

ASIAN SEED

THE OFFICIAL PUBLICATION OF THE ASIA & PACIFIC SEED ASSOCIATION



Study Tour to China
APSA members
learn about hybrid
rice cultivation



ASC 2015
Warm welcome
to Goa for
APSA delegates



OBs Survey
ASC 2016 Venue
at ConvensiA
Incheon, S Korea



Seed for Thought
Uday Singh on
hybrids and the
Indian seed market

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It's Time for Congress



Photo by John Clewley

It has been an interesting year, and, halfway through my two-year tenure as APSA President I can report that we have been making progress. During September, I joined APSA's Office Bearers to keep in close contact with the Indian National Organising Committee and consider the preparations for the upcoming Asian Seed Congress in Goa, India.

The programme for ASC 2015 is packed this year. As usual, the Congress will begin with a Pre-Congress Workshop that will focus on insights into setting up and operating a seed business in India. In addition, the Activity and Crop Groups will all meet in Goa to map out their activities for 2016, discuss relevant issues and access new developments in their sectors.

The seaside setting at the Congress venue offers delegates a natural, relaxed environment for social networking, which is an important part of the 'Congress experience' and one of the ways in which seed people do business and maintain their contacts.

This year, APSA is offering tours for accompanying persons on each day, with half-day and full-day

tours available to some of Goa's scenic spots and historical sites. For the full day tour on Wednesday 18 November, accompanying persons can join a full-day tour to a spice plantation, pick some spices and then cook their own meal. And the APSA golf tournament this year is hosted at the Lalit Golf & Spa Resort, a beautiful links course situated facing the Arabian Sea (delegates can register online on the APSA website).

The post-Congress tour this year is a field visit to vegetable seed production and will last several days. We expect this tour to be well attended, as there is a great deal of interest within the industry on seed production in India. To understand the background of the Indian seed industry, see the cover story and our accompanying stories on the pioneers who started it all and today's current generation of seed leaders, all of which can be found within this issue.

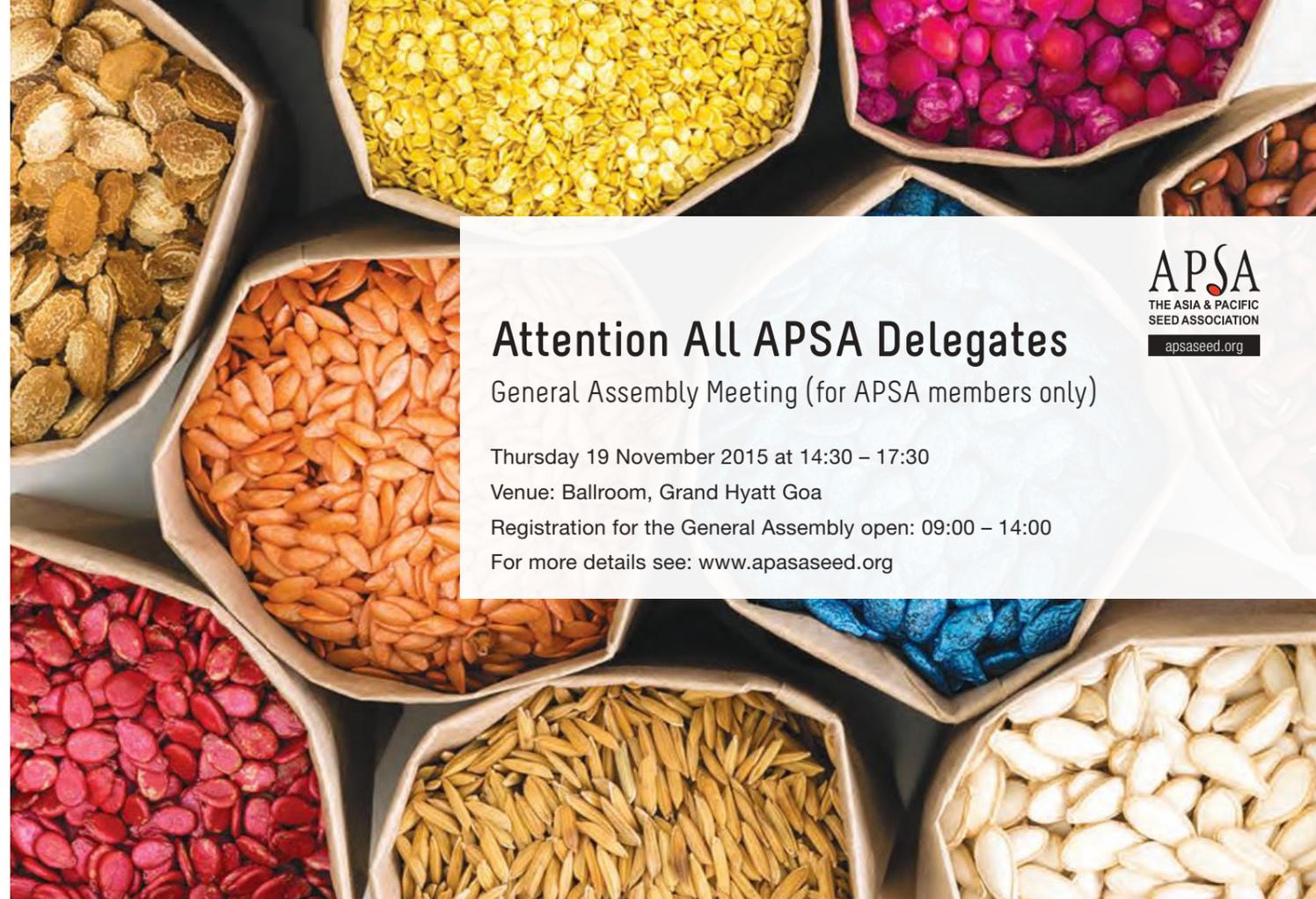
Elsewhere, this has been a busy year for APSA. We have hosted two workshops in Bangkok, on Intellectual Property Rights (to consider the draft paper on IPR to be presented at the General assembly) and Phytosanitary issues. APSA has also organised

several study tours for members: one on hybrid rice to China; another to New Zealand to consider seed production; and one to Holland to study seed technology and attend an industry meeting, 'Seed Meets Technology' in Seed Valley.

APSA has also welcomed delegations and visitors at the APSA headquarters in Bangkok, including seed specialists from Japan's Ministry of Agriculture, Forestry and Fisheries, representatives of the Vietnam Seed Trade Association, and representatives of the Agro-Input Retailers' Network of Bangladesh.

Finally, I can report that APSA's representatives have been travelling the globe to attend important meetings, conferences and congresses, such as the ISF's World Seed Congress (this year it was in the Polish city of Krakow), the African Seed Congress (Zimbabwe), and the International Seed Testing Association's Annual Meeting in Uruguay.

I look forward to meeting you all in Goa and I expect that you will not only enjoy doing good business, but will also have a great time. ☺



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Attention All APSA Delegates

General Assembly Meeting (for APSA members only)

Thursday 19 November 2015 at 14:30 – 17:30

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Photos courtesy Agricultural Wealth magazine

Hybrid Rice Study Tour to China

A hybrid rice study tour was organised for members in August of this year, providing the opportunity for participants to visit the research and processing facilities of major hybrid rice seed companies in China. The 15 participants, which included 12 members from India, two from the Philippines and one from Pakistan, travelled to Hunan, Hubei, Anhui and Sichuan provinces.

The nine-day tour was jointly organised by APSA and the China National Seed Association (CNSA), and led by Dr. Narendra Dadlani, and supported by CNSA's Ms. Ma 'Wendy' Wenhui, the Director of International Programmes.

The tour participants not only visited key hybrid rice facilities in China, they also had the opportunity to meet Professor Yuan Longping, the 'Father of Hybrid Rice' (see box on page 7).

The participants were particularly keen to see and understand how Chinese researchers were able to produce quality hybrid rice materials bred through a two/three line methodology using locally-developed CMS male sterile lines. They were keen to learn about the two-line method, which is mainly used in China as other countries are unable to develop thermo sensitive male sterile lines, because two-line hybrids are high yielding and have appreciable disease resistance.



