation in India in 2014-15 stands 12.25 million hectares with 6 percent growth over last year. India is also the second largest producer of Cotton worldwide. Since 2002, Bt Cotton has steadily prevailed over India's Cotton fields raising overall Cotton production. Today, over 90 percent of Cotton grown in India is cultivated by using Bt Cotton seeds. There are very few countries in Asia and Africa which allows commercial cultivation of GM crops and hence Cotton seed export has not been picked up in last decade. Now with more countries are opening up for GM cultivation, there exists huge potential to export Cotton seeds from India.

Post 2002, Bt Cotton has given strong boost to Indian seed industry.

BT COTTON DRIVING THE SEED EXPORT

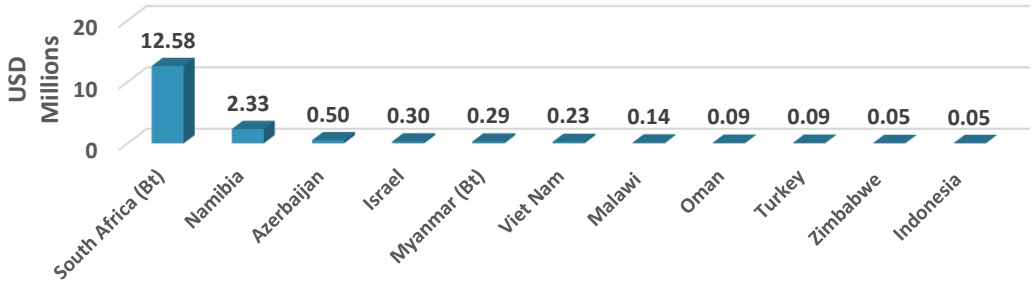
Fig 20: Top Export Destinations (Value)



Source: COMTRADE and Sathguru analysis

In 2013, India exported approximately USD 0.27 Mio worth Cotton seeds to rest of the world. Myanmar (SEA) was the largest importer with USD 0.09 Mio followed by S. Korea - USD 0.07 Mio, Bangladesh – USD 0.06 million and Japan – USD 0.03 Mio. Myanmar and South Korea allow cultivation of Bt Cotton and seeds exported from India are predominantly Bt hybrids. India exports non Bt Cotton seeds to Bangladesh and Ethiopia which are yet to approve Bt Cotton cultivation.

Fig 21: Top Cotton Seed Importers (APAC & Africa)



Source: ITC and Sathguru Analysis

Recently, the governments of India and Pakistan have given permission for few seed firms to test their Indian Bt Cotton varieties on Pakistan soil. Similarly number of African countries like Sudan, Zimbabwe are testing Bt Cotton seeds from India for their suitability to local agro-climatic conditions.

4. SOYBEAN

Soybean is an important global crop, used as protein source and as an oil; more than 80per cent of the Soybean crop is used as meal for animal feed, with the remainder used either directly for food or in a wide range of industrial products. The United States, Brazil and Argentina together account for more than 80per cent of global Soybean production, while China and the European Union are the major import markets for Soybeans. In 1997, 8per cent of all Soybeans cultivated for the commercial market in the United States were genetically modified, and by 2012 that number had grown to 93per cent. Globally, 80per cent of the Soybeans planted today are genetically modified.

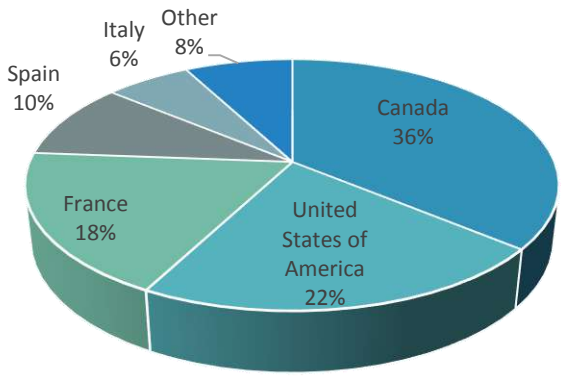
In 2013, India produced 9.5 Mio MT of soybean

India does not allow GM soybean cultivation

NORTH AMERICA ACCOUNTS FOR MORE THAN HALF OF SEED EXPORT FROM INDIA

In 2013, India exported USD 8.7 Mio worth Soybean seed to rest of the world. Most of it was exported to America and Europe. Canada was the largest importer with import value of USD 3.1 Mio followed by USA – USD 1.9 Mio, France – USD 1.6 Mio and Spain – USD 0.9 Mio. In Asia, UAE is the largest importer (USD 0.05 Mio) of Soybean seed from India followed by Nepal, Qatar and Singapore. India has also reported some export to African countries like Benin and South Africa but the value of export is minimal.

Fig 22: Top Export Destinations (Value)



Source: ITC and Sathguru Analysis

5. SUNFLOWER

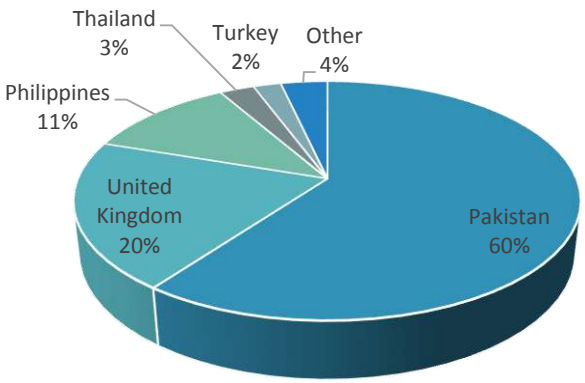
Sunflower is one of the fastest growing oilseed crops in India. It occupies fourth place among oilseed crops in terms of global acreage and production. The world Sunflower seed production stood at 44.5 Mio tons from an area of 25.45 Mio hectares, accounting for 8.5 percent of the total oilseeds production. Russia was the largest producer of Sunflower in the world, followed by Ukraine, Argentina, China and Romania during the year 2013. Europe contributes to 68 percent of total Sunflower production in world followed by Asia -14 percent and America – 12 percent. India's Sunflower seed production in the year 2013 was 1.66 Mio tons.

Ukraine is the largest exporter of sunflower and sunflower oils

PAKISTAN ALONE ACCOUNTS FOR 60 PER CENT OF IMPORT

In 2013, India exported USD 4.4 Mio worth Sunflower seeds. Pakistan was the largest importer with import value of USD 2.6 Mio followed by UK – USD 0.87 Mio, Philippines – USD – 0.5 Mio and Thailand – 0.1 Mio. Out of total Sunflower seeds export from India, approximately 76 percent goes to Asian countries, 20 percent goes to European Union and rest 4 percent to Africa. In 2013, only two countries - Tanzania and Angola from Africa imported Sunflower seeds from India. India's Sunflower seed export to America is negligible apart from USA, which imports less than USD 2,000 worth Sunflower seeds from India.

Fig 23:Top Export Destinations (Value)



Source: ITC and Sathguru Analysis

VEGETABLES: INCREASING CONSUMPTION IN DEVELOPING NATIONS

India's vegetable seed industry is a bouquet of wide range of vegetable which are widely consumed within the country. The demand for Indian vegetable seeds is growing very strongly in many of the foreign countries. Most in demand are Solanacius vegetable crops and Cucurbits. Currently, vegetable and fruit seed exports consist of about 4 per cent of the total horticultural exports from India. In this section, we will discuss Tomato, Cabbage, Okra and Melons in detail.

1. TOMATO

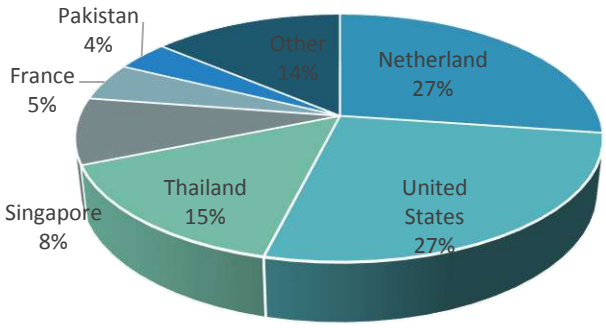
Tomato is the world's largest vegetable crop after potato and sweet potato. Asia alone produces 60 percent of total world's Tomato with China and India leading the global Tomato production. In 2013, world's Tomato production was 164 Mio tons from 4.5 Mio hectares. China ranks first in the list with annual production of 50.5 Mio tons followed by India – 18.2 Mio tons, USA – 12.6 Mio tons and Turkey – 11.8 Mio tons. India's climatic conditions are very congenial for the growth of wide variety of Tomato.

India is the Second largest user of tomato hybrids after USA

HIGHEST EXPORTED VEGETABLE SEED: ONE FIFTH OF TOTAL VEGETABLE SEED EXPORT

In 2013, India exported USD 11.58 Mio worth Tomato seeds which consists of 17 percent of total vegetable seed export. Netherland was the largest importer with import value of USD 3.15 Mio followed by USA – USD 3.09 Mio, Thailand – USD 1.72 and Singapore – USD 1 Mio.

Fig 24: Top Export Destinations (Value)



Source: APEDA and Sathguru Analysis

When we look at the region wise export (value), APAC accounts for 35 percent, Europe 34 percent, North America 27 percent and Africa 4 percent. While in volume terms, APAC accounts for 54 percent, Europe 23 percent, North America 13 percent and Africa 9 percent. This explains that the price realized per unit of Tomato seeds is much higher in the regions like Europe, America and Africa than APAC region.

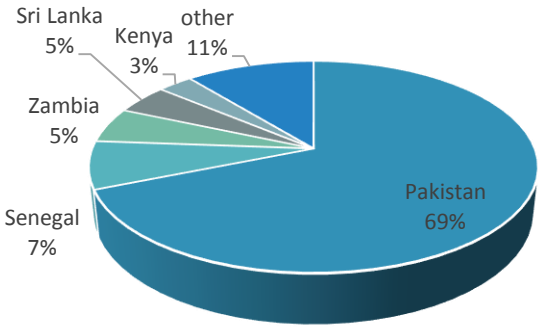
Kenya, Nigeria, Egypt, and Ethiopia are the countries from Africa importing Tomato seeds from India. Egypt and Nigeria are the largest producers of Tomatoes in Africa, together producing more than 10 Mio tons of Tomato annually.

