

ASIAN SEED

THE OFFICIAL PUBLICATION OF THE ASIA & PACIFIC SEED ASSOCIATION



Pakistan Seed Trade Trends

Movement of seeds over past five years



Paddy Select

Key factors that make Thai rice seed 'world class'



ASC turns 24 in Bangkok

The Asian Seed Congress returns



Seed for Thought

Wise words from both the public and private sectors

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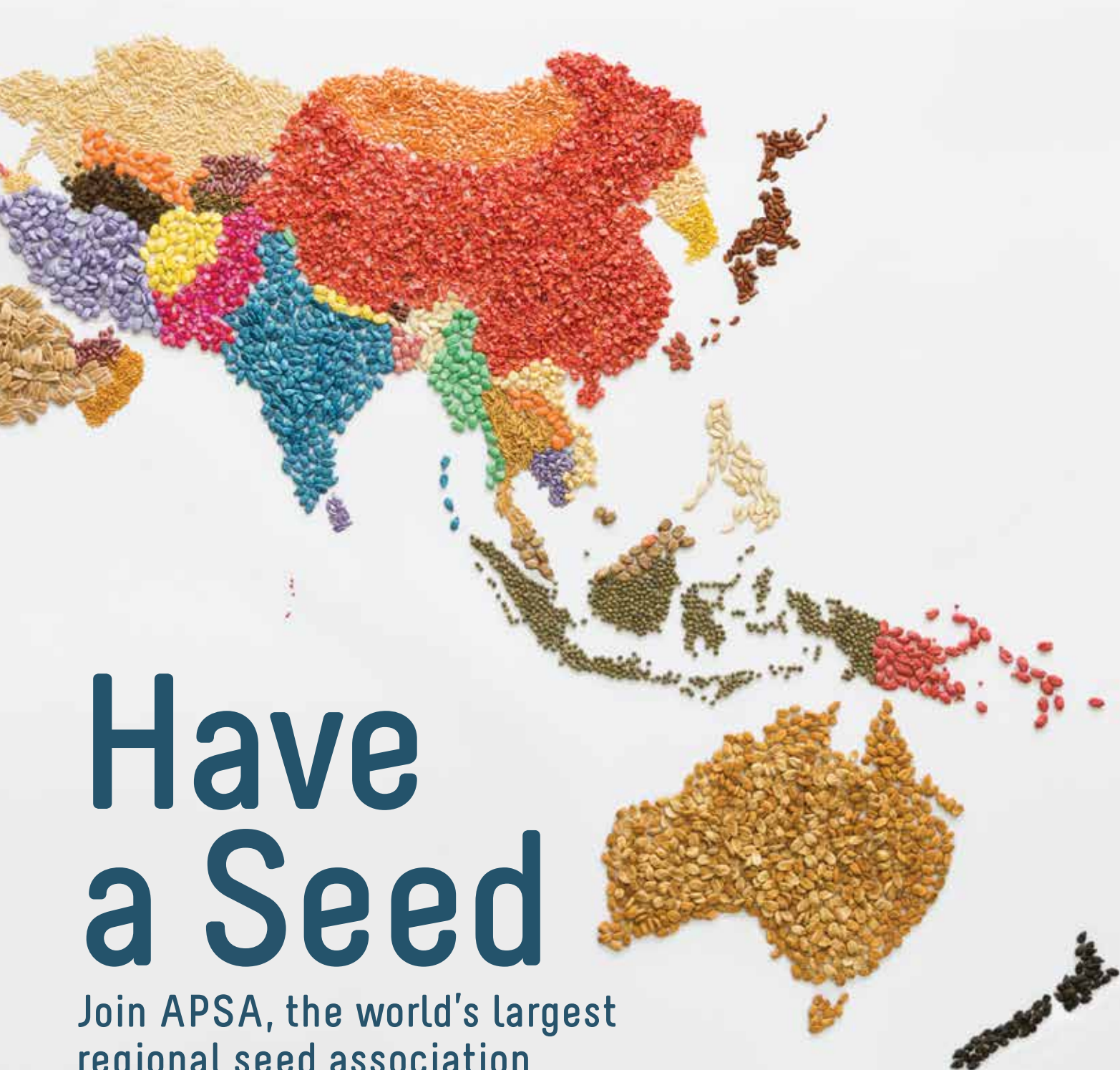
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Family Values of APSA



Brenda Dossey, APSA President

In one of our Executive Committee emails recently, APSA Executive Committee member Muhammed Asim Butt mentioned that he believes APSA is not just an institution, but a family. I have often tried to explain to non-members who have never attended an APSA function how APSA is different or how the Asian Seed Congress is different. When I read Asim's statement this week, I thought to myself, "That is it."

Even though we have grown over the years and now routinely have Asian Seed Congresses with more than 1,000 delegates in attendance, we have managed to hold on to that feeling of family. It is a warmth of friendship that comes through when we gather for activities. Perhaps it is the Asia-Pacific region that makes this possible, but I know that it is this very feeling that makes APSA special to me.

No matter the reason, like families everywhere, we have our differences of opinions. We come from many cultures and many different places. It is

surprising actually that we do not have more moments of miscommunication or misunderstanding. Of course we do not always agree. Some of us are louder than others and more outspoken. At times the sparks might fly. But when all is said and done, we come together and share the experience of being members of the Asia and Pacific Seed Association. We all work together for the betterment of the association.

I am the youngest of a family with three children, but my parents were both from much larger families. My mother is one of seven children and my father is one of 11 children. It is hard to count all the aunts and uncles I have had over the years with various marriages and such. I think I have over 35 first cousins! I always thought it was fun to have this incredible extended family. We were lucky when I was young, we didn't live far away from each other and you could always find someone whose company you could enjoy at a family gathering.

The 2017 Asian Seed Congress is the annual APSA family

gathering. Our membership today represents more than 47 countries and we are truly unique in the way that members can join our association. You do not have to be sponsored by your national seed association. You do not even have to be from a country with a seed association. At APSA, if you want to become a member and if you meet the criteria, you can become part of the family.

I invite you all to participate in the activities of this grand APSA family gathering this year in Bangkok. Let's work together with friendship and harmony for the future of APSA. You may have noticed that the past few issues of the Asian Seed Magazine have featured stories about the beginnings of APSA and how we started. At this Asian Seed Congress, let us keep our humble beginnings in mind, give thanks for our progress to date and look forward to a future with a growing, thriving APSA.

Welcome to Bangkok! Welcome to the APSA family! 🍌



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Creating Tomorrow Today

After the Rain Comes the Sun



Heidi Gallant, APSA Executive Director

It has been an amazing couple of months for us here at the APSA secretariat. The Asian Seed Congress has received an unprecedented amount of early registrations this year and we are delighted that the event is shaping up to be one of the biggest editions to date.

I know that some of our members are struggling with the change to our provision of the delegate list. I once again assure you that this change is extremely important to APSA as a membership association and not just as a congress organiser. We know that you love the Asian Seed Congress and we understand how important it is for your businesses. However, as your regional seed association, we want to offer you a benefit to membership that no other seed association in the world can offer. The APSA Member Directory is the most important tool for the seed trade globally, and as a good standing member we want you to be able to use it all year long to buy and sell seed products. If you have not yet completed your profile, you are missing out on business opportunities.

ASC 2017 was certainly a challenge with our venue change at the last minute, but as always, APSA members have thrown their full support behind the function. We at the secretariat are so pleased that the urgent need to change the venue did not result in a cancellation of the event for 2017. We want to thank the APSA Executive Committee, the Philippine Seed Industry Association, the Thai Seed Trade Association, and the Marriott Hotel in both Bangkok and Manila for their prompt cooperation in managing the unexpected change.

We have prepared for your General Assembly Meeting with great care, identifying all of our voting representatives with special badges. This will help us manage the function's required voting this year. We have some excellent prizes and gifts on offer to encourage your attendance as it is imperative that we reach quorum for this meeting. We only have the opportunity to share the work of our association once per year with you, so please be sure to attend this important


meeting which will take place in the Sala Thai Ballroom on the 5th floor of the Marriott Marquis hotel at 14:00 on 16 November 2017.

In other news, we took part in the Seed Association of the Americas conference in Columbia, South America, and also promoted APSA in Thailand at the Thailand Agricultural Mass Media Association Anniversary event. We were also represented by our China Liaison Officer, Xiaofeng Li, at the Beijing Seed Expo.

The APSA Secretariat appreciates all of your feedback and we have worked really hard to improve member services this year. We will continue to increase the benefits of joining APSA throughout 2018 and beyond. I encourage you all to take an active role in the work of our association through participation in one of our many Special Interest Groups and Standing Committees. More information can be found in the members only area of our website or by speaking to one of the APSA team here at your 2017 Asian Seed Congress. 🌱




Mr. Uthai Noppakoonwong, Deputy-Director General of Thailand's Department of Agriculture (3rd right), joined the APSA Secretariat team at the Thailand Agricultural Mass Media Association's 10th Anniversary dinner on 24 September.




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Pakistan Seed Trade Trends

There have been many interesting seed trade trends worth highlighting in Pakistan over the past five years. Though the world's sixth most populous country has consistently been a net importer of sowing seeds in terms of value, it has achieved trade surpluses for specific types of seed, namely durum wheat, barley, cotton and herbaceous flowering plants. Still, its dependence on foreign seed suppliers remains high. Last year the country logged a sowing seed trade deficit of US\$549.62 million, deriving from \$560 million worth of imports, and just \$10.6 million in exports. But when measuring volume of the movement of seed to and from Pakistan, the books are more balanced. In 2012 and 2013, for example, the country actually exported more seed than it imported – a surplus of more than 10,000 tonnes during the two years.

Inbound

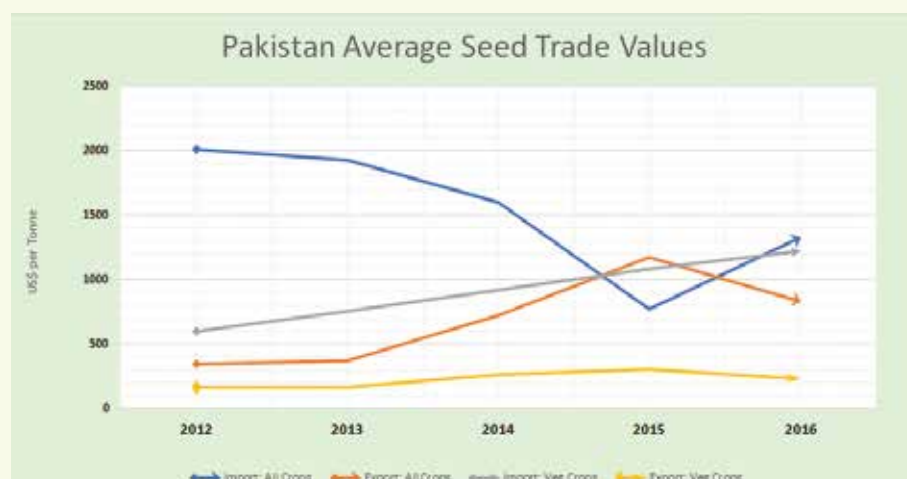
Last year Pakistan imported no less than 422,203 tonnes of sowing seed, valued at about US\$560 million. These figures are anomalous, considering that the country typically only imports a tiny fraction of this amount. An analysis of the figures reveals that a majority of the imported sowing seed last year were soya beans (78%). This was followed by coriander (4%), maize (4%) and paddy (3%). From not importing any sowing soya in 2012 and 2013, the country began logging notable imports of this

type of seed in 2014 when it imported 6,541 tonnes worth about \$6.5 million. In 2015, the volume of soya seed imports surged by a factor of more than 60 times, resulting in 400,387 tonnes worth \$247.9 million. Though soya seed imports in 2016 dropped year-on-year in volume by 16% to 332,808 tonnes, the overall value of this type of seed rose by 54% to \$383.4 million. More than half of the seeds (53%) came from Brazil, while the rest came mostly from the US (32%) and Canada (14%).