Professor Yuan Longping – The Father of Hybrid Rice

Study tour participants had the honour of meeting Professor Yuan Longping (3rd from right, above) during their travels. He said that it was good that international communication on hybrid rice was enhanced by tours like the one organised by APSA. He showed the new hybrid varieties he had developed, particularly the quality

high yielding 'Super Good 1000' hybrid rice variety, which he said was very promising.

Born in 1931, Professor Longping graduated from the Southwest Agriculture Institute in 1953. He came up with an idea for hybridizing rice in the 1960's after a serious famine. In 1964, he found a natural

hybrid rice plant that had many advantages over other varieties. By 1973, he had cultivated a hybrid variety that yielded 20 per cent more per unit than other varieties. The following year he successfully developed the technology to produce *indica* rice, putting China at the forefront of modern rice production and garnering the title, 'Father of Hybrid Rice.'

In 1979 the technique for producing hybrid rice was introduced into the USA, and since then more than 20 countries have adopted hybrid rice. He is now a wealthy man, has won many domestic and international awards and is famous across China, but his focus remains on his rice research. The 'Super Rice' varieties he is now developing offer yields 30 per cent higher than those of common rice. He continues to work in the field on his research, always searching for new ways to improve on his work. 🌾

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The tour kicked off in Changsha, Hunan Province, which boasts the first research centre for hybrid rice, the China National Hybrid Rice R&D Centre and also the most famous hybrid rice company in the world, the Yuan Longping High Tech Agricultural Company.

From Changsha, the tour moved to other hybrid rice growing areas in Wuhan, Hubei Province and Hefei, Anhui Province. In Wuhan the tour visited Wuhan Qingfa Hesheng Seed Company and in Hefei, Winall Hi Tech Seed. In addition to these companies, the tour also visited Grand Agriseeds Technology, Guoying Seed Co., Wuhan Comega Seed Co., Anhui Longping High Tech Seed Co., and Zovee Seed Co.

Tour participants were impressed with the series of roundtable discussions held at meetings in Changsha, Wuhan, Hefei and Mianyang. At the meetings, the situation of hybrid rice production in China, India, the Philippines and Pakistan was discussed and notes compared. As a result, it was noted

that China has highly productive paddy, although seed production figures between countries were comparable, and that the cost of hybrid seeds in China was much higher than elsewhere. Chinese companies currently export hybrid rice seeds to 50 countries.

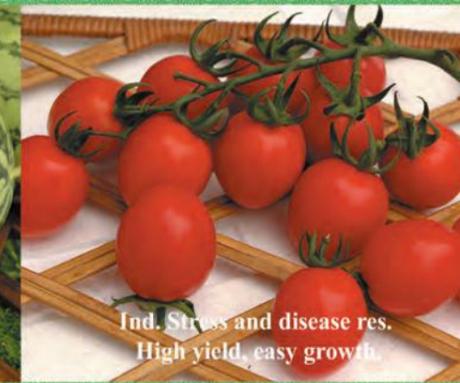
In addition to visiting private sector facilities and discussing hybrid rice issues with private sector researchers, tour participants also talked with hybrid rice researchers at public institutions such as the China National Hybrid Rice R&D Centre, Wuhan University and the Rice Research Institute of Anhui Academy of Agricultural Sciences. Further trips were also made, including one to the Wuhan High tech Bio Agri Park, an agro-industrial estate that groups together bio-medicine, biotechnology, bio-agriculture, bio-services and bio-information, and is also the base for several seed companies. ☺

Web resource: CNSA website: www.cnsa.agri.gov.cn



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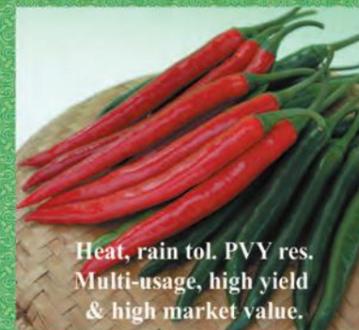
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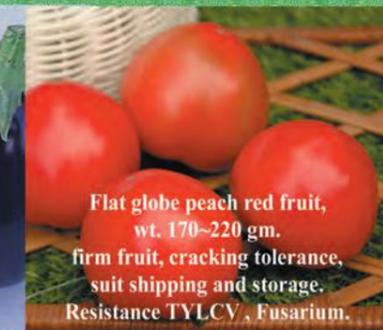
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Seedsman Simon Groot Receives Prestigious Award



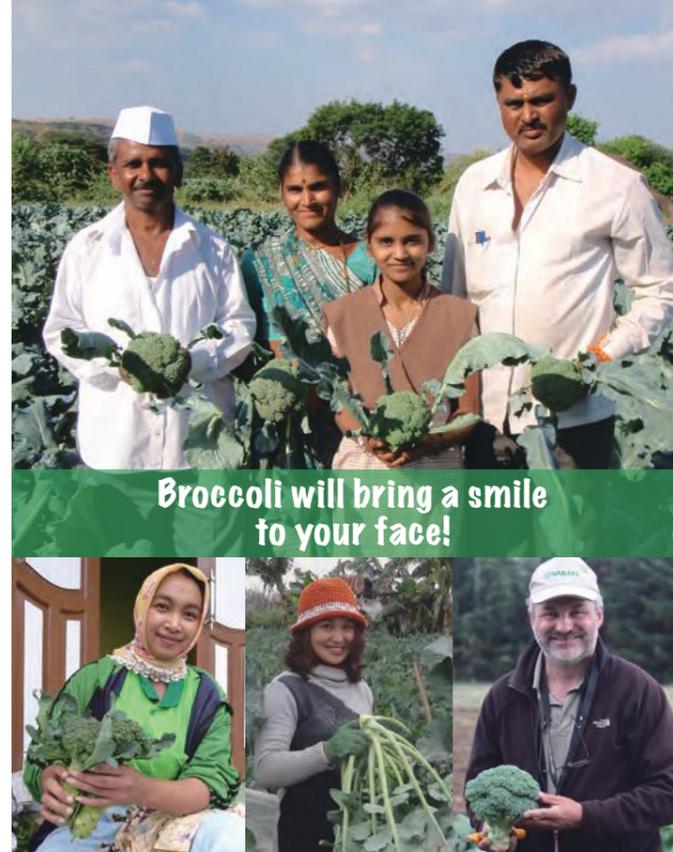
APSA Honorary Life Member Simon Groot, a sixth generation Dutch seedsman, was awarded the prestigious Mansholt Business Award for Sustainable Entrepreneurship by Wageningen University in August in recognition of his contribution to the vegetable farming sector in the tropics over the past thirty years.

Mr. Groot founded East-West Seed more than thirty years ago and the company has since played an important role in the development, improvement and distribution of tropical vegetable seeds in

Southeast Asia and beyond. Today, East-West distributes seeds to more than 60 countries, and employs 4,000 people worldwide.

“Our world is dominated by small-scale farmers. What we can do is add value to their labour and land. We have worked hard to create better genetics in tropical vegetable crops, using plant breeding technologies that have been successful for centuries in the West where I come from.”

Mr. Groot is the second recipient of the award. 🌱



Boosting the Benefits of Broccoli



Throughout a 101 year history, Sakata Seed Corporation has focused on breeding and introducing innovative vegetables. This focus has made Sakata a pioneer in the world of broccoli breeding. Sakata has achieved more than 50% of the world market share in the crop and is now helping to boost growth of the broccoli market in Asian countries, such as Japan, Korea, China, India, Indonesia, Vietnam, and the Philippines.

The consumption of broccoli has increased because of its health promoting properties, such as its high Vitamin C content. Recent findings have shown the presence of cancer suppressing sulforaphane and glucosinolate in broccoli. These findings have spurred even more growth in demand.

With fast-growing consumer demand, the price of the fresh broccoli tends to stay high. That, coupled with Sakata's high quality and easy-to-grow varieties, motivates farmers to cultivate this crop.

