



# PULSE INDIA

AN INDIA PULSES AND GRAINS ASSOCIATION PUBLICATION

## SPECIAL ISSUE DESI CHANA

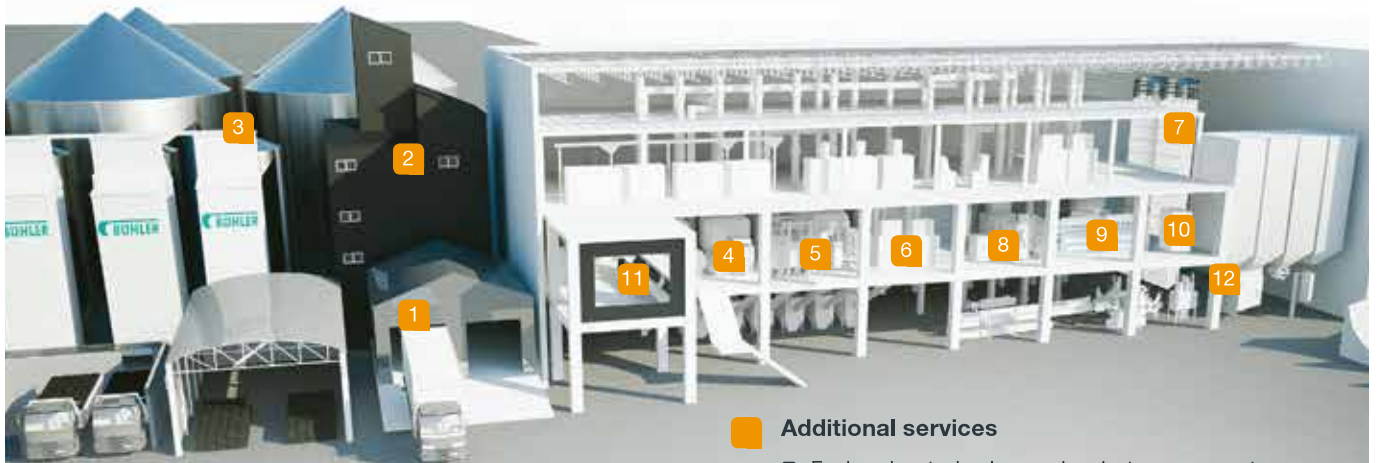
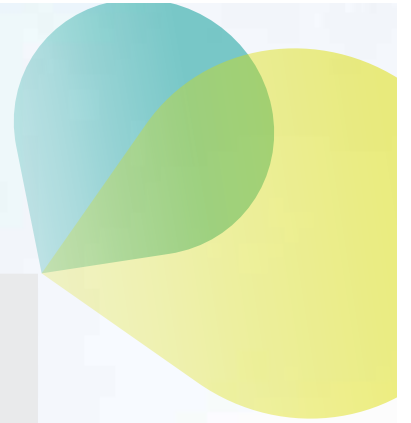
- Desi Chana - The Powerhouse Of Nutrients
- Technological and policy intervention for increasing chickpea production in India
- The government holds the key to Chana's prospects

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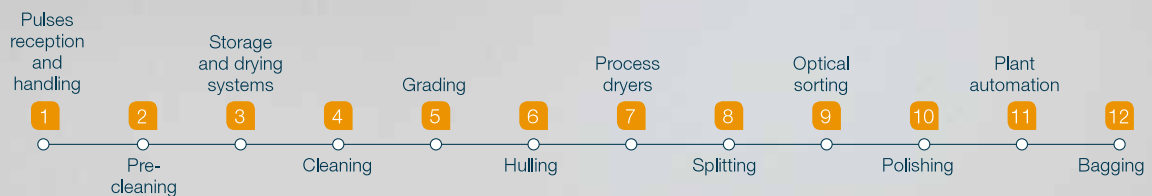
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## *From the Chairman's Desk*



It gives me immense pleasure to address you for the first time as Chairman of India Pulses and Grains Association. At the outset, I would like to acknowledge the great work done by the Past Chairman Mr. Pravin Dongre. His contribution to the growth of IPGA has been immense and it is because of the hard work done by him and his team that IPGA today is recognised as an apex body of pulses and grains in India.

I humbly accept the responsibility bestowed upon me by the Managing Committee and assure you all that we as a team shall continue to work towards the benefit of all the stake holders in the value chain of pulses like Farmers, Consumers, Traders, Millers, Brokers, Service Providers etc.

Friends, I am also delighted to inform you that The Pulses Conclave has been a tremendous success and it would not have been possible without the contribution of Patrons. So, a big thank you to you all. We have come a long way since 2012 when we hosted our first Pulses Conclave and the event is becoming more and more popular with the pulses traders from across the globe. This is evident from the success of The Pulses Conclave 2018 held between 14th February -16th February in New Delhi. We had the presence of nearly 750 participants from various countries including some prominent names like Hon'ble Onier Carlier, of The Minister Agriculture & Forestry, Alberta Canada, Hon'ble Charity Kaluki Ngilu, The Governor, Kitul County, Kenya, Dr. B Rajendra, Joint Secretary – Plant Protection, Ministry of Agriculture and Farmers Welfare, Government of India and Mr. Huseyin Arslan, The President CICALS.

Friends, as we all know that Pulses trade is passing through a testing time. On one hand Farmers are not getting the appropriate realization of their produce despite the best efforts by The Government and on the other hand traders are in fix given the restriction imposed on the imports for various pulses. Government has taken various measures like "Bhawantar Bhugtan Yojna" to push the prices of pulses towards the MSP level. However heartening factor in all this time of disturbance is that India is fast moving towards self-reliance in the field of pulses and we are likely to have record production of pulses in the coming season.

IPGA was recently invited by The Ambassador of Argentina to India H.E. Daniel Chuburu to discuss the possