IPGA

INDIA PULSES AND GRAINS ASSOCIATION

the pulses conclave 2018

NEW DELHI

AN INTERNATIONAL EVENT

SOUVENIR

Congratulations

IPGA

on PULSES CONCLAVE

2018

UNITED STATES *of* AMERICA

PKT ASSOCIATES INC

Serving Client Needs for Special Crops Worldwide

PKT ASSOCIATES INC
19-03 Maple Ave Unit 5
Fair Lawn NJ 07410
USA

TEL: +1-201-794-1051

Dear friends,

My colleagues in the IPGA Managing Committee join me in welcoming all of you at The Pulses Conclave 2018 being held in New Delhi.

Friends, India's pulses production has shown a remarkable increase in 2016-17 and is looking equally good for the year 2017-18 as well. The entire Government machinery is working tirelessly towards achieving the Hon'ble Prime Minister's vision to double farmer's income by 2022 and make India self-reliant in pulses.

The Government has complimented the farmer's efforts with introduction of tariff and non-tariff barriers on pulses imports and we feel that over a period of time things will fall in place and India will achieve the balance between production and imports to ensure availability of pulses at affordable prices.

Having said that, the Association is still pursuing the Government at various levels to try and include pulses in the PDS in every State. We believe that the key to achieving nutritional security is to make pulses affordable to those on or below-the-poverty-line and that can be achieved only by including the pulses into the PDS in every Indian State.

The FAO recently announced February 10th of every year as World Pulses Day and efforts are on to have the United Nations also recognise February 10th as World Pulses Day. We in the Pulses trade, as the key link between the Producer and Consumer, need to step up and plan initiatives to drive activities on World Pulses Day to ensure that pulses consumption shows an exponential growth in the coming years. I am sure that the growing consumption will be a huge incentive for our farmers to increase production.

The Government of India, recently, removed the ban on pulses exports after 11 long years. This, in our opinion, will be a morale and confidence booster for the Indian farmer as it gives him an additional option to improve his earnings and incentivize him to grow more pulses. I feel that the Indian trade should now start exploring the export options and thereby help the Indian farmer improve their earnings.

In this year's Conclave, while focussing on the global pulses scenario, we have some interesting speeches focussing on pulses research in India to improve production, policy framework in agri sector as well as initiatives towards doubling farmer's income.

I would like to extend a special welcome to Hon'ble Oneil Carlier, Minister for Agriculture and Forestry, Government of Alberta, Canada and Mr. Jesús M. Silveyra, Joint Secretary of State for Agribusiness Markets, Ministry of Agro Industries, Argentine Republic. Canada has been a long-standing partner of India in the Pulses trade and Argentina is fast growing their pulse production capacities to become a major player in the sector.

I, once again, welcome all to The Pulses Conclave 2018 and am sure that you will have a great time in India's capital city!

Zaverchand (Jitu) Bheda

HONORARY SECRETARY
India Pulses and Grains Association

Contents

Diplomatic And Political Fallout Of India's Foreign Trade Policy Decisions

Mr. G. Chandrashekhar
Global Agribusiness and Commodities Market Specialist

East African nations like Tanzania, Ethiopia, Mozambique, Uganda, Malawi and others are terribly upset with the Indian government. There is a sense of not just a let-down but betrayal by big brother India. Not only the political establishment, but also pulse growers in those countries are seething with anger over India's sudden decision to shut the door on pulse imports from these origins which has resulted in a price collapse and inflicted huge losses on African growers.

To put in perspective, after encouraging African nations to produce more for meeting the country's ravenous appetite, the Indian government imposed quantitative restrictions (QRs) on import of tur/arhar (pigeon pea), urad (black matpe) and moong (green gram) in August last year which has effectively denied market access to pulses from Africa.

The widespread discontent following India's poorly thought-through decision is sure to have medium to long-term negative implication for India's political and economic relation with East African nations. India's image as a reliable trade partner has surely taken a beating in the eyes of East African nations.

The wholly unexpected decision – unexpected from the African side – to clamp QRs has meant that African farmers, most of them smallholders like in India, have been denied access to the world's largest pulse market that is India – a market that the supplier nations have been servicing for years.

The denial of access to the Indian market without prior notice really hurts because India continually held out promises and urged these countries to produce more pulses that India would always be ready to buy. When India faced serious shortage of the protein-rich legume during 2014-2016 period and prices escalated to unconscionable levels, Indian government officials including in particular the Prime Minister went around these countries, desperately engaged with the governments there and urged them to produce more and supply more to India.

To be sure, the Indian PM visited Mozambique, Tanzania and Kenya in July 2016 and discussed pulses supplies. Earlier in 2015, during India Africa Forum Summit, Indian Commerce Minister encouraged African trade ministers to help boost pulses production for India. There were other engagements too at the bureaucratic level. Relying on the promise, African growers rose to the occasion and harvested large crops; but to their dismay India has clamped restrictions on import.

In 2016-17, India harvested a record crop of 22.9 million tons (previous year 16.4 ml t); but the policy of unrestricted duty-free

import continued until August 2017 by which time traders had already imported nearly 4.0 million tons. This led to a glut which in turn resulted in a collapse of domestic prices. Demonetization of high value currency in November 2016 and a trading community demoralized by the previous negative policy interventions like imposition of stock limits and seizure of pulses exacerbated the price action.

Domestic price collapse and agitation by domestic pulse growers forced the Indian government to take precipitate action; and New Delhi made the unthinking and facile decision to impose controls on imports through the trade policy route and tariff route.

The anger among the East African governments and pulse growers is palpable because financially they have lost heavily and there are not many markets for them to service. Some of the countries are keen to drag India to the WTO and to the courts. Some are said to be examining the possibility of legally challenging the imposition of QRs on pulse import. India has committed to WTO years ago that QRs will be removed. Some form of retaliatory action from African countries cannot be ruled out either.

It is unclear if New Delhi is ready to face the political and diplomatic challenge. India's ongoing efforts to engage with Africa may be jeopardized. It is necessary to recognize that Indian agriculture in general and pulses production in particular is vulnerable. What if there is a setback to pulse crops next year? Who will supply to India because India has alienated its trade partners.

The validity of QR on pulses - tur/arhar, urad and moong – is till March 31, 2018. On tur/arhar the ceiling is two lakh tons and on the other two pulses, three lakh tons combined. Even after imposition of QRs on these pulses and customs duty on other pulses such as chickpea, yellow pea and lentils, market conditions within the country have not improved. Prices are still well below the minimum support price and growers are still unhappy.

As this writer has consistently maintained, the government's negative tactics such as QRs and customs duties will have only a limited impact, if at all. What is required is affirmative action to support domestic pulse growers. The two million ton pulse procurement plan last year left much to be desired in terms of timing and implementation. For a country that year after year procures 50-60 million tons of rice and wheat, sourcing 3-4 million tons of pulses should not be difficult. The government should strengthen pulse procurement including by engaging private professional warehousing companies and work towards including pulses under welfare programs such as TDPS and NFSA.

Importantly, the Indian pulses sector needs holistic solutions –production, processing, distribution, consumption, value addition and foreign trade. Solutions are available; but sadly, there is no policy, nor is there political will to make the sector competitive. We see only kneejerk reactions from time to time. It is sad state of affairs.

(G. Chandrashekhar, senior journalist and policy commentator, is a global agribusiness and commodities market specialist. Views are personal. He can be reached at gchandrashekhar@gmail.com and +919821147594)

Argentina As A Global Legume Supplier

Mr. Jesús M. Silveyra
Joint Secretary of State for Agribusiness Markets, Ministry of Agro Industries, Argentine Republic

Argentina is the 5th global exporter of dry legumes, with over 600,000 tons yearly exports, which means a 4.1% global market share.

Argentine domestic consumption of legumes is 120 grs/capita/year, which are consumed with a remarkable seasonality with higher volumes in winter months. 50% of that domestic consumption are lentils, 22% edible beans, 18% peas, and 10% chickpeas. Given the low level of domestic consumption, Argentina exports most of its legume production to the global markets.

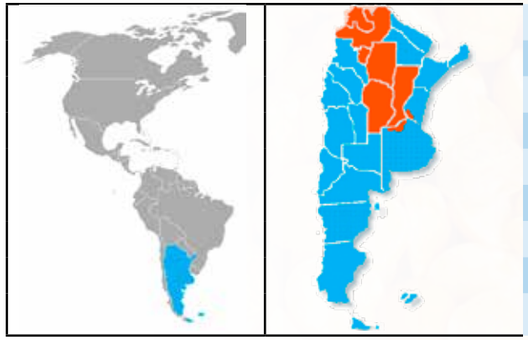
Production

Argentina has optimal soil, moisture and climate for pulse production, a condition that determines a leading edge competitive advantage in the world. The main pulse produced in Argentina are:

- edible beans
- chickpeas
- lentils
- peas

In mid XXth Century, pulse production took its relevance in Argentina as a large-scale productive alternative. Sometimes it became a rotation element, given its short production cycle and the fact that they contribute to soil Nitrogen availability for the following crops grown in the same lots. Most of pulse production devoted to industrial elaboration is extensive in Argentina, while fresh consumption production is more labor-intensive.

Pulse Productive Zones in Argentina



Entre Ríos	Peas
Santa Fé	Lentils, Peas
Salta	Beans, Chickpeas, Lentils
Santiago del Estero	Beans
Jujuy	Beans, Lentils
Tucumán	Beans
Catamarca	Beans
Córdoba	Beans, Peas, Lentils
Buenos Aires	Lentils, Peas

Argentine Pulse Production Global Markets

97% of the Argentine pulse production is exported, which means only 3% is consumed domestically.

In 2017 exports grew 0,5%. Jan-Nov exports were 562.000 tons, with a total FOB value of us$ 470.000 dollars.

- **Edible beans** constitute 81% of total pulse exports: 45.2% are Alubia bean variety and 39% Black bean varieties.
- **Chickpeas** follow edible beans in importance in Argentina, and the Kabuli variety leads production, and the Desi variety follows in volume. They are exported mainly to Pakistan.
- **Green Peas** follow chickpeas in importance, and Argentina is the main South American green peas producer. There are 76 varieties of green peas being produced in Argentina. They are exported mainly to Brazil, where only the green variety is sold. Argentine green peas presence in Brazil has been solid and constant over the years. 99% of green peas exports are in the form of shucked dry peas.
- **Lentils** are the 3rd in importance legumes produced in Argentina for food, after edible beans and dry peas. In the last few years, main importers from Argentina have been:
  - Uruguay
  - Portugal
  - Spain

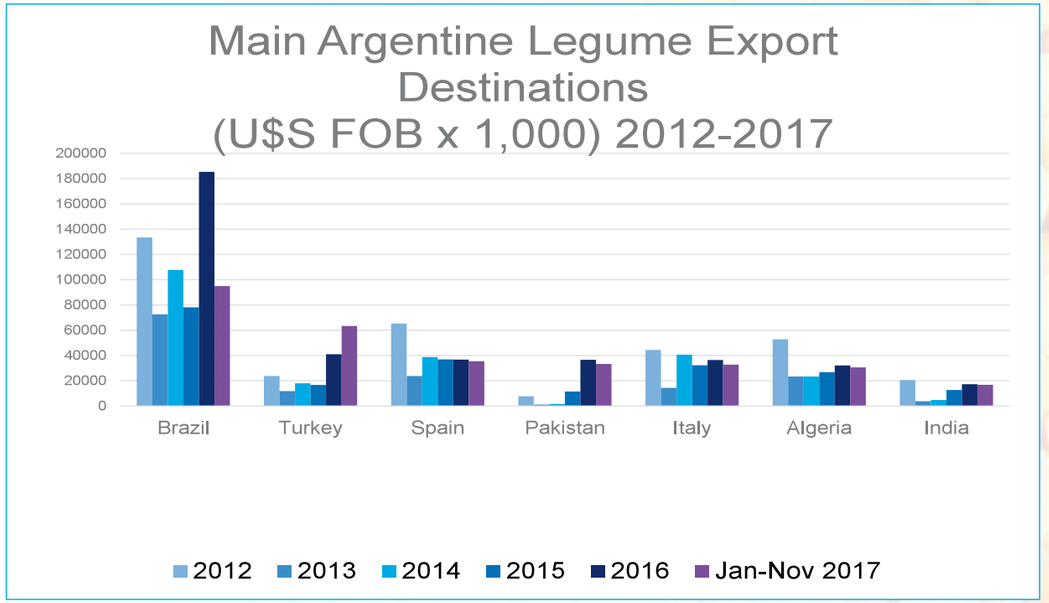
Brazil is the main importer of Argentine dry legumes, with 20% of total exports during 2017. Turkey imports 13.5% of Argentine legumes. Pakistan takes 78.5% of Argentine legume exports, and Algeria takes 7% of Argentine legume exports.