Monsanto Drops Bid, Syngenta to Sell Seed Business

Despite believing a merger would create shareholder value, Monsanto has dropped its bid for Syngenta. Monsanto confirmed reports that it had made an enhanced bid, thought to be around \$47 billion, on August 18 to combine the two agri-giants, but the new proposal did not meet Syngenta's financial expectations. In a public statement, Syngenta said that Monsanto's revised proposal "significantly undervalued" Syngenta and was "fraught with execution risk."

Shortly after rejecting the revised bid from Monsanto, Syngenta

moved to reassure investors and shareholders by announcing measures such as a share buy-back of more than \$2 billion, to return capital back to shareholders, and the sale of its flower and vegetable seed businesses. Analysts estimate that the vegetable seed business alone could fetch as much as \$2.5 billion, and that other agro-chemical companies such as BASF and Bayer are likely to be interested, particularly Bayer which has rapidly expanded its seed business in the past five years. 🌱

Source: Bloomberg, Reuters, agencies

Asia-Pacific Countries to Cut Import Duties

The Trade Ministers from 16 Asia-Pacific countries agreed in August to eliminate tariffs on 80% of their imports by 2025, as part of a regional free trade deal called, the Regional Comprehensive Economic Partnership (RCEP).

The RCEP, which has been locked in talks since May 2013 and is touted as the world's largest free trade deal, includes the 10-member Association of Southeast Asian

Nations (ASEAN) and China, Japan, South Korea, Australia, New Zealand and India, and is seen as a platform for China to counter the Trans-Pacific Partnership or TPP, which is led by the United States.

Countries in the RCEP represent half the world's population and have a combined output of \$22.7 trillion in 2014. 🌱

Source: Agencies

DELICIOUS BROCCOLI SOUP

Ingredients:
 Broccoli -----250 grams
 Ginger Garlic Paste--- 1tsp, Water--- 3 cups
 Milk--- 1 cup, Clove--- 1, Cardamom--- 1,
 Vegetable Oil (a little), Salt (a little)

Preparation:

1. Cut the florets and separate from the stem
2. Boil the stem and florets
3. Puree them with salt, ginger garlic paste, clove, cardamom, vegetable oil and water
4. Serve and enjoy!



New! Beneficial Beets

Due to the merger of Sakata Seed America and its subsidiary Alf Christianson Seed Company in 2014, Sakata Seed Corporation is now able to distribute high quality beet genetics all over the world. The beets formally distributed under the Chriseed brand are now available under the Sakata Seed brand.

Beets are now booming in China, India and Sri Lanka and Sakata Seed Corporation is boosting this growing trend in Asia by providing highly-reputed beets formerly offered by Chriseed. Beets are garnering quite a bit of attention due to their unique pigment antioxidants which are said to work against coronary artery disease and stroke, lower cholesterol levels within the body, and have anti-aging effects.

A slice of beet brings joyful color and nutrition to your plate!



WELCOME TO ASC 2015 GOA

This year's Asian Seed Congress, the fourth to be held in India after New Delhi (1995), Bangalore (2000) and Hyderabad (2008), is in Goa - the perfect venue to spice up your life, and, most importantly, your business. Known for centuries as a centre of the spice trade, Goa is renowned for its beautiful beaches, lush jungles, spice plantations, multi-cultural environment, delicious 'fusion' food and spectacular architecture. There is something for everyone in Goa.

The focus of this year's Congress though is not exclusively on Goa's relaxed atmosphere, because the spotlight will be trained firmly on the Indian seed industry, which has been growing prodigiously in recent years. With this in mind, Asian Seed presents this special section, providing a snapshot of the Indian seed industry, profiles of pioneering seedsmen and industry leaders, a timeline of relevant seed legislation in India, background on the National Seed Association of India (NSAI) and the story of the oldest Indian seed company, Namdeo Umaji Agritech. ❧

Photo by John Clewley

Indian Seed Industry – High Growth Set to Continue

India is one of the world's largest agricultural producers. It is the largest producer of beans and pulses, and the second largest producer of rice, wheat and vegetables. In addition, India has massive markets in many agricultural products, goods and services, including seeds, agrochemicals and fertilisers, irrigation, and general agricultural equipment. And most of these sectors and sub-sectors are growing rapidly.

With around 2.4% of the world's land area, from mountains to desert to tropical and equatorial forests, and some 16% of the world's population (1.3 billion people), India is one of the most diverse countries in the world, which is reflected in the wide range of agricultural goods produced in the country.

As a result of introducing policies of economic liberalisation in 1991, India has posted some of the highest economic growth rates in the world: in 2003-2008 GDP growth was more than 8.8% and in 2009-11 it was 8.4%, and despite the current global economic slowdown, India's economy continues to perform well, growing at around 6.9% in 2011-2013.

In terms of the agricultural sector, far-reaching changes are occurring as agricultural markets shift from self-sufficiency farming to farming-for-profit; and yet despite these changes, agriculture still supports some 58% of the population (compared to 75% at the time of independence in 1947). Nonetheless, liberalisation and modernisation have broadened and diversified

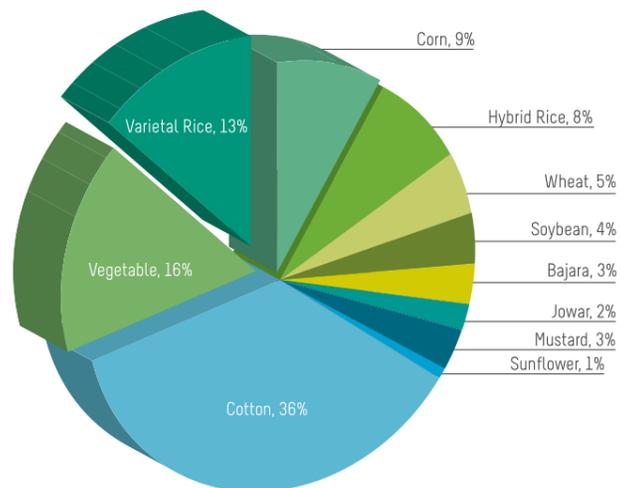
India's economic and industrial base, leading to a decline in the contribution of agriculture and agri-business to GDP from 61% to 19% over the past fifty years.

During the 1960's, agriculture grew exponentially on the back of the so-called 'Green Revolution', and GDP and food grain production have both grown at a faster rate than population growth over the past fifty years. The focus now is on ensuring food and nutritional security, as 28% of the country's population remains below the poverty line.

Seeds have played an important role in supporting agricultural growth over the past 40-50 years, and productivity gains have gone hand-in-hand with the expansion of the domestic seed industry. Since productivity has to rise to deal with increasing demand, and with no more arable land available in India, quality seeds will remain a key component of all agricultural production in the coming decades.

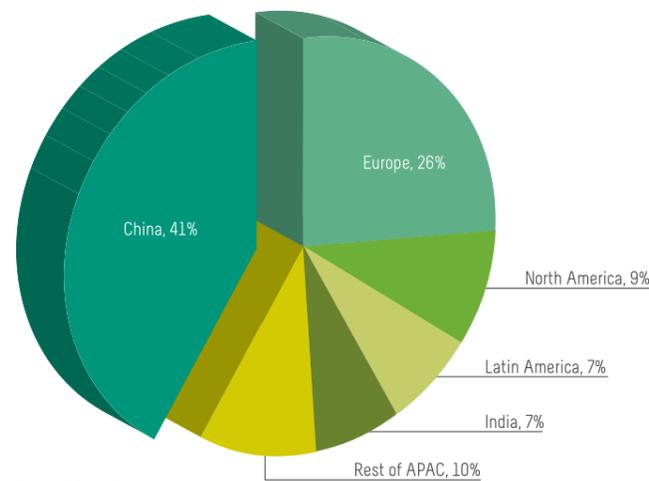
While Indian farmers have saved and swapped seeds since ancient times, the modern industrial seed industry is only around 40 years old. The International Seed Federation (ISF) ranked the Indian seed industry fifth globally in 2013, and valued it at \$2 billion (estimate for 2014: \$2.2 bn); various forecasts suggest that the Indian seed industry will continue to grow at a Compound Average Growth Rate (CAGR) of 12%, or twice the average for the rest of the world; some estimates put the CAGR as high as 17%.