In Turkey, Tomato seed prices are 10 times than that of in India.

2. CABBAGE

In 2013, India exported USD 1.01 Mio worth of Cabbage seeds accounting for 1.49 percent of total vegetable seed export. Pakistan was the largest importer with import value of USD 0.7 Mio followed by Senegal – USD 0.07 Mio, Zambia – USD 0.05 Mio and Sri Lanka –USD 0.04 Mio. Asia pacific region accounted for total of 78 percent, while Africa accounted for 19 percent of total Cabbage seed import from India.

Fig 25: Top Export Destinations (value)

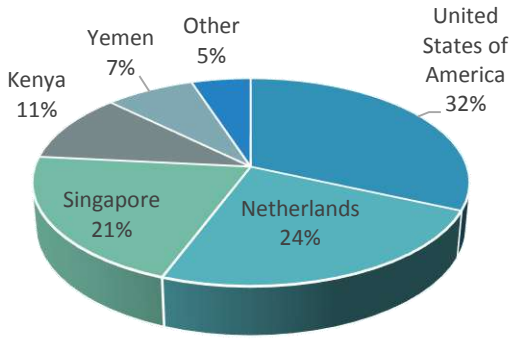


Source: APEDA and Sathguru Analysis

3. MELONS

In 2013, India exported USD 0.81 Mio worth Melon seeds accounting for 1.19 percent of total vegetable seed export. USA was the largest importer with import value of USD 0.25 Mio followed by Netherlands – USD 0.2 Mio, Singapore – USD 0.17 Mio and Kenya – USD -0.87 Mio. USA was the only country in North America importing Melon seeds from India. Surprisingly no country from SAARC group is importing Melon seeds from India. Asian countries accounts for 31 percent total import from India of which countries from ASEAN group accounts for 21 percent.

Fig 26: Top Export Destinations (Value)

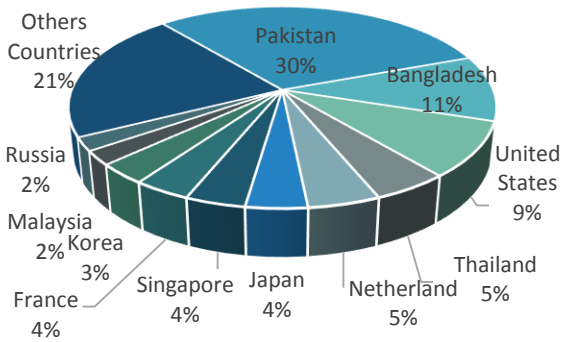


Source:APEDA and Sathguru Analysis

4. OTHER VEGETABLES

India has the potential to be a breeding center for other tropical/ sub-tropical vegetable crops such as Peas, Cauliflower, Radish, Onion, Hot Pepper (Capsicum) Okra, Egg Plant etc. India is also exporting these vegetable seeds to the various international destinations. Pakistan (30%) is the major export destination for India in terms of value followed by Bangladesh (11%), United States (9%), Thailand (5%) and Netherlands in the year 2012-13.

Fig 27: Top Export Destinations - Other Veg.

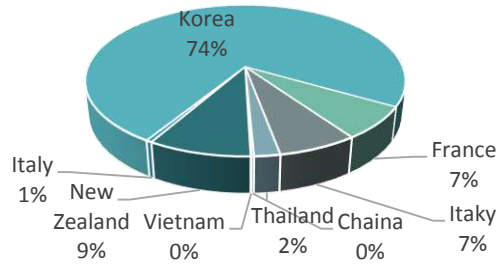


Source: APEDA and Sathguru Analysis

Algeria was the largest importer (84%) of Pea seeds from India in the year 2012-13. Pakistan (6%), Malaysia (1%) and Middle East countries (6%) also import Pea seeds from India. Overall value of the pea seed export in that particular year was 1.54 Million USD.

Indian Radish Seed find place in the markets like Korea (74 per cent), New Zealand (9 per cent), France (7 per cent), Italy (7 per cent) and Vietnam (1 per cent). The total export during 2012-13 was 166.97 metric tons, valued at USD 33.58 million. Of the total exports, USD 25 Mio was to Korea and USD 2.95 Mio to New Zealand.

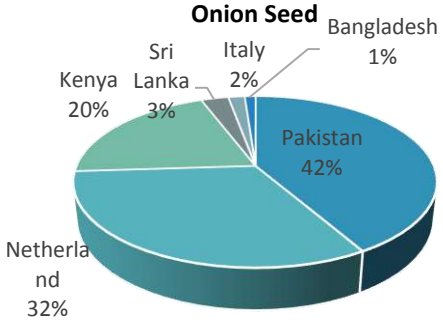
Fig 28: Top Export Destinations- Radish Seed



Source: APEDA and Sathguru Analysis

A small volume of Onion seeds have also been exported from India. Pakistan (42%) is the largest importer of Onion Seeds from India, followed by Netherlands (32%), Kenya (20%) and Sri Lanka (3%). Pakistan is one of the largest Onion producer and exporter in the Asian Region. In addition Indian Onion varieties can be easily adopted in Pakistan and hence it is big export market for Onion seed from India. Netherlands is more of a re exporting country unlike Kenya or Sri Lanka who imports for local cultivation.

Fig 29: Top Export Destinations - Onion Seed



Source: APEDA and Sathguru Analysis

COUNTRY OVERVIEW

GEOGRAPHY AT GLANCE

India enjoys diverse agro-climatic conditions supporting cultivation of wide range of agronomic and horticultural crops. Most of the countries from Asia and Africa shares similar agro-climatic situations with one or other part of India. Even some of the European and American regions have similar crop growing zones as found in India. However, considering the similarity in economic importance of crop and stage of seed industry growth, African and Asian nations are high potential markets for Indian players to focus on. In this section, we will study the seed sectors of some potential countries from African and Asian regions in detail.

AFRICA – LAND OF OPPORTUNITIES

Access to high quality, locally adapted, improved seed at affordable prices has long been recognized as an essential ingredient to boosting agricultural productivity. This is particularly important in Africa given its ever growing population. Agricultural policies in African countries are therefore gradually moving towards creating enabling environments for private seed sector development. Most of the African countries have started field trials of improved seed varieties/hybrids from all over the globe for its suitability to the local conditions. Many national and international seed firms are trying to enter African market space with existing portfolio or doing exclusive research for Africa market.

1. KENYA

The number of registered seed companies in Kenya has grown from one to 116 since liberalization of the seed subsector in 1996. However, the number of active seed companies involved in the production and distribution of seed for the focus crops is only 17. Most of the multinational and national companies in Kenya depend on seed imported from overseas market. Kenya has well established seed dealer network making it most favored market by overseas seed firms. The only challenge with Kenyan seed industry is strong hold of government parastatals (62per cent).

It takes 28 days to import seed and 37 months to release new variety in Kenya

CROP ACREAGE AND SEED IMPORT SCENARIO

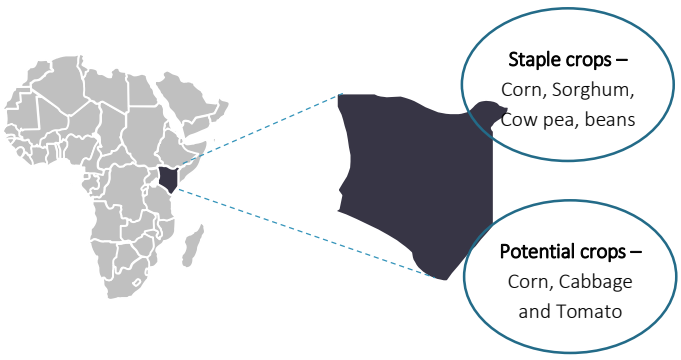
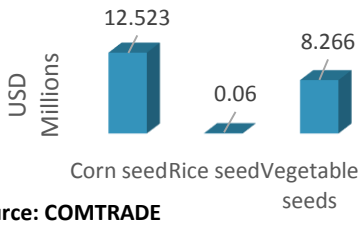


Fig 30: Kenya Seed Import (value 2013)

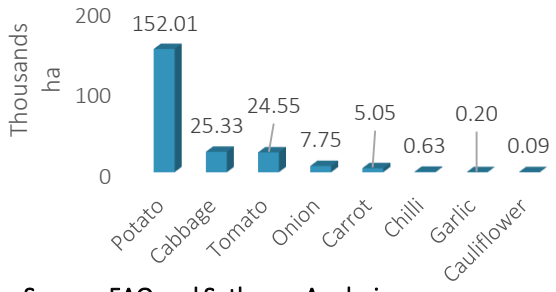


Source: COMTRADE

Even though Kenya has huge acreages under cow pea and beans, use of open pollinated varieties by farmer which can be recycled for the next season keeps private player away from entering these two crop segments. In case of Corn, Kenya shows good penetration of hybrid seeds and around 17 local players are involved in Corn seed production. However the demand for Corn seed is too high to meet with local seed

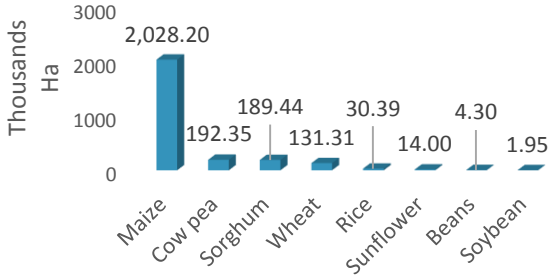
In Kenya seed imports are duty free

Fig 31: Vegetable Crop Acreage (2013)



Source: FAO and Sathguru Analysis

Fig 32: Field Crop Acreage (2013)



Source:FAO and Sathguru Analysis

production. Kenyan Corn seed market has monopoly of one player holding 80 percent of market share and it might be a challenge for new overseas player. As compared to field crops, vegetable seed production in Kenya is low and consequently market is totally dependent on imported seed. Vegetables like Cabbage, Tomato and Onion are the crops with highest acreage in Kenya after tuber crops.