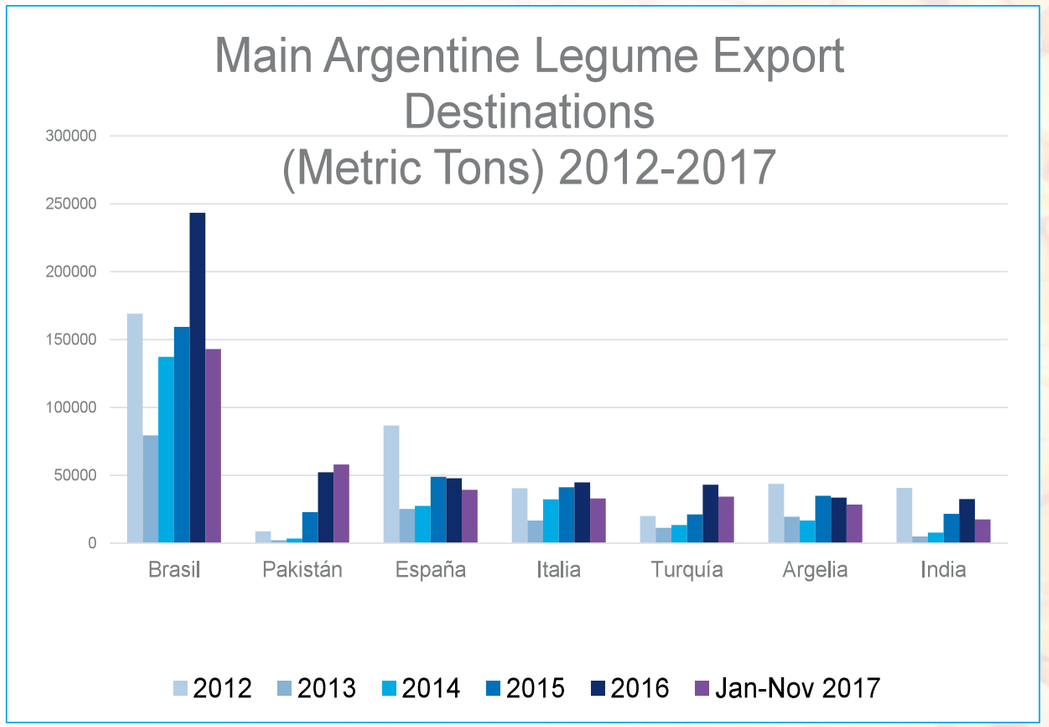
Yellow peas have the largest volume demanded in the global market, with India as the largest consumer of yellow peas. Argentina has begun producing yellow peas.

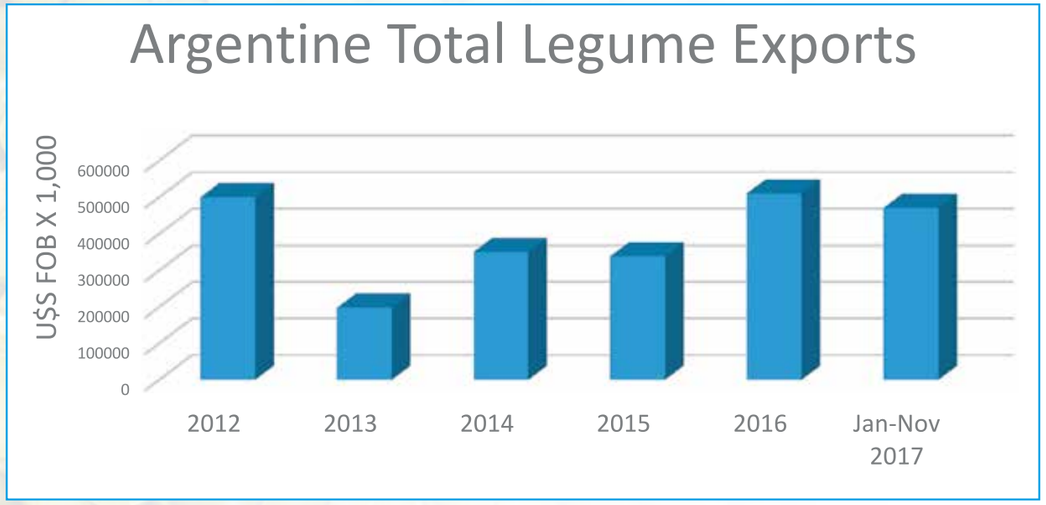
Main Argentine Legume Exports Destinations

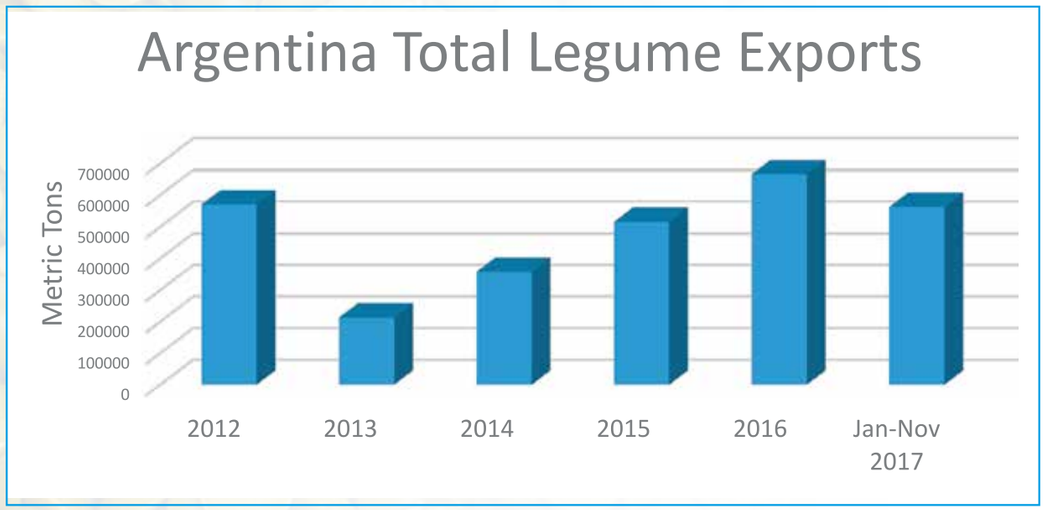
January-November 2017.

2017	u$s FOB x 1,000	Metric Tons	% Mkt Share
Total	**470.301**	**562.048**	
Brazil	94.934	143.048	20.2%
Turkey	63.393	57.958	13.5%
Pakistan	35.462	39.324	7.5%
Algeria	33.261	32.991	7.1%
Italy	32.704	34.256	7.0%
Spain	30.610	28.484	6.5%
Portugal	16.760	17.520	3.6%
India	14.470	25.750	3.1%
United Arab Emirates	12.260	12.285	2.6%
Mexico	9.089	11.719	1.9%









Argentina, a natural leader

Argentina can provide what the world food market needs, as a natural leader and a strategic geopolitical ally for many countries; Argentina is becoming the world's food supermarket.

Becoming the world's food supermarket is one of the current nation's goals, and from the Ministry of Agroindustry we are devoted to that goal, with the focus on:

- Becoming more competitive
- Reducing bureaucracy
- Opening new global markets for Argentine products

Pulses And The Future Of Food

Mr. Gordon Bacon
CEO- PULSE CANADA

The rest of the world is realizing what the pulse industry has known for decades: pulses are the future of food. Consumers and governments around the world now look to pulses as an important part of action plans to improve the global food system and address nutritional and environmental challenges.

Increasing pulse consumption is critical to meeting growing global protein needs. Pulses are an important part of cropping systems that diversify revenue sources for farmers, and pulses make a significant contribution to affordable and sustainable food production systems. Through collaboration on events like 2016 International Year of Pulses, the global pulse industry has been successful in raising the profile of pulses. Pulse Canada is proud to have played a leadership role in shaping the path forward for pulses.

This increasing emphasis on pulses is changing the industry at every level. While traditional demand remains, new uses for pulses are emerging. Consumers are exploring ways to make pulses a bigger part of the foods they prepare at home as well those that they buy in supermarkets and at restaurants. Food companies, including traditional cereal foods and animal meat and milk companies, are increasing their use of pulse ingredients to meet consumer demand for affordable food that is healthy for them and good for the planet. Farmers and governments are focused on how they will capitalize on demand for pulses.

The global pulse market is influenced not only by the commercial forces of supply and demand (trade) but also by government directions (policy) that can complement but also override commercial market direction. Perhaps no government is having a bigger impact on the pulse industry than the Government of India.

India has chosen to focus on supporting its farmers through a market support price for pulses and border controls in the form of import duties and quota restrictions. These actions have had the unintended effect of driving down international pulse prices and are also impacting the pulse planting decisions of farmers around the world. What started as a method of price support for India's farmers has become the focus of a discussion on forecasts for food security. Global pulse plantings are presently forecast to undergo a significant reduction in 2018. Analysts are predicting that Canada alone may reduce seeded area by one million acres of peas and one million acres of lentils.

Food production the world over is subject to the variability of climate during the growing season and at harvest. Science and technology cannot yet fully remove the negative impact of pests and plant diseases.

When most of the world's pulses are grown in areas that rely on rainfall, the phrase 'rain makes grain' will remain the dominant explanation for pulse surpluses and pulse shortages the world over. Given what is happening now in the global pulse market, governments should be discussing whether there is a policy-induced drain on areas seeded to pulses, and if there are ways to mitigate the impact of policy on pulse planting decisions and the risk associated with trade with India. And as a country of rising economic influence, India must recognize the vital role that their domestic pulse policy is playing at the global level.

This is not the time to enter yet another policy debate on the relationship between trade and food security or what constitutes an over-reliance on imported food. What is needed in the short term (now) by both the global pulse industry and governments with a vital interest in food security is to focus on implementation of an operational plan that works for the pulse sector. Pulse production and trade is about more than food security. Pulses are also improving the environmental sustainability of food production systems, addressing global protein needs and contributing to the economic viability of farmers in many countries.

So what is needed? Pulse policies implemented by the Government of India have a global reach as a 'pulse market maker' and a 'pulse market breaker'. While only the Indian government can decide how best to support its own farmers, domestic price support for farmers must be undertaken in a manner that is both transparent and predictable. Without this balance, the uncertain future of domestic policy in India will continue to negatively impact the global pulse market, leading to reduced plantings by farmers in regions such as South Asia, Africa, North America, Eastern Europe and Russia. The inherent risk in global pulse production is being compounded by uncertainty in India's domestic pulse policy.

From the Canadian perspective, a first and urgent step for India's government is the development of a transparent system that will help farmers and trade predict changes, up or down, to India's import duties. The timeline for this is very tight; farmers around the world are already making their 2018 planting decisions.

India must also return to science-based approaches to plant protection policy. Plant protection policies cannot be abused as a tool to limit trade for economic or political reasons as this further erodes the confidence of growers and trade in the global pulse market. Plant protection policies must only be used to address the actual level of risk that imports present to the importing country.

And finally, future changes to India's policy must respect the WTO Agreement on Agriculture that in Article 5:3 states that additional duties on products 'tariffed' shall not be applied to goods "en route on the basis of a contract settled before the additional duty is imposed".

Pulse trade with India has changed at the very time when the entire world is looking to the food system to deliver on both consumer expectations and social needs like human health and environmental sustainability. Pulses will inevitably be part of the global strategy to create an affordable and healthy food system that protects the planet's resources. A more predictable production and trade environment for pulses is in everyone's interest. Governments and the pulse trade the world over had best move quickly to fix this problem.

2018 should be the year to grow more pulses – not less.

Role Of India In Promoting Agriculture Processing In Africa

Dr. Bharat Kulkarni
Chairman- Indo Global SME Chamber

One of the important sector, apart from commercial agriculture that requires attention and investment in Sub Saharan Africa is the sector of Agro processing and Agribusiness. However, the details about the opportunities and success stories about the investment is not very easily available. Most reliable information is provided by several governmental and multilateral donor agency reports. These set of information confirms that the investment in agro-processing, especially in rural Africa is mostly absent. This absence of the capacity to undertake processing the raw produce at the rural levels leads to huge post-harvest losses. This is more visible in the cases of perishables like fruits and vegetables. The average post-harvest losses in perishables in sub Saharan Africa ranges between 35-50% of total production. When we look at grains and other products, the post-harvest losses is in excess of 15-20%.

Most governments in Sub Saharan Africa realize that the lack of processing capacities lead to two major challenges. First is that close to 40% of the produces is lost and this leads to higher cost of production. Combined with lower yields, this loss further makes the agriculture unsustainable for small holders. Secondly, the producing countries remain raw material suppliers and, as a result, are not able to move up on the value chain. An investment in processing capacity can help address both these issues.

To this effect, several governments in the Sub Saharan Africa have identified the Public Private Partnership as a workable model for promoting investment to develop locally relevant agro-processing industries. The idea is to promote solutions that will not only address the issue of high post-harvest losses, but also generate jobs and increase the rural incomes. Development of agro-Industries would also create a culture of industrialization and urban employment. Further, it will also cater to the expanding market of processed foods by providing better and cheap food to the urban dwellers. As the technology required is not very sophisticated and the investment size is also not high making it well within the capacities of SMEs in Sub Saharan Africa.

Realizing the importance of this, many governments have developed the policies to target this sector and promote investment using the value chain approach. An initiative like one village one product in Malawi is an example of the same. By this, the governments are ensuring increased income generation

and livelihood to the beneficiaries, who are largely rural farming communities. Several Public Private Partnership projects have been launched successfully in Africa. One example can be quoted as the partnership between DSM food specialties, the government of Rwanda and a number of other partners like the UN World Food Programme and CHI can be looked into. The project is to set up a baby food factory in Kigali involving a $60 Million. It is providing a market for about 9,000 farmers, and at the same time creating hundreds of jobs. Finally, the Rwandan market is able to access cheaper and more affordable nutritive food for children. The business model has been highly successful and the demand has already started to outpace supply for DSM. Like this success story, other similar models are also emerging in certain countries and particular sub-sectors, but the spread of this model in private agribusiness activity has yet to take off.