Crop Segments



Source: Sathguru Analysis

Global Vegetable Seed Market



Source: ISF and Sathguru Analysis

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The domestic seed industry really began in earnest with the establishment of The National Seed Corporation in 1963 and the enactment of the Seeds Act in 1966. It was built on strong public sector support (currently, the public sector for seeds comprises of two central corporations, The National Seed Corp. (NSC) and the State Farm Corporation of India (SFCI), and 13 state seed corporations), particularly up to the introduction of a 'New Seed Policy' in 1988, which radically departed from the previous policy on foreign investment. The new policy liberalised seed imports for flower and vegetable seeds in general and some seeds of other crops.

These public sector organisations established a network of nationwide breeding centres for all major crops and a nationwide trial system and extension support.

The new policy also encouraged foreign seed companies to enter the Indian seed market to initiate R&D activities; 24 foreign seed companies entered the market by making substantial investments in seed-related activities like R&D, marketing and distribution chains.

Private sector companies, both local and foreign, have worked hard to develop the seed industry and the private sector, estimated to have more than 150 private seed enterprises, now has a 76% market share of the total seed industry. Consequently, the situation today is that private firms tend to play a dominant role in terms

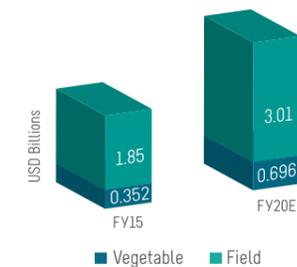
of R&D, marketing and supply chain development, transfer of technical skills, and production capacity, while the public sector continues to invest in germplasm as it has for many years.

Over the past twenty years or so, the market has been undergoing a transformation as more farmers switch to fields crop seeds, like Bt cotton hybrids and quality hybrid vegetable seeds, the latter of which offer higher yields than older OP varieties. Bt cotton hybrids, single-cross corn hybrids and hybrid vegetables are the crops driving seed industry growth.

Interestingly, the two major producers of vegetable seeds – China and India – together hold a 48% market share (41% China, 7% India) for vegetable seeds. Future growth is likely to come from increased cultivation on the back of rising demands from developing countries for quality seeds, technology upgrading (irrigation, covered cultivation, better agronomy etc.), better access to finance, market liberalisation and a more rapid uptake and adoption of hybrid vegetable seeds.

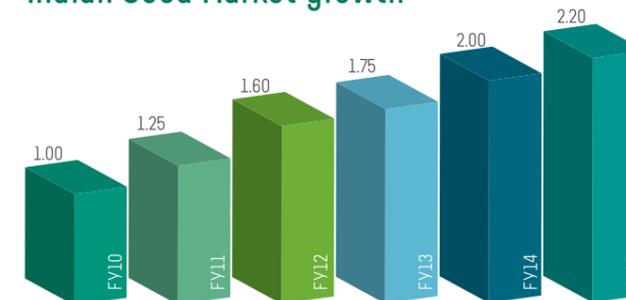
Overall, the Indian seed industry is expected to remain on its growth trajectory. The sub-sector on vegetable seeds will grow at an even faster pace, while the field crop market could be worth as much as \$3 billion by the year 2020.

Indian Seed Market Forecast



Source: ISF and Sathguru Analysis

Indian Seed Market growth



Source: Sathguru Analysis

India - Fact Box

Name: Republic of India

Independence: 15 August 1947

Location: Southern Asia, bordering the Arabian Sea and the Bay of Bengal, between Myanmar and Pakistan with Nepal, Bhutan and China in the north.

Population: 1.3 billion (2013 estimate); population growth: 1.3%

Land area: 3,287,263 sq km

Literacy: 61%

Internet users (per 100 people): 18

GDP: \$2.06 tn

GDP growth: 7%

Inflation: 4%

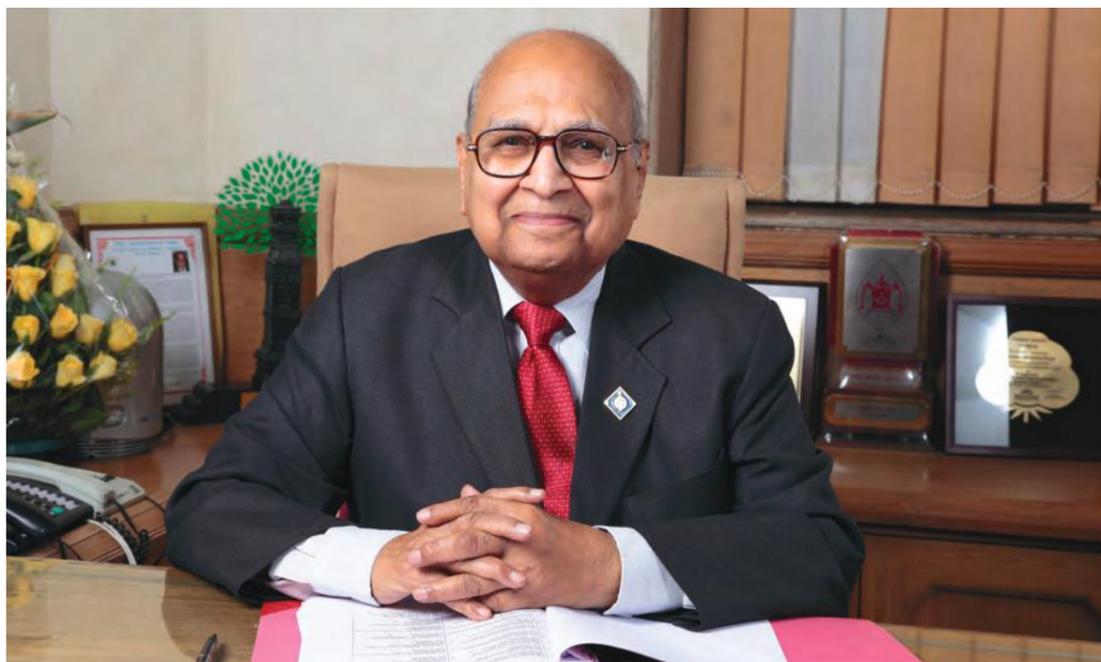
Source: World Bank World Development Indicators



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Pioneers of The Indian Seed Industry



Dr. BR Barwale – The Father of the Indian Seed Industry

The modern Indian seed industry was born in early 1960s India, when the country embarked on the ‘Green Revolution’ that transformed agriculture and propelled the nation to become one of the world’s leading food producers.

But the Green Revolution could not have occurred without significantly improved agro inputs, of which seed was the most important. Dr. BR Barwale was one of the first to understand this and his visionary approach was to utilise seeds as a vehicle for innovation to improve agricultural productivity. Born into a farming family in Hingoli, Maharashtra in 1931, and moved by the plight of local farmers, he established the Maharashtra Hybrid Seeds Company (Mahyco) in 1964, and, by doing so, he laid the foundations of the Indian seed industry.

In the late 1950s he was at the World Agricultural Fair in New Delhi and was given some new high-yielding Okra hybrid seeds by the Indian Agricultural Research Institute (IARI). He cultivated the seeds, got twice the normal yield and began selling them. Just after this the Indian Council of Agricultural Research (ICAR) chose him to produce the first hybrid maize seeds. His company went on to produce the first hybrid seeds for Bajra, maize, sunflower and Bhendi.

In 1966, he accepted the challenge of Dr. Norman Borlaug, the ‘Father of the Green Revolution’ to develop and commercialise the world’s first wheat hybrid.