SEED POLICY AND REGULATIONS

Plant Breeder's Protection

Kenya is a member of UPOV. KEPHIS (Kenya Plant Health Inspection Services) which tests, registers and protects new varieties of plants in accordance with UPOV requirements and regulations in the Seeds and Plant Varieties Act

Seed Import Procedure

- Register with KEPHIS
- File application to import by filling form SR 14 provided by KEPHIS.
- Obtain a Plant Import Permit (PIP) from KEPHIS and a Phyto-sanitary Certificate from the corresponding Seed Certifying body in the country of origin for imports.
- Obtain an international orange (International Seed Testing Association (ISTA) certificate from the official seed tester (KEPHIS) or the corresponding seed certifying body in the country of origin for imports. This will accompany the seeds.
- The Seed must be inspected by KEPHIS at the port of exit/entry, sampled & verification tests done, before sale- imports

2. TANZANIA

Agriculture is the primary economic activity for 80 percent of Tanzania's population. A parastatal seed company - Tanseed had monopoly on seed production and distribution for long time. In last few years, other local players have started catering to the market needs and penetration of improved seed is on rise. In year 2011-12, Tanzania faced acute shortage of seeds meeting only 50 percent of total 60,000 MT seed demand. Tanzania's local seed industry requirement is estimated to be 90,000 MT, of which only 14,000 MT was locally produced while another 16,000 MT was imported.

Of the 27 active seed companies in Tanzania, not more than five have their own seed processing and storage facilities

CROP ACREAGE AND SEED IMPORT SCENARIO

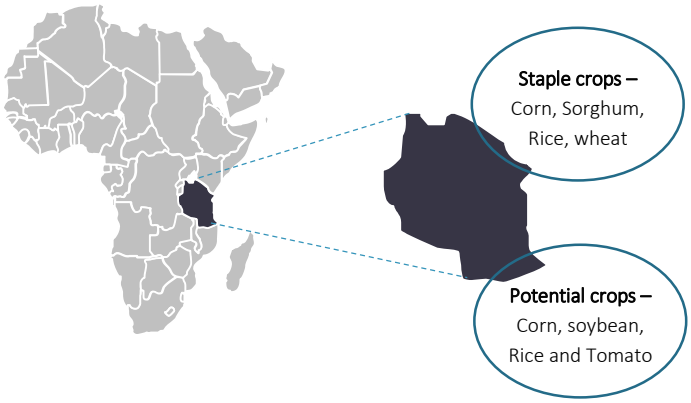
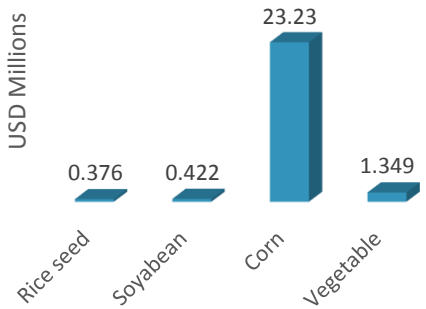


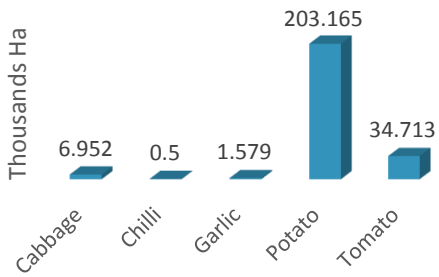
Fig 33: Tanzania Seed Import (2013)



Source: ITC and Sathguru Analysis

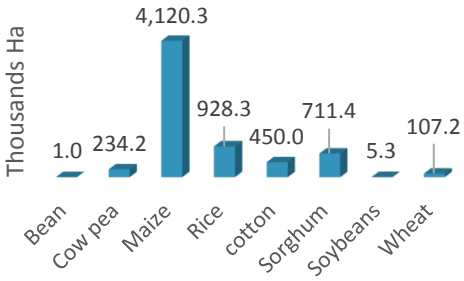
The Seed Unit of the Ministry of Agriculture, Food Security, and Cooperatives (MAFC) estimates that only 27 seed companies and less than 2,000 agro-dealers are actually active today. Furthermore, certified seed production is estimated to cover only 15-25per cent of the national seed requirement.

Fig 34:Vegetable Crop Acreage



Source: FAO and Sathguru Analysis

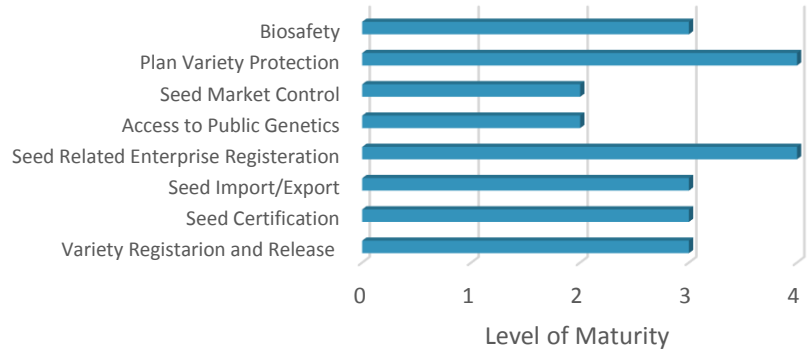
Fig 35: Field Crop Acreage



Source:FAO and Sathguru Analysis

SEED POLICY AND REGULATIONS

Fig 36: Legal Framework



Source: USAID –Enabling Agriculture Trade

Tanzania is one among few countries in Africa with legislation to protect plant breeders' rights. The Protection of New Plant Varieties (Plant Breeders' Rights) Act, 2002 establishes the Plant Breeders' Rights Registry (under MAFC) separate from the normal Patents Registry.

A breeder who wishes to release a new variety must submit an application to TOSCI. The new variety is evaluated through a National Performance Trial where the candidate variety is tested for distinctness, uniformity and stability (DUS) and value for cultivation or use (VCU). TOSCI conducts DUS testing for two seasons and VCU for one season.

Seed Import Procedure

- The variety to be imported should be registered with Seed Unit of Ministry of Agriculture Food Securities and Cooperatives (MAFAC) and need an Import permit issued by Seed Unit
- Must meet the phyto-sanitary certificate requirements of the Plant Health Services office of Tanzania.
- Inspection will be carried out by the Plant Health Services on arrival of the consignment

3. ZIMBABWE

In the early 1980s, Seed Co. Ltd. was the sole producer of seed for seven crops (Corn, Sunflower, wheat, barley, Soybeans, groundnuts and sorghum). Up until 1990, Zimbabwe's seed industry was dominated by three companies (Seed Co. Ltd., Pannar Seeds, and Pioneer). Since then, the number of seed companies has grown tremendously and currently there are 22 out of 38 companies selling the focus crops (Corn, Soybean, Cotton and sorghum). These companies are registered with the National Certifying Authority (NCA). Variety registration, seed production and marketing activities are regulated by Seed Services (National Certifying Authority), under the Ministry of Agriculture. Complementing Seed Services is an association of seed companies known as the Zimbabwe Seed Trade Association (ZSTA) that also coordinates seed industry activities and sales. Through Seed Services and ZSTA, the Zimbabwe seed industry works and participates in various regional and international associations and technical bodies such as ISTA, AFSTA, SADC, COMESA, UPOV, ARIPO and OECD.

Farmers depend on informal sector for vegetable seeds

More players entering into veg. seed space

CROP ACREAGE AND SEED IMPORT SCENARIO

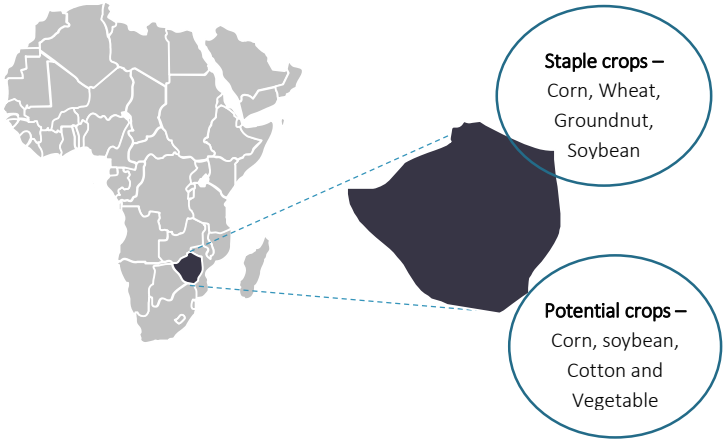
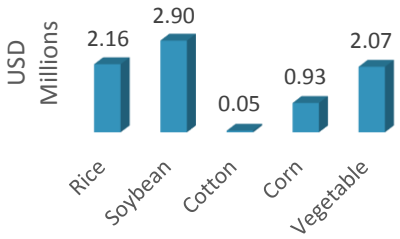


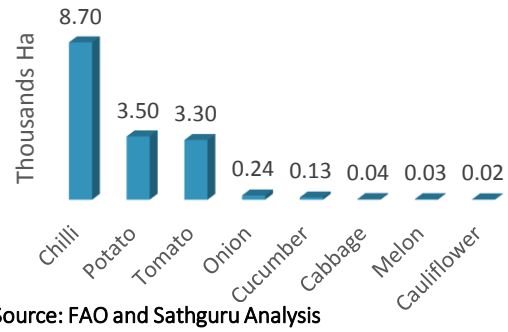
Fig 37: Zimbabwe's Seed Import (Value)



Source: ITC, ISF and Sathguru

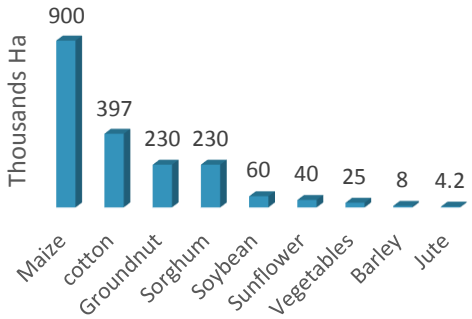
Currently, there are 38 registered seed companies in Zimbabwe. Of the 20 that are involved in the focus crops, 15 and 11 are active in the production and supply of Corn and sorghum seed, respectively. Only seven of the companies produce Soybean seed, while only three produce Cotton seed. Cotton has the lowest number of active seed companies. The underlying reason for this is that, for a long time, one player had the sole right to multiply and market Cotton Research Institute varieties for domestic and international trade. Because of the exclusivity of Cotton varieties, no other company could venture into the Cotton seed business. Recently that exclusivity of Cotton varieties has expired resulting in attracting more players in the Cotton seed business.