Pakistan still heavily depends on foreign vegetable seed too, last year importing a total of 3,111 tonnes worth \$37.9 million. Growth in imports for three main types of vegetable seed has been stagnant lately compared to other types of vegetables.

Nonetheless, overall vegetable seed imports in 2016 grew in volume year-on-year by 2.3% to 3,107 tonnes, while at the same time the overall value rose by 15% when compared to 2015.

According to local reports, imports of vegetable seeds have been sluggish during the first part of 2017. Citing the All Pakistan Vegetable Seed Merchant Trade Association (APVSMTA), an article by *Daily Times Pakistan* in June reported that a decline in imports – mostly from Europe, the US, Japan, South Korea, New Zealand and India – was due to an increase in consumption of domestically produced seeds, with consumption of vegetables among certain segments reportedly rising by about 45%. Market prices of vegetables during the period reportedly



rose by 15-20%. Another figure cited in the article suggested that domestically produced vegetable seeds supply about 57% of the country's needs. As for the remainder, Pakistan's largest suppliers of vegetable seed in 2016 were India, where 58% of the commodity was sourced, followed by Thailand (11%), the US (8%) and China (6%).

Exports Recovering

Pakistan seed exports suffered immensely in 2014, plummeting from the previous year by 72% in volume and 41% in value. The sharp downtrend continued in 2015, nosediving year-on-year by 73% in volume and 57% in value. Indeed, both drought and flooding were key factors in lost productivity (see *Climate Change* story on page 16); seed consignments affected the most were cotton, barley, maize, paddy, various forage plants and most types of vegetable seeds.

Following the woes of 2014 and 2015, the industry experienced a sharp rebound in 2016, with all sowing seed exports growing 123% year-on-year in volume and 59% in value (12,872 tonnes worth \$10.6 million). In terms of volume, the strongest performing categories were cotton (+593% at 10,900 tonnes) and ryegrass (+512% at 877,940 tonnes), in addition to paddy (25,000 tonnes) and soya (5,000 tonnes), neither of which were exported in 2015. Major rebounders in terms of value included durum wheat (+319% at \$33.2 million) and herbaceous flowering plants (+190% at \$612,000).

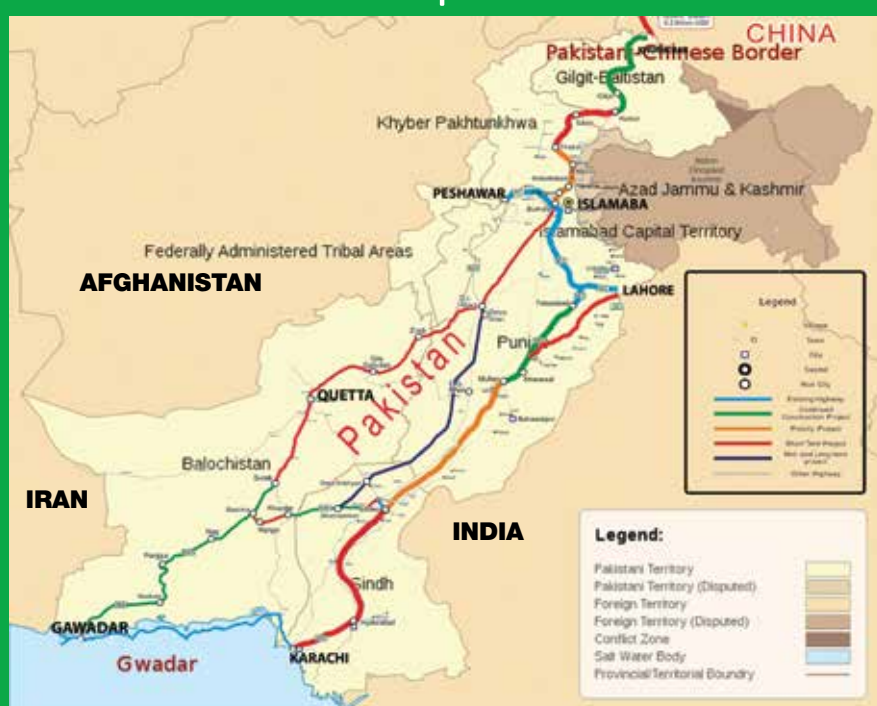
Pakistan's vegetable seed export sector is relatively small, accounting for only \$595,000 of the country's total \$88 mn of sowing seeds exported between 2012 and 2016. Indeed, the 52 tonnes of vegetable seed exported from Pakistan last year were worth just \$121,000 on the books, barely 1% of all sowing seed exported from the country. But the market is budding with lots of growth potential. Pakistan's main buyers of vegetable seed last year were Oman (24% of the volume), Bahrain (13%), Spain (13%), Nigeria (11%), Australia (11%), India (10%) and Ethiopia (8%). And at least in the cases of Oman, Bahrain, Nigeria and Australia – Pakistan had a vegetable seed trade surplus.

Promising Potential

Many indicators point towards a bright future for the Pakistani seed industry, especially considering that domestic consumer trends are starting to show

Sowing Seed Category	Imports (Tonnes)	Exports (Tonnes)	Trade Balance Volume	Imports (\$ million)	Exports (\$ million)	Trade Balance Value
Tomato	826.48	30.27	-796.21	30.237	0.158	-30.079
Okra	9,069.63	5.07	-9,064.56	15.134	0.01	-15.124
Onion	1,420.09	50.71	-1,369.38	7.012	0.163	-6.849
Other vegetables	5,092.03	185.27	-4,906.76	93.671	0.264	-93.407
Herbaceous flowering plants	104.46	727.44	622.98	0.266	1.465	1.199
Lucerne (alfalfa)	10,857.98	3,672.32	-7,185.66	19.671	8.798	-10.873
Other forage plants	31,683.29	641.96	-31,041.33	65.304	0.831	-64.473
Clover	33,581.63	1,915.31	-31,666.32	87.806	4.281	-83.525
Ryegrass	46.10	1,515.96	1,469.86	0.116	0.549	0.433
Sugar beet	953.27	1.05	-952.22	3.19	0.001	-3.189
Cumin	39,689.83	1,555.42	-38,134.40	27.346	3.646	-23.7
Coriander	77,398.35	187.65	-77,210.70	19.293	0.517	-18.776
Juglans regia, Jatropha, Sesamum, Sesamum	8,377.32	4,096.99	-4,280.33	6.28	7.654	1.374
Potato	39,926.86	2,110.62	-37,816.24	28.748	0.376	-28.372
Cotton	84.88	6,346.73	6,261.85	0.189	2.263	2.074
Barley	342.00	1,250.00	908.00	0.102	0.152	0.05
Maize	100,116.00	85,882.00	-14,234.00	267.227	23.955	-243.272
Millet	13,347.00	185.00	-13,162.00	3.65	0.088	-3.562
Soya	739,736.74	5.00	-739,731.74	637.916	0.005	-637.911
Paddy	112,399.00	219.00	-112,180.00	139.931	0.021	-139.91
Durum wheat	41.00	86,776.00	86,735.00	0.005	33.238	33.233
Five Year Sum	1,225,093.93	195,359.27	-1,029,734.67	1,453.09	88.44	-1,364.66

CPEC Super Seeds



A key driver in the coming decade of Pakistan's agriculture sector, and greater economy, will be the China-Pakistan Economic Corridor (CPEC), which refers to a collection of infrastructure projects tabled throughout Pakistan, currently valued at more than \$60 billion. To be reinforced financially by China as part of its "Belt and Road" policy, the CPEC includes some seed-specific projects. These include demonstration plots where high-yielding seed varieties will be developed on some 6,500 acres of agricultural land, which will be acquired by the Pakistani Government and leased out to Chinese breeding companies.

a preference for higher quality, domestically-produced seed. One key advantage of Pakistan seed is its relatively cheaper price on the regional market, especially when compared to counterparts from Thailand, India and China. As readers know very well, in the business of seed, price must be reinforced by quality. And

judging from overall trends and economic implications for specific vegetable, field and forage crops, especially in respect to forthcoming industry infrastructure reinforcement through the China-Pakistan Economic Corridor (see panel), *Asian Seed* has great expectations for the Pakistan Seed Industry. Watch this space! 🌱

About the Data

Unless stated otherwise, the statistics cited in this article were queried from the United Nations Comtrade Database via the International Trade Centre of the UN and WTO. APSA has logged stats for 19 different groups of sowing seeds. These groups include seeds from various field crops (maize, soya, cotton, potato, et al.), forage crops (clover, alfalfa), herb/spice (coriander) and vegetable crops (tomato, okra, onion), but do not include seeds that are intended for uses other than sowing. Hence, not included are most oil crops, fruits and certain spices such as mustard seed. As for vegetable seed, specific figures are available for tomato, onion and okra seeds, but not other types of horticulture crops, which fall into a general "other vegetable seeds" category. The full tables, sorted and analysed, will be made available via Apsaseed.org. If you notice any discrepancies, errors or anomalies in the data, please notify Steven@apsaseed.org.

Thai Paddy Report

Thailand and rice are synonymous. The word for rice in the Thai language – ‘Khao’ (ข้าว) – is engrained in many aspects of the culture and can literally substitute the word for food in colloquial speech.





Not only is the kingdom famed for being a top exporting country of the staple grain, but the Southeast Asian nation of 69 million prides itself on the supreme quality of its paddy. Upon close examination, it becomes apparent that the success story of Thai paddy can be traced back to an efficient and effective seed production circuit that effectively integrates public-private interdependence, target-driven contract farming, modern and mechanised processing lines, community-rooted distribution and marketing networks, and above all, high-quality control standards. Asian Seed reports.

Though import and export of rice seed is tightly regulated by the kingdom's seed law, the Thai Government openly supports and encourages international exchange in terms of technology, expertise and know-how. Hence, to better understand the factors that contribute to the success of Thai paddy, *Asian Seed* reached out to the Rice Department (RD), who graciously organised exclusive field visits to several key research, production and distribution sites.

Our first stop was the Pathum Thani Rice Research Center (RRC), the first of 27 facilities of its kind in the kingdom, administered under the Division of Rice Research and Development of the RD. There we visited germplasm storage facilities, quality-control labs and test plots, where we learned first-hand the mechanisms and processes for seed selection, screening, storage, conservation and multiplication, with an emphasis on two fundamental categories of Thai rice seed: Breeder and Foundation.