From the 1960s onwards, he has tirelessly worked to develop new seed varieties and set up his own R&D team during the decade to further improve public sector-produced seeds. By the early 1970s he was already producing hybrid cotton seeds commercially. By leveraging new technology and by dealing fairly with farmers, he enabled Mahyco to garner 10% of the then highly fragmented seed market; today, Mahyco has more than 80,000 contract farmers and more than 400 hybrid seed varieties. The company has also been at the forefront of Bt. cotton production in partnership with Monsanto, further underscoring Dr. Barwale’s commitment to making the best technology available to India’s farmers.

Dr. Barwale has been awarded many prestigious prizes, including the 12th World Food Prize in 1998, Honorary Life Membership to FIS, and several from the Indian Government for services to agriculture. In 1998, the Crop Science Society of America recognised Dr. Barwale as the ‘Father of the Seed Industry in India.’ His selfless and passionately-driven work developing seeds is neatly summed up in a comment he once made about his belief that increasing the food supply was part of ‘God’s work’:

“The seed business is a sacred business.”



TAKII SEED

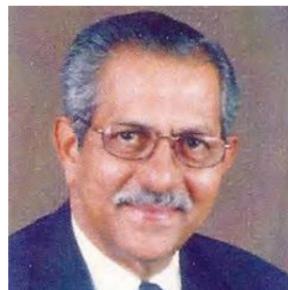
Since 1835

www.takiiseed.com



Dr. Manmohan Attavar – Facilitator of Year-Round Seed Production

Dr. Attavar was one of a new generation of Indian agro-scientists to study extensively in the USA, earning his Doctorate in Plant Breeding and Genetics at Montana State University in 1964. He returned to India in 1965 just as the Indian seed industry and the introduction of hybrid seed techniques were taking off. He set up Indo-American Hybrid Seeds in Bangalore, which over the past fifty years has grown to become one of India's leading seed companies.



He was the first Indian seedsman to introduce environmentally-controlled greenhouses to India to facilitate year-round seed production. And within two years he was exporting the first Petunia hybrid seeds to the USA; from that time onwards, Indo-American has produced a substantial volume of F1 hybrid flower and vegetable seeds for export. Moreover, Dr. Attavar was instrumental in introducing the concept and practice of the 'Lab-to-Land' nursery management programme to India.

Dr. Attavar also pioneered the development of vegetable hybrids such as the first commercial hybrid tomato ('Karnataka') and Capsicum ('Bharath') in 1973. More vegetable hybrids in Okra, Brinjal, gourds, watermelon, muskmelon and onions have been

released, along with the first aromatic rice hybrid ('Khusboo') and the high-yielding non-aromatic rice hybrids 'Samrat.' He has also popularised IAHs hybrids in Bt. cotton, sunflower and corn.

His background as a scientist and his commitment to improving vegetable crops and ornamental plants with modern technology led him to establish the Genetic Engineering Laboratory & Commercial Tissue Culture Laboratory in 1987. The company's seed testing laboratory was the first laboratory of its kind in the private sector in Asia.

He has been awarded many honours and prizes by both the Indian Government and the international community. 🌱

Dr. Kuldip R. Chopra – Pioneering Plant Breeder

Dr. Kuldip R Chopra was born in 1933 and educated in Allahabad and the USA; he received his doctorate in agronomy from the University of Nebraska, USA, in 1964.

He began his career as a junior maize breeder in a unique project, the All India Coordinated Maize Improvement Project, which brought together various Indian government agencies, agricultural universities and the Rockefeller Foundation to collaborate on germplasm collection, development of stable lines, and high yielding and pest resistant, adaptable maize hybrids. He was directly involved with the official release of the first four maize hybrids in 1961.

He was one of the first scientists to jump from the security of public sector work to set up a small research-based company, Mahendra Hybrid Seed, which worked closely with the India Crop Improvement Projects. He later set up Biostadt MH Seeds with a similar focus on R&D-based breeding strategies.



Dr. Chopra conducted over 28 consultancies for the FAO, World Bank and related agencies and organisations. He has trained many scientists in the field of efficient seed production and marketing systems and has been very active in working to develop systems and regulations for seed production for relevant trade associations: he was President of APSA in 1995-96 and President of the Seed Association of India (NSAI) from 1998 to 2004. 🌱

Indian Seed Leaders

Mandava Prabhakar Rao, NSL Group www.nuziveeduseeds.com



Mr. M Prabhakar Rao, who was born in Andhra Pradesh state and was a highly successful student, is the Chairman of the NSL Group. He comes from a well-known farming family and after graduating he took over the small family-owned seed company Nuziveedu Seeds Limited (NSL) in 1982, which, under his direction, transformed into the largest seed company in India, with a 20% share of the huge hybrid cotton seed market. NSL has also pioneered the introduction of high density planting for cotton and direct seeding for rice, both techniques of which were utilised to improve farm productivity.

Mr. Rao was elected as the first President of the National Seed Association of India (NSAI), a position he continues to this day. He has been and continues to be an influential figure on the development and growth of the Indian seed industry.

In addition to his contributions to the seed industry, his conglomerate of companies is involved in substantial projects in the power, textiles, sugar and IT infrastructure sectors. 🌱

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This illustration is Shin Yun-bok's 'Dan-opungjeong' which is Korean genre painting in the second half of the 18th Century.

Beyond Seeds Share the World

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GV Bhaskar Rao, Kaveri Seed Company www.kaveriseeds.in



In 1976, Kaveri established a seed processing plant to support quality seed production, and shortly afterwards began to produce contract quality seeds. In 1986, the firm was officially incorporated as the Kaveri Seed Company; over the next two decades, Kaveri expanded to produce not just quality seeds, but also a range of agri-products such as micronutrients, bio-fertilizers and bio-pesticides. In 2007, Kaveri became a publicly listed company.

Mr. Rao is known for his pragmatic approach and his dedication to knowledge-driven products; consequently, he has invested heavily in R&D and technology, employing the latest state-of-the-art facilities and collecting crop germplasm with which the company then works on in collaborative partnership with ICRISAT, CIMMYT, USDA and many other institutions and agencies.

Kaveri claims market leadership in Bt. cotton, maize, bbara, rice and sunflowers, and is one of the fastest growing companies in India.

The road to quality seeds began for Mr. GV Bhaskar Rao, the Managing Director and Chairman of Kaveri Seed, in the remote village of Gatlanasingapur in Telangana. After graduating in agriculture, Mr. Rao returned to his native village to produce seed on his family's land, and, by doing so, began the Kaveri story.

Mr. Raju Barwale, Mahyco www.mahyco.com

Managing Director of Mahyco, Mr. Raju Barwale has built on the vision of founder Dr. BR Barwale (see page 18) in producing quality seeds for more than 30 years, resulting in Mahyco's position today in Indian agriculture as one of the most respected biotech companies.

It was Mr. Barwale who had the foresight to join forces with Monsanto in the 1990s in order to introduce Bt. technology into Indian agriculture. He was convinced that the technology from Monsanto would enable farmers to successfully counter the bollworm scourge in cotton crops. In 2002, Mahyco pioneered the introduction of India's first biotech crop – Bt. cotton.

Just eight years after the introduction of Bt. cotton in India, the country became the second largest producer of cotton in the world; cotton production increased from 13.6 million bales in 2002 to about 39 million bales in 2014, a 186 percent increase, while India's cotton yields increased from just 190kg/hectare in 2001 to over 500kg/hectare in 2014.



Under Mr. Barwale's supervision, Mahyco has also developed Bt. Brinjal, India's first GM food crop, which awaits the Government's decision on commercialisation. Additionally, he has also nurtured the development of molecular marker technology, which in turn has facilitated taking crops to market more quickly.

Dr. M Ramasami, Rasi Seeds www.rasiseeds.com

Dr. M Ramasami is a graduate of the Tamil Nadu Agricultural University and comes from a well-known farming family. He worked for a short while with the Department of Agriculture in the 1970s, but his wish to help farmers and his entrepreneurial spirit led him to leave the public sector to set up Rasi Seeds in 1973.

Although Rasi Seeds began as a seed production and supply company, he realised that he could not create value for farmers without a strong R&D focus. He set out to create high yielding, quality seeds in cotton and then moved onward; today, Rasi boasts an extensive range of both field and vegetable seeds (sold under the brand name HyVeg).