Fig: 38 Vegetable Crop Acreage



Source: FAO and Sathguru Analysis

Fig 39:Field Crop Acreage

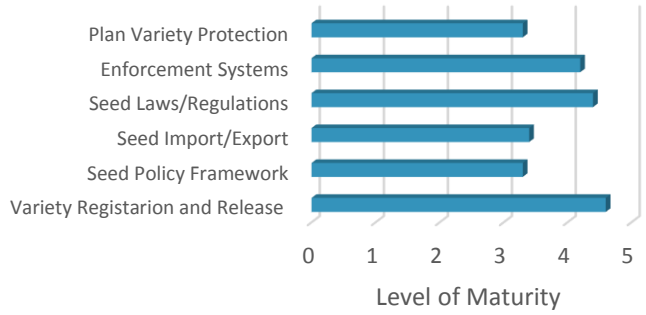


Source: FAO and Sathguru Analysis

SEED POLICY AND REGULATIONS

Two seed laws support the variety development and seed certification in Zimbabwe, namely the Plant Breeders' Rights Act Chapter 18:16 of 1972 and the Seed Act Chapter 19:13 of 1971 with its enabling regulations and schemes. The varietal development by the private sector is strengthened by the Plant

Fig 40: Legal Framework



Source: USAID - Enabling Agriculture Trade project

Breeders' Rights Act, which gives breeders rights to royalties on any of their varieties that are commercialized by seed companies. The Seed Act, its enabling regulations and the Seed Certification Scheme Notice (2000) spell out the procedures and guidelines for seed certification and quality control.

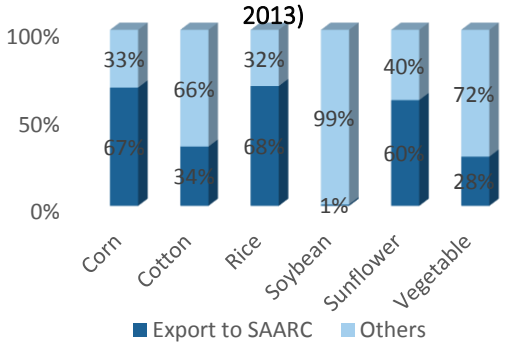
Seed Import Procedure

- The variety to be imported should be registered in Zimbabwe.
- Supporting documents to meet 1 above are
  1. Seed testing results of the seed to be imported, which is an OIC or any official seed testing certificate, and
  2. Clearance letter regarding GMO (Genetically Modified Organism) status of the seed. Zimbabwe does not allow importation of genetically modified seed.
- After verification and approval of documents by Seed Services, the application is forwarded to PQS, for the issuance of phyto-sanitary certificates, which highlight pests and diseases prohibited in Zimbabwe.
- If the phyto-sanitary certificate is granted, the importer proceeds to the Ministry of Agriculture, Mechanization and Irrigation Development (AMID), Department of Economics and Marketing for the issuance of an import permit.

SAARC – POTENTIAL MARKET FOR HYBRIDS

India and other South Asian countries offer natural markets for each other's commodities. The South Asia region enjoys mutual advantages of similar agro-climatic conditions, food habits and common languages. Additionally, it has several advantages such as potentially low transaction cost and complementarity in production processes. Among the South Asian countries, India holds a place of prominence in seed trade, particularly export. This can be understood by looking at the export share of SAARC countries in overall Indian seed export. SAARC countries account for 67 percent of Corn

Fig 41: India's Seed Export to SAARC (Value 2013)



Source: APEDA, ITC and Sathguru analysis

seed, 34 percent of Cotton seed, 68 percent of Rice seed, 60 percent of Sunflower seed and 28 percent of vegetable seed exported from India in 2013.

Among SAARC members, Pakistan, Bangladesh, Nepal and Sri Lanka are the top potential markets for seed export. Apart from formal seed export from India, lot of seeds are being siphoned off to Bangladesh, Pakistan and Nepal through porous country borders. SAARC members are working towards harmonizing the seed laws and avoiding unnecessary plant quarantine rules. This will catalyze the improved seed trade between SAARC members and thereby improve the overall productivity of agriculture in member countries. In the following section, we will discuss seed industry and policies of Bangladesh and Nepal in detail.

1. BANGLADESH

In 1990, Bangladesh implemented pro-market seed policies which fostered the development of a competitive private industry. Today, Bangladesh has more than 200 seed companies. As of 2013, the President of the Bangladesh Seed Association reported that there are 17,000 registered seed dealers along with 50,000 mobile seed vendors. The annual value of Bangladesh's domestic seed market reached USD 125 million in 2011[2]. Bangladesh has private seed industry with capacity to breed and/or assess varieties and to produce and deliver Rice, wheat, Corn and vegetable seed to farmers. Although almost all seed companies are locally owned, Bangladesh's seed industry is still well-linked to the world seed industry.

In Oct 2013, Bangladesh approved release of several varieties of GMO Brinjal

INDIA'S SHARE IN BANGLADESH SEED IMPORT

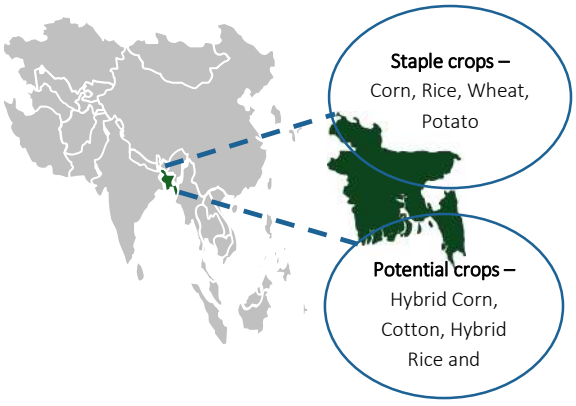
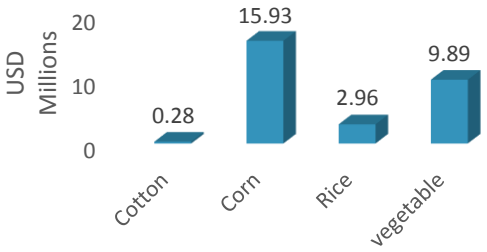


Fig 42: Bangladesh Seed Import (Value 2013)



Source: APEDA, ITC and Sathguru analysis

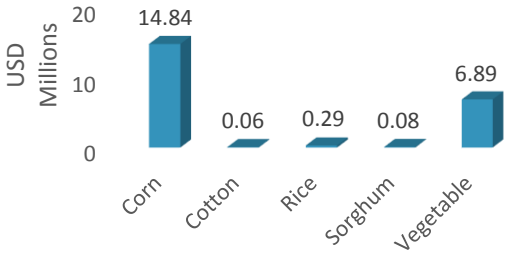
Currently, private seed companies in Bangladesh introduce many Corn hybrids as well as some Rice hybrids from India. However the in-bred Rice variety scenario is different than

Most jute area in Bangladesh is planted with an Indian jute variety (JRO-524) with jute seeds from India

[2] USAID –Enabling Agriculture Trade (EAT) project South Asia report

hybrid Rice seeds. No commercial player is interested to transfer quality Rice in-breds. Because farmers can produce their own seeds for such varieties, the profit margin that companies can realize is low; companies can sell seed for in-breds at not more than about two times of the grain price. Furthermore, without a PVP law, companies that pay to register an inbred from India could find competing companies offering the same variety as soon as it is registered. Most of the registered Rice hybrids are from China and minority are from India. Bangladesh vegetable seed market is just shifting from OPVs to hybrid seeds and holds big potential for Indian seed companies to enter this space.

Fig 43: India's Seed Export to Bangladesh (Value 2013)



Source: ITC and Sathguru analysis

SEED POLICY AND REGULATIONS

- Registering with MoA as a seed company takes seven days and is free. This favors market entry and competition.
- Introducing (registering) a new variety is automatic and free, except for five notified crops (Rice, wheat, jute, sugarcane and potato). This favors market entry and competition.
- For hybrid Rice, the MoA requires official VCU tests in six locations for two years and for DUS for one year; after tests the MoA may approve or deny registration.
- Seed imports require an MoA permit detailing phyto-sanitary conditions and must meet Bangladeshi quality standards; for five the notified crops, seeds must be of registered varieties
- Bangladesh has not registered any Rice or wheat inbred varieties from India.

2. NEPAL

Nepal has about 35 private seed companies in the formal sector; this number includes all private organizations wholesaling seed from own production or import. The value of annual seed sales at the retail level from the formal private sector (excluding National Seed Company Limited) is roughly USD10 million, of which vegetables account for about three-fourths by value. About half of vegetable seeds by volume are imported, while the rest are locally produced. However, because hybrids account for a large portion of imported seed, while almost all local production is for OPVs, the value of imported vegetable seed far exceeds the value of local production. Seed for only one vegetable hybrid—a Tomato hybrid bred in Nepal—is produced in Nepal.