Role of India in promoting Agriculture and Agro processing in Africa- India has always been a natural partner for Africa for long. India and Africa have the same legacy and history. Africa is going through the same evolution process and finds the Indian model very familiar. Like India, Africa is also largely an agrarian economy comprising of small holder farmers. India's experience in developing the value chains can help Africa to become a net exporter of agriculture products. Indian experience of a successful green revolution, along with initiatives like contract farming, drip irrigation, structured agricultural markets, food processing etc is something that Africa finds relevant. Further, the experience of India in introducing the robotics technology, affordable food processing technology and precision farming can help Africa replicate the Indian experience. Lastly, the experience of developing a mechanism of institutional support and marketing support are also worth sharing with the African economies.

To this effect, government of India has established various engagement mechanisms with the African governments on issues, like production, technology transfer and investment promotion. In one of such efforts, the government of India has sent several teams of agricultural experts of the Indian Council of Agricultural Research (ICAR) to various African nations to understand how Indian experience in the agricultural practices can be relevant in African to improve productivity. Further in the area of capacity building, the Indian government has granted several scholarships to African students in the sector. As a part of the commitment under the India Africa Forum Summit, government of India, through NABARD, has set up a capacity building institute in Malawi. All this is helping the African nations to address their issues on productivity enhancement and yields. Improved varieties of seeds and inputs are being provided under the support of government of India.

The government of India is also promoting and supporting the investment in agro processing and irrigation in various African countries. This is done through the several concessional lines of credit provided by the Government of India. Exim Bank has extended several Lines of Credit to international financial institutions, regional development banks, national governments and even private

sector entities internationally for investment in various sectors like development of infrastructure, transportation, health care, agriculture etc. Out of the total investment by EXIM bank through the lines of credits, about $ 1.65 billion is in agricultural sector alone. Following are the lines of credit approved by the government of India for agriculture in Africa in past two years-

Country	Amount of Credit (in USD mn)	Purpose
		2015-16
Kenya	100.00	Agriculture Mechanization project
	15.00	Development of various small and medium enterprises
	29.95	Upgrade of Rift Valley Textiles Factory (RIVATEX East Africa Ltd)
Zambia	40.00	Agricultural Mechanisation
		2014-15
Ghana	24.54	Sugarcane development and irrigation project
Ghana	150.00	Strengthening of Agriculture Mechanization Services Centres
Senegal	62.95	Rice Self Sufficiency programme in Senegal

The support from India for agricultural development and specifically agro processing has been offered since past several years. The most noticeable was the support to the sugar industry in Ethiopia. One of such line of credit given to Ethiopia worth $640 million for its Tindaho Sugar Project, was the largest by the EXIM bank outside Indian subcontinent. Similarly, Senegal received concessional lines of credit first worth $27 million for procuring equipment for irrigation projects in 2006 and then second worth $160 million for agricultural mechanisation in 2011

The idea of providing line of credit for agriculture is provided with two objectives. The first objective is to create necessary infrastructure along with improving production through supply of requisite inputs, agriculture implements, and the another objective is to catalysing investment into processing and value addition. With better infrastructure and improved production, the input for processing is more easily available. By making the required technology for processing and value addition available for investors, the Indian lines of credit promote the transfer of technology in a more adaptable and affordable manner.

In many cases, these investments further facilitate Indian private sector investments. With proper infrastructure developed, Indian investors look at the opportunities more positively. The investment in textile industry in Ethiopia, by companies like Raymond and Arvind denims, is an example of an infrastructure driven processing investment. The government of Ethiopia invested in developing industrial parks, which have attracted several Indian companies to invest in textile processing. EXIM bank with agencies like IL&FS Clusters is looking at making investment in such infrastructure that can act as a catalyst for the processing exporters. Same model can be used in Pulses, Edible oils, grains, sugar and many others.

African governments have huge potential for investment into agro processing. But for this, there is a requirement to develop required infrastructure like market infrastructure, logistics systems, power supply, communication networks, etc which can support investment in agro processing at the production centers. The major limitation for investment in agro processing is that investing firms in Africa are required to undertake development of huge infrastructure to make the project viable. For example, a company looking at investing into a rice processing plant in east Africa realized it had to make significant investment in procurement network for raw material. The absence of the structured market, made it very costly for the company to procure the raw material and as a result project viable. An investment in development of the market infrastructure is required to promote such projects. The Indian government's support can come handy in such cases to act as a catalyst for promoting FDI from India. The Indian government's concessional credit can be used by the African nations to build infrastructure and promote FDI in agro processing. In addition, support from government of India to African SMEs can also promote access to affordable and adaptable technologies for Agro industry.

Shifting Acerages - A Farmer's Perspective

Mr. Nirav Desai
Managing Partner
GG Patel & Nikhil Research Company

Initiative

The industry has been discussing how shift in acreage affects the Agro Industry to a great echelon. However, there is no adequate research data in India on the same. Thus, we took an opportunity to know the farmer's stance on it.

Objective

- Identify the cause for shift in Crop Acreage
- Outline the Crop Costing.

Survey Facts

GGN Research team executed a survey across 7 states in India, i.e.

1. Madhya Pradesh
2. Maharashtra
3. Gujarat
4. Rajasthan
5. Haryana
6. Punjab
7. Andhra Pradesh.

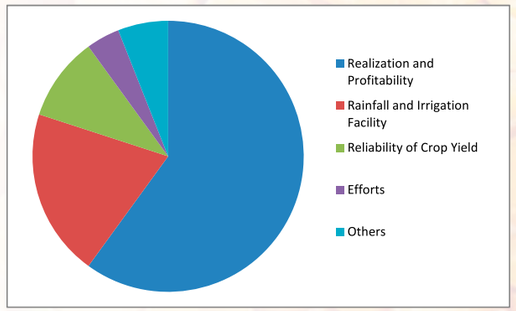
The survey enclosed some major cash crop from these states. It covered different group of farmers including small farmers.

We found out during the survey that we have knocked the door to a world so big beyond our imagination and a subject worth years of study. Also we saw there was no similarity in farming practices of the same crop in the same area; Yields of the neighboring farms were also different in cases.

Then we realized that we could just give the industry a glance of the farmer's perspective.

REASON FOR SHIFTING CROP ACREAGE AND IT's WEIGHTAGE

1.	**Realization and Profitability**	**60%**
2.	**Rainfall and Irrigation Facility**	**20%**
3.	**Reliability of Crop Yield**	**10%**
4.	**Efforts**	**4%**
5.	**Others**	**6%**



We discovered that the most important factor emerged out as Realization & Profitability, so we have gone into the finer details of crop costing and profitability.

Farmers gave a good weightage to water availability and reliability of yield. So during our survey we tried to figure out the way these factors affect the sowing pattern and what could be the new emerging trends.

Factors taken to evaluate the Costing of the farmers

(Per Hectare)

Particulars	Formula
Land Preparation	Hours*Tractor rent *time
Weedicides	Ltr*Price
Seed	Kgs*Price
Sowing	Hours*Tractor Rent
Intercultural (Nindai)	Labor Days*Rate
Fertilizers	Kgs.* Price
Pesticides	Ltrs.*Price* Time
Irrigation	Hours*Cost Per Hour Time
Labor	Labor Days * Rate
Harvesting	Labor Days * Rate
Threshing	Qntl * Rate
Transport Cost	Qntl* Freight
Interest	Working Cap*Rate*5Months
Wear & Tear	Annual Wear & Tear / 2
Total Cost	**Mandi Price * Yield Realization**

The Land Cost is not taken into consideration as generally the Indian Farmers does not calculate it. But for your reference we have indicated the general land lease rate prevailing.

Estimated Profitability & Costing of the Average Indian Farmers

(Per Hectare)

Farming Activity	Gram	Kabuli	Masur	Wheat	Mustard	Soybean
Land Prepration	2100	2100	2100	2100	2100	2100
Seed Cost	5500	12000	1800	2200	850	5500
Sowing Cost	1500	1500	1500	1500	800	1500
Total Fertizers Cost	1500	1500	1500	3000	500	1500
Pesticides / weedicides	500	500	500	1000	1000	4500
Irrigation	1500	1500	1500	4500	1500	
Labour *	3500	3500	3500	3500	3500	3500
Harvesting	2550	2550	2550	2550	2550	2550
Threashing	1000	1250	1000	2500	1000	1000
Transportation Cost	600	600	600	1500	600	600
Wear Tear	200	300	200	500	200	200
Interest	500	500	500	500	500	500
Total Cost	20950	27800	17250	25350	15100	23450
Yield (in Qtl)#	10	7	8	45	11	12
Mandi Price	3800	8000	3200	1700	3800	3400
Realization	38000	56000	25600	76500	41800	40800
Profit	17050	28200	8350	51150	26700	17350
Return	81%	101%	48%	202%	177%	74%
Cost per qtl as per farmers yield	2095	3971	2156	563	1373	1954
Land Cost (Lease 6 Months)	10000	10000	10000	10000	10000	10000
Land Lease as a % of Profit	59%	35%	120%	20%	37%	58%

* Labour Cost includes labour involved in various fieldwork like spraying, threashing, Nandai, harvesting Etc

Yield is of farmers who were interviewed to arrive at this costing.

•The Pulses acreage had risen this year Due to higher prices during last season, whereas the above sheet is showing the profitability as per current prices in January 2018.

Rainfall & Irrigation Facility

Insufficient water makes the farmer choose a crop which is by force and not by choice. Irrigation is the biggest reform area in the whole Farm sector. Thus, an appropriate infrastructure of canals can be of great significance in increasing the total production.

A broad deficient of irrigation facilities leads to the following circumstances:

Farmers select Early Sowing variety over High Yielding variety in Kharif

Indian Farmers sow the Kharif in hush & harvest in a rush so that they are left with water to prepare their land and manage water for the Rabi crop. This is why they opt for early sowing variety even through its yield is less. This is one of the key causes for low productivity level in India as compared to U.S & Brazil.

Less rainfall result a shift from Wheat to Chana and Mustard

Due to scarcity of rain water farmers change from more water consuming crops like Wheat to less water utilizing crops like Chana and Mustard. At times farmers even pass to a single crop looking at the shortage for Rabi.

High Cost of Irrigation in areas with deficient electric power

The cost of irrigation varies significantly in different areas. Here are some examples of the cost of irrigation in Rabi season for watering 4 times.

- Canal area - Rs.250/ hectare*
- Irrigation by electricity - Rs.1280/hectare**
- Diesel generators - ***Rs.3600/ Hectare

**In Rajasthan they take fixed cost per crop i.e. Rs250/Hectare.*

***4 units x 20hrs x Rs4/unit x 4times i.e. Rs1280/Hectare*

****1Ltr/hr x Rs 45/ltr x 20hrs x 4times i.e. Rs3600.*

Other Important Findings

Soybean scoring up on Acreage.

The last page observation depicts a consistent progression in the soy yield also making it score more on the irregular and stagnated Groundnut and Mustard yield.

Some basic reason for the above is as follows:

- More resilient to weather adversity.
- Can manage a sturdy yield in less or excess rainfall.
- More adaptable to diverse soil and climatic condition. (it grows in cold region of U.S to tropical climate in India to equatorial climate in Brazil)
- The production is more homogenous and there is no discount on small or broken seeds.
- Acceptability of Soy Oil in India.
- Soy meal edges above Groundnut Cake that faces aflatoxin issue and Mustard Cake due to pungency.
- The Soy meal varies an extensive range of usage and enormous buyers market.

Farmer's perception of Profitability:

There is a general perception among farmers that the profitability depends on the yield and realization and not on the cost of production. As generally all the activities involved in raising the crop cannot be majorly compromised on.

I hereby conclude my article by saying that Shift in acreage of crop holds a very crucial aspect and should not be neglected.

Attaining Self-Sufficiency In Pulses Sector

Dr. N P Singh* and Dr. C S Praharaj**
ICAR-Indian Institute of Pulses Research, Kanpur (U.P.)

The country has developed a roadmap to achieve its twin and focused national priorities in fulfilling *Self-sufficiency in pulses* and *Doubling farm income*. With patronage of all our stakeholders, India has created a history by a record production of pulses to the tune of **22.95 million tonnes** with a productivity of **779 kg/ha** during 2016-17. Kudos to the farming community as this phenomenal success was achieved through synergy in the diverse and strategic components of self-sufficiency that includes the outstanding achievements realized through scaling seed production (through 150 seed hubs and strengthening BSP), developing MAS products using genomic resources, commercialization of matching technologies, adequate policy support (MSP, market support, financial incentives, pulses buffer stock and good governance), value addition and processing, skill enhancing training and capacity development at diverse stake holders.

Technology generation

ICAR-Indian Institute of Pulses Research has pursued all its focus in scaling-up the productivity goals consistently on sustained basis through its multifarious efforts. During the last couple of years or so, the institute has succeeded in developing 15 most promising varieties of pulse crops for cultivation in different parts of the country. These include 4 in chickpea (IPC 2004-01, IPC 2004-98, IPC 2005-62 & IPC 2006-77), 4 in fieldpea (IPFD 10-12, IPFD 11-5, IPFD 12-2 & IPFD 6-3) 3 in lentil (IPL 316, IPL 526 & IPL 520), 2 in mungbean (IPM 410-3 & IPM 205-7) and one in pigeonpea (IPA 203) and urdbean (IPU 07-3). One hybrid of pigeonpea, IPH 09-5, has also been under evaluation for NEPZ region. R & D against diverse and dynamic biotic and abiotic stresses have been further strengthened with increasing crop productivity through protection of the pulse crops. Besides these, inheritance of important traits, such as Fusarium wilt resistance, double podding, seed size and earliness in chickpea; resistance to wilt, pod fly, sterility mosaic and Phytophthora stem blight in pigeonpea; and photo-thermo-insensitivity, seed colour, pod pubescence, MYMV resistance, plant type and functional male sterility in urdbean has been worked out.