Dr. Ramasami's commitment to biotechnology positioned the company to take up the first sub-license for Monsanto's Bt. cotton in 2000. He remains committed on working towards developing environmentally safe and economically sound technologies by further integrating new advancements in biotechnology and genetic engineering with conventional plant breeding methods.



Photos courtesy Namdeo Umaji Agritech

Namdeo Umaji Agritech – India's Oldest Seed Company

Rewind back to 1885 to Byculla Vegetable Market in the then Bombay State. Mr. Namdeo Umaji Bhalinge who at the time ran a small vegetable store had the idea that if he could provide quality seeds to vegetable growers, then they would be able to grow good vegetables that would fetch premium prices and enable better nutrition and a healthier diet for consumers.

With this idea in mind, Mr. Bhalinge opened a shop to sell quality seeds. Soon word got around and growers started to ask for other agricultural products, and within a short period of time he was not only selling seeds, but also fertiliser and farming implements to growers who were also selling their produce at the same market. It was an early example of what we would now call, a 'One-Stop Shop.'

When the founder passed away, his son Ramchandra took over the business and set about expanding the company's network. He visited growers in Junnar, Nashik and other agricultural districts in which vegetables were grown. He gained insight into what they needed in terms of seeds and fertilisers and was able to introduce them to better farming methods and the potential of growing cash crops. He also made grafted fruit plants available to vegetable growers to boost rural incomes.

After independence in 1947, tertiary education in agriculture expanded in the Bombay State (comprised of the present-day states of Maharashtra and Gujarat). Ramchandra moved quickly to establish strong links

with these institutions; useful information on farming methodology was then disseminated through his distribution network.

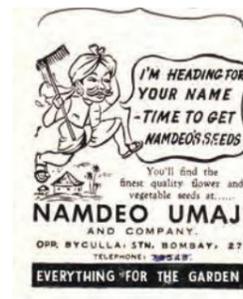
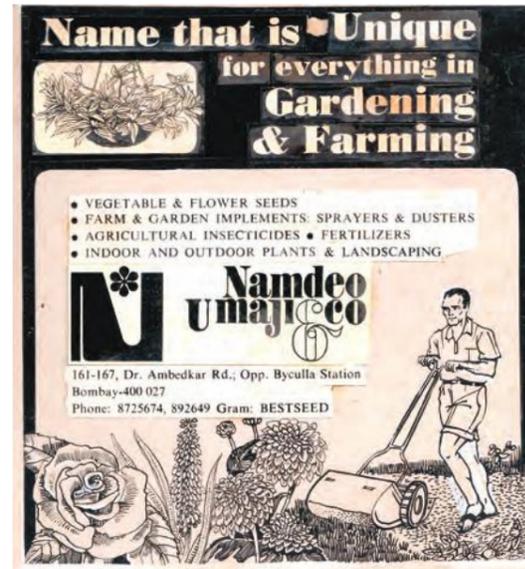
His two sons, Gajananrao and Madhukarrao took over the business from their father, and immediately set about promoting their products. As the company's customers were scattered across the country, the brothers had to travel extensively to reach them, and in doing so they established a pan-India supply channel to distribute their products and services, a network that continues to serve the company to this day.

The final piece of the Namdeo Umaji story was when Sachin Bhalinge took over the company in the centenary year. He expanded the company further and in 2000 he established it as a private limited company.

Today, Namdeo Umaji Agritech (India) Pvt. Ltd. is a group of inter-related companies:

- Namdeo Umaji Industrial Company: Marketing imported spray pumps for agriculture
- R.S. Sales Corporation: Marketing mulching films and organic fertilisers
- Horticon Foundation: An NGO publishing Adarsh Sheti Udyog magazine in Marathi every quarter
- Namdeo Umaji Cine Arts: Film production

More information from: www.namdeoumaji.com



Under Sachin's guidance the company has expanded its horizon overseas, with seed exports to other Asian and African countries as part of their new strategy.

130 years is a long time for a seed company to be in business, and guided by a motto – "We never forget what our seed grows up to be" – it is highly likely that the company will be right in the heart of the seed business for another 130 years.



Seeds since 1880





Photos by John Clewley

The National Seed Association of India

The apex trade association for the Indian seed industry is the National Seed Association of India, which was created by merging four key seed associations: the Seed Association of India (SAI), the Association of Seed Industry (ASI), the Indian Seed Industry Association (INSIA) and the All-India Crop Biotechnology Association.

Currently, the NSAI has more than 230 members, drawn from both the private and public sectors. The association's vision is to "create a dynamic, innovative, and internationally competitive research-based industry, producing high performance, high quality seeds and planting materials, which benefits farmers and significantly contributes to the sustainable growth of Indian agriculture."

Specifically, the association's mission is:

- To create a policy environment for the seed industry
- To create better interactions & provide business opportunities among our stakeholders
- To hold meetings and interactions between public & private sectors to discuss common issues
- To facilitate the Public-Private Partnership

The NSAI held the first annual Indian Seed Congress in Bangaluru in February 2010.

The current President of NSAI is Mr. M Prabakar Rao and the General Secretary is Mr. Bhupen Dubey. Mr. Rao, upon election to the office of President, said that it was important to "work towards regulatory issues faced by the seed industry, creating a conducive environment for the seed industry's functioning, and for intellectual property rights for seed varieties, so as to enhance R&D investments for the benefit of farmers."

NSAI website: www.nsai.co.in

Indian Seed Industry Key Milestones

- 1914 The Destructive Insect and Pest Act
- 1963 National Seed Corporation established
- 1966 Seeds Act enacted
- 1983 Seeds (Control) Order
- 1988 New Policy on Seed Development, liberalisation of vegetable and flower seed markets, entry of foreign seed companies to the Indian market
- 1989 Plants, Fruits and Seeds Order (Regulation of Import into India Order)
- 2001 Protection of Plant Varieties & Farmers' Rights Act, New Seed Law
- 2002 National Seed Policy
- 2003 Protection of Plant Varieties Rules
- 2004 Seed Bill

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Asian Seed Congress 2015 Programme

Sunday 15 November

Programme	Participants	Location
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09:00 - 24:00	APSA Secretariat Meeting Room Open	Secretariat and NOC	Registration Area
14:00 - 17:00	APSA EC Meeting	APSA EC Members	Salao 4

Day 1 - Monday 16 November

06:00 - 17:00	APSA Golf Tournament	Players	Lalit Golf Course
08:30 - 17:00	Registration Opens	Delegates	Registration Area
08:30 - 18:30	Pre-Congress Workshop	Workshop Attendees	Salao 2 and 3
13:00 - 18:00	Exhibits, Trading and Private Meeting Rooms Open	Delegates	Ballroom
19:00 - 22:00	APSA EC Dinner (by invitation)	APSA EC Members and invited guests	Lawn 4

Day 2 - Tuesday 17 November

09:00 - 17:00	Registration Opens	Delegates	Registration Area
09:00 - 11:00	Inaugural Ceremony	Delegates	Ballroom
13:00 - 18:00	Exhibits, Trading and Private Meeting Rooms Open	Delegates	Ballroom and Salao 1
11:30 - 13:00	APSA Past Presidents' Luncheon (by invitation)	APSA Past Presidents and invited guests	Chulah Indian Restaurant
13:00 - 16:00	Crop Group on Vegetables and Ornamentals	Delegates	Salao 2 and 3
16:15 - 18:15	Activity Group on Seed Technology	Delegates	Salao 2 and 3
18:30 - 22:00	Welcome Cocktail Party	Delegates and Accompanying Persons	Lawns