Varieties/hybrids from India are mostly smuggled across by traders avoiding formal registration

INDIA'S SHARE IN NEPAL SEED IMPORT

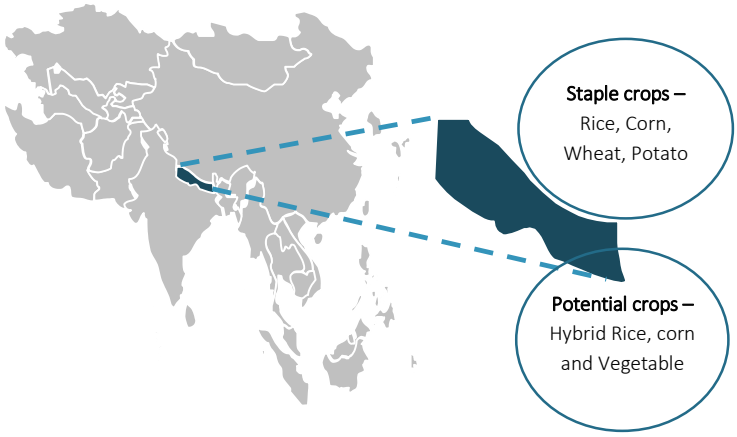
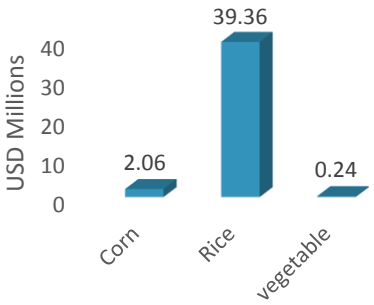


Fig 44: Nepal Seed Import (Value 2013)



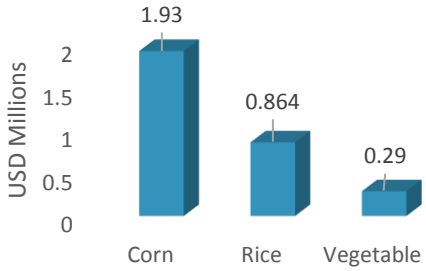
Source: APEDA, ITC and Sathguru analysis

The GON has registered hundreds of varieties—primarily hybrids— submitted by private companies in Nepal from foreign breeding during 2010, some in 2011, and one Corn hybrid in 2012. This total includes 17 Rice hybrids and 16 Corn hybrids but no private self-pollinated varieties for Rice or wheat or OPVs for Corn. Most varieties are for vegetables. Many varieties come from Japan, Korea, China and Thailand. The requirement for registration applies equally to varieties from all sources. However most of the Indian crop varieties are traded through porous borders without registration. As result of this, Nepali seed companies compete with traders who lower their overheads by eschewing variety registration.

In western Nepal, most popular corn hybrid is a non-registered Indian private hybrid

Nepal has an articulated network of seed dealers available to retail seed to farmers. This allows companies to reach farmers with minimal expense in staff to distribute and sell seed at the wholesale level.

Fig 45: India's Seed Export to Nepal (Value 2013)



Source: APEDA, ITC and Sathguru analysis

SEED POLICYAND REGULATIONS

- Nepali firms can get into the seed business as growers, seed companies (wholesaling own-produced or imported seed), distributers and dealers with little or no difficulty.
- Seed certification is voluntary; the Act, regulations and polices allow sale of truthfully labeled seed for all crops, which favors competition locally.
- Nepal has more stringent rules of variety introduction than some in other regional countries. All the traded seeds has to be notified according to 'Type or Variety'.
- Variety introduction is more difficult in case of field crops. The process to register new variety takes more than 1250 days and costs more than $2000.
- A Plant Variety and Farmers' Rights Protection Bill is in Parliament, but has not passed.

OPPORTUNITY

MARKET DYNAMICS, CHALLENGES, OPPORTUNITIES AND STRATEGIC APPROACH

MARKET DYNAMICS – SEED SECTOR DEVELOPMENT MAP – COUNTRIES TO FOCUS

STAGE OF GROWTH	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5
	Nascent	Emerging	Early Growth	Late Growth	Mature
Markets	South Sudan, Liberia, Sierra Leone, Angola, DR Congo	Niger, Mozambique, Rwanda, Mali, Senegal, Botswana, Madagascar, Ivory Coast	Burkina Faso, Ghana, Ethiopia, Tanzania, Nigeria	Uganda, Zambia, Kenya, Malawi, Zimbabwe	South Africa
High Value Varieties Adoption	Development/ Aid driven	Adoption rate is Less than 2.5per cent Mostly Innovators	Adoption rate is 2.5-16 per cent Mostly Early adopters	Adoption rate is 16-84 per cent Mostly Early to late majority	Adoption rate is more than 84 per cent All but laggards
Hybrid Release	No public sector participation in breeding	Poor public sector participation in breeding	Strong breeding systems	Robust breeding pipeline	Mostly private sector driven
	No formal variety release process	Variety release formalized	Significant policy issues preventing further growth	Favorable seed policies	
Policy and regulation	Non- existent in most cases	Basic and incomplete	Evolving seed policy and regulations	Established and enforced	Industry driven & self – regulating
Private sector participation	No private seed companies	Few small seed companies	Many small/med seed companies	Many stable seed companies	Mostly large seed companies
Channel	Imported seed only	Limited agro- dealer network	Growing agro- dealer network	Strong agro-dealer network plus specialized outlets	Vertical integration

1. **Nascent**: Key policy and institutional frameworks for a formal seed sector are absent, Mostly Imported Seeds
2. **Emerging:** Poor Public sector breeding, Formalized Seed release process, Seed production and distribution is conducted by a handful of seed companies and/or government parastatal
3. **Early Growth:** Strong Breeding programs and regulatory framework, and private sector participation
4. **Late Growth:** Strong breeding programs and seed policies that support private sector participation, Presence of MNCs
5. **Mature:** Dominated by vertically integrated private sector companies, well developed distribution system

SEED SECTOR BUSINESS ENVIRONMENT - AFRICA

Dynamism in the seed sector is unlikely to come from the government alone, and requires strong private sector participation, even in roles traditionally earmarked for the government. This transition can be achieved through a legal and regulatory framework that removes unnecessary barriers to private seed sector growth, and effective public-private partnership in supporting private sector market development. Over the past years, a considerable progress has been made in the seed systems of many African and Asian countries. The following table illustrates various parameters that can be used to evaluate the seed sector environment in the countries of Africa and Asia for expansion considerations.

S. N	Countries	Agro climatic Zone	Domestic Market size(USD Million) 2013	Trade Agreement with India	Ease of Doing Business (Rank)	OECD SS	ISTA	ISF	Pro-Bt
1	Burkina Faso	Warm Sub humid	NA	×	167	×	×	×	√
2	Egypt	Warm Arid and semi-arid	140	×	112	√	√	√	√
3	Ethiopia	Warm arid and semi-arid tropics	NA	×	132	×	×	×	×
4	Ghana	Warm humid tropics	NA	√	70	×	×	×	×
5	Kenya	Warm arid and Semi-Arid	NA	×	136	√	√	√	×
6	Malawi	Warm arid and Semi-Arid, Warm sub humid tropics	26	×	164	×	√	×	×
7	Nigeria	Warm sub humid tropics	120	√	170	×	×	×	×
8	South Africa	Warm arid and Semi-Arid	454	√	43	√	√	√	√
9	Sudan	Warm arid and Semi-Arid	40	×	186	×	×	×	√
10	Tanzania	Warm arid and Semi-Arid, Warm sub humid tropics	15	√	131	×	√	√	×
11	Uganda	Warm arid and Semi-Arid, Warm sub humid tropics	10	√	150	√	√	×	×
12	Zambia	Warm arid and Semi-Arid	20	√	111	×	√	×	×
13	Zimbabwe	Warm arid and Semi-Arid	30	√	171	√	√	×	×

SEED SECTOR BUSINESS ENVIRONMENT - ASIA

S. N	Countries	Agro climatic Zone	Domestic Market size(USD Million) 2013	Trade Agreement with India	Ease of Doing Business (Rank)	OECD SS	ISTA	ISF	Pro-Bt
1	Nepal	Humid Subtropical	10	√	108	×	×	×	×
2	Bangladesh	Warm humid subtropical	125	√	173	×	√	×	√
3	Sri Lanka	Warm humid tropical	NA	√	99	×	×	×	×
4	Pakistan	Warm humid and arid	845	√	128	×	√	√	×
5	Indonesia	Hot and humid tropical	NA	√	114	×	√	√	√
6	Philippines	Humid subtropical	NA	√	95	×	×	√	√
7	Myanmar	Hot humid tropical	NA	√	177	×	×	×	√
8	Thailand	Humid tropical	NA	√	26	×	√	√	√
9	China	Humid subtropical	9950	×	3	×	√	√	√
10	India	Tropical to temperate	2200	-	142	√	√	√	√

*Cells highlighted in light green color exhibits positive scenario.

1. **Agro Zone:** Agro Climatic condition is the foremost criteria to consider to enter in a new market.
2. **UPOV Membership:** The countries which are contracted with UPOV ensures the IP rights of the organizations.
3. **ISTA Accredited Labs**: ISTA (International Seed Testing Laboratory) certified seeds are widely accepted in many countries.
4. **Trade Pacts with India:** The countries are also evaluated based on the trade agreement with India.
5. **International Seed Federation:** ISF membership helps in dispute resolution among the member countries.

CHALLENGES IN SEED EXPORT BUSINESS

Most of the Asian and African nations are agrarian countries struggling with consistent low yields and food security problem. In order to feed the growing population, they have to produce double the amount of food produced today with same land. Increased use of improved seed of high yielding varieties/hybrids (HYV) is the fundamental change which can revolutionize the agriculture in these nations. Some of them have excellent breeding/research capabilities to develop HYV/hybrids while others depend on imported seed from overseas market. Export-import of seed/planting material is way different than the export-import of general agricultural commodities. Some of the challenges which limits inter-country seed exchange are explained below:

1. LAST MILE VISIBILITY

Much of the data currently available is of questionable quality due to inconsistent collection and unreliable estimation methods. Consequently, key policy and investment decisions are being made with limited information of questionable quality

2. PROCESS COMPLEXITIES

Key concern with seed regulation in these markets especially in Africa is the inordinate amount of time required for the approval process, which can take around two to three years or even more

Years required for seed release: Uganda – 2.5, Bangladesh – 2.5, Thailand – 1.5 years

3. REGULATORY HURDLES

While each country's regulations for variety release, seed certification, and phyto-sanitary control aim to serve perfectly legitimate and desirable functions, problems soon arise when different countries with small seed markets each impose their own standards. It delays the introduction of new varieties in overseas market. Certification and testing requirements become more about raising revenue for the certifying body than actual protection of consumer interests or plant health. *E.g. Indonesia has self-sufficiency rule in case of Rice which allows import of Rice seed only for two years and later exporter has to transfer the basic parent material to Indonesia for local seed production.*

3. INCONSISTENCY IN BIO PROPERTY LAWS

Intellectual property rights are generally nonexistent or with several loopholes. Because of this reason many of the private players are reluctant to enter in the African market. Plant variety protection (PVP) is not enforced in Angola, Malawi, Uganda, and all countries in West Africa excluding Ghana.

Plant variety protection (PVP) is not enforced in Malawi, Uganda, and all West African countries

4. HURDLES IN GRASS-ROOT CHANNEL DEVELOPMENT

Complex processes of entity and marketing channel establishment in the target country generally discourage the private players to actively engage in seed distribution.