Our next stop in the production circuit included visits to two key provincial Rice Seed Centres (RSC) in Nakhon Sawan and Chai Nat provinces. Administered under the Rice Seed Division of the RD, the RSCs number 23 nationwide, with the RD currently in the process of opening 15 more. It is at these facilities that seeds are collected, cleaned, dried, processed, packaged and stored before being marketed and distributed to rice farmers nationwide.

Completing the Thai rice seed production circuit, we also visited a model private sector rice production and distribution community based in

the Nang Reu and Tha Chai subdistricts of Chai Nat province. It was in these rice producing communities that we saw how the private sector operates to produce and supply rice seed to farmers.

APSA would like to formally thank Mr. Vilas Vichyadachar (Rice Seed Quality Control Expert). Now officially retired, Vilas is a long-time APSA associate who helped coordinate these tours, assisted by his dedicated team of Agricultural Research Officers, including Mrs. Varenya Sengkanipa, Ms. Wasithee Phoolsawad, Ms. Sasiwimon Siricharoen and Dr. Sujittra Tejakhod.

In addition, we would also like to take this opportunity to thank Mr. Panya Romyen, Director of the Pathum Thani Rice Research Center; Ms. Kidakorn Poomisak, Director of Chainat Rice Seed Center (now retired); Mr. Suntorn Norach, Director of Nakhon Sawan Rice Seed Centre; Mr. Sittichai Muangngam, Chief of Quality Control Group at the Chainat Rice Seed Center; and all of their colleagues who warmly received APSA and provided us with much valuable and useful information presented herein.

Seed to Feed the Need

Though Thailand expects to export about 10 million tonnes of rice this year, it needs to cultivate about three times this amount in order to meet the domestic needs of farmers, millers and end-consumers. All in all, this grain will require about one million tonnes of paddy seed. The Rice Department estimates that about 60% of this is farmer-saved seeds, while the rest is new seed produced by both the private and public sectors.

Leading supply initiatives from the public sector, the Rice Department has a target to produce about 80,000

tonnes of commercial seed divided into two grades: “Registered” and “Certified”. Certified Seeds are the standard grade of commercially-traded seed that must meet minimum Quality Control requirements as stipulated by seed laws. QC standards for Registered Seed are even more stringent, as this is the preferred type of seed used for seed multiplication (see table on page 15).

Taking into account various geographical, technical and economic factors, the RD devises specific annual production targets for each of its Rice

Seed Centres (RSC), where targets are typically set between 3,000-4,000 tonnes per centre. The seeds are secured through farming contracts with local farmers, farmer groups and cooperatives.

In a mutually beneficial arrangement, seed farmers obtain their base seeds from the RSC at below-market rates. The RSC also support farmers with training and guidance on inputs and production. Farmers then multiply seeds by a factor of 20-40 times, selling their harvest back to the RSC for a market premium.



Director of Pathum Thani Rice Research Center, Panya Romyen (right) with rice germplasm expert, Kasem Soontharajan.



Paddy Processing Perfection

The price the farmer receives is determined by the quality of their harvest. On delivery day, the load of raw paddy is queued up at the RSC’s Quality Control Inspection Station. Samples of the harvest are taken and screened in the lab to confirm moisture content, purity and germination rates. Based on post-harvest-pre-processing criteria stipulated by the seed law, RD and ISTA standards, germination rates must be no less than 85%; purity no less than 95% and moisture content no more than 15%.

Though germination is not typically an issue with Thai paddy, especially as it is

usually delivered fresh from the fields, extra care is taken to screen for purity. Unlike dirt, metals or straw, wild red rice weed kernels are much more difficult to detect and require inspection of individual de-husked kernels under the close eye of a trained specialist. Tests are replicated and an inspection report is usually issued to the farmer within 30 minutes.

After paddy passes initial inspections, it is then unloaded at the RSC’s processing plant and is put through an initial pre-cleaner stage, in which rough impurities (dirt and straw, for example)

are removed from the paddy. Seed is then moved to a drying bin where an air blower is initially applied to further reduce moisture content, which is gradually reduced to below 12% over a 48-hour period through a blower-heater combination. The dried paddy is then moved to temporary holding tanks before going through a fine air-screen cleaner process to grade the seed by size and shape. The seed is graded further by weight through a gravity separator stage before chemical treatments and fumigation are applied. Finally, the seed is packaged and put in storage, ready for commercial distribution.



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生生種子



There are tens of thousands of varieties of rice conserved in Thailand's gene banks, but only a handful are exploited commercially.

Public-Private Interdependence

To achieve its production targets, officials at each Rice Seed Centre must carefully decide which farmers and farms in their area to work with, taking into account a number of factors such as geography, infrastructure, capacity and prevailing best practices. Hence, before any contract is drafted or signed, officials conduct due diligence, which may include land surveys and field visits, as well as capacity building and training activities, to ensure their contractors will be able to meet the high standards required.

In some instances, the local farming community is already highly skilled, well organised and ready to supply seed of the highest standard. One example is the Nang Reu Tha Chai Rice Seed

Producing Group in Chainat province. A model for community-scale private sector seed production in the kingdom, the group not only supplies premium rice seed to meet quotas at the Chainat Rice Seed Centre – which has jurisdiction over Chainat, Uthai Thani and Sing Buri provinces – but also supplies rice seed directly to farmers locally and throughout the kingdom. The group has been operating successfully for decades and even receives financial reinforcement from the provincial government.

The group, which is part of the Chainat Seed Production and Distribution Club, is one of about 4,000 groups of its kind throughout the country. At the community level, farmers form groups

– similar to cooperatives – who are typically organised as part of larger locale-based clubs. These clubs fall under the umbrella of one private sector national level association – the Rice Seed Compiler and Supplier Association, which is based in Suphan Buri and will be one of the stops of the Post Congress Tour on 17 November.

In the case of Thailand paddy, the public and private sector strongly depend on one another to meet the increasing demand for new, quality seeds. Considering all things, the RD's policy is not to increase its own capacity to produce more seeds, but rather to support the continued development of private sector quality seed production.

Genetic Conservation

Over the years, the RD has collected and conserved more than 24,000 varieties of rice, samples of which are kept in the cool and dry storage facilities of the National Rice Seed Storage, Laboratory for Genetic Resources, administered through the RD's Rice Research Centres. To ensure preservation of its vast genetic resources, the RRC renews all of its samples on five-year propagation cycles.

Commercially traded Thai rice seed today derives mostly from only about a few dozen varieties, which the RD categorises into five strategic groups. These include two types of popular aromatic rice varieties (Hom Mali and Hom Pathum), white rice, sticky rice and niche market rice types.

While direct private access to Thai rice gene banks is off limits for commercial exploitation, access and benefit sharing of Thai plant material is possible in certain contexts as stipulated through Thailand's Plant Variety Protection Act (please see article on p. 30 of Volume 23, Issue 3, for more details).



Rice dept staff load sacks of rice seed onto a fork lift.



A quality control officer measures the moisture content of a paddy sample.

Breeder & Foundation Seeds

Before rice seed can be made available for commercial multiplication and distribution, a set number of base or Foundation Seeds of the target variety must be determined, procured and multiplied by the RD through its Rice Research Centres. In sum, Foundation Seeds derive from the Breeder Seeds of a newly developed variety. Once testing confirms genetic purity, stability and uniformity of said variety, pinnacles containing kernels of the breeder seeds are painstakingly multiplied into foundation seeds as per the following steps.

- Neutral soil (6-7PH) is prepared in an initial grow bed. An alkaline agent such as a lime additive can be used to treat acidic soil.
- Breeder seed panicles are hand-planted in the bed one by one and left to germinate and grow.
- After 20 days, many new tillers or shoots will have sprouted (from

individual kernels on the panicle) and an optimal height of about 60 cm should be reached for each tiller.

- The tillers are inspected for quality. Imperfect ones are removed from the tillers and discarded.
- Individual tillers are collected from the bed and bundled together so that tillers from the same pinnacle are bunched in the same bundle.
- The tillers are transplanted into a new bed so that tillers from the same bundle are planted in a uniform row – one bundle is planted in one row.
- Growth is closely monitored for the remainder of the plants' life cycle. Whenever an imperfect tiller is spotted, the entire row (bundle) is removed from the lot to ensure optimal quality of the final harvest.

The multiplication factor is between 20 to 40 times per cycle – in other words, one tonne of seed can be multiplied into 20-40 tonnes of seed by the subsequent

harvest. However, due to dedicated manpower, as well as special care, time and attention required in early multiplication stages, the cost to multiply breeder seeds is estimated to be about twice that of commercial seeds.

In conclusion, while it goes without saying that specifications and processes outlined in this article apply specifically to rice seed production, the examples and models of the production value chain may apply to seed production in general. Whether in respect to research and development, quality control standards, germplasm conservation or public-private cooperation, the take-home message here is that in producing quality seed, one must incorporate care, concern and close attention to detail in their fully integrated production chain. Then, and only then, can “world class” quality seed be produced en masse. 🌱

Seed Standards for Distribution

Standard	Registered พันธุ์ชาย	Certified พันธุ์จำหน่าย
Purity	No Less than 98%	No Less than 98%
Other invasive seeds	No more than 0.15%	No more than 0.2%
Kernels of different varieties	No more than 5 kernels per 500 g	No more than 15 kernels per 500 g
Red rice seed (weed rice)	No more than 1 kernel per 500 g	No more than 5 kernels per 500 g
Germination	No less than 80%	No less than 80%
Moisture Content	No more than 14%	No more than 14%

Climate Wise, Seed Smart

Top Climate Change Threats to the Seed Industry and How to Mitigate Them

Climate Change poses imminent challenges and opportunities for everyone. As concluded in our comprehensive *Climate Change Report 2017* (Volume 23, Issue 1) there are a multitude of factors that influence the environment, atmosphere, weather and greater climate. For the seed industry, these changes can mean failure or fortune. *Asian Seed* herein presents “Top Climate Change Threats to the Seed Industry and How to Mitigate Them”.

Fire & Ice

Extreme hot and cold weather anomalies pose major challenges for the seed industry. Cooling calamities are more familiar in far northern and southern latitudes such as in North, Central and East Asia, South Australia and New Zealand, where farmers know all too well how costly an early or late season cold snap can be. As the climate changes, unprecedented snow and cold weather in the past two years has extended to unlikely places, such as central Vietnam, Laos, Chinese Taipei, Okinawa, Iran, Turkey and Saudi Arabia, where agriculture is increasingly vulnerable to cooling conditions. Likewise, warming trends persist as a major threat to crop seed productivity, especially in tropical climates. Truth be told, heat by itself is not a serious threat and some crops may even thrive in warmer climates that are more productive in terms of carbon absorption, for example. The problem is when warming is sudden, extreme and/or coupled with prolonged arid conditions.

Fast Flux

While breeders may develop plants to be more tolerant to temperature extremes – heat or cold

– it is much more challenging to breed for tolerance to wide or rapid fluctuations of the extremes. Even plants that thrive in temperate climates – where the temperature range in a single day may be in the double digits – will fail if changes are too sudden. Depending on one's location in relation to the equator or other relevant geographical factors, this threat is difficult to mitigate, especially in open fields, where crops are most vulnerable.