Day 3 - Wednesday 18 November

08:30 - 17:00	Registration Opens	Delegates	Registration Area
08:00 - 18:00	Exhibits, Trading and Private Meeting Rooms Open	Delegates	Ballrooms A - F
08:30 - 10:00	APSA - National Seed Associations Meeting	Delegates	Salao 2
08:45 - 16:00	Accompanying Person's Tour	Accompanying Persons	Registration Area
09:00 - 17:00	Banquet Reservations Open	Delegates	Registration Area
10:15 - 12:15	Crop Group on Cover Crops	Delegates	Salao 3
13:00 - 16:00	Activity Group on Intellectual Property Rights and Biodiversity	Delegates	Salao 2
16:15 - 18:15	Crop Group on Field Crops	Delegates	Salao 3

Day 4 - Thursday 19 November

08:30 - 13:00	Registration Opens	Delegates	Registration Area
08:30 - 13:00	Banquet Reservations Open	Delegates	Registration Area
08:00 - 12:30	Exhibits, Trading and Private Meeting Rooms Open	Delegates	Ballrooms A - F
08:30 - 10:30	Crop Group on Hybrid Rice	Delegates	Salao 2
09:00 - 12:00	GAM Registrations Open	Delegates	Registration Area
10:30 - 12:30	Activity Group on Trade and Marketing	Delegates	Salao 3
12:00 - 14:00	GAM Registrations Open	Delegates	Registration Area
14:30 - 17:30	APSA General Assembly Meeting	APSA Members	Ballroom
19:00 - 22:00	Grand Banquet	Delegates and Accompanying Persons	Lawns

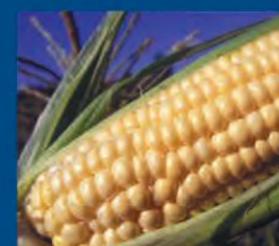
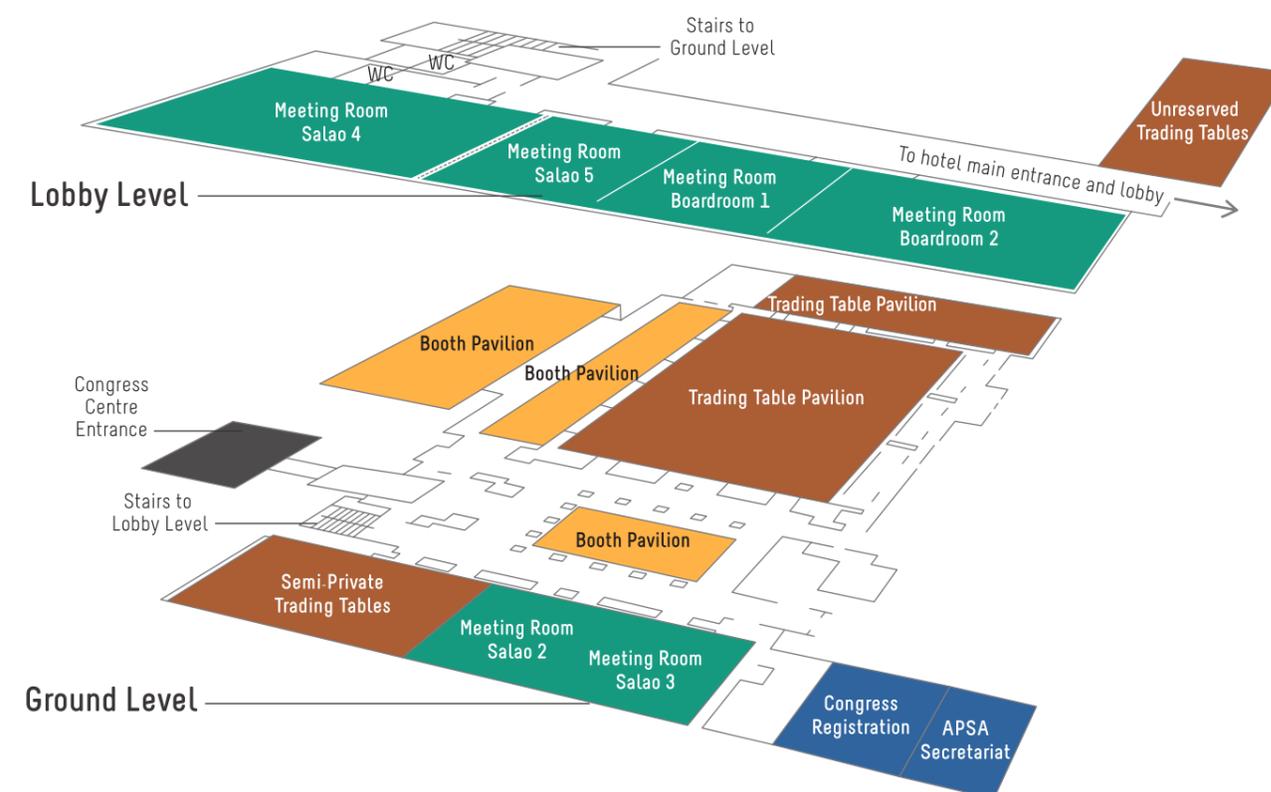
Day 5 - Friday 20 November

08:45 - 16:00	Post-Congress Tour(s)	Delegates and Accompanying Persons	TBA
08:30 - 12:00	APSA EC Meeting	APSA EC Members	Salao 4

Special Notes:

1. Trading table and booth areas now have extended times, opening from 13:00 to 18:00 Monday, 11:00 to 18:00 Tuesday, 08:00 to 18:00 Wednesday and 08:00 to 13:00 Thursday.
2. Coffee and tea are served from 08:30 to 17:00, daily.
3. Lunch will be served on 17, 18 and 19 November from 11:30 to 13:30 at the following venues: Lawn area, Coffee shop, and Chulah Restaurant.
4. All meeting and trading rooms as well as the exhibition area will CLOSE during the Inaugural Ceremony on 17 November, opening at 13:00.
5. All meeting and trading rooms as well as the exhibition area will CLOSE at 13:00 on 19 November for the APSA General Assembly Meeting.
6. Private meeting rooms now have extended times, opening from 09:00 to 18:00 Monday, 11:00 to 18:00 Tuesday, 09:00 to 18:00 Wednesday and 09:00 to 13:00 Thursday.

Asian Seed Congress 2015 Floor Plan



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Chiang Mai, Thailand
February 22-26
2016

Seed Business 101SM in Asia

Seed Business 101SM is a one week program that shortens the learning curve for employees new to the seed industry. Taught by industry experts, the course offers participants a broad understanding of the major aspects of a seed company's operations and a cross-departmental knowledge of best practices for profitability.

Early-bird Registration: \$3,250
(ends Nov 27, 2015)

Full Registration: \$3,500

Register online at sbc.ucdavis.edu



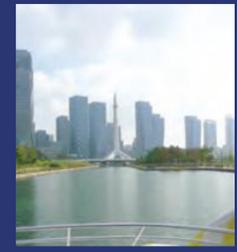
OBs Survey ASC 2016 Facilities

APSA's Office Bearers, led by President Zhiping Wang and supported by Events Organiser Duangchai Pancom, visited South Korea in September to meet with representatives of the National Organising Committee (NOC) for ASC 2016 to discuss the details of next year's Congress, which will be held in Incheon at Songdo Convensia on 7-11 November 2016.

The OB Committee (Zhiping Wang, Brenda Dossey, Avtar Singh Dhindsa and Jack Metzelaar) met with Korean NOC members (Mr. Kyoung-Ou Ryu, Mr. Il-Woong Yoo, Dr. Sangji Byun, Mr. Jang Hyun Mo) along with members of the Korean Seed Association (KOSA), led by President Mr. Chang Hyun Kim, the Korea Seed & Variety Service (KSVS), represented by APSA EC member Ms. Mi-Hee Yang and Seed Business Assistance Division

Director Mr. Kyon-II Lee. Mr. Jae-Wook Chung, the President of Koconex (Korean Convention Services Ltd.), which is the event planner for the Congress, led a team of staff from his office to meet APSA's representatives. In addition, a MICE marketing team from the Incheon Development & Tourism Corporation (IDTC), also attended along with Maureen Kim, MICE Director at the Incheon Convention and Visitors Bureau (CVB).