Besides these the institute has also developed 4 land mark varieties of pulses with specific features and unique characteristics viz. IPL 220 (high Fe and Zn fortified lentil variety), IPH 09-5 (early duration pigeonpea hybrid), IPM 205-7 (Virat, a Super early mungbean

variety), IPFD 10-12 (green seeded fieldpea varieties).

Significant advancement was achieved in development of transgenic chickpea and pigeonpea events for insect resistance (IR) trait through genetic engineering technology. Requisite Permit Letters were obtained from Genetic Engineering Appraisal Committee, Ministry of Environment, Forest and Climate Change and Review Committee on Genetic Manipulation, Department of Biotechnology, Ministry of Science and Technology, Government of India to conduct Event Selection Trial of five transgenic chickpea and five transgenic pigeonpea events. This will definitely have long-term impact on the management of pod borer per se in pulses.

In developing marker assisted selection products using genomic resources, draft genome sequence of chickpea and pigeonpea is available that provides a resource for trait improvement, development of transgenics in chickpea and pigeonpea for insect (Pod borer) resistance using Bt gene (Cry 1Ac & Cry 1Aabc) in DCP 92-3 (Chickpea) and Asha (Pigeonpea) genotypes, respectively. The institute has also developed Diagnostic Kits "LYMVs PCR Diagnostic Kit" for identification of viruses causing yellow mosaic disease and Multiplex-PCR "LYMVs Mplex" for the accurate identification of the viruses causing YMV in pulses.

Sustained efforts are also made on management considerations in developing improved and updated package of practices (POPs) through adoption/popularization of improved agro-techniques involving BBF/ raised bed planting for kharif pulses, precision tillage using laser leveler, drip-fertigation in long duration pigeonpea, sprinkler irrigation in chickpea and lentils, popularization of most remunerative pigeonpea + soybean - lentil in Central India, appropriate lentil-seed priming under rainfed situation, zero till seed drill for resource poor farmers, improved post emergence herbicides (Imazethapyr and Quizalofop-ethyl at 80-100 g/ha POE at 20-25 days after sowing) for better weed control and supplementary (and life saving) irrigation using micro-irrigation (dripfertigation and sprinkler irrigation) and pond technology. Besides these, rice fallow technologies (viz., unpuddled rice/ direct seeded rice followed by foliar nutrition of micronutrients and 2% urea in chickpea, life saving irrigation and appropriate crop management practices such as retention of 30 cm rice stubbles, zero tillage and appropriate rice establishment method) have been refined for pulses.

Since economics is the major consideration for success of any crop husbandry practice, greater emphasis is made towards decreasing cost of cultivation and increasing farm output/ income through farm mechanization and value addition/processing (higher dal recovery by IIPR Mini Dal Mill). Now mechanical harvesting of chickpea (like, GBM 2, NBeG 47 and HC 5 with >20 cm ground clearance) is possible. Besides these, new transfers of technology (TOT, MGMG, Farmers FIRST) models are in vogue for rapid dissemination and adoption of suitable agro-technologies. On BSP, a total 663.53 quintals of breeder seed was produced in chickpea (215.5 q), pigeonpea (58.7 q), mungbean (96.88 q), urdbean (53.3 q), lentil (62.18 q), fieldpea (174 q), rajmash (2.57 q) and horsegram (0.4 q) fulfilling the seed-indent fully (Table 1) .

Table -1.Breeder seed production at ICAR-IIPR in aid of

self-sufficiency in pulse sector (2016-17)*

Pulses	Breeder Seed (q)	Seed Production by ICAR-IIPR at other locations (q)
Chickpea	215.50	35.00
Pigeonpea	58.70	-
Lentil	62.18	25.00
Mungbean	96.88	161.64
Urdbean	53.30	59.85
Fieldpea	174.00	267.90
Rajmash	2.57	-
Horsegram	0.40	-
Sub total	663.53	549.39
	Total	1212.92

*Besides these, quality seed (Foundation seed) seed Hubs to the tune of 1096.36 q were also produced

On crop physiology and biochemistry, the role of salicylic acid on increasing nitrogen index balance (NBI), chlorophyll and flavonol under drought (PEG induced) was established while anthocyanin content was high in leaves without salicylic acid pre-treatment. Similarly, it was confirmed that NDVI value - an essential physiological tool for detecting plant health through remote sensing - for promising chickpea genotypes (ICC 12916, ICC 15868, ICC 14880, RSG 896, JG 12 and ICCV 37) were invariably higher. Compatibility of beneficial bacterial isolates with *Mesorhizobium* was also confirmed.

Technology demonstration and promotion of pulses was made through diversified projects and activities that included Farmers' FIRST, Soil Health Cards, promotion of pulses in NEH Region, Seed Production, registering farmers under e portal '*Dalhan Sandesh*' and voice based SMS advisory service and conduct of demonstrations, designing Commodity profile for pulses (CPP Portal), registering Copyright for software and filing Trademark of PulsExpert and developing farmers friendly website e-*Dalhan Gyan Manch* and *Chana Mitra* app., and organizing training programmes and exposure visits for farmers.

Since international collaboration plays a significant role in updating knowledge and awareness on pulses sector globally, we have a liaison with ICRISAT, ICARDA and World Vegetable Centre, other funding organizations dealing on pulses research (BT, DST, ICAR National Fund, Bill and Melinda Gates Foundation, ACIAR, UPCAR and many others) for cutting edge technologies.

Fulfilling the Targets

Pulse requirement in the country is projected at 32 million tonnes by the year 2030 and 39 million tonnes by the year 2050 at an annual growth rate of 2.2% requiring an all round efforts and strategic steps in research, generating innovations, its dissemination, and commercialization along with capacity building. Keeping in view of the per capita availability of land, population growth rate and technological innovations, projections shows that productivity has to be scaled up by an average of about 80 kg/ha during every 5-year interval to achieve average pulses yield of 950 kg/ha by 2025 and 1335 kg/ha by 2050 following expanding its growing area or acreage by about 4 million ha. In pulses, it is significant to note here that ample number of high yielding varieties of different pulse crops have been released and notified for their

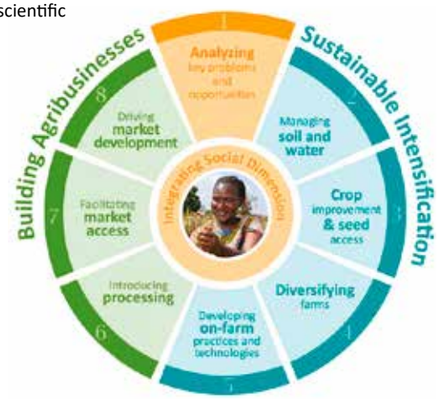
ICRISAT is an international non-profit organization that undertakes scientific research focused on making agriculture profitable, and overcoming poverty, malnutrition and environmental degradation

- Working in Asia and Africa for over **45 years** as an international **non-profit** and **non-government** organization, ICRISAT has established a strong scientific and independent credibility
- ICRISAT has specialized knowledge on drylands, which covers **55 countries** in Asia and Africa; inhabited by over **2 billion people**, of whom **644 million** are poor. These regions are most vulnerable to climate change, subject to droughts, degraded soils and have poor social infrastructure

ICRISAT's Vision

ICRISAT envisions a prosperous, food-secure and resilient dryland tropics.

ICRISAT conducts agricultural research for development in the dryland ecosystems of Asia and Africa, and has expertise on crops that survive best here – the legumes and nutri-cereals.



ICRISAT takes a holistic approach with expertise across the whole agriculture R4D value chain.

Grain Legumes

Over grain legumes research is contributing to raising and securing productivity for health, income and sustainability by improving quality and production of three legume crops namely chickpea, pigeonpea and groundnut. In brief, it tackles the following:

- Battles biotic constraints in an integrated way, including breeding for resistance as well as the judicious use of biological, crop management and chemical-control method.
- Tackles additional breeding targets such as grain quality and nutritional traits, improved food safety, improved nitrogen fixation, hybrids, drought tolerance and avoidance, and adaptation to diverse dryland agroecosystems and to differing rotations with cereal crop.
- Enhances breeding with modern genomic and molecular tools, precise phenotyping and crop simulation modelling.
- Improves availability of affordable improved seed and overcomes seed system constraints.

Mandate legume crops: chickpea, pigeonpea and groundnut.

Key Highlights of our Research

- World's largest collection of genetic resources of chickpea, pigeonpea and groundnut.
- Fusarium wilt resistance in pigeonpea and chickpea and rosette virus resistance in groundnut.
- Creation of the world's first commercial hybrid grain legume crop (pigeonpea).
- Large-scale genomic resources including genome sequences of chickpea, pigeonpea and groundnut.
- Pre-breeding, wide crossing, genomic and genetic, and transformation research to transfer new disease- and insect-resistance genes into groundnut, chickpea and pigeonpea.
- Short-duration varieties/lines in chickpea, pigeonpea and groundnut.
- High-value pigeonpea and chickpea types suitable for export from Eastern and Southern Africa.
- Aflatoxin control research in groundnut.
- Build capacities of smallholder farmers along the value chain to achieve quality standards required to export groundnut.
- Improved seed systems and policy research on grain legumes.
- Smart Food initiative to solve our biggest issues in unison: rural poverty, malnutrition and adaptation to climate change and environmental degradation.

ICRISAT INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS

smart food Good for you - the planet - the farmer

ICRISAT is a member of the CGIAR Consortium
About ICRISAT: **www.icrisat.org**
ICRISAT's scientific information: **EXPLORE*it*.icrisat.org**
About Smart Food: **www.ICRISAT.org/smartfood**

cultivation in the country recently. Marker assisted breeding and development and utilization of genomic tools are being given due importance so as to develop multiple disease resistant cultivars. Merged with these are matching POPs which could have tremendous role in enhancing productivity and production.

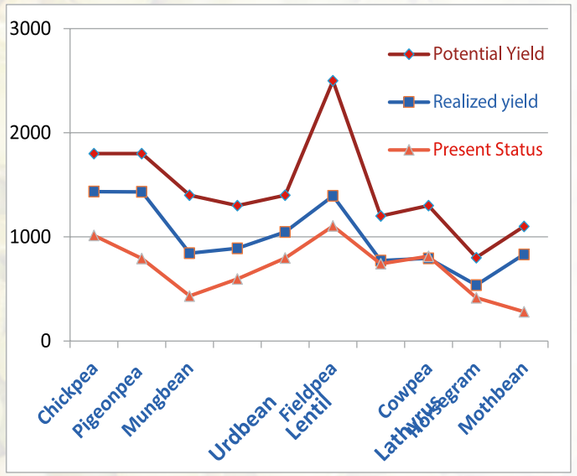
The constraints in pulses as a profitable enterprise are many. In most of the pulses, since actual productivities of different pulses are considerably lower as compared to their potential yield as well as that realized on farm demonstrations (Fig 1), there is an ample scope aiming at scaling productivity. Since pulses are generally grown in poor and marginal lands with minimum inputs and about 87% of the pulses cultivation in the country is rainfed, productivity of pulses per se is low. Many of our farmers still use old varieties, grow their home-saved seeds year-after-year and that too through broadcasting instead of line sowing resulting in sub-optimum plant population and low yield. Farmers often don't use pre-emergence herbicides to control the initial weed growth causing substantial yield loss due to weeds. In addition, cost reduction is not actually possible since farm mechanization is of low priority in pulses cultivation.

Deficit in pulses availability is attributed to a number of underlying factors such as ever-increasing population, geographical shift, abrupt climatic changes, complex disease-pest syndrome, socio-economic conditions of the farmers and lesser market opportunities. Since pulse production is usually taken up by small and marginal farmers (mostly as subsistence farming), limited availability of cultivable land, stagnation in cropping intensity due to absence of irrigation facilities and depleting natural water resources, have relegated pulses to poor returns. Cultivation of pulses on poor soils under rainfed conditions with minimum inputs and management have led to often yield losses and damage right from field to storage. Moreover, high influence of environmental factors and G×E interaction are the major production constraint in pulses leading in meager gain in productivity in most of the pulses.

Among pests, gram pod borer in chickpea and pigeonpea, pod fly in pigeonpea, whitefly, jassids and thrips in dry beans cause severe damage to crops. Similarly among diseases, Fusarium wilt coupled with root rot complex (probably it is the most widespread disease causing substantial economic loss in chickpea), sterility mosaic and Phytophthora blight in pigeonpea, yellow mosaic, Cercospora leaf spot and powdery mildew in both mungbean and urdbean and the rust and wilt in lentil cause considerable losses, if uncontrolled/ not contained. Abiotic stresses like drought and high temperature at terminal stage, cold as well as sudden drop in temperature coupled with fog during the reproductive phase, and soil salinity/alkalinity cause havoc towards potential expression of crops and yield formation. Other socio-economic considerations include improvement in seed replacement rate, suitable policy directives/ incentives and allocation of storage facilities to pulses. All these have significant impact and bearing on scaling productivity in pulses. It has been demonstrated that improved

varieties of pulses have a positive impact to the tune of 15-20 % in increasing pulses production in all major pulse crops including chickpea, mungbean, urdbean and lentil while in pigeonpea, improved varieties increase the yield by 10-12%.