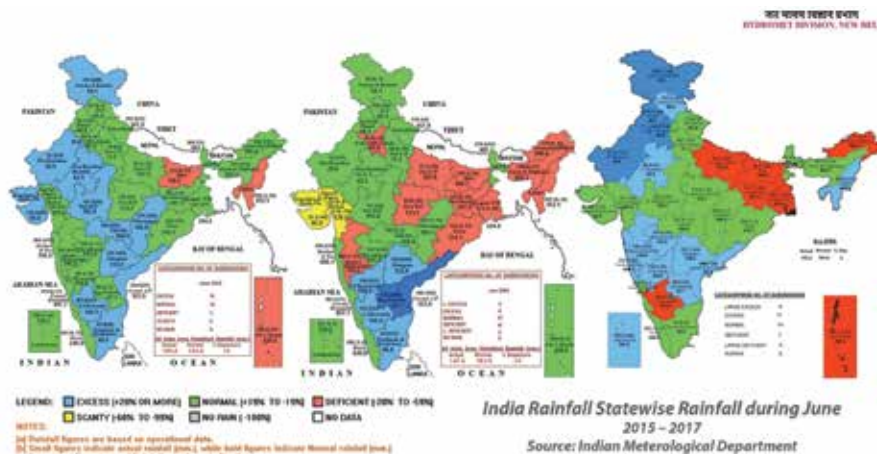
swathes of Australia, China, India, Indonesia and Malaysia, was only the start of the wet and wild weather, which continues its full fury in 2017 throughout Asia and the Pacific. Indeed, the northeasterly and southwesterly monsoons have come earlier and fuller than usual this year, as excessive torrential rainfall, coupled with intense tropical storms and cyclones continue to impose agricultural hardship in the Philippines, China, Chinese Taipei, Japan, Vietnam, Cambodia,

Laos, Thailand, Myanmar, India, Sri Lanka, Bangladesh, India and Nepal. To minimise vulnerability to bad weather, flood mitigation infrastructure at production and processing sites needs to be reinforced. Methods may include storm drains, dykes, floodwalls and levees, depending upon a site's location in relation to major river basins and storm-prone areas. A number of ICT tools may prove useful for planning and preparation, including

customised, localised apps and websites that provide real-time, short-term and long-term meteorological forecasting, as well as disaster prediction and alert services.

Infestation Endemic

This threat is compounded by other aforementioned threats and comes in the form of multiplying and migrating pests, weeds and pathogens. As the weather and climate change in any given locale, so will ecological conditions. Though hearty rain may be welcome after extended dry periods, enabling bountiful productivity, bumper crops may lure insects and rodents, which can multiply rapidly if left unchecked. Freshly inundated, waterlogged crop



Season-to-Season: The last three years of India's rainfall averages for the month of June, which is the traditional time for kharif or rainy season crop planting.

High & Dry

Drought devastation in early 2016 linked to the El Niño effect is still fresh in the memory of many farmers in India, Pakistan, Indonesia, Thailand, the Philippines, North Korea and Australia. This year, the threat persists for many, including in North Korea, China, India, Indonesia, the Philippines, Pakistan and Australia, which should continue to exercise resilience through investment in and implementation of water purification, conservation, irrigation solutions and drought-resistance breeding and research.

Wet & Wild

Widespread flood devastation in 2016 (also linked to El Niño), experienced throughout

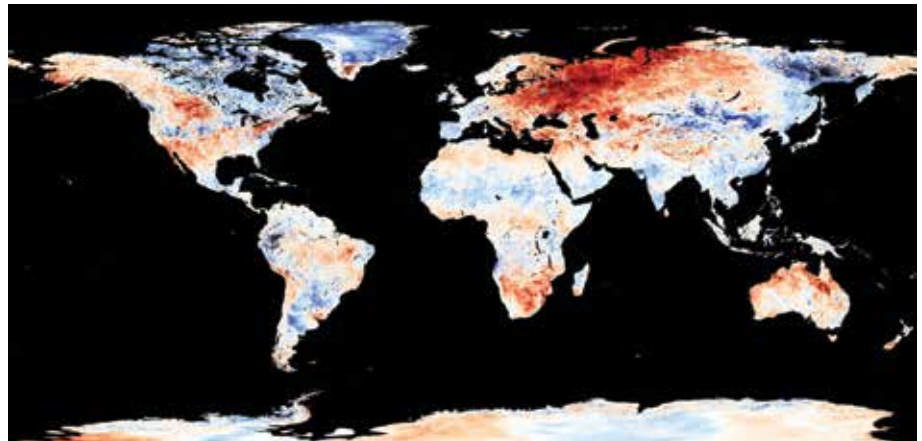
Quantifying Climate Change

This year, *Asian Seed* has been actively monitoring and tracking crop loss and other impacts from Climate Change on agriculture region wide. We've been collecting data from news reports, logging losses in both volume and value. We will present our findings in a "2017 Climate Change Report Card" next issue. So far, we've received data from India, Thailand, the Philippines, Indonesia, Vietnam, Bangladesh, Chinese Taipei and others, but we could always use more. If you have any of your own data, leads or other reports about weather/climate related crop damage – whether from frost, floods, cyclones, storms, drought, heat, pests or pathogens – or have been impacted by Climate Change in any way, we'd love to hear from you.

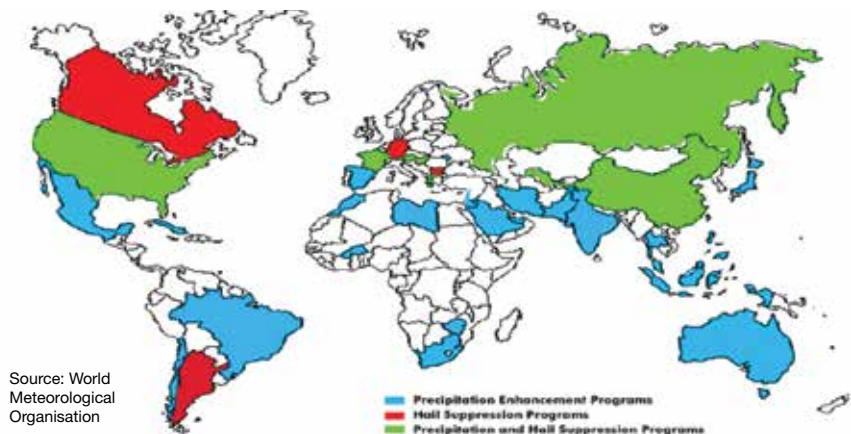
fields with poor drainage provide the perfect breeding grounds for a host of disease-carrying pests and fungi looking to proliferate, which may prove costly. Effective and responsible pest management efforts may include humane traps, non-toxic bio-pesticides, beneficial predators or other permaculture solutions. Weed and pathogen vulnerabilities are best addressed through "best practices", as well as the development, production and use of high quality seed, which has a high level of purity, bred for disease tolerance and resistance.

The Human Touch

There is no denying that "homo sapiens" are a significant factor in the Climate Change equation, contributing through pollutive emissions, geo-engineering and weather modification, which all directly influence atmospheric chemistry in the troposphere, stratosphere, mesosphere and ionosphere, in turn driving meteorological systems, including jet streams, monsoons, temperatures, wind, rain and sun exposure. To mitigate human pollution threats, ensure that production and processing bases are not within or near heavy industrial zones, where air levels of heavy metal particulate may prove a serious hindrance, if not hazard, to seed production and health. Also, determine if there are any active local weather modification projects used to induce or suppress weather events (see weather modification map). Continuously developed weather altering techniques are being tested and employed in nearly every Pacific and Indian Ocean country – Russia, China, Iran, Saudi Arabia, India, Pakistan, Japan, Thailand, Indonesia, the Philippines, the Korean Peninsula, Canada, the US, Mexico and Chile. Most of the projects involve seeding clouds through the dispersion of carbon dioxide, aerosols and other agents into the atmosphere using patented techniques and technologies. If you start to notice an increase in "contrails" over your fields,



GLOBAL CONFUSION: This surface temperature anomaly map by NASA Earth Observations indicates a mixed bag of extremes during February of this year. Blue areas experienced cooler temperatures than the previous decade, while orange experienced warmer.



Source: World Meteorological Organisation

Weather modification around the world: 52 countries with active cloud seeding programmes.

it may be a good idea to conduct labwork to monitor for potential contaminants in the soil, air and water. These may be as simple as salts, or malicious as heavy metal. If contamination proves problematic, but relocation is not an option, invest in necessary insulation, filtration and ventilation systems to minimise the threat.

Cosmic Clouds

You may have noticed more clouds in the sky lately. Many new types of clouds are being regularly discovered – some may be explainable by natural processes, while others can be linked to weather modification. Increased cloud coverage at a global scale is linked to an increase in cosmic rays penetrating our atmosphere. More clouds blanketing the planet not only has implications for a rainier forecast, but the associated cloud albedo effect also implicates reduced total solar irradiance (TSI), which in turn may prove a hindrance for photosynthesis processes and thus crop productivity.

Geo-Upheaval

Extreme, erratic weather is the new normal, as are natural disasters. So it seems that Japan, Taiwan, the Philippines, Vietnam, New Zealand and Australia are habitually on the alert for the next devastating cyclone or torrential storm to sweep through; just as highland farmers across

the Himalayan foothills and flood plains – from Nepal to Bangladesh, and India to Myanmar and Thailand – have become increasingly wary of intensifying, deadly and damaging geomagnetic havoc and hail storms. Let's not forget about the eternal threat posed by the "Ring of Fire" around the Pacific rim, where many active sulphur-rich volcanoes pose grave implications for the global climate should the influx of cosmic rays trigger eruptions as they have done so in the past.