5. LACK OF HARMONIZED REGIONAL SEED LAWS:

The legislative frameworks of countries within the regional economic communities are less than uniform to facilitate harmonization. Domestication of harmonized regional seed laws and regulations can lead to a drastic reduction in the time lag between the release of a variety in one country and its access by farmers in similar agro ecologies in other countries; more rapid availability of new seed varieties; and lower seed costs due to more competitive markets

In Senegal, three government offices must approve each seed import permit, which takes three weeks on an average.

6. POOR ADOPTION RATE:

Recurrent purchases of hybrid seeds are too costly for many resource-poor, small-scale farmers in developing countries of Africa and Asia. Policy solutions spanning technology, innovation, private participation and Distribution are necessary conditions to improve the adoption rate among the farmers in these countries.

POTENTIAL – INDIA: SEED HUB FOR ASIA AND AFRICA

1. FAVORABLE AND DIVERSE AGRO CLIMATIC ZONES

India has rich and fertile soils with versatile agro climatic conditions. Abundant rainfall is suitable for a variety of crops and conducive for research and seed production.

2. STRONG AGRICULTURE RESEARCH CAPACITY

The presence of national and international research institutes with the state of the art research capabilities and genetic pools strengthen the countries' research capacity. Presence of n such international research institutes in India gives India an added advantage to leverage these partnerships to develop products targeted for geographies outside of India. Also the increasing research capability of private sector in India would catalyze the export oriented seed development programs of India.

3. SCIENTIFIC AND COMMERCIAL CAPABILITIES

Availability of highly qualified techno commercial talent pool for both public and private organizations proves to be one of the greatest strengths of Indian seed industry

4. STRONG SEED PRODUCTION CAPABILITY

India has the strong seed production capability compared to most of the other developing nations. Well established seed production systems and regulations, large number of trained seed growers, large number of seed producing companies are the enabling factors to make India a hub for seed export.

5. CLIMATIC AND CROPPING PATTERN SIMILARITIES WITH COUNTRIES

India's climatic conditions and cropping pattern is similar to many of the countries in APAC and African region. Many of the Indian companies are already expanding to these regions. Below regions hold good potential for seed export:

i. South Asia
ii. South East Asia
iii. Africa

6. LACK OF SEED INFRASTRUCTURE AND HUMAN RESOURCES IN THE AFRICAN AND ASIAN COUNTRIES

Countries located in these regions lack infrastructure and human resource capabilities for seed production. Even they lack sufficient and diversified germplasm base to undertake crop research to develop improved crop varieties.

7. INDIA'S PARTICIPATION IN OECD SEED SCHEMES

In 2008, India became the member of Organization for Economic Co-operation and Development (OECD) seed schemes with an objective to promote seed export to other nations and increase its share in global seed trade to 10 percent from existing 1.94 percent. The listing of Indian seeds with the OECD, a group of 34 countries, guarantees the quality of seeds that can be imported by countries participating in the OECD Seed Schemes. About 57 nations are registered in such seed schemes. India has registered 95 crop varieties mostly hybrids with OECD seed scheme and another 118 are pipeline to be registered in coming few months.

8. PRESENCE OF MNC KNOWLEDGE SYSTEM

Post liberalization, India emerged as a regional hub for several multinational seed companies creating capacities in the area of research, production, supply chain and intensive channel systems. This knowledge could be leveraged to penetrate and develop seed business in developing markets.

STRATEGIC APPROACH TO TAP THE OPPORTUNITIES!

Seed input is a vital input in agriculture and holds a great potential to improve the farm productivity. Seed industry has come a long way in terms of various modern trait development, use of biotechnology and nanotechnology to address the biotic and abiotic stress with right kind of research and development. However, the adoption to new varieties and traits are at diverse levels, some markets have reached the threshold level of adoption while others are still struggling to introduce new technologies for enhancing the productivity. America and EU are already saturated with decreasing growth rate over last five years, while Africa and Asia are the growing markets with more countries opening up their markets and participating in international seed treaties and regulations.

The movement of seeds across the nations is very critical for growth and development of agriculture and fulfill the need of growing population in terms of food, feed and fuel. The export seed industry is not fully exploited owing to a number of political, trade and seed related constraints. These issues need to be addressed to harness the enormous potential of international seed trade. In this section, we will discuss the strategic initiatives required at different levels to tap seed export potential in growing markets.

POLICY STREAM: MORE HARMONIZED VARIETAL INTRODUCTION AND TRADE LAWS

Seed industry faces several constraints that need full cooperation and urgent attention to mitigate the problems in a sustainable manner. A global support for meeting the research related challenges and problems is the foremost requirement. Resource mobilization treaties and memoranda among nations and international associations are the need of hour. International communities must open more totally protected and safe sea routes than current only 27 routes out of 1215. Additionally, as of now, the global seed standards are heterogeneous and need to establish internationally accepted seed quality and certification standard. Furthermore, low level presence (LLP) due to the unintended non-approval of kind or variety in the country of import while it is approved in the country of export is another legal hindrance significantly affecting international seed trade of various hybrids/varieties of crops. Few reforms such as, joint evaluation of improved rice varieties for release in areas with similar agro-climatic conditions, reciprocal acceptance of research data, streamlining of evaluation to reduce processing time from two to three years to one and harmonized plant quarantine laws among South Asian countries could be adopted to enhance and nurture the trading transactions.

R & D STREAM: EXCLUSIVE BREEDING FOR EXPORT ORIENTED SEED PRODUCTION

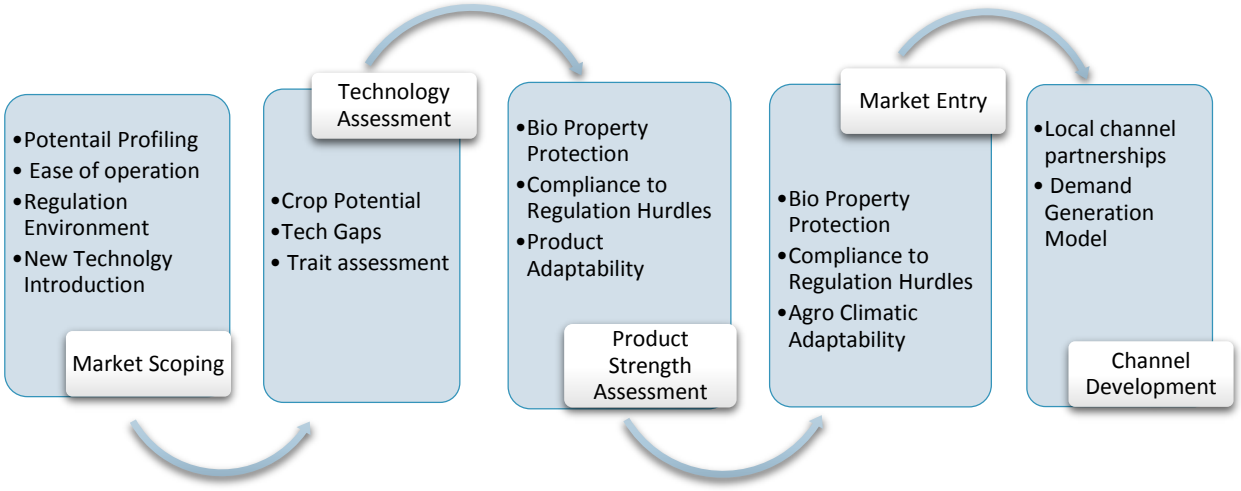
India has huge scope to produce seeds for wide range of crops owing to its vivid agro-climatic conditions. Presence of large multinational seed firms with state of the art breeding and research labs, strong domestic firms matching international seed standards and various associations and industry bodies playing active role in policy development are the factors pushing for the growth of seed export from India. Indian in-house R&D in plant breeding is not growing with a pace to cope up with international demand in other Asian and African developing countries. These countries are importing the improved varieties seeds from developed countries. Moreover, there is no specific breeding programme in India for development of crop varieties for exporting their seeds. Intellectual Property Rights (IPRs) should be addressed with adequate

mechanization, awareness on legislations and certification. Restrictions on export of germplasm or research material need to be lifted. Presently, public and private organizations are not working in-tandem in aspects of R&D to the extent required. Strong public private partnerships (PPPs) are urgently needed in different areas[1].

MARKET STREAM: WELL ANALYZED AND CUSTOMIZED ENTRY STRATEGY FOR EACH COUNTRY

Seed industry sources are aware that research in India delivers a flow of bio-materials that could be useful in neighboring countries. Companies are primarily interested to expand business into regional countries, including Pakistan, Sri Lanka and Africa along with existing markets in Bangladesh and Nepal. One option is to export seeds produced in India, but this may be unpalatable for regional governments worried about the reliability of their seed supply and the development of their national seed industries. Alternately—and more strategically—Indian companies may produce seeds in neighboring countries. They could do this through subsidiaries or joint ventures, or by licensing varieties to local companies in those countries. Product prices are also a factor when considering this option; hybrid seeds may be exported, while low-value seeds of open pollinated varieties may be fit for production in importing countries. Overall cost of production is another important factor in deciding country as production hub. If compared with other Asian countries, India has cost competitive advantage attributed to low human resource cost. While same cannot hold true in case of African countries with cheaper land and human resource option.