Fig 1. Yield gaps in different pulse crops



Source: *IIPR, Pulse (FLDs); Present status as the national average yield*

Besides the major pulses (chickpea alone shares about 45% of the total pulses production followed by pigeonpea, mungbean, urdbean and other pulses), irrigated pulses comprising mungbean, urdbean and fieldpea can largely compensate the projected yield gap. There is an ample scope of horizontal expansion of short duration Spring/Summer pulses viz., mungbean and urdbean in Indo-Gangetic plains and rice fallows of southern India. The geographical shift in pulses towards central and south India is an indication of their potentialities to adapt to diverse climatic conditions and enabling their production in new niches. It is also estimated that about 11.695 m ha in India remains fallow after rice harvest, of which around 82% lies in the Eastern India and the rest falls in three southern states *viz*., Tamil Nadu, Karnataka and Andhra Pradesh. These areas have a vast potential to cultivate low input and low water requiring upland pulse crops such as lentil, chickpea, lathyrus, mungbean and urdbean. Besides this, large scope exists to grow pulses in inter-row space of wide row crops like sugarcane, pearl millets, and sorghum (Table 2) that could brought at least a couple of million hectares under pulses cultivation.

All these efforts should complement and supplement to policy support which could possibly through linking pulses to welfare schemes (PDS, Mid Day Meal, and Integrated Child Development Services) where pulses could be a part, would address the issues of protein energy malnutrition among the vulnerable population. In an endeavour, the states of Andhra Pradesh, Tamil Nadu, Himachal Pradesh, Punjab and Chhattisgarh have diversified their PDS with inclusion of pulses as a means to curb the nutritional deficiency among the poor. Besides these, building farmers' Associations/Institutions, post-harvest processing through small scale pulse efficient milling units especially at the village level, Need based support in storage infrastructure, Supporting with MSP and procurement policies (Table 3), necessary arrangements for scaling up skill development in processing are other key areas needed to be implemented.

Table 2. Intercropping systems capable of large scale promotion and adoption

Intercropping systems	States
Soybean+ pigeonpea/ urdbean	Madhya Pradesh, Maharashtra
Pearl millet/sorghum + pigeonpea	Karnataka, Andhra Pradesh, Gujarat, Maharashtra
Groundnut + pigeonpea	Gujarat
Groundnut/sorghum/ pearl millet + urdbean/ mungbean/ cowpea	Bihar, Maharashtra, Madhya Pradesh, Karnataka, Gujarat, Uttar Pradesh, Rajasthan
Sugarcane + cowpea/ mungbean/urdbean	Uttar Pradesh, Maharashtra, Karnataka Andhra Pradesh, Tamil Nadu
Cotton + urdbean/ mungbean/cowpea	Punjab, Haryana, Madhya Pradesh, Gujarat, Andhra Pradesh, Maharashtra

Other avenues aimed at special niche segment like, Kabuli *chickpea and rajmash* offers new opportunities for tapping the untapped potential of these commodities through demand in international markets. Another un-reach destination is *organic food production*, and its market in India which is estimated to grow at 25-30 per cent although the awareness about it is still low. For all these, both knowledge and skill enhancement of farmers are handy for promotion of organic pulse production.

Table 3. MSP (INR/q) of major Pulse crops in India during last 3 years*

Crop	2015-16	2016-17	2017-18
Pigeonpea	4625	5050	5450
Mungbean	4850	5225	5575
Urdbean	4625	5000	5400
Chickpea	3500	4000	4400
Lentil	3400	3950	4250
* Includes bonus also.			

Conclusion

To achieve the target of self-sufficiency in pulses, we are continuously striving for increasing genetic gains through novel technology, like transgenic technology, incorporating photo-thermal insensitivity and breeding short-duration varieties, for increasing cropping intensity, conservation agriculture and strategic practicable technologies, research on storage structures and minimizing post harvest losses, promoting participatory and demand driven research including value addition and appropriate policy support. All these again oriented towards *reducing cost of production* and *enhancing income* through scaling productivity so as to double the farm income by 2022. With existing resources and infrastructure, achieving a record production of pulses to the tune of 23 million tonnes during 2016-17 is one step ahead in realizing self-sufficiency in pulses sector.

*Director ** Principal Scientist and Head, Division of Crop Production, ICAR-IIPR, Kanpur 208024

Results From The International Year Of Pulses: Two Year Onwards

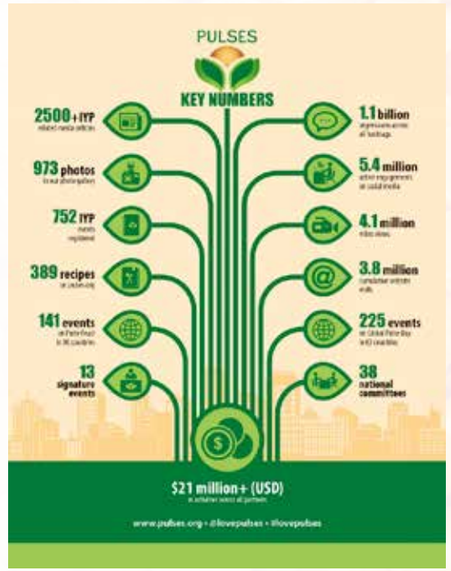
Ms. Robynne Anderson
President, EmergingAg, Canada

The International Year of Pulses (IYP) declared by the United Nations for 2016 and ended in February 2017, so what were the legacy outcomes? The IYP saw the pulse sector band together to conduct an unprecedented worldwide campaign. Today, multiple sources and research results agree: this very special crop might make an immense difference in a world where the estimated number of undernourished people increased to 815 million in 2016, up from 777 million in 2015.

IYP, a highly successful campaign

The IYP campaign saw amazing results all around the world including in the digital realm. In 2016 the consumption of pulses experienced a 10% increase worldwide. In India, which has always been a great champion in the pulse industry, it was record breaking, with 23% year over year increase in pulse production (2016-17 v 2015 -16)!

The food innovation sector was also highly influenced by the campaign, there was a 10% increase in global product launches



containing pulses and pulse ingredients. Based on a report by Mintel, 4121 new pulse products were released globally in 2016! The competition #LovePulses product showcase saw more than 60 new pulse based products developed within the IYP campaign.

The social media numbers are even more mind blowing. To give a sense of the success of the International Year of Pulses campaign, there has been 1.1 billion social media impressions (including all campaign hashtags e.g. #PulseFeast, #IYP2016)!

The world celebrated together on Global Pulse Day on January 18th 2017 as people around the globe gathered to honour these astonishing pulse crops. Global Pulse Day exceeded all expectations: while the year before Pulse Feast saw 141 events in 36 countries; on January 18th 2017, the celebrations broke the record of 225 events in 63 countries reaching 62 million impressions via social media.

We witnessed a great variety of events: some planned pulse-based company events or parties with friends and families, others launched videos or recipes promoting pulses, some hosted seminars on pulses or simply joined the social media campaign that day.

Advocating for World Pulse Day

The outcome of these celebrations was so positive that the FAO hosted a closing ceremony of the International Year of Pulses in Burkina Faso on February 10, 2017. In addition, thanks to the leadership of Burkina Faso, the Conference of the UN Food and Agriculture Organization (FAO), which is the governing body of the agency, endorsed the proposal to celebrate an annual World Pulse Day during its 40th plenary session in July 2017. Galvanized by the important achievements of the 2016 International Year of Pulses, and wishing to build on its successes, the Conference acknowledged the enormous value of pulse production and consumption for food security, human health, and the environment, and requested that the UN General Assembly, at its next session, consider declaring World Pulses Day as an annual observance on February 10. The campaign for World Pulse Day is still underway, as it now awaits discussion by the UN General Assembly in the coming year. If approved, that will be the final hurdle to have an ongoing global celebration of pulses.

To keep the momentum alive, Burkina Faso is hosting a Pulse Day event February 18th in its country, featuring the participation of the Director General of the Food and Agriculture Organisation, Jose Graziano da Silva, and an award to the President and First Lady of Burkina Faso for their global achievements in the pulse sector by the Global Pulse Confederation President Huseyin Arslan.

World Pulse Day will be a means to celebrate the benefits of pulses, and also a way to continue the dialogue on issues where the crop still needs help such as yields, research and nutritional studies.

The lack of investment is one of the reasons behind the large gap between the significant potential of pulse crops for meeting global sustainability challenges and current capacity to seize this potential. According to the 'Global Pulse Productivity & Sustainability Survey', the 13 pulse crops receive just USD 175 million in research funding annually, a tiny fraction of the USD 61 billion directed toward public and private food and agriculture research. With more research attention, pulses can make major contributions to sustainable food and agricultural systems.

New nutritional research findings on pulses

New research is demonstrating further the nutritional benefits of pulses. The Legume Innovation Lab from the Michigan State University sponsored a clinical study in Malawi conducted by Drs. Mark Manary (Washington University in St Louis School of Medicine) and Ken Maleta (University of Malawi School of Medicine) involving the complementary feeding of pulse (cowpea and bean) flours to young children. The most noteworthy findings from this study were that:

- Cowpea flour supplements fed to infants between 6 and 12 months resulted in increased linear growth.
- Common bean flour supplements fed to young children during their second-year improved gut health as evidenced by reduced biomarkers for gut inflammation.

These important findings further add the impact of pulses on child growth and gut health. Those complement some of the other nutritional and health benefits known to pulses:

- They are one of the most important sources of plant-based protein for people around the globe.
- They can have a positive impact on the management of non-communicable diseases, including diabetes and coronary conditions.

IFPRI book about pulses

Another outcome of the International Year of Pulses was the publication by the International Food Policy Research Institute (IFPRI) of a new book about pulses, exploring the nutritional and environmental benefits of pulses in India to help policy makers find ways to feed and nourish a growing population. Pulses for Nutrition in India: Changing Patterns from Farm to Fork makes very valid points in trying to understand how pulses can play a major role in India's food policies and gives answers to many questions: What is the role that pulse production plays in global trade? What are the changing demand for pulses in India since the 1960s? How can we improve pulse yields with better technology to compete with cereals? What are the long-term health benefits of greater reliance on pulses?

The pulse sector is living exciting times. Having been for too long a neglected crop, pulses are now more important than ever, considering our world food security challenges. The increase in research shows a growing interest from the agricultural science community and brings back fundamental findings on the many benefits of pulses for people and the planet.

Robynne Anderson is the President of Emerging ag inc and provided the secretariat services to the Global Pulse Confederation for the International Year of Pulses.

SITA In Pulses

International Trade Centre

Supporting Indian Trade and Investment linkages to Africa (SITA) is a five-year project being implemented by the United Nations' International Trade Centre and funded by the United Kingdom's Department for International Development (DFID). SITA aims to increase investment and trade linkages within seven sectors; one of which is pulses, between India and East Africa.

Pulses play an important role in economic growth and food security of three EA countries:, Tanzania, Ethiopia and Kenya. The first two are already exporting significant amounts, while Kenya shows potential though, it still produces low levels of pulses for export. The main challenge faced by all these three countries is to achieve high yields and consistent supply quantities. The lack of access to capital and partnerships are a concern for processors in all these 3 countries. Consequently, a strong appetite exists among pulses processors to partner with investors so as to expand their production and export capacities.

Meanwhile, India, the world's largest producer, consumer and importer of pulses, is currently dependent on industrial-scale suppliers, often from distant geographies. Pulses processors in the East African region have a strong appetite for expanding their production and export capacities in order to enter the Indian market and other new and growing markets. Boosting production requires increased yields coupled with greater predictability for the smallholders responsible for the bulk of pulse production in East Africa.

Since project's launch in March 2014, important milestones have been achieved within SITA. The interventions have focused mainly in three areas: the first one is trade, through increasing pulses exports from Tanzania, Kenya and Ethiopia to India and third markets. The second through the facilitation of capacity building to address the constraints hindering increase of production of pulses in East Africa and strengthening the ties between India and the African region. The third area is focusing interventions to incentivize investment.

In the area of capacity building; value chain roadmaps were developed for the above mentioned three East African countries. These instruments are guides for these

countries towards a successful development of the pulses sector. The articulation of these guides was a multi-stakeholder effort were ITC provided guidance through its technical expertise and brought together the most relevant stakeholders in the country in a series of consultation meetings that defined the road ahead to boost the sector. Furthermore, select companies have received training to acquire HACCP certification in order to improve their access to the Indian market.

In the areas of trade and investment, SITA in pulses has organized 5 B2B events which witnessed over 200 B2B meetings. As a result, over 20 companies reported doing additional transactions of 15 Million USD. Some of the Indian companies have also showed interest in investing in East Africa to process pulses in country and export to high value markets in Europe and U.S. An investment delegation visited two east African countries where they met various industry stakeholders. One of these investors is currently in advanced stages of discussion for setting up local presence.

To bridge the information asymmetry between India and East Africa, SITA supported the development of a Mobile app providing updated information about the sector. This app was developed by Level A commodties and is available for download on Android and I phone. Furthermore, a pulses handbook was developed which presents pictures and names of pulses in Hindi, Swahili and Amharic to bridge communication barrier between stakeholders.