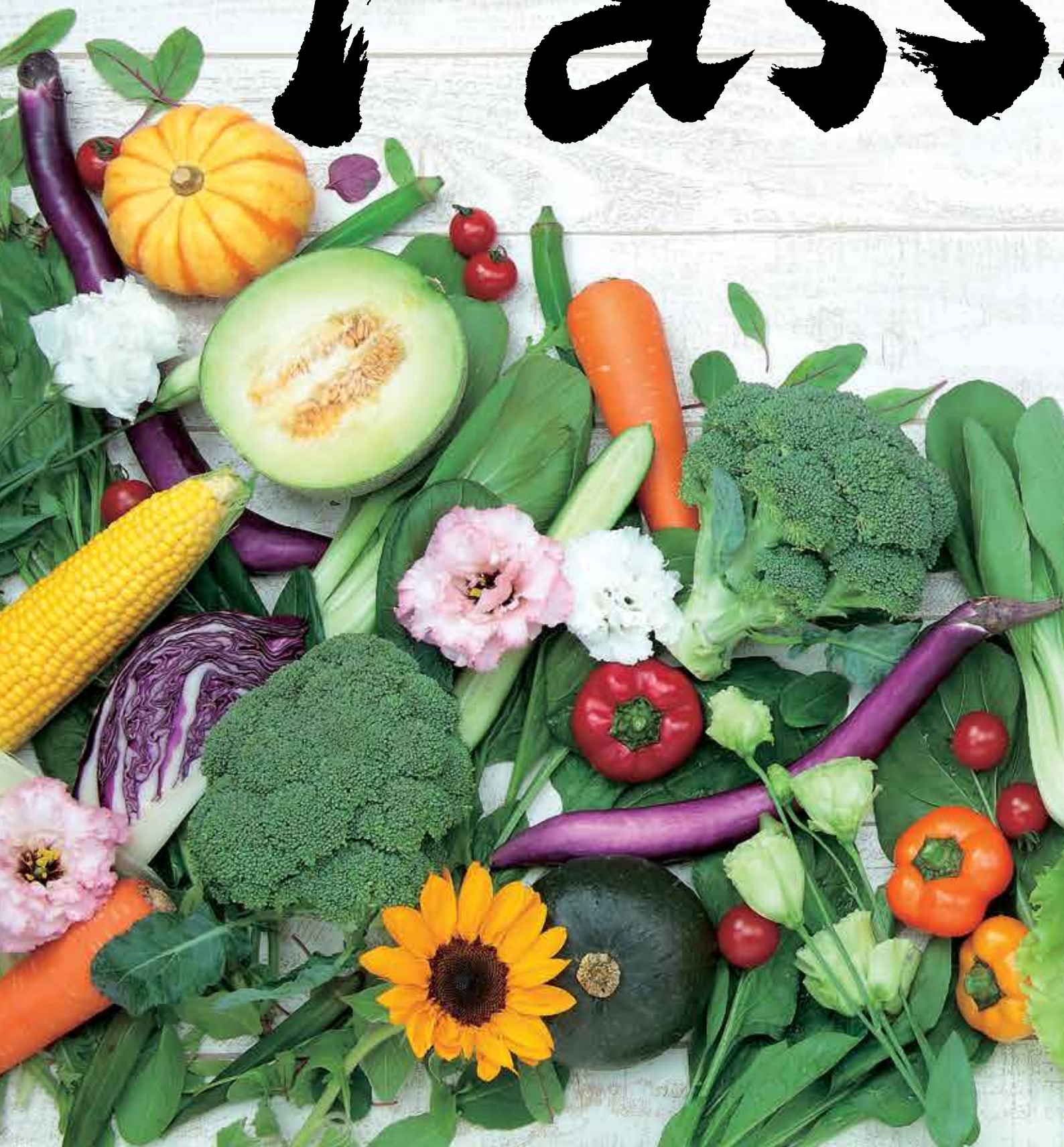
Sleepy Sun

Many of the factors and threats listed up to this point are directly or indirectly linked to our star and its phases of minima and maxima. As we descend toward the trough of Solar Cycle 25 – which we are expected to bottom out by 2020–2022 – it cannot be overstated that our star is weaker than it has ever been since scientists have been able to accurately measure sunspots, solar wind, solar flares and coronal mass ejections. Historically, weak phases of the sun have had an inverse correlation with our planet's climatic vulnerability and variability. Hence, there are major implications for the seed industry in the coming years. Understanding the relationship and all the factors is therefore vital to devising effective mitigation strategies. On the contrary, ignorance and complacency may prove futile for fertility. ☹️

DISCLAIMER

Readers are encouraged to do their own research. This article is not intended to be used as an academic reference and the views do not necessarily represent those of APSA or any of its members. All claims are verifiable in peer-reviewed scientific journals and papers. If you require specific reference, please email Steven@apsaseed.org

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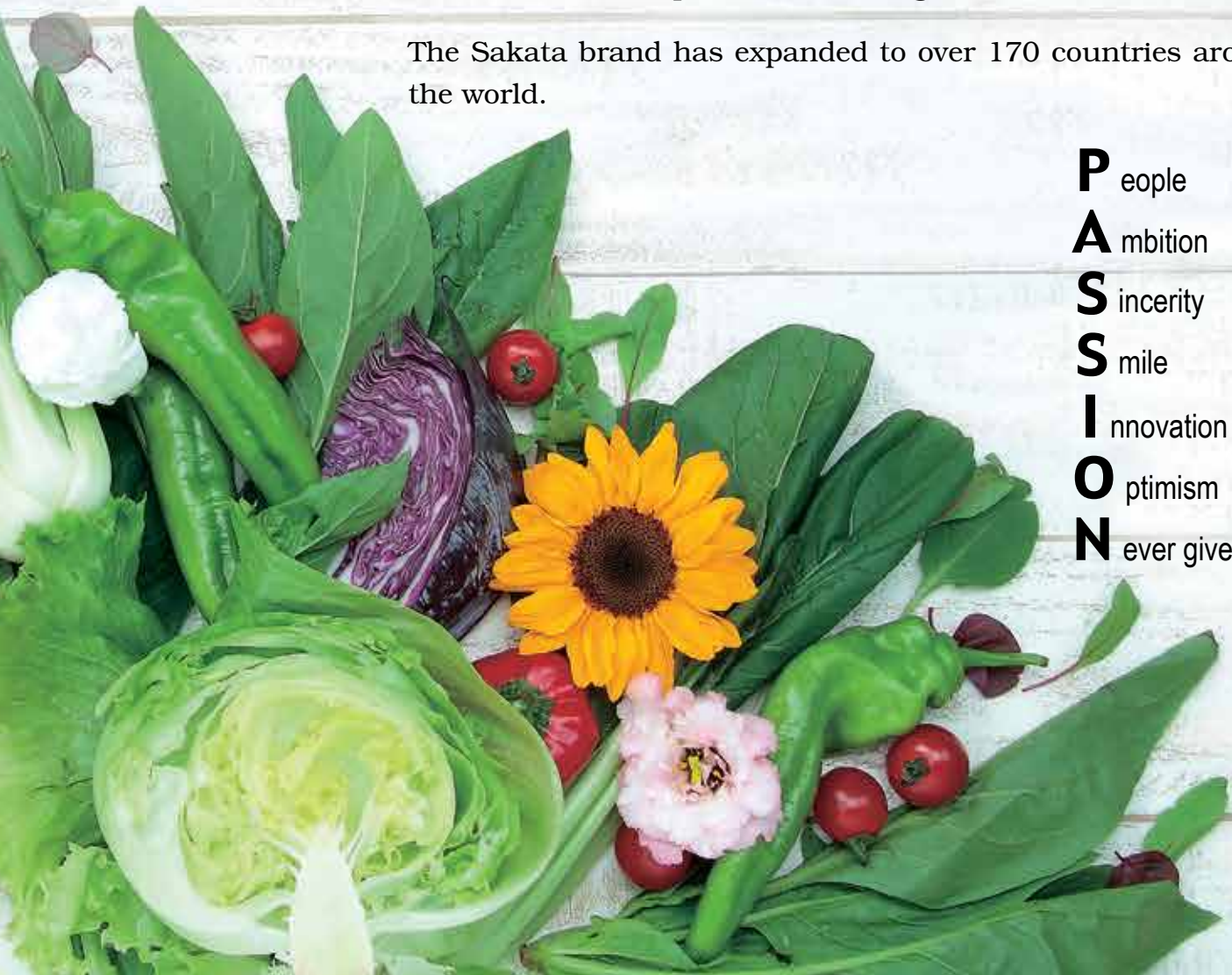
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Asian Seed Congress Turns 24

The Asian Seed Congress is making a welcome return to the home of the APSA Secretariat, Bangkok Thailand. This is the sixth time in 24 years that APSA's flagship event has been held in the country where the modern *Asian Seed* story all began. The inaugural Congress was held in Chiang Mai, Thailand, in 1994, followed by three subsequent editions in Bangkok (1999, 2003 and 2009) and one in Pattaya (2011). Over the years, so much has changed in the seed industry, yet much remains the same.

Thailand is always a popular host nation for the Asian Seed Congress and this year's fully-booked edition has proven to be no exception. Thanks to its ideal geographical location in the heart of the Indo-Chinese Peninsula and Southeast Asia, Thailand has been a strategic trading hub throughout its history. Even since long before the 'Age of Sail', Indian, Arab and Chinese merchants have loaded their vessels with goods to follow trade winds and seek out fortunes in Siam. Many never returned to their ports of origin, instead staying on to create legacies that last to this day.

As infrastructure evolved over the years, trading activity in the region grew ever upwards. Siam, which officially became Thailand in 1949, remained a favourite destination and port of call for sailors, traders, entrepreneurs and adventurers, diplomats, and eventually, tourists.

Thanks to their rich history, trade and interactions with the rest of the world, the Thais themselves have mastered the art of negotiation and adaptation, having maintained their independence through two World Wars and enjoying relative peace and stability throughout numerous geopolitical conflicts that have impacted the region since.

The story of the Thai economy in the second half of the 20th century has been dubbed a miracle by economists who point to the phenomenal GDP annual growth rate of 6.6% between 1950 and 2000, which is said to have boosted output by a factor of 20. Over the decades, Thailand has especially excelled in agriculture, and is today a leading net exporter of numerous staple crops, including rice, para rubber, sugar



cane, palm oil, cassava, shrimp, tuna and an array of fruits and vegetables. Of course, this list would not be complete without mentioning the most important product as far as we're concerned: seed.

As covered in Volume 23, Issue 2 of this year, *Asian Seed* highlighted key trade factors and indicators behind the strength of Thailand's seed sector. To recap, the kingdom exported more than 21,115 tonnes of sowing seed last year, which was worth 157 million baht. And, as it only imported 7,636 tonnes worth 26 million baht during the same period, Thailand can be ranked as one of the most, if not the most seed sustainable country in Asia, and its trade performance certainly puts it into the world's top list – alongside seed-strong countries like the Netherlands, US, France, Chile and Israel.

Justifiably, the Thai people are proud of their national achievements, which aren't only about agriculture, but extend to manufacturing, IT, engineering, construction, sport, tourism and medicine, among others.

Ask the Thais what factors have given rise to this success and they will likely cite the legacy

of the Thai Monarchy, whom they deeply revere and respect for ensuring and maintaining peace, stability and unity throughout turbulent times. And so it was, with great national sadness, that just over a year ago, the country was forced to cope with the passing of H.M. King Bhumibol Adulyadej, known universally as Rama IX.

The Late King was a self-taught jazz musician, boat builder, sailor and Olympic gold medalist, and these are just a few of his accomplishments. But H.M. the King's greatest legacy to the Thai people extends to agricultural sustainability. His "Self Sufficiency" model is celebrated by agriculturalists throughout the country and across the world. *Asian Seed* agrees with and is inspired by H.M. the King's effective and efficient approach to sustainability, and the seed industry as a whole could benefit from it too. In the future, we hope to feature more information about King Rama IX's works. In the meantime, enjoy your visit to Thailand and make the most of your business, interactions and trade with the smiling and ever-cheerful Thais. But be warned, the Thai nature and outlook on life is contagious, and you may find yourself coming back to this lovely land time and time again. 🇹🇭





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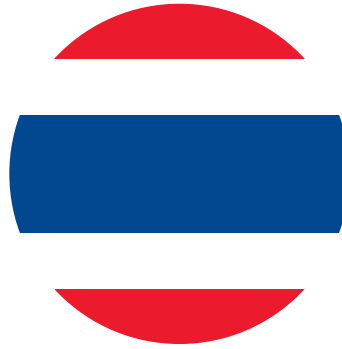
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The Thai flag is called “*Tong Chaat Thai*”. The red stripes represent the blood of life, white is for faith and blue for the Monarchy. The current Thai flag was adopted in 1917.