Critical Decisions in seed export business:

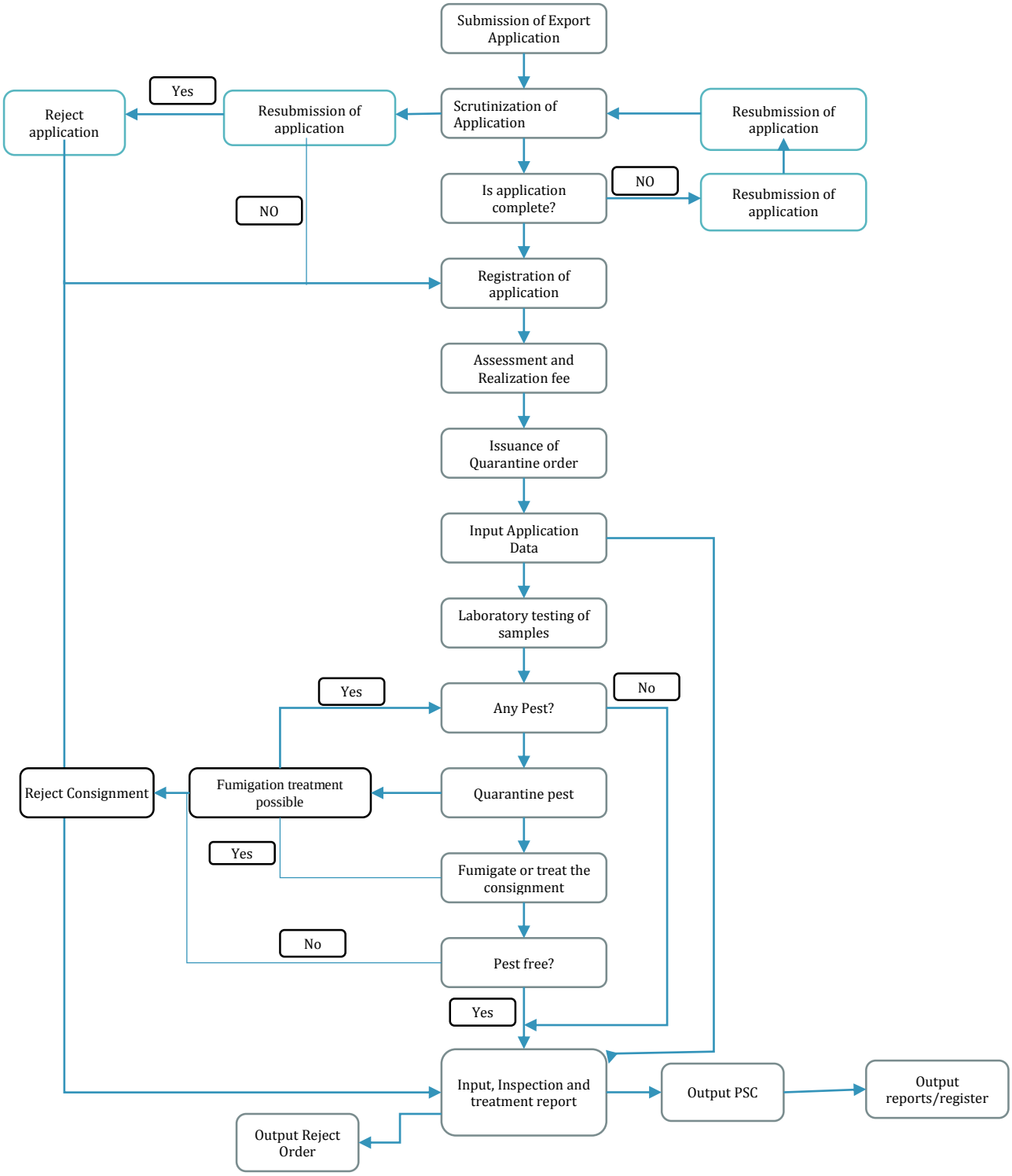


Indian seed industry has a long way to go to tap the current potential existing in Asian and African markets. Policy makers, private industry and knowledge institutes must work in tandem to create an enabling environment to promote seed export. With aligned policies, right product and affective commercial strategy, seed export will be a next big wave in Indian seed industry.

[1] USAID Enabling Agriculture Trade Project

APPENDIX

APPENDIX 1: SEED EXPORT PROCEDURE FLOW CHART



APPENDIX 2: OVERVIEW OF THE REGULATORY FRAMEWORK IN SEED TRADE

Certification schemes, the seed testing areas, the phyto-sanitary measures and plant variety protection are the four main pillars on which global international regulatory system works.

UNION FOR THE PROTECTION OF NEW VARIETIES OF PLANTS (UPOV)

The International Union for the Protection of New Varieties of Plants (UPOV) is an intergovernmental organization based in Geneva, Switzerland. UPOV was established in 1961 by the International Convention for the Protection of New Varieties of Plants. The objective of UPOV is to provide and promote an effective system of plant variety protection, with the aim of encouraging the development of new varieties of plants, for the benefit of society. Most countries and intergovernmental organizations which have introduced a plant variety protection (PVP) system have chosen to base their system on the UPOV Convention in order to provide an effective, internationally recognized system.

Many countries, including developing countries and countries in transition to a market economy, are considering the introduction of a system for the protection of new varieties of plants (PVP system). Most countries which have already introduced a PVP system have chosen to base their system on the International Convention for the Protection of New Varieties of Plants (UPOV Convention) in order to provide an effective, internationally recognized system.

BENEFITS OF UPOV:

- The number of new varieties increased after the introduction of plant variety protection.
- Introduction of the UPOV system of plant variety protection was associated with increased breeding activity and with the encouragement of new types of breeders, such as private breeders, researchers and farmer-breeders. The introduction of PVP was also associated with the development of partnerships, including public-private cooperation.
- Introduction of plant variety protection was associated with the development of new, protected varieties that provided improvements for farmers, growers, industry and consumers, with overall economic benefits.
- One of the benefits of plant variety protection is to encourage the development of new, improved plant varieties that lead to improved competitiveness in foreign markets and to development of the rural economy.
- Membership of UPOV was associated with an increase in the number of varieties introduced by foreign breeders, particularly in the ornamental sector.
- The breeder's exemption, whereby protected plant varieties can be freely used for further plant breeding, is an important feature of the UPOV system which advances progress in plant breeding.
- Access to foreign plant varieties is an important form of technology transfer that can also lead to enhanced domestic breeding programs.

OECD SEED SCHEME

The Organization for Economic Co-Operation and Development (OECD) is an intergovernmental organization, founded in 1961 and based in Paris. It is composed of 30 Member countries and works with over 70 developing and transitional economies. The Organization provides a unique forum where governments can compare policy experiences, seek answers to common problems, identify good practices and coordinate domestic and international policies

The OECD Seed Schemes provide an international framework for the certification of seed with the aim of facilitating the growth in trade of seed by reducing technical barriers. The Seed Schemes are a globally recognized system for the varietal certification of seed moving through international trade. The Schemes were established in 1958 in response to a combination of factors including the rapidly growing seed trade, the increase in regulatory requirements in some countries, the development of off-season production, the large breeding and production potential of exporting countries in North and South America and demand from the private seed industry.

The purpose of the OECD Seed Schemes is to encourage the use of quality-guaranteed seed in participating countries. The Schemes authorize the use of labels and certificates for seed produced and processed for international trade according to agreed principles. The OECD certification is applied to varieties satisfying DUS tests (Distinction, Uniformity and Stability), and the Schemes aim to ensure varietal identity and purity through seed multiplication, processing and labeling.

The OECD Seed Schemes facilitate the import and export of seed by the removal of technical trade barriers using worldwide recognized labels. They also provide specifications for seed multiplication outside of the country, which is becoming an ever-increasing practice In addition, the main OECD principles can also be applied to seed that is used on the domestic market.

In overall terms, the schemes provide a consistent and operational legal framework at international level. Trade in seed is subject to bilateral and/or multilateral agreements at local, regional, and international levels. As the first input in the cropping process, high-quality seed brings high genetic yield potential resulting in higher productivity and crop production. The body in charge of seed quality control in most countries is the National Designated Authority (NDA), which has responsibility to ensure the seed meets all the required standards for certification.

The OECD Seed Certification Schemes are based on two key criteria; varietal identity and varietal purity.

1. Varietal identity: The identity of a variety is defined by the official description of its characteristics, resulting from a given genotype or combination of genotypes.
2. Varietal purity: The purity of a variety is the proportion of plants or seeds within the population that conforms to the official description of the variety.

The Schemes are built on a number of fundamental principles. First, they include only those varieties which are officially recognized as distinct and having an acceptable value in at least one participating country. Second, all the certified seed produced must be related directly through one or more generations to authentic Basic Seed of the variety. In addition, satisfactory conditions for the production and processing of Basic and Certified Seed must be ensured and verified by field inspection and post control tests. Third, post-control tests are conducted to ascertain that the schemes are operating satisfactorily.

The number of countries participating in the OECD Seed Schemes continuous to increase with new applicant countries requesting accession on an annual basis. Currently there are 57 countries participating in the OECD Seed Schemes.

BENEFITS OF INTERNATIONAL SEED CERTIFICATION

The harmonization of certification procedures at international level has made a significant contribution to developing the global seed trade. The benefits arising from the facilitation of trade in seeds and the improvement in market access are numerous and can be summarized as follows:

- Reduction of the technical barriers to trade (TBT).
- Improved transparency for traders and stakeholders.
- A reduction in transaction costs.
- The use of worldwide recognized official seed labels and certificates facilitate the exchange of technical information on seed.
- Encourages the development of seed production in other regions and countries.
- Contributes to the elaboration of international rules for seed certification.
- Promotes collaboration between the public and private sectors.
- Shares experiences and information on emerging issues and concerns in the seed sector.

A large number of countries are already participants in the OECD Seed Schemes and this number is likely to increase as more countries are entering international markets, and seed "consumers" are becoming more demanding with respect to supply consistency, quality and safety. Cooperation between countries and all stakeholders including international organizations is a response to the need to develop a market-responsive regulatory approach.

The rapid growth in the volume of international trade of seeds has given rise to many challenges, not least of which is the need to harmonize certification procedures and to adopt reliable and enforceable standards. The OECD Seed Certification System is the most widely used global certification system for the export and import of high-quality seed.

The ongoing development and release of new plant varieties and the trend toward the multiplication of seed in developing countries increase the complexity of the production and distribution systems. Moreover, increasing cooperation between the public and private sectors is paramount to ensuring that the benefits arising from the use of new varieties are shared between the different shareholders in the system The adoption of international certification standards has encouraged the growth in the seed trade

by reducing technical barriers to trade, increasing transparency, lowering transaction costs and increasing access by farmers in all regions of the world to high-quality seed.

PHYTO-SANITARY MEASURES AND THE INTERNATIONAL SEED TRADE

The IPPC is a multilateral treaty for international cooperation in plant protection, promoting harmonization of phytosanitary measures in commerce and the environment and is the international phytosanitary standard-setting organization recognized in the World Trade Organization Agreement on the Application of Sanitary and Phytosanitary Measures (WTO-SPS Agreement).