To ensure sustainability of its interventions, SITA has also supported building of local institutions in East Africa. A good illustration of this is the creation of the Trade Pulses Network in Tanzania in early 2017. During the consultations held for the configuration of the Tanzania pulses value chain strategy, a group of pules exporters was formed as a result and constitutes now first group of pulses exporters in Tanzania who are actively keeping the dialogue between the government and the private sector, for the successful development of the pulses industry.

SITA is now going onto its fourth year of implementation in which our focus will be on attracting more businesses into East Africa for mutual gains. SITA invites participants at the pulses conclave interested in looking at East Africa to reach us at sita@intracen.org.

Initiatives And Strategies For Doubling Farmers' Income

Mr. David Bergvinson
Director General, ICRISAT

The importance of agriculture for a developing economy like India got a boost when Prime Minister Narendra Modi laid a challenge to double farmers' income by 2022. The key strategy elements for achieving this goal are:

- Major focus on irrigation with the aim of 'per drop, more crop'.
- Provision of quality seeds and nutrients based on soil health.
- Large investments in warehousing and cold chains to prevent post-harvest crop losses.
- Promotion of value addition through food processing.
- Creation of an online national agriculture market.
- Introduction of a new crop insurance scheme to mitigate risks at affordable cost.
- Promotion of on-farm ancillary activities like poultry, beekeeping and fisheries.

The next step would be a graduated holistic approach of improving farmers' welfare. Considering the nature of rural livelihood systems the following elements need to be part of farmers' welfare:

1. **Household income:** Sufficient income to cover costs, support a decent standard of living and savings for future investment (superannuation, pension, provident fund) and any contingencies.
2. **Food and nutritional security:** Access to sufficient, clean, safe and nutritious food to achieve food and nutritional security.
3. **Health, education and financial inclusion:** To ensure a decent level of human development.
4. **Infrastructure:** Social and physical infrastructure is crucial for ensuring effective functioning of the elements of farmer welfare, easy market access, technology adoption and reducing transaction costs.
5. **Institutions:** Innovative institutions are great enablers as well as levelers for social welfare providing equitable access to schemes and benefits.
6. **Skill development:** Contributes to upward mobility in income and effective use of new technologies within the digital landscape.
7. **Resilient systems:** Capacity to withstand market fluctuations, climate extremes, natural calamities and address risks in production.

How can it be delivered?

The Prime Minister also launched the Digital India program in 2015 to create the digital infrastructure for empowering rural communities, thus enabling digital delivery of services and promotion of digital literacy. Given that agriculture is the main source of livelihood for more than half the population, one must consider the role of Digital Agriculture within Digital India. Digital Agriculture can be defined as Information and Communication Technologies (ICT) and data ecosystems to support the development and delivery of timely, targeted (localized) information and services to make farming more profitable and sustainable (socially, economically and environmentally) while delivering safe, nutritious and affordable food for ALL.

Digital technologies will be the major conduit to deliver timely, targeted and tailored products, services and knowledge to increase rural incomes, improve nutrition, reduce risk and support sustainable agri-food systems. Three key components to support the implementation of Digital Agriculture are:

- Spatial (and Temporal) Data Infrastructure (SDI)
- Low-cost smart phones and tablets to support bi-directional flow of data and information; and
- Unique identifier like Adhaar.

Agriculture is a data-rich enterprise when one considers soil variability, moisture and nutrient levels, rainfall variability, timing of key operations like planting and harvesting and market price volatility. Agriculture

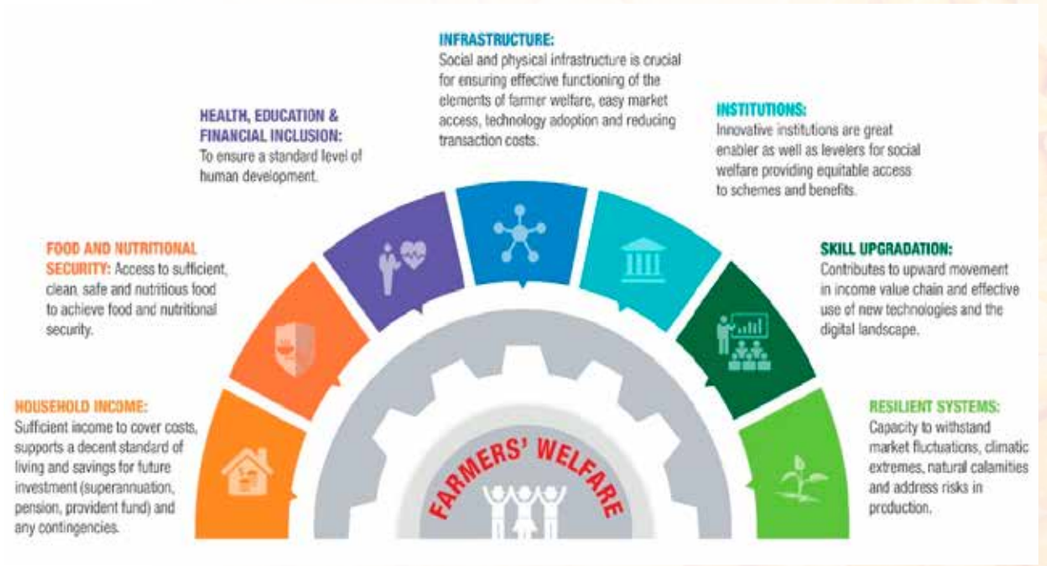


Figure 1. Farmer welfare requires: income, food security, infrastructure, institutions, health, education, skills and resilient systems.

industries in developed countries help farmers manage production and market risks through the application of spatial/temporal databases that are cloud enabled and integrated. This creates a rich and dynamic data ecosystem that enables advanced analytics to inform farmers of the best economic options to maximize profitability and minimize risk – two critical variables farmers in India also need to manage. Integration of spatial/temporal databases will enable coordination among actors to implement crop insurance, Pradhan Mantri Krishi Sinchai Yojana (PMKSY), pulse self-sufficiency and direct payment of fertilizer and seed subsidies based on farmer needs.

Smart phones are the key interventions as they are equipped with GPS which can help track fields, say, where pest infestation or hail damage has occurred for technical support or insurance claims. Mobile phones also enable farmers to integrate into structured markets based on approved grades and standards that can be verified using calibrated photos and settlements can be made through mobile money. There is a need to accelerate coordinated implementation tailored to the needs of farmers. The technology tools to support this through Aadhar are already available. ICT can empower farmers to manage production and market risks as well as democratize information to address information asymmetries that currently disadvantage farmers when dealing with intermediaries and aggregators.

Digital Agriculture is already the nerve center for modern food systems that enables democratization of information and distillation of big data analytics to provide timely and

Using digital agriculture to improve profitability

targeted insight for farmers, input suppliers, aggregators, processors and consumers. These insights are now delivered to the location of a decision (e.g. farmer's field on a smart phone) on how to optimize profitability, increase value chain efficiency and support consumer awareness on food and its impact on their nutrition, rural economy and environmental footprint of agriculture.

The greatest impact of Digital Agriculture will be realized through transparency of market pricing and compressing transaction costs so farmers capture a higher portion of their produce's marketable value. Agricultural value chains are complex with several actors along the chain but information asymmetry between the farmer and aggregator or intermediaries results in farmers having to sell into saturated, weak markets that are not based on transparent grades and standards. Powerful business models have emerged from Africa, Brazil and China that use Big Data Analytics and mobile phones to increase value chain efficiency and equitable integration of smallholder farmers. This will translate into access to appropriate inputs (e.g. digital soil maps to recommend micronutrient blends for fertilizer) and credit (e.g. banks will now know their rural customers to manage lending risk). Commercial service providers are offering targeted recommendations to farmers in developed markets to improve productivity through to market integration based on agreed grades, standards and prices. India is well positioned to realize the same opportunities for its farmers by providing the basic spatial data infrastructure to enable coordination along the value chain from input providers to farmers to aggregators down to consumers who will increasingly want to be assured that their food is safe and traceable to ensure quality control.

The concepts of Digital Agriculture are scale neutral and are being successfully applied to smallholder farmers around the globe. The Government of India, at the national and state levels, is moving with a sense of urgency to apply these new tools to accelerate the pace of agriculture development to not only realize the vision of a Digital India but to facilitate doubling of farmers' incomes and achieve the Sustainable Development Goals by 2030. Digital agriculture will, thus, enable us to track stewardship of natural resources; help us achieve food and nutrition security in the most efficient, effective and equitable manner to ensure all have access to safe, nutritious and affordable food; and thus live within our ecological boundaries.

Dr. David Bergvinson, Director General, International Crops Research Institute for the Semi-Arid Tropics. David joined ICRISAT in January 2015 to lead its strategy development to ensure science, demand-driven innovation and strategic partnerships come together to translate science into prosperity for rural families in the dryland tropics of Asia and sub-Saharan Africa.

Prior to joining ICRISAT, David worked on the Agriculture Development team at the Bill & Melinda Gates Foundation and led their Digital Agriculture initiative. As Director General of ICRISAT, David continues to build partnerships that leverage the power of digital technology to accelerate the development and delivery of farmer-preferred products and services. To this end, ICRISAT is working closely with national partners along value chains of ICRISAT's mandate crops (sorghum, pearl and finger millet, chickpea, pigeonpea and groundnut) to ensure our science improves the lives of farmers and nutrition for all consumers. ICRISAT refers to these crops as Smart Food – Good for consumers nutritionally, Good for the planet by diversifying farms and Good for smallholder farmers by increasing their resilience and offering diverse market opportunities. David is a Canadian national who has worked in international agriculture research for development for over 25 years.

The Changing Dynamics Of The Global Pulse Sector: Market Access And Supply

Mr. Huseyin Arslan
President, Global Pulse Confederation
Executive Chairman, AGT Food and Ingredients Inc.
President, The Arbel Group

For many decades, the global pulse sector has operated in a reasonably predictable and traditional fashion. Production was high in markets like India and Turkey, where pulses were consumed as well as distributed to regional markets. Timing on trade was reasonably predictable: local production was consumed in the period after the local harvest in traditional production and consumption markets, with trade commencing once there was a need to fill supply pipelines prior to the next harvest period.

Around a decade ago, non-traditional production origins like Canada, Australia and the U.S. began to participate in global pulse markets, producing vast quantities of pulses, but consuming very little of this production. These non-traditional production origins balanced the decrease in production volumes in traditional origins where consumption and demand remained high, but local production was not always able to keep pace.

In addition to efficient agricultural output—producing products that markets want—non-traditional production origins have focused on pulses as part of sustainable agricultural production systems. Growing pulses uses less water, promotes better soil health and creates a positive environmental impact, driving even higher production levels.

Supply from non-traditional production origins, combined with lower local production levels, has impacted the predictable trade flows of pulses, wherein periods that were traditionally slow for pulse trade suddenly became heavy shipping periods, affecting the traditional cycles of new crop products flowing into the market. Prices were also impacted, where traditional consumption markets needed to pay higher prices than markets traditionally were used to for the staple products these markets needed.

These new dynamics have resulted in recent trends wherein traditional consumption markets have become net importers of pulses, the staple foods that have historically been key components of food availability and security. In some cases, these trends

have led to rising food inflation, with the cost of staple items rising in relation to available income.

Governments in traditional consumption markets have deemed these conditions to be not in the interest of their respective countries or their people, and their actions are having a ripple effect on global pulse markets. Protectionist policies and government market intervention have had significant influence in local markets, affecting production and pricing worldwide.

What we are finding is the importance of resolution of non-tariff trade barriers in markets around the world. In India, the ongoing issues surrounding fumigation, in addition to newly enacted policies on import duty for peas and lentils as well as initiatives by Indian Government to support the prices and agricultural production of its local farmers, are demonstrating the importance of India as a driver of the global pulse sector and world supply. It is important to ensure that consumers in India have access to the pulses and staple foods they need, supplying quality and nutritious vegetable protein to the world's largest pulse market.

These dynamics have affected trade flows, prices and overall market psyche of the global pulse sector as market participants, in both traditional and non-traditional production and consumption markets, adjust to the new realities of the global pulse sector.

Things are no longer as predictable and traditional as they had once been.

Today there are more non-traditional production origins for pulses, such as Russia, Ukraine, Kazakhstan, Kyrgyzstan, as well as new production areas for pulses in Canada, Australia and the U.S.—in regions where agricultural output has been high, but where farmers had not participated in pulse production to date, often due to reasons such as a lack of knowledge on how to grow pulses or unavailability of varieties that would be successful in their growing regions.

Additionally, recent years have shown a relative rise in production in India and Turkey, reducing import dependence and providing local markets the ability to once again dictate their own supply terms to the possible advantage of their farmers and consumers. We predict conditions where global supply is high for the foreseeable future.

These are market conditions that the global pulse sector must adjust for to maintain the strength of our sector as a whole.

Pulses are a key protein source for large numbers of the world's population, particularly in those markets where pulses are most consumed and most regularly. There are interesting market dynamics at play in the world's largest pulse market. It is estimated that the global middle class may increase from 1.8 billion to 3.2 billion by 2020 and to 4.9 billion by 2030, with 85% of this growth coming from Asia. In India alone, the middle class estimated to be 200 million by 2020 and 475 million by 2030. This could translate to a dramatic increase in global spending by the middle class, potentially growing from $21 trillion today to $56 trillion USD by 2030 (**Source**: UN FAO; OECD; EY; AAFC).