Thailand is one of five founding members of the Association of Southeast Asian Nations (ASEAN) along with Indonesia, Malaysia, the Philippines and Singapore. Today, the powerful economic and political bloc of ASEAN also includes Vietnam, Myanmar, Cambodia, Laos and Brunei.

Key Statistics

\$1.2 TRILLION

GDP (estimated total for 2017)

\$17,460

GDP per capita

5.2%

Anticipated GDP growth 2017-2018

83

Internet users per 100 people
(based on 2017 estimates of 57 million)

96.7%

Literacy rate

51%

Population living in rural areas

Notes: GDP is calculated from Purchase Power Parity, sourced from the IMF; population factor in per capita is based on UN population data estimate of 69 million. Other sources of data include CIA World Factbook, Office of Agricultural Economics.



The *Ratchaphruek* (*Cassia Fistula*) is the national flower of Thailand. The golden flower was informally made the national flower in 1963 in honour of the Late King H.M. King Bhumibol Adulyadej, who was born on a Monday, which is represented in Thai culture by the colour yellow. Formally made the national flower in 2001, the prolific flower can be found across the country and boasts many medical benefits.



The Kingdom of Thailand was formerly the Kingdom of Siam until 1949. The Thai country, culture and language has been established through many kingdoms over the course of the last millennia and today spans 513,120 km² and is home to a population of 69 million.



The Thai Baht (THB) is the official currency of the Kingdom of Thailand. One baht is subdivided into 100 satang. Banknotes are issued by the Bank of Thailand in denominations of 1,000, 500, 100, 50 and 20, while coins produced by the Royal Thai Mint come in denominations of 10, 5 and 1 baht, in addition to 25 and 50 satang.



The value of Thailand agriculture production in 2017 is expected to reach US\$19 billion dollars in 2017. This will derive mostly from production and exports of rice, rubber, palm oil, cassava, sugar cane, fisheries and livestock. Crop seed is also a valuable commodity, with exports worth more than \$160 million annually.



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Thai Agriculture Products and Projects Showcased at Inaugural Farmer Expo



Dept of Agricultural Extension Director General Somchai Chanarongkul (2nd left) and Dept of Agriculture Deputy Director General Uthai Noppakoonwong (3rd left) pose with two Thai pineapple farmers at the event.

Hundreds of agriculturalists and agrifood officials, researchers and entrepreneurs from all of Thailand's 77 provinces gathered under a massive tent at Bangkok's Lumpini Park to pitch both products and projects at the inaugural Thai Farmer Expo.

Held from 16-20 August and organised by the Department of Agriculture Extension (DOAE), in cooperation with all departments, offices and bureaus under the Ministry of Agriculture and Cooperatives, the inaugural edition of the event featured a farmer's market, stages, exhibits, booths, training clinics, a food court and a vast exhibition space showcasing an array of projects, products and public relations information from both public and private agriculture stakeholders.

The event was held in honour of the sustainable agriculture legacy of the Late King Rama IX, whose many works and contributions to Thai agriculture were on display.

"This is the first time we have organised this expo, but based on the Government's policy to support farmers, and judging from the positive feedback we've gotten so far, it will certainly not be the last time," said Mrs. Usa Thongjang, Director of International Relations Planning Division, Dept of Agriculture Extension, and a longstanding associate of APSA. 🌱

New Law Requires Registration of Seed Production Contracts

A new law recently came into force in Thailand mandating that all contracts involving agricultural production – including seed production – be registered with the Government. Enacted in May, and enforceable as of September this year, the "Agriculture Contract System Promotion and Development Act of 2017" stipulates that all contracts related to the production of, and services for crops, fisheries, livestock and other agricultural commodities that the Government may declare, must be registered with the Office of the Permanent Secretary of the Ministry of Agriculture & Cooperatives.

Thailand agriculture legal expert and Attorney at Law, Dr. Prasert Soodmai, explained that the new law is the result of many years of debate and deliberation. "The law was drafted for the benefit of farmers, many of whom claimed to have been taken advantage of by companies. In the past, farmers had limited legal recourse

options when a contract wasn't honoured or had unfair terms, and the legal procedures to make a case could require a lot of time and money."

"This new law addresses this problem by making contractors – the farmers – less vulnerable, and the contractees – the companies – more accountable." Dr Prasert went on to add that the new law requires the Permanent Secretary's Office to publicly declare which companies in the kingdom employ contract farming as part of their operations.

"The new law facilitates transparency and mediation." Dr. Prasert noted. "Before a contract can be registered, the contractee needs to prepare an invitation letter and a complete draft of the contract, which must be issued to the contractor in advance. The invitation letter must be part of the contract, the terms of which must meet several requirements outlined by Section 21 of the new law. These include specific details of the

agreement, such as the exact nature of production or service, price, and volume, for example."

"In case of a dispute, either party to the contract shall report to their local agriculture office who shall mediate the dispute within 20 days. If the dispute cannot be settled within that time, the government attorney in charge may file for an extension for an additional 10 days, but this must be executed before the initial 20 days has expired."

Failure to comply with the new law by not registering outstanding or new contracts



Dr. Prasert Soodmai

may incur fines of as much as 300,000 baht. For consultation about the law and concerned regulations, Dr. Prasert Soodmai can be contacted at drprasertsoodmai@hotmail.com. 🌱

Thailand Mulls Restrictions on Popular Crop Chemicals

Authorities in Thailand are considering a proposal to ban the herbicide paraquat and insecticide chlorpyrifos by 2019, in addition to imposing stringent regulations on the use and marketing of the herbicide glyphosate.

Initiated by the Ministry of Public Health, the proposal was made on the basis of reports that linked increased pesticide intoxication with an uptrend in imports of concerned crop chemicals.

Opponents refute the links and argue that if carried out, the restrictions, which would immediately restrict imports and marketing of the popular chemicals, would result in significant economic losses for the country through a decline in agriculture productivity and an increase in production expenses.

Last year the Kingdom reportedly imported 31.5 tonnes of paraquat valued at US\$63.9 million (22% market share of all herbicide imports), 2.1 tonnes of chlorpyrifos worth \$8.3 million (7% of insecticide imports) and 61.8 tonnes of glyphosate worth \$89.2 million (30% of herbicide imports).

Herbicides and insecticides are by far the most valuable of nine types of pesticides. In 2016, Thailand imported 125,596 tonnes of herbicides worth \$293.6 million, in addition to 16,062 tonnes of insecticides worth \$118.1 million.

According to Graham Brookes PG Economics Limited UK, who presented at a recent seminar to underline economic and environmental benefits of glyphosate in Thai agriculture, expenses of farmers would increase in the face of the proposed restrictions.

Increased costs – attributed to alternative pest, weed and field prep management measures that would be required to maintain yields – could range from \$18 per hectare for oil palm, to as much as \$129 per hectare for citrus.

At the time of press, the proposal had yet to be accepted and was pending a request for more expert validation, made by the Department of Agriculture, which is in charge of issuing and renewing import licenses for agriculture chemicals.



A report, "Pesticides Used in Thailand and Toxic Effects to Human Health" published July 2015 in the Medical Research Archives by the Ministry of Public Health, in conjunction with Chulalongkorn University, concluded that "... the intensive use of pesticides certainly has consequences for human health and environments, even though identifying the true extent of these is quite difficult..." 🌱

Welcome Address from the NOC Chairman



On behalf of the Thai Seed Trade Association and the National Organising Committee for the 24th Asian Seed Congress, I would like to extend a warm welcome to the more than 1,100 delegates who have joined us here in Bangkok.

Most of you are longstanding members who have been integral to the tradition, culture and spirit of APSA and the Asian Seed Congress. I welcome you back and look forward to catching up. Some of you here may have even attended most, if not every edition of the ASC, dating to the Foundation meeting that was organised in Chiang Mai back in 1994. And now, there are a lot of new members joining us here in Bangkok for their first time.

We are confident your experience will be fulfilling and that if you take full advantage of all the opportunities that the congress offers, you will make valuable business contacts, leads and even friends from Thailand, Asia and the world.

Indeed, the Asian Seed Congress is always a memorable and productive affair year after year. This is in fact the sixth edition to be held in Thailand and the second time that we've had to move it here on short notice. Many of you may recall back in 2011 when we were left scrambling for a venue after an earthquake and tsunami tragically devastated Japan, where the 18th ASC was originally scheduled to be held. That year was particularly turbulent as Thailand itself was stricken by devastating floods in September, which left many industries vulnerable and out of operation for extended periods. But we at APSA and THASTA persevered with determination, reminding ourselves that the "Show Must Go On". So, we set up base in Pattaya that year and the congress ended up running smoothly.

Disaster struck again this year when our venue for the Manila ASC suddenly became unavailable due to the 31st Asean Summit. So we had to again relocate to Thailand, which was actually chosen to be the venue for the 25th Asian Seed Congress in 2018. This meant that we only had five months, rather than 17, to prepare, but we took this challenge in our stride.

Thailand welcomed us with open arms and thanks to all of our partners, hosts, sponsors, and the dedicated staff of the THASTA and APSA Secretariat offices, this year's ASC looks set to live up to its past glory while setting the bar even higher for future editions.

In closing, I would like to remind everyone of our underlying mission and objective in organising what has become the most important seed industry event in the region: To strengthen the seed industry by developing and forging relations between and among private and public stakeholders. As President of THASTA and Past President of APSA, I am proud to represent the Thai and Asian seed sectors, and cannot stress enough the importance of us all working together.

Unity is the centerpiece of our industry, and we can achieve our objectives more efficiently and effectively by building and strengthening our networks and seed associations – working in harmony at the local, national, regional and global levels. This idea is embodied in APSA's simple albeit powerful slogan: "Growing Stronger Together".

That said, should you have any inquiries about Thailand seed, please don't hesitate to approach me or one of my associates. And don't forget to enjoy your time in beautiful Thailand. Kop Khun Krup – Thank you. 🙏



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- **Large leaf**



The Success Behind ASC 2017

We would like to take this opportunity to thank and acknowledge all of our sponsors, partners and supporting organisations, whose cooperation, support, dedication and contributions have ensured the success of the 24th Asian Seed Congress here in Bangkok. Without you, this year's event would have never been possible. On behalf of the entire APSA Secretariat and Executive Committee, thank you.



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Looking Forward to Manila



Now that we've got a full year ahead of us to plan and prepare for the 25th edition of APSA's flagship event, we are pulling out all stops to ensure that Asian Seed Congress 2018 in Manila will be a memorable and historic event. The event will be held at the Marriott Manila – the same venue as was originally planned for the 24th edition before circumstances beyond our control forced us to bring the event back to Bangkok – and we are pleased to confirm that we will be prepared to accommodate even more delegates, space, trading tables, booths and indeed, friendships and memories.

The sudden change in plans back in May (due to the Philippines requiring our venue for the ASEAN Summit) presented us with limited options and time to prepare. But thanks to the dedication of our team, partners and organisers, we were able to make sure that the event would still go ahead. That said, we sincerely apologise to any delegates who wanted to join us in Bangkok but couldn't due to capacity limitations. Indeed, we never thought we would have to close registration nearly two months before the event. This goes to show just how important the Asian Seed Congress has become and underlines our desire to ensure that the event continues to grow while remaining a world-class function for our members.