Seeds are considered high-risk material in international trade, providing a ready pathway for movement of pests, especially seed-borne pathogens. The International Standards for Phytosanitary Measures (ISPMs) published by the IPPC provide guidance regarding phytosanitary measures and their application to the international seed trade.

APPENDIX 3: SEED RELATED LAWS IN INDIA

SEED ACT 1966

The objective with which the seed act was formulated was to regulate the quality of certain notified kind and varieties of seeds for sale and for matters connected therewith. The seed act passed by the Indian Parliament in 1966 was designed to create a 'Climate' in which the seeds companies could operate effectively and to make good quality seed available to cultivators. The major 28 legislative measures involved under the Act are Seeds rules framed in 1968, Seeds (Control) order, formulated in 1983 after including seeds as an essential commodity. Seeds of food crops, oil crops, Cotton seeds, seeds of cattle fodder and all types of vegetative propagating material are included under the act. A total of twenty five clauses have been mentioned in the act. The legislation could be broadly divided into two groups' i.e.

- Sanctioning legislation authorizing formation of advisory bodies, seed certification agencies, seed testing laboratories, foundation and certified seed programs etc.
- Regulatory legislation controlling the quality of seeds sold in the market including suitable agencies for regulating the seed quality. The legislation comprises of:
  - Minimum limit & labeling of the notified kind and varieties of seeds
  - Seed Certification
  - Restriction of Import and Export of Seeds

SEEDS (CONTROL) ORDER, 1983

The inclusion of seeds as an essential commodity item under the Essential Commodity Act, 1955 brought the Seeds (Control) Order. The Ministry of Civil Supplies earlier has declared the seed for sowing or planting materials of food crops, fruits, vegetables, cattle fodder and jute to be essential commodities in exercise of power conferred by Section 2(a) of Essential Commodities Act, 1955. The order confers power to the Central Govt. to control, and regulate production, supply and distribution of essential commodities. The order mainly covers the following points:

- Issue of License to Dealers
- Renewal of License
- Appointing of Licensing Authority
- Time limit for analysis of samples by Seed testing laboratories
- Suspension/Cancellation of License

NEW SEED DEVELOPMENT POLICY (NSDP) 1988-89

The New Seed Development Policy was formulated to provide Indian farmers with access to the best available seeds and planting materials of domestic as well as imported quality. The policy permits the import of selected seeds under Open General License (OGL), to make available to the farmers high quality seeds to maximize yield and productivity. The policy allow import under OGL of items such as seeds of oilseed crops, pulses, coarse grains, vegetables, flowers, ornamental plants, tubers, bulbs, cuttings and saplings of flowers. The key legislations of the act were:

- The imports of horticultural crops including flowers need recommendation from Horticulture Directorate.

- Imports of crop seeds require permission from ICAR.
- Evaluation of important traits such as yield, pest resistance etc. needs to be done within 3 months of harvest after which importer shall apply to the DAC for permit.
- Private seed producing firms should compulsorily register with NSC before importing the seeds.

PLANTS, FRUITS AND SEEDS ORDER (REGULATION OF IMPORT INTO INDIA ORDER) 1989

Post the formulation of NSDP in 1988, the Plant Fruits and Seeds Order 1989 was made suppressing the Plants, Fruits and Seeds Order (Regulation of Import into India) 1984. The act provides regulations during import based on post entry quarantine checks. The key legislations of the act are:

- Post entry quarantine facilities shall be established which shall be permitted to be released by Designated Inspection Authority.
- Import of any form of seed for consumption or sowing should carry a perm1it issued by the competent authority, and the import should be only through specified customs stations.

The consignment shall be inspected by the Plant Protection Advisor. Amendments have been made for the above order during 1998, 2000 and 2001. With the liberalized trade in agriculture, as consequence to WTO agreements, Government introduced new legislative provisions under the new order**,** Plant Quarantine (Regulation of Import into India) Order, 2003. The Order has now replaced the Plants, Fruits and Seeds Order, 1989.

PROTECTION OF PLANT VARIETIES AND FARMERS RIGHT ACT, 2001

One of the important aspects of Indian seeds policy is the unique legal framework governing the protection of plant varieties and farmers rights. The Protection of Plant Varieties and Farmers Rights Act, 2001 (and rules, which were released in 2003), provide for the protection of intellectual property rights of seed manufacturers, who are required to register /notify the seed which they want to be placed under protection. After due diligence, and establishment of the fact, protection is granted to the variety for a period of 15 years. However, this protection extends only to other manufacturers, and not to the farmer who produced the seeds. Under India‘s legal framework, the farmer retains the right to save, sow and sell seeds which were produced on his/her land, provided that he/she does not use the brand name of the concerned seed. This legislation ensures not only the protection on intellectual property rights of the company incurring the cost of research and development (in the market at large), but also those of the farmer whose land is being utilized for the production of the concerned seeds. The Act allows for the original parties who have their registrations approved to seek damages in the event that other parties market their seeds during the protection period. Furthermore, any registered seed can be used to start the generation of new varieties, and the developed variety can be registered as a new seed provided it satisfies the criteria for a patentable variety as per TRIPS (The Agreement on Trade Related Aspects of Intellectual Property Rights) norms.

NATIONAL SEED POLICY, 2002

National seeds policy was formulated in the year, 2002 to provide an appropriate climate for the seed industry to utilize available and prospective opportunities, safeguarding the interest of farmers and conservation of the biodiversity. The policy raised India‘s share in the global seed trade by facilitating advanced scientific aspects such as biotechnology to farmers and as a result, in March 2002, the first transgenic Bt. Cotton was approved for commercial cultivation in India.

PROTECTION OF PLANT VARIETIES RULES, 2003

The rules were enforced for the smooth implementation of the Act, 2001. The rules provide detailed procedures while applying for protection, ways of administering the national gene fund, procedure on application for compensation, procedure to alter the denomination of a registered variety, procedure for cancellation of certificate and all other procedures to be implemented as per the provisions given in the PPV & FR Act, 2001.

SEED BILL 2004

With a view to repealing and replacing the Seed Act 1966, the Seed Bill 2004 was introduced. Among others, one of the notable exemptions provided in the Bill with regard to farmers seed was: "Nothing in this Act shall restrict the right of the farmer to save, use, exchange, share or sell his farm seeds and planting material, except that he shall not sell such seed or planting material under a brand name or which does not conform to the minimum prescribed limit of germination, physical purity, genetic purity". A public opinion emerged on the fact that Seed Bill provisions are contradictory to the PPV & FR legislations and that the Seed Bill has been drafted to suppress the merits of PPV & FR Act, 2001.Consequently, the Government of India referred the Bill to the Parliamentary Standing Committee on Agriculture (PSCA), which prepared its report in 2006. An amended Seed Bill was introduced in 2008 has not been enacted thus far. Therefore, the Seed Act 1966 and its amendments are still in force.

APPENDIX 4: STATUTORY INDIAN BODIES RELATED TO SEED EXPORT

DEPARTMENT OF AGRICULTURE AND COOPERATION (DAC)

An EXIM Committee was constituted in the Seeds Division of DAC to deal with application for exports/imports of seeds and planting materials in accordance with the New Policy on Seed Development and EXIM Regulations. This committee has been constituted to advise the Government on matters relating to export/import of seeds and planting materials. The main function of this committee is to analyze and give recommendations to the Director General of Foreign Trade for issuing license for export of seeds which are listed in the restricted items. It also gives recommendations for import of seeds for planting material and fiber crop seeds. The committee also gives recommendations for import of vegetable seeds like peas and beans. It's only after EXIM committee's recommendation, one can undertake export/import of seeds listed under restricted items.

DIRECTORATE GENERAL OF FOREIGN TRADE

DGFT is responsible for implementing the Foreign Trade Policy with the main objective of promoting India's exports. DGFT plays a very important role in the development of trading relations with various other nations and thus help in improving not only the economic growth but also provides a certain impetus needed in the trade industry.

DGFT issues Export license to the seed exporter based on the recommendation made by the DAC. Also DGFT is responsible for allowing list of seed/planting materials that can be exported or imported based on the recommendations made by DAC.

DIRECTORATE OF PLANT PROTECTION, QUARANTINE & STORAGE

The mandate of Plant Quarantine Service within the Directorate of Plant Protection, Quarantine and Storage is to prevent the entry, establishment and spread of exotic pests in India as per the provisions of The Destructive Insects & Pests Act, 1914 and the notifications issued there under. Every exporter has to register and file an application with concerned Plant quarantine station at the designated port through which he intends to export.

GENETIC ENGINEERING APPRAISAL COMMITTEE (GEAC)

Genetic Engineering Appraisal Committee (GEAC) established under Ministry of Environment, Forestry and Climate Change (MoEFCC) is the apex body to accord notified under Rules 1989 for approval of activities involving large scale use of hazardous microorganisms and recom-binants in research and industrial production from the environmental angle. The GEAC is also responsible for approval of proposals relating to release of genetically engineered organisms and products into the environment including experimental field trials.

APEDA

The Agricultural and Processed Food Products Export Development Authority (APEDA) was established by the Government of India under the Agricultural and Processed Food Products Export Development Authority Act 1985. APEDA is mandated with the responsibility of export promotion and development of the following scheduled products. Vegetable seed products are one of the scheduled under the mandate of APEDA.

- Development of industries relating to the vegetable seeds for export by way of providing financial assistance or otherwise for undertaking surveys and feasibility studies, participation in enquiry capital through joint ventures and other reliefs and subsidy schemes;
- Registration of persons as exporters of the vegetable seeds;
- Fixing of standards and specifications for the scheduled products for the purpose of exports;
- Carrying out inspection of meat and meat products in slaughter houses, processing plants, storage premises, conveyances or other places where such products are kept or handled for the purpose of ensuring the quality of such products;
- Improving of packaging of the vegetable seeds;
- Improving of marketing of the vegetable seeds outside India;
- Promotion of export oriented production and development of the vegetable seeds;
- Collection of statistics from the owners of factories or establishments engaged in the production, processing, packaging, marketing or export of the vegetable seeds or from such other persons as may be prescribed on any matter relating to the vegetable seeds and publication of the statistics so collected or of any portions thereof or extracts therefrom

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