Global demand for protein has not diminished and certainly will continue to rise as populations grow and more and more people enter the middle class. We must, as the FAO reports, produce the same amount of food in the coming decades as has been produced in the last 10,000 years of civilization in order to feed the world's growing population. Pulses play an important role in the food chain, both through direct consumption by consumers but also in the food system, such as the use of pulses as ingredients in other foods, as well as for animal feed in markets where non-vegetable protein sources are consumed.

As the many components that are part of the chain of production, supply and distribution change, so must our sector's ability to actively participate in the market. We can ensure that pulses are part of the sustainable agriculture system with regard to water usage, soil health and reduction of carbon footprints. We can ensure that with rapid middle class growth, consumption drivers focused on convenience, better quality food and higher quantities of vegetable protein are part of the consumer dynamic.

These factors, external to our sector, also impact global pulses, particularly in the area of governmental policy. Both domestic agriculture and trade policy must be addressed as well.

It is through the various conventions and meetings—and, in particular, the Pulses Conclave in New Delhi for 2018—that spirited debate on upcoming market trends, speculation on crop size, quality and demand takes place, and gives us as an industry "food for thought" throughout the marketing year.

As a sector, we must ensure that we are clear on our positions to governments all over the globe: that pulses are an important component of the global food chain, and that we must work together to ensure that quality, nutritious protein-rich foods move through global markets unimpeded, ensuring food security for all.

These elements are part of our discussions as a sector and continue to evolve and develop, ensuring we work collectively with all participants in the pulse value chain to strengthen our sector. The world depends on it.

The Grain Legumes and Dryland Cereals Agri-food Systems: CGIAR Research Program

Dr Peter Carberry
GLDC Director, ICRISAT, India

The Grain Legumes and Dryland Cereals Agri-food Systems CGIAR Research Program is a new investment in agricultural research for development that will increase the productivity, profitability, resilience and marketability of critical and nutritious grain legume (chickpea, cowpea, pigeonpea, groundnut, lentil, soybean) and cereal (sorghum, pearl millet, finger millet) crops grown within the semi-arid and sub-humid dryland agroecologies of sub-Saharan Africa and South Asia. CRP-GLDC commenced on 1st January 2018 and represents an investment of *circa* US$400 million over five years (2018-2022).

Dryland agroecologies of sub-Saharan Africa and South Asia are where poverty, malnutrition, climate change and soil degradation are among the most acute globally. By 2022-2030, as a consequence of this research program, 8.9-21.7 million farm households will have adopted improved varieties, helping 4.4-11.8 million people to exit poverty and 12.7-24.8 million people meet daily nutritional requirements, with 50% of beneficiaries being women. The logic is that improved innovation capacities within agri-food systems of key cereal and legume crops will enable coherent and integrated research and development, production, market and policy reforms that deliver resilience, inclusion, poverty reduction, nutritional security, environmental sustainability and economic growth.

Sorghum, millets and the grain legumes are grown, eaten and traded together within the same agri-food systems. The CRP will coordinate research interventions that recognize and build on the synergies in these cereal-legume-tree-livestock systems. Prioritization for this research was based on metrics of poverty prevalence, agroecological alignment, value of crop production, foresight projections of significant demand and/or deficit in supply, *ex-ante* return on research investment, consideration of quality, market and environmental traits and alignment with stakeholder priorities. Consequently, first-order priorities for research consist of an incomplete matrix of the 9 crops grown in 13 countries of sub-Saharan Africa (Burkina Faso, Ethiopia, Malawi, Mali, Mozambique, Niger, Nigeria, Sudan, Tanzania, Uganda, Zambia) and South Asia (India, Myanmar).

The CRP is logically structured on five Flagship Programs. Informed by purposeful monitoring and evaluation, research planning is driven by the analyzed needs of these agri-food systems (FP1: Priority Setting and Impact Acceleration). Through strategic partnerships, sector intelligence will identify and leverage value chain interventions that support dryland cereals and grain legume markets (FP2: Transforming Agri-food Systems). These analyses and innovation system engagements can inform and direct the cultivar requirements from crop improvement programs, seed and input supply systems (FP4: Variety and Hybrid Development) and the farming systems practices (FP3: Integrated Farm and Household Management) that lead to resilience and sustainable intensification outcomes. Modern breeding approaches will both underpin and increase the efficiency and effectiveness of crop improvement innovations that meet market demands (FP5: Pre-breeding and Trait Discovery).

CRP-GLDC is managed by the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), supported by the International Institute of Tropical Agriculture (IITA), World Agroforestry Center (ICRAF), International Center for Agricultural Research in the Dry Areas (ICARDA), International Livestock Research Institute (ILRI), International Water Management Institute (IWMI) and Bioversity International. These CGIAR partners will lead key programs of the CRP along with Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO), the French-Agriculture Research for Development (CIRAD), and Institute of Research for Development-France (IRD).

Broad partnerships are essential for CRP-GLDC and include the National Agricultural Research Systems collaborators in West Africa, East and Southern Africa and South Asia, Sub-Regional Organizations, non-Government Organisations and private companies to increase regional adoption of improved crop varieties and enhance market opportunities for smallholder farmers.

More information can be sourced on CRP-GLDC at http://gldc.cgiar.org/.

Australia And India: A Strong Interdependency

Mr. Nick Goddard
CEO- Pulse Australia

Australia and India have a strong and proud history of trading- from spices, tea and fibres in the 18th century to resources, food, tourism and education in the 21st century. Trade has been based on necessity- Australia's early settlers needed tea, spices, cotton and jute to establish the colonies; India needed wool and wheat to supplement domestic production.

Tied by a common language, a common legal system, and, in the early days, sharing a common Regal head, India and Australia have much in common. Add to this our shared love of cricket, and our shared passion and respect for great cricket legends like Sachin Tendulkar, Rahul Dravid , Shane Warne and Donald Bradman, India and Australia are tied at the hip. We have been for centuries, and will be for centuries to come.

Both men equally respected in both India and Australia

This is no more true than in the world of pulses. Our relationship is truly one of ***interdependence.***

Australia needs India, and India needs Australia.

Australia needs pulses and India needs pulses.

To fully understand the interdependence, one needs firstly to look at the history of Australian crop production.

Pulses are not a traditional crop or food in Australia. When the English came to Australia in the 18th Century to establish a new colony, they brought what they knew how to grow in England. When it came to grains, they brought wheat and barley. And for the next 150 years that is pretty much all Australia grew.

Australia struggled in the early days to get cereals to grow, but by the 1840's we were in surplus, and exported our first shipment of wheat. Just like in the US, the discovery of gold in the 1850s opened up wide areas of land well suited for cultivation, and we grew more wheat, and more wheat, and yet more wheat.

We still grow a lot wheat today- we grow more wheat in Australia than India grows pulses.

Wheat production in Western Australia.

But 150 years of continual cereal production has taken its toll on soil nutrients and disease susceptibility. By the 1930's agricultural scientists were talking the benefits of rotation crops, and in particular, legumes for their nitrogen fixing ability. Pulses began to be introduced into the farming system…but not for grain, but as a green or brown manure, and ploughed back into the soil. It wasn't until the 1960s that chickpeas came on the scene as a crop to be harvested for grain, and then followed by lentils in the 1970's.

Today, pulses are a vital component of the Australia broad acre cropping system as growers fully appreciate the importance of including a break crop in their rotations, and in particular, pulses as a nitrogen fixing and disease breaking crop.

Pulses mean a great deal to Australia farmers. Without pulses, Australia would not have the productivity and sustainability of its broad acre farming.

However, ample supply is of no value if there is not ample demand, and it is the Indian demand for Australian pulses drives Australia-India interdependence with pulses. Chickpeas are at the centre of this interdependence. In Australia, chickpeas are one the few winter crop rotation options for wheat in Northern New South Wales and Queensland, while in India, chickpea production continues to fall short of total demand. This presents a true win-win situation for both countries. India needs close, reliable and food-safe supplies of chickpeas to meet any domestic production shortfall, while Australia needs chickpeas to provide viable and sustainable cropping alternatives to improve and protect farming productivity.

John Woods from Bogabilla in northern NSW is typical of an Australian broadacre grain farmer who fully recognises the role chickpeas play in his crop rotation, and recognises the critical importance of India has an export destination for his chickpeas. He knows that a successful wheat crop benefits from a strong, viable chickpea crop in the prior year; and that the chickpea crop benefits from a cereal in the rotation in the year prior to that. He also knows that India requires clean, safe, high quality chickpeas, and ensures his harvested crop meets India's requirements.

John Woods, Australian Chickpea grower.

The Australia- India interdependence goes beyond chickpeas, however. Lentils, peas and faba beans are widely used as crop rotation option in the southern grain growing regions of Australia, providing much needed nitrogen back to the soil, as well as a sustainable and disease break options against cereals. India once again draws heavily on Australian pulse production from the southern region to supplement its domestic production, providing a ready and well-established market for southern grown pulses. Competition for rotation options is greater in the southern growing areas, with lupins, canola/rapeseed, along with wheat, competing with lentils and peas for a share of the rotation.

Australia- India interdependence is founded on ***trust***. India trusts Australia to produce high quality, safe and good value pulses, and expects Australia to be able to supply Indian markets when shortfalls occur. Australia expects India to be a low risk market, tough, but fair negotiations, and reliable for execution.

The Australian Agriculture Minister recently met in Delhi with India's Minister for Commerce and Industry, the Hon. Suresh Prabhu to specifically discuss the interdependence between the two countries in relation to pulses. This follows the sudden imposition of a 30 % tariff on chickpeas and lentils in December 2017.

Australia recognises that ensuring the viability of Indian farmers is critical…400+ million farmers and their families do need to be supported. If they are not viable, then India is not viable. That is not good for India, and it is not good for Australia. Australia also fully recognises that food security is priority one, two and three for India, and we believe Australia is a core partner in the equation for India's food security for the consistent supply of safe, high quality and market accepted Australia pulses.

It is important that the confidence of Australian pulse growers and Indian and Australia pulse traders can be upheld and while recognising India's sovereign right to intervene in markets for domestic purposes. The enduring trust and reliability of Australia as a supplier and India as a buyer remain paramount.

Interdependence, not unlike marriage, is built on trust, courage, honesty, and above all, understanding.

The long and proud interdependence that Australia and India have is testament to the understanding we have of each other.

A busy year for Gafta's Arbitration Department

By Beth Jameson, Arbitration Manager, Gafta

The arbitration statistics for 2017 reflect a busy year for Gafta's Arbitration Department. We aim to process all arbitration cases, from receipt of notice to issuance of award, in as efficient a manner as possible and the process has run smoothly. This is reflected in feedback made to the department by parties and law firms. The 2017 statistics discussed below relate to the period 1 October 2016 to 30 September 2017 and any comparisons are against the same period from the previous year.

2017 has been by far the busiest year for first tier Gafta arbitrations since 2010 (when Gafta first collated arbitration statistics). This year Gafta received 984 claims of arbitration; an increase of 56.69%. The department issued 184 first tier awards of arbitration; a 9.52% increase. Of the 184 first tier awards 24% were appealed and Gafta issued 33 appeal awards; a decrease of 25%.

On average the total time taken for Gafta to issue a first tier award from the date of setting the procedural timetable was seven months which includes an average of three months taken from when the Tribunal closed proceedings. For appeal awards it took an average of 12 months from timetable to issue.

The average cost of a Gafta first tier and appeal award for 2017 are set out in the below tables.

First Tier

ASSOCIATION FEES	ARBITRATOR FEES	TOTAL FEES (INCLUDING NON MEMBER CHARGES)
£1,032	**£6,326**	**£9,012**

Appeal

ASSOCIATION FEES	ARBITRATOR FEES	TOTAL FEES
£3,020.08	**£16,399.43**	**£20,140.59**

The most common specific commodities seen in Gafta arbitrations during 2017 (in order of their use) were as follows:

Brazilian soybean meal pellets, Russian milling wheat, Argentine corn, Ukrainian/ Russian whole yellow peas, Argentine soybean, Ukrainian milling wheat, French feed barley, Australian barley, Great Northern beans.

As part of the Gafta arbitration service we also offer the defaulter process. In the event that either party to an arbitration neglects or refuses to abide by a final award or does not pay any outstanding costs due to Gafta when called upon to do so, Gafta's Council may post the name and address of the company on the Gafta website and circulate these details amongst members. In total 32 parties were 'posted' by Gafta in 2017, of which 5 parties have settled within the same period. For more information on this process please refer to Rules 24.1 and 24.2 of Gafta 125 Arbitration Rules.

"I have been running commercial arbitrations at Gafta for the past 20 odd years. I have always found the way claims are processed by their Arbitration Team to be of a consistently high standard over all this time. I cite the following short examples;

- *Any notice of arbitration is immediately responded to with a case number allocated.*
- *If an arbitrator needs to be appointed due to a respondent failing to do so, it is done diligently and promptly by the Team.*
- *Appointment of arbitrators is another area where they excel. Appointments are spread around so no one arbitrator ends up with too many appointments. This allows case management to proceed efficiently.*
- *Orders are also issued promptly and efficiently. There is no undue waiting time.*

Well done the Gafta Arbitration Team and keep up the good work."

Patrick Battersby of Davies Battersby law firm

Gafta's Arbitration Team (l to r): Jonathan Waters, Beth Jameson, Emily Bensusan-Sterry, Nancy Wing

Beth joined Gafta in 2013 as Arbitration Assistant, and was subsequently promoted to Arbitration Executive in 2015 and then Arbitration Manager in March 2017. Beth deals with all Gafta Arbitration cases, arbitration appointments and contract updates. She provides administrative support to the International Contracts Policy Committee and Arbitration Committee.