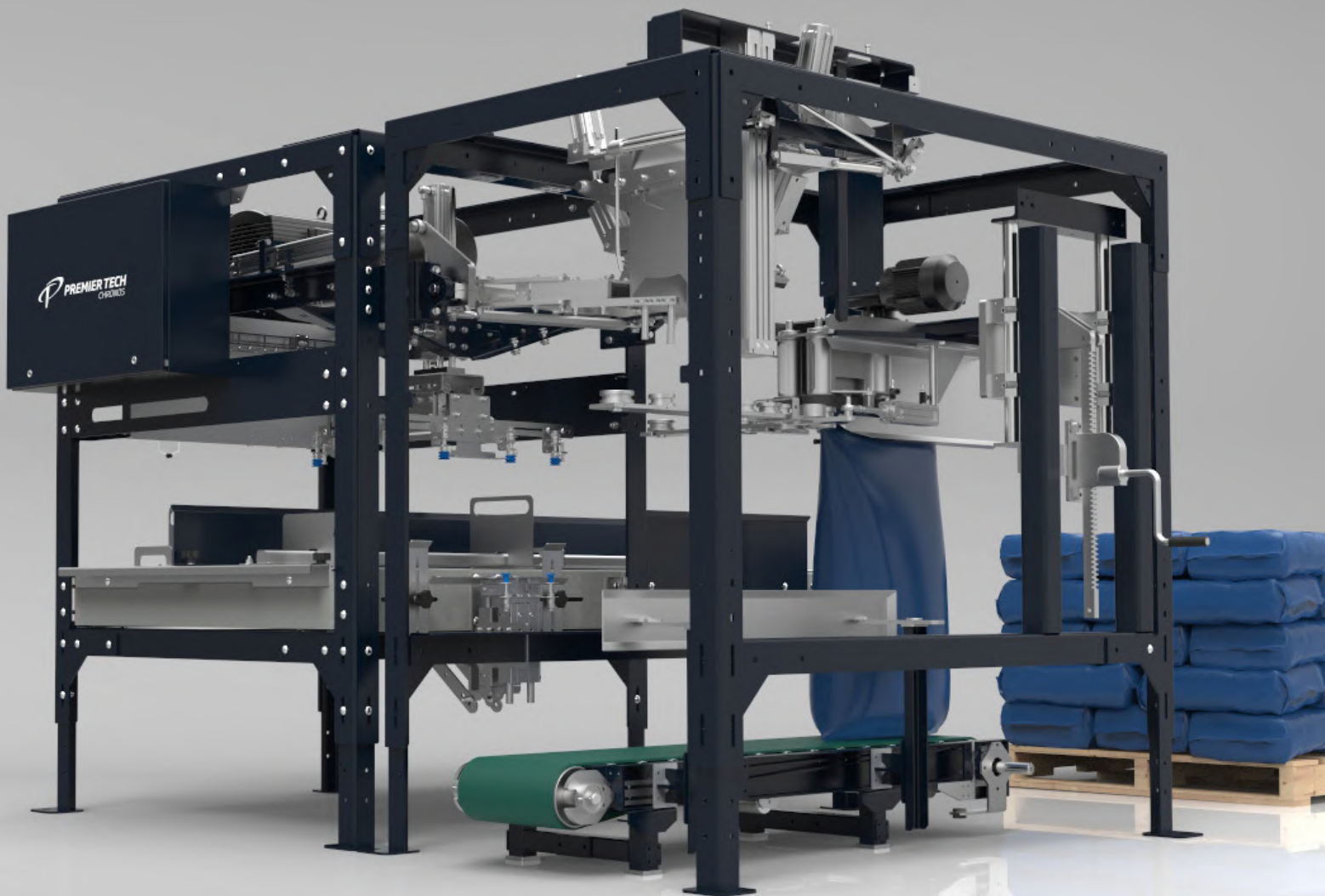
In light of this, we are well into our preparations for next year for what is, by far, the largest membership seed trade event in the region, if not the world.

See you in Manila! 🌱

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Asian Seed Bids Farewell to Two Seed Pioneers



Farewell to the 'Father of Indian Seed Industry'

Dr. Badrinarayan Barwale, Founder and Chairman of Maharashtra Hybrid Seeds Company (MAHYCO), a leading Indian seed company, and an APSA member of long standing, passed away on 24 July 2017 at 86 years of age.

Dr. Barwale, a simple farmer in the 1950s, was fascinated by the high yields of an okra variety, and so produced and distributed its seeds to his fellow farmers, who joined him in harvesting the benefits of good technology. Encouraged, he founded the first private sector seed company MAHYCO in 1964, built upon his threefold principle of precise situational awareness, readiness to work hard and the constant pursuit of innovation.

Recognised as the 'Father of the Seed Industry in India' by the Crop Science Society of America, Dr. Barwale was awarded 'Life Membership' of the Federation of International Seedsmen (FIS) in 1996. His superior accomplishments in developing the role of private seed enterprises in India earned him the prestigious '12th World Food Prize' in 1998. A highly decorated seedsman, Dr. Barwale's contributions to Indian agriculture and food security won him several awards and recognition, including the Government of India's esteemed civilian honour, the 'Padma Bhushan' in 2001. The Indian Council of Agricultural Research (ICAR), conferred on him the 'Lifetime Achievement Award' for his innovative and outstanding contributions to Indian agriculture in 2014. And in 2016, The Prime Minister of India congratulated him in recognition of his immense contributions to Indian agriculture.

Dr. Barwale held a lifelong conviction that technological innovation is the key to improving crop production in a country of small farmers, whose cause he always championed. It was his vision that led him to introduce the first GM crop in India in 2002, which revolutionised cotton production in the country, catapulting India from being a net importer to a leading global exporter of cotton.

The Asia and Pacific Seed Association (APSA) mourns the death of this giant of India's seed industry. Our sincere condolences on his passing go out to his family and colleagues. The world is truly "a better place" because of him. 🙏



Chinese Hybrid Rice Pioneer Passes Away at 78

Professor Zhu Yinguo, a revered academic, breeder, researcher, geneticist and rice biologist in China, passed away on 9 August 2017 at the age of 78.

A pioneer in hybrid rice research and breeding, Professor Zhu was a faculty member at the Chinese Academy of Engineering, as well as a Doctoral Advisor at Wuhan University.

Among his early career successes was breeding the Honglian line of rice, a three-line hybridisation of red awn wild rice and cultivated rice. The Honglian CMS lines, developed by Professor Zhu in the 1980s, led to the breeding of several rice hybrids which were of very good quality, highly adaptable and had improved resistance to diseases. These hybrids now cover large rice farming tracts, not only in China, but also in other hybrid rice growing nations such as Indonesia, Laos, the Philippines and Vietnam.

Professor Zhu's lines have been successfully promoted and utilised at provincial and national levels, cultivated on about seven million hectares, and have benefited more than 500 million farmers, not to mention consumers.

Around 1980, Professor Zhu started research on photoperiod sensitive genic male sterile rice. He successfully bred seven varieties of indica type and japonica type photoperiod sensitive genic male sterile lines; his work of which has become a valuable model for discerning the molecular mechanism of CMS (cytoplasmic male sterile) and fertility restoration.

Professor Zhu's more than five decades of contributions to hybrid rice research, seed breeding and industrialisation have brought immense social and economic benefits to China and the hybrid rice industry at large.

Acknowledging Professor Zhu's national contributions and importance, Secretary-General Xi Jinping made a special trip to the Ezhou experimental base to visit Professor Zhu and to learn more about his work.

APSA remembers Professor Zhu's selflessness when he got permission from hospital authorities to come to Wuhan University to meet the China Hybrid Rice Study Tour members in August 2015. The Asia and Pacific Seed Association (APSA) mourns the passing of this doyen of the Hybrid Rice Industry. Our sincere condolences on his passing go out to his family and colleagues. 🙏

Good Traits from the Parent Line

By Kunaporn Phuntunil

In this second installment of **Women In Seed**, we feature the mother and daughter duo of Suvannee Prathuangsit and Rintr Marutalarert, who run one of the oldest seed companies in Thailand

From Tomboy to World Discovery

Born in 1948, Suvannee was the only girl of four siblings. Growing up with three brothers taught her to be tough and to “play like a boy”. Her father, who was a prominent businessman who had immigrated to Thailand in 1907, passed away when she was only 12 years old. “My mother let my brothers mostly do what they wanted, but kept me on a tight leash,” she recalls. Suvannee was enrolled in Saint Joseph Convent School and Wattana Wittaya Academy for her primary and high school education. Later, Suvannee convinced her mother to let her pursue a BBA in Secretarial Studies and a Masters in Home Economics at Eastern Michigan University, USA.

After returning to Thailand, Suvannee became an Assistant Professor at Srinakharinwirot University and a Special Lecturer at Kasetsart University. She got married to Pong Marutalarert when she was 27. Pong was then running Chia Kwang Seng together with Lion Seeds Co., Ltd.

Suvannee became involved in the family business while also working full-time to look after the family, which by now included three children: Anchalee, Aek and Rintr.

Life Lesson

After 19 years of marriage, Suvannee’s life was turned upside down. “My husband passed away in 1996. It was a difficult time for my family and the business suddenly seemed vulnerable. I remember customers asking me at the funeral if we were going to close down the company.”

But Suvannee’s “tough” upbringing kicked in, and, telling her children not to cry, she made a big decision for the future. “I told everyone that life goes on and the company will remain open. After the funeral, I wrote letters to our counterparts to affirm the status of the business. Thankfully, my husband’s customers and my family were all really supportive, and their loyalty proved invaluable. We would survive.”

While gender stereotypes may initially prove disadvantageous for women leaders or managers, who may not initially be taken seriously by male counterparts, Suvannee was not deterred. Nurtured by these strong-yet-gentle lady’s hands, Lion Seeds began to expand into the global market.

Self-confidence is key, she explained. “I always told myself to be assertive and open-minded no matter what situation arises. I’ve never felt inferior as a woman working in seed among so many men. When you believe in yourself, nothing can stop you.”

Apart from this, Suvannee puts importance in being sincere and honest with customers. “Quality first” is her motto.

“There was a client who once asked me to reduce the price for an order, claiming that he could get a better price from a supplier in a neighbouring country. I firmly but softly



YASHU SEEDS



Yashu Green Pepper



Yashu Pink Tomato



Yashu Red Tomato



Yashu Tianlong No.8 Eggplant



Yashu Bitter Gourd



Yashu Miben Pumpkin No.980 F1



Yashu Baobei Wax Gourd



Yashu Baoyu Sweet Chieh-qua



"I like education but I felt it would narrow my options, while pursuing business would allow me to do many things that I like – such as travelling and meeting people, which is what I am most passionate about," she said.

To complement her business education, Rintr also pursued intensive language studies, spending a year learning Chinese in Taipei and Guangzhou with the help of another scholarship.

In contrast to her mother's upbringing, Rintr was given more freedom to learn, play and work. An open-minded, steady and calm person, Rintr has no cultural or gender barriers to overcome when working with people from all over the world, something her job requires her to do often.