The venue for ASC 2016 is the Songdo ConvensiA and all related facilities such as hotels, shopping and recreation facilities which are handily located around the venue. The ASC venue hotel will be the Sheraton Incheon Hotel, which is next door to the Songdo ConvensiA. Also located close by are the traditional Korean hostelry, the Orakai Hotel and the Oakwood Hotel, both of which will be made available to APSA delegates.

Members of the OB inspected all the accommodation options using the local transportation system, which included travelling by boat through Central Park,

located across the road from the ASC venue.

One of the highlights of the site survey was a trip to a local restaurant and cooking school, Cobbles, at which OB members tried their hand at cooking Korean pancakes.

The OBs also visited the golf club, Sky 72, which will host the APSA Golf Tournament at ASC 2016. There are four different courses at Sky 72, including an 'Ocean Course' and a 'Night Course', the latter of which is open until 2:00am! The APSA Golf Tournament will, however, most likely be held at the Ocean course.

The presentations and facilities viewed were first class and were enjoyed by everyone on the fact-finding mission. As for the Korean side, KOSA President Mr. Chang Hyun Kim said that the Korean NOC was ready to support APSA's members, and he added that "the Asian Seed Congress 2016 will provide an outstanding opportunity for all members of APSA to learn more about the seed industry while experiencing the beauty and culture of Korea."

For more information:
www.incheoncvb.co.kr



International Seed Testing Association (ISTA)

- 1 EMBRACE ISTA'S VISION OF "UNIFORMITY IN SEED TESTING"**
 Founded in 1924 as an international, non-profit association, ISTA operates under the governments of its member countries. ISTA's work is endorsed by international organizations such as the ISF, UPOV and the WTO, it guarantees worldwide "uniformity in seed testing".
- 2 FOLLOW THE INTERNATIONAL RULES FOR SEED TESTING**
 Annually updated, the ISTA Rules provide standardized methods to be used in sampling, testing seed lot quality and reporting results internationally.
- 3 BENEFIT FROM THE KNOWLEDGE OF ISTA'S TECHNICAL COMMITTEES**
 ISTA counts 18 Technical Committees whose work is to solve technical challenges that, in most cases, are not unique to one company. They represent the most efficient and cost-effective way of addressing analytical needs.
- 4 EVALUATE YOUR PERFORMANCE WITH THE PROFICIENCY TEST PROGRAMME**
 The Proficiency Test programme is exclusive to ISTA. It provides an opportunity for seed laboratories to assess their technical performance and to benchmark themselves against the ISTA laboratory community.
- 5 WITH ISTA ACCREDITATION, OBTAIN RECOGNITION OF YOUR COMPETENCE**
 There are more than 130 ISTA accredited laboratories globally. Accredited laboratories have proven their technical competence in carrying out seed testing in accordance with the ISTA Rules, and operate an effective quality management system.
- 6 ISSUE ISTA CERTIFICATES TO GROW YOUR BUSINESS INTERNATIONALLY**
 Once accredited, laboratories are authorized to issue ISTA Certificates. ISTA Certificates create a common language for seed vendors and buyers, benefiting companies wanting to expand sales internationally.
- 7 MAKE YOUR VOICE HEARD**
 ISTA recently introduced the category of "Industry Membership". Aiming at further engaging with the seed industry, it is meant for all sizes of companies and provides a forum to voice the seed industry's concerns within ISTA.
- 8 JOIN A GLOBAL NETWORK OF SEED SCIENCE PROFESSIONALS**
 ISTA's community includes more than 300 seed testing laboratories and individual seed professionals in 80 countries. ISTA is a global network of experts to whom to turn to for all seed testing challenges.
- 9 STAY UP TO DATE, READ ISTA PUBLICATIONS**
 ISTA publishes a range of technical handbooks, the scientific journal "Seed Science and Technology", the semi-annual news bulletin "Seed Testing International" and proceedings from ISTA events. Stay informed!
- 10 ACQUIRE KNOWLEDGE IN ISTA WORKSHOPS AND EVENTS**
 ISTA regularly holds workshops and events which provide a platform for acquiring and exchanging information, experience and ideas. ISTA Members benefit from prioritized and reduced registration fees.

How Hybrids Revolutionised the Indian Seed Market

By Uday Singh, General Manager, Namdhari Seeds & former APSA President

Hybrid vegetable seed dissemination in the Indian market was in its infancy during the eighties. Indo-American Seeds and Mahyco Seeds started things off with hybrids in cabbage and tomato. It was during this period when the idea of establishing Namdhari Seeds was born. Since then, the development and growth for hybrid vegetable seeds during the past three decades has indeed been stupendous. Initially, European and American companies undertook contract seed production in Taiwan, but with rapid industrialisation, hybrid seed production became expensive there. Sensing the opportunity, we secured contracts for hybrid seed production from US companies, focusing on solanaceous and cucurbitaceous crops. Scientific methods of production were adopted to meet stringent international standards.

Systematic breeding efforts were simultaneously directed towards the development of tomato and watermelon hybrids for India, and subsequently for hot peppers and melons. At that time, hybrid melons and hot peppers were unknown in India. Chilli was considered a dry land crop with little hope of hybrids finding favour with growers. Success followed for Namdhari Seeds with the release of tomato and watermelon hybrids in 1992-93. The enhanced yields and excellent quality of produce of the hybrids contributed to their triumph. Since then, the market, which was uncompetitive with few companies breeding hybrid vegetables, has evolved, developed and grown. With several companies entering the arena and increased competition, growers now enjoy more refined products from foreign and Indian companies, which has triggered a transformation in the market. Demand for hybrid seeds has outstripped



Photo by John Clewley

that of open pollinated varieties; for instance, over 80% of all tomatoes grown in India today are hybrids.

Interesting changes included the development tomato hybrids in the acidic (desi) sub-segment, which are mostly used for cooking and have replaced varieties previously developed and sold by the public sector. As tomatoes are grown continuously, tomato leaf curl virus (TYLCV) has become a serious problem, but most new hybrids developed are resistant. Dual purpose and processing tomatoes continue to be important and Namdhari Seeds is a major player in both these sub-segments.

Watermelon has made a rapid transition in rind patterning from those of varieties like Sugar Baby and Arka Manik to hybrids with Jubilee patterning. The most recent trend is for smaller-sized fruits, referred to as 'ice box'; as family sizes get smaller, consumers prefer smaller fruit.

A unique and popular Indian crop is okra, which has shown a dramatic shift from OPs to hybrids. While viruses continue to be a major challenge for

the growers, the private sector has been successful in developing resistant varieties, triggering yet another change. The lowly gourd also lent itself to hybrid development, and hybrid seed penetration has been rapid for bottle, bitter, sponge and ridge gourds. Some of these are indigenous to India, which helped the breeding process by private seed companies.

India is the largest producer of hot peppers for drying, and Indian cuisine uses abundant quantities of fresh green chilli. Hybrids have entered the markets in these segments and production has increased. Given regional chilli preferences, private companies have successfully bred and developed hybrids to suit differing tastes coupled with adaptability, disease resistance and yield advantage. As a result, India is now one of the largest seed markets globally for hybrid chilli peppers.

Hybrids have also penetrated other major crops, such as cucumbers, eggplants, cabbages, cauliflower, and more recently hybrid carrots. Surprisingly, onion hybrids have been slow to start. These accomplishments have caused a revolution in vegetable growing.

Along with the development of hybrid seeds, major advances have also taken place in agronomy. Drip irrigation, fertigation, and the use of mulch have come into vogue. Most recently, the area under protected cultivation has been expanded. Moreover, State Governments now provide subsidies to small farmers for greenhouse construction. Cucumber (Lebanese/beit alpha) and coloured peppers are the favoured crops grown in these structures.

The challenge for the seed industry in India remains over-regulation, which makes selling seeds very difficult. There is scant regard for intellectual property rights too, leading to a mushrooming of many 'overnight' players. Although plant protection legislation has been passed, implementation has been too slow. But despite all these challenges, I expect the seed industry to continue growing in the next decade as the middle class expands and the demand for quality vegetables increases. 🌱

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