Net Exporters To Cut Pulse Output

Mr. Brian Clancy
STAT Publishing

Canada and the United States will have no shortage of pulses to market in the coming marketing year even though total area is expected to drop 21% to 10.6 million acres. Most of the drop will be in yellow peas and red lentils. That is because demand from the Indian subcontinent is not expected to recover any sooner than the last half of 2019.

India's rabi season plantings have set a new record this year, with production of chickpeas expected to reach a record 9.71 million metric tons. If yields drop back to their recent five-year average total pulse output for the 2017-18 production cycle could drop from 22.95 to 21.57 million metric tons. If India consumed all the pulses available that would mean that imports need to rise during the last half of the year to cover the difference. One problem is imports reached epic proportions.

Looking at pulse supply in India on a calendar year basis makes more sense than thinking about the country's fiscal year production cycle. On that basis, it looks like the available supply of pulses during 2017 approached 28 million metric tons. The suggests there was a surplus of almost 2.2 million metric tons.

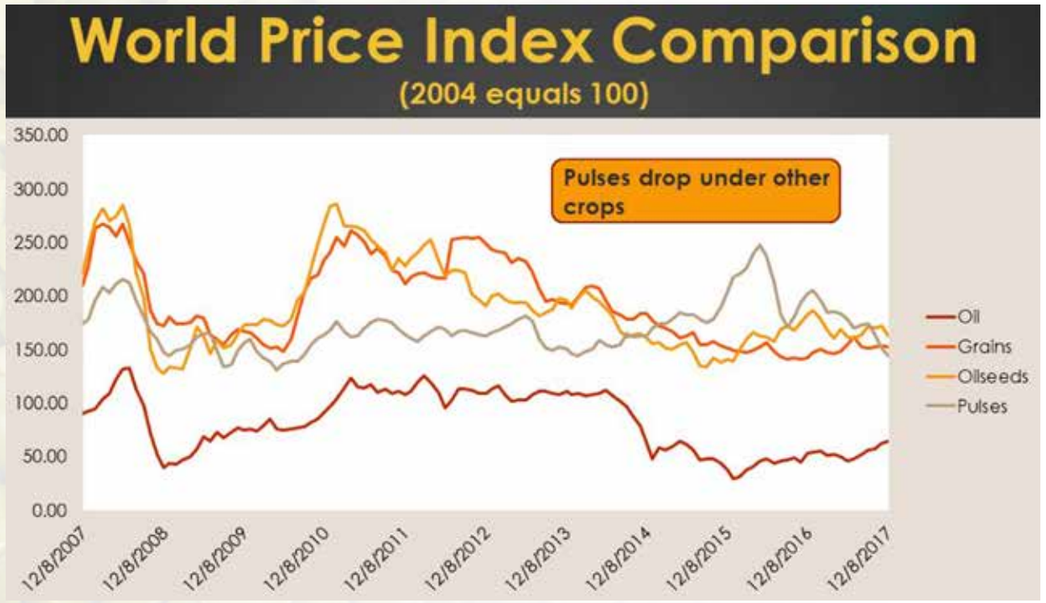
Even if the available supply of domestic pulses drops from 22.5 to around 21 million metric tons in 2018, India will not have a fundamental shortage and could finish 2018 with a residual surplus of around 735,000 metric tons.

Ironically, imports probably spiked in 2017 because some speculators and importers may have accumulated stocks in hopes of a windfall profit once steps were taken to limit imports. The key moves were imposing import quotas on tur (pigeon peas), urad (black matpe) and mung beans; penalties if pulses were not fumigated with methyl bromide at time of shipment; and eliminating the import duty exemptions for pigeon peas, yellow peas, green peas, lentils and chickpeas.

While 2016 was a year in which India's needed to import over five million metric tons of pulses to cover its domestic needs, imports in 2017 were higher than necessary. That demand was the key reason global pulse output set recent records in both 2016 and 2017. But, combined with rising production in India, it was clear during the first quarter of 2017 that global trade should decline after the third quarter of 2017 and not recover unless there were production problems in a key consuming region in 2018.

That forecast was not fully realized until India eliminated the import duty exemptions for pulses. On November 8, the duty for peas returned to 50%, while it was not until December 21 that duties for lentils and chickpeas returned to 30%. Some of the loss in prospective demand from India has been offset by rising pea purchases by India and desi chickpeas by Pakistan.

With prospective returns returning to a more normal relationship to grains and oilseeds and unsold stocks rising, world pulse output could drop from 55.7 million metric tons to around 52 million. While just below the recent five-year average of almost 56 million, output is still well above the average 50 million metric tons harvested between 2011 and 2015.



Even so, pulses prices have been on a general downward since January of 2017. Historically, the global price index for pulses was almost always lower than the indices for cereal grains and oilseeds. But between April of 2015 and July of 2017 the global price index was above grains and oilseeds, encouraging farmers to shift into pulses.

Significantly, the decline is in net exporting countries. Current weather patterns suggest this year's monsoon will be close to normal. But, if rainfall is uneven and the main rabi production states start the 2018-19 seeding campaign with moisture deficits, global demand could improve in 2019.

Unfortunately, exporters may not be in a position to respond and unless prices become more competitive with other crops during the first quarter of 2019, seeded area would not be expected to recover in the northern hemisphere.

There is an old saying, "Be careful what you wish for. You might get it."

Demand for pulses from food and pet food manufacturers is growing rapidly. That has resulted in significant investment in pulse fractionation plants close to the production areas in Canada.

Rapid growth in this market is a direct result of efforts leading up to International Year of Pulses and recent increases in production. The first helped raise the profile of pulses in developing countries and the second made manufacturers confident about continuity of supply.

Rising competition from domestic buyers in net exporting countries is changing global demand fundamentals and, over the long term, leaving net importing countries in a more vulnerable position. While exporters can respond to unexpected increases in demand, the price shocks could be more extreme than in the past because of more widespread competition for available sources of supply.

Production	2015	2016	2017	2018	Average
Beans	22,803,000	22,479,000	22,864,000	22,225,000	22,381,400
Chickpeas	11,437,080	12,789,800	14,136,600	13,700,900	13,078,396
Lentils	5,200,000	6,582,000	5,719,000	5,318,000	5,455,800
Peas	10,890,000	14,050,000	12,985,000	10,798,000	11,990,000
Total	50,330,080	55,900,800	55,704,600	52,041,900	52,905,596
Total Supply	2015	2016	2017	2018	Average
Beans	23,774,000	23,064,000	23,517,000	23,267,000	23,194,400
Chickpeas	11,935,080	13,045,800	14,374,600	14,003,900	13,463,396
Lentils	5,783,000	6,873,000	6,222,000	6,139,000	6,086,000
Peas	11,720,000	14,330,000	13,715,000	11,918,000	12,500,000
Total	53,212,080	57,312,800	57,828,600	55,327,900	55,243,796

Trade	2015	2016	2017	2018	Average
Beans	4,117,000	3,710,000	3,222,000	3,434,000	3,649,200
Chickpeas	1,821,000	3,278,000	1,157,000	1,193,000	1,731,800
Lentils	2,905,000	4,030,000	2,841,000	2,786,000	3,063,800
Peas	4,310,000	6,040,000	4,650,000	4,000,000	4,906,000
Total	13,153,000	17,058,000	11,870,000	11,413,000	13,350,800
Inferred Use	2015	2016	2017	2018	Average
Beans	23,189,000	22,411,000	22,475,000	22,521,000	22,355,400
Chickpeas	11,679,080	12,807,800	14,071,600	13,640,900	13,098,196
Lentils	5,492,000	6,370,000	5,401,000	5,502,000	5,437,600
Peas	11,440,000	13,600,000	12,595,000	11,048,000	11,822,000
Total	51,800,080	55,188,800	54,542,600	52,711,900	52,713,196
Ending Stocks	2015	2016	2017	2018	Average
Beans	585,000	653,000	1,042,000	746,000	839,000
Chickpeas	256,000	238,000	303,000	363,000	365,200
Lentils	291,000	503,000	821,000	637,000	648,400
Peas	280,000	730,000	1,120,000	870,000	678,000
Total	1,412,000	2,124,000	3,286,000	2,616,000	2,530,600
Stocks to Use	2015	2016	2017	2018	Average
Beans	3%	3%	5%	3%	4%
Chickpeas	2%	2%	2%	3%	3%
Lentils	5%	8%	15%	12%	12%
Peas	2%	5%	9%	8%	6%
Total	3%	4%	6%	5%	5%
BASED on historical data from the FAO and other country specific data sourcesCopyright					

Leading provider of integrated pulses processing and milling solutions. With a presence in over 140 countries, our global reach gives pulses processors unparalleled access to a wide range of capabilities including comprehensive machine portfolio and process know-how, supported by our full turnkey capabilities.

Interested? Let's talk.
pulses-spice.processing@buhlergroup.com
www.buhlergroup.com/pulses

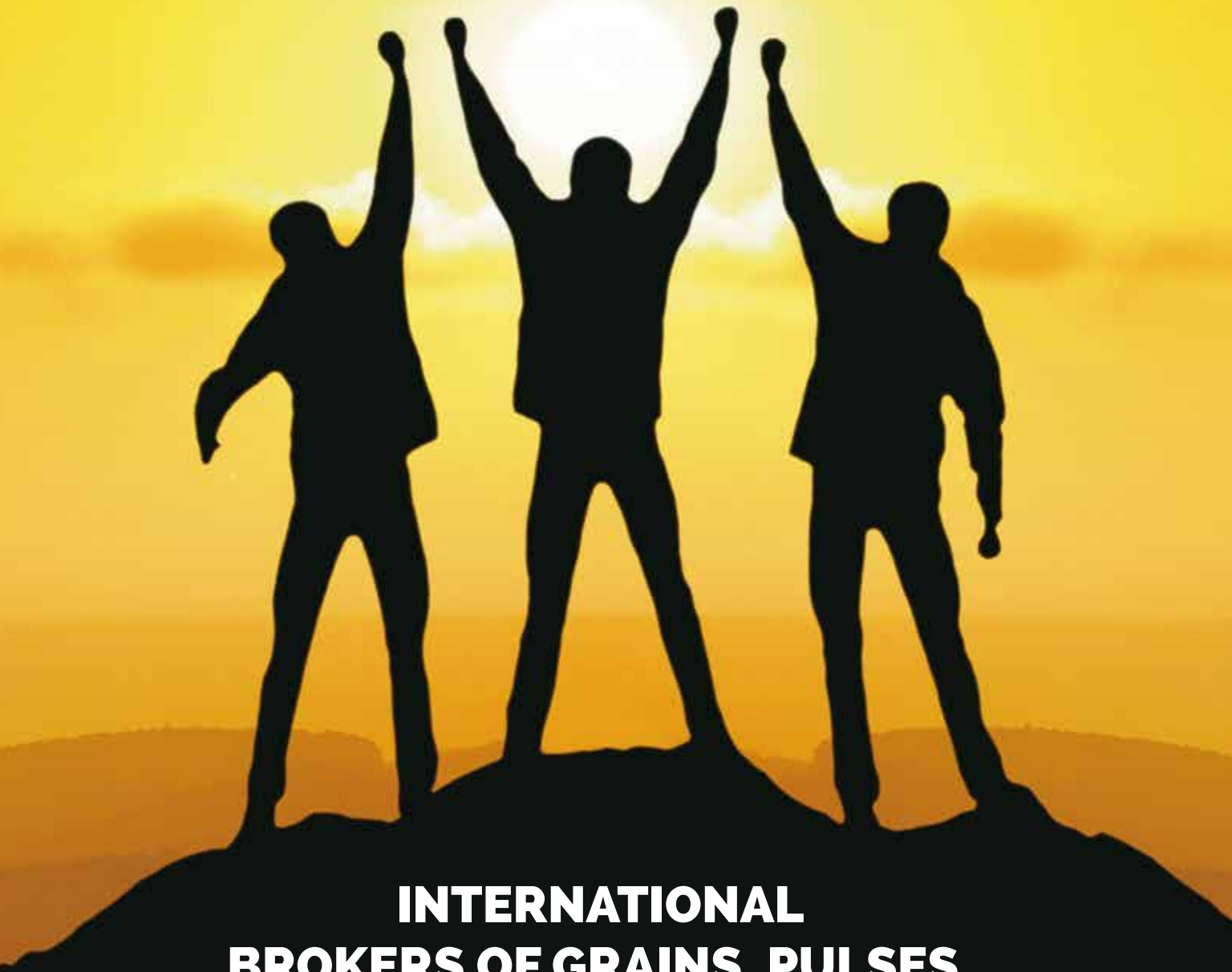
The number one **partner of choice** for pulse processors.

For best in machine performance, efficiency and yield.

Innovations for a **better world.**

BÜHLER

INFINITE POSSIBILITIES !!!



INTERNATIONAL BROKERS OF GRAINS, PULSES, OILSEEDS AND SUGAR

ESARCO

ESARCO EXIM PVT LTD

4B, S.B.TOWERS, 2/FL, 37 SHAKESPEARE SARANI, KOLKATA- 700017, INDIA

• Tel : + 91 33 2281 1764 • Fax : + 91 33 2281 1767

• Email : business@esarco.com • Web : www.esarco.com