While she doesn't feel disadvantaged as a Woman In Seed, she does highlight several advantages she has over her male counterparts. "Women are detail oriented and we bring a soft touch to create a relaxing atmosphere that's conducive for good negotiations. And we tend to be more flexible too," she says.

As for her professional values, she places great importance in sincerity, understanding and happiness.

"My first business trip with Lion Seeds was to Bangladesh to meet 70 farmers, breeders and distributors of our products. I felt proud that our products had made their lives better. I knew then that I had made the right career decision and am thankful to my parents for leading me down this path," she said.

Now approaching retirement, Suvannee is confident that her own two seeds and heirs – Rintr and Aek – can successfully run the family business, which is now celebrating its 100-year anniversary and is the oldest seed company in Thailand.

"I gave them complete authority to learn from both success and failure at work. I trust them from the bottom of my heart," Suvannee said.

Since first attending the Asian Seed Congress in Jakarta in 1997, Suvannee has continuously joined APSA activities, and since becoming a Woman In Seed herself, Rintr is now following in her mother's footsteps.

As a member of the Asian Seed Congress National Organising Committee, Suvannee underlines the strong potential for the local seed industry.

"Thailand has many advantages in terms of breeding, production skills, trustworthiness, as well as geographical strengths. Though we cannot compete with the cheaper labour and production costs in neighbouring countries, Thailand should maintain its high standards and transfer knowledge to future generations," Suvannee concludes.

In their free time, Suvannee helps several charity foundations as well as serves as a Treasurer of the Thai Seed Trade Association while Rintr enjoys travel, meditation and exercising at the gym. 🌱



refused to budge, insisting that our price is based on high standards and service. He was angry and went for the cheaper supplier. A year later he returned to us and admitted that he ended up losing a lot of money because the company he chose to go with was unable to provide him good products."

Flying High

While Suvannee was busy running the seed business, her youngest daughter Rintr could be found playing under the office desk. But all the time, she was learning from her parents. Like her mother, Rintr too has a strong instinct for independence and for learning about the world first-hand. From a young age, she recognised

her mother's strong faith and sincerity in dealing with people. And though she is the International Marketing Manager of Lion Seeds today, Rintr considered other career paths before ultimately ending up in seed.

With a Bachelor's in Business Education from Bangkok's Chulalongkorn University, Rintr initially planned to be a teacher. But after a heart-to-heart talk with her mother, she decided to pursue a Masters' degree in Educational Administration at the University of Wisconsin-Madison, and later received a scholarship to study a Master of Business Administration (in International Marketing), at Malardalen University, Sweden.

In this Asian Seed Congress edition of Seed For Thought, we feature two longtime Thai associates of APSA – one from the public sector and one from the private sector. Here they share their experiences, perspectives and wisdom from their careers in seed.

Planting the Seed for Community Empowerment

Punnee Thongket, 59, is a Planning and Policy Analyst with the Bureau of Rice Policy and Strategy at Thailand's Rice Department at the Ministry of Agriculture and Cooperatives. She has been a good friend of APSA for two decades.



I was born in 1958 in Chonburi province. My dad was a government official so my family often moved around Thailand, and I spent my childhood at schools in various provinces, including Chaiphaphum during my primary school years and in Nakhon Pathom in secondary. My mother was a housewife and looked after me and my siblings (I am the oldest of four) and my father was a Community Development Administrative Officer. I often accompanied him on field visits and took part in local workshops and community empowerment activities.

During summers, we visited our grandparents in Samut Prakan province. My fondest memories are of their bountiful fruit orchard where banana, coconut and mango trees grew. It was during these visits that I first became fascinated by agriculture. I would ultimately pursue this interest and follow in my father's steps to become a government official involved in community development.

After high school I was offered a place at nursing college, but decided instead to enroll in the Faculty of Agriculture at Kasetsart University. My major was in field crops, and two internships upcountry made it clear that I'd chosen the right career path the first internship involved maize cultivation at the National Corn and Sorghum Research Center in Nakhon Ratchasima province, the second oversaw rice transplanting in Kalasin province in Northeastern Thailand.

After graduation in 1982, I applied for a position at the Planning Division of the Department of Agricultural Extension (DOAE) and spent five years there before moving to the Seed Division. At that time, seed production in Thailand was still unable to meet the demands of an emerging market, so the Government began developing projects to support seed production.

The seed division received funds to establish Seed Centres to promote quality seed production around the country, but expertise

and technology were quite limited at the time. I therefore applied for, and was awarded, a scholarship from the division to study for a Master's of Science in Seed Technology at Mississippi State University, which has a renowned reputation for seed science.

Looking back, I was extremely fortunate to have this experience in the US. Not only was I able to study under Prof. Dr. James C. Delouche, whose guidance was invaluable as I wrote my thesis on "Field Emergence and Storability of Peanuts", I also met the man who would become my life partner, who was also an MS-PhD scholarship student at DOAE.

After graduating and returning to Thailand, I was immediately assigned to a newly-opened Seed Centre in Kamphaengphet province where I conducted seed testing, with a focus on soybeans. Later I moved to Phitsanulok province to monitor agricultural plots for peanut seeds. I then moved to Chonburi Seed Center to monitor rice seed. I spent two years at each centre before being called back to DOAE headquarters in Bangkok. In 2006, the Rice Department and Seed Division became a separate entity from DOAE and I stayed with the division to share and further my expertise.

I first got involved with APSA around 1997. Back then, APSA's office was in the DOAE building and the division has worked closely with APSA since its founding. I was asked for help in preparing and checking the Thailand seed country report, which I worked on for a few years. I remember attending my first Asian Seed Congress in Bangkok back in 1999. DOAE had a booth at that event for information dissemination and I also helped organise the post-congress tours, taking delegates to maize plots and vineyards outside Bangkok.

Thanks to various projects and dedicated effort from the public sector, especially in

respect to seed infrastructure development, the quality of Thai rice seed has continuously improved over the years. Before, the private sector played a smaller role, but now we are at the point where private entities can shoulder more responsibility when it comes to producing quality seed.

And the community too plays a vital role in ensuring that the best knowledge, practices

and seeds are used in all aspects of seed production and agriculture.

Despite the challenges facing the seed sector, I know that increased cooperation between government, industry and local communities will help overcome all the problems ahead.

Looking back on my career as an official in the seed sector, I am grateful to all the

experts I have met and worked with. As for young people coming up in the industry, my advice is to always be patient yet goal-oriented; always have a timeline for your task in hand. Also, remember that in the end, no-one develops or succeeds alone and you will get more out of your career by growing and working with the people around you. 🌱

Embracing a Business of Change

Vinich Chuanchai, 69, is an Advisor to the Thai Seed Trade Association and served as APSA's 10th president from 2003-2004

I was born in 1948 in Bang Khon Ti, one of three districts in Thailand's smallest province – Samut Songkhram, located about an hour's drive to the west of Bangkok. This is where my roots in agriculture began. Owing to the province's fertile soil and an effective irrigation system, there are many plantations along the banks of its main water source, the Mae Klong river. The river feeds canals that have provided livelihoods to farmers since time immemorial. To this day, agriculture is the cornerstone of the local economy and the region is where some of the best pomelos, razor clams, mackerel, sea salt and coconuts famously originate.

Like many of my generation, I came from a large family and had many siblings, including four older brothers, one older sister and one younger sister (I was the sixth out of seven). My parents were coconut farmers and merchants so from a young age, my siblings and I played in the plantations - learning to get along with others was a big part of my growing up.

After finishing high school, I enrolled at Kasetsart University in Bangkok, pursuing a Bachelor of Science with a Major in Entomology. After graduating around 1970, I worked at KU in student affairs for a few years.

After that, I started my career in the private sector, gaining fundamental sales and management experience over eight years with several international chemical companies, including the Chinese-American company, US Summit; the German company, Hoechst; and American pharmaceutical giant, Eli Lilly. While working full time, I also pursued an MBA part time at Thammasat University. In 1979, I joined CP, which was a relatively small firm at the time, though with big plans to expand internationally.

The CP Group began to grow rapidly thanks to a range of ambitious projects, some of which I got to work on. These included some of their early "mega farm" projects which applied a fully-integrated mechanised farming model, a key component of the company's successful business model to this day. Thanks to my background in chemicals and insects, I was initially transferred to CP's



chemical division and finally to their seed arm, Chia Tai. Starting off as Sales Manager, I remained at Chia Tai for the next three decades, ultimately working my way up to Senior Vice President of what had become Thailand's leading seed company.

My association with APSA goes right back to the beginning. Chia Tai is one of the founding members of APSA, and I have been a representative of Chia Tai with APSA ever since the foundation meeting in 1993. I love the association and am proud to have helped make it financially secure in the early days. During my tenure as President, I fondly recall the Congress in Seoul, South Korea in 2004, which was a hugely successful event. I have attended every Asian Seed Congress – well, all except one. I missed the Goa meeting in 2015, but technically I was already retired by then. However, I did return to attend the meeting again last year in Incheon and you will certainly see me around at this year's Bangkok Congress.

Though I still serve on the executive board for the Thai Seed Trade Association, I am now happily retired with four grandchildren – two boys and two girls. The apples didn't fall too far from the tree. My eldest daughter, who previously worked for the APSA

Secretariat, now works for the chemical company, BASF. My other daughter studied accounting and is also very business savvy.

Reflecting over my path in life, I have no regrets. Though my early education background was not specific to seed, everything I now know I learned from experience over the years. I realised early on that the chemical industry is limited in terms of growth, restricted by many stigmas and bans worldwide, with little research and development to support it. The seed business, in contrast, is a very interesting one, with new developments and breakthroughs occurring every day. The industry is relatively small and everyone knows each other, as most of the firms are family-run businesses.

Moving forward, it's important to maintain and forge close relationships with other stakeholders, including one's competitors. And it's important for the new generation of seedsmen to keep an open mind, as new developments and breakthroughs will continue to come in this industry, which will provide many challenges and opportunities. We have to always keep in mind, seeds are the origin of our food, and without them, we are nothing. 🌱

Welcome New APSA Members

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SG2000 | Seed Enterprise (Chile)

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SHANDONG UNELL SEED INDUSTRY CO., LTD. | Affiliate Member (China)

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MISR HYTECH SEED INTERNATIONAL | Associate Member (Egypt)

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NETHRA ENTERPRISES PVT., LTD. | Associate Member (India)

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APSA Members can access full member details, including contact information, and other business details via our Member Directory at Apsaseed.org

25th Beijing Seed Congress Generates \$7.5 Million

No less than 50 million RMB (US\$7.5 million) in business deals is estimated to have been generated at the 25th Beijing Seed Congress, held between 20-23 September at the Oriental MGM hotel in the Fengtai District of Beijing.

The event attracted a total of 810 Chinese and international seed companies and more than 10,000 guests.

Some 450 new seed varieties from 50 companies were demonstrated at the plant variety demonstration base in Wangzuo County. Among them were 180 tomato, 70 cucumber, 50 brassica, 50 squash and 100 leafy green cultivars. More than 40 APSA members were represented at the event. 🌱

– Xiaofeng Li
For full article, see apsaseed.org/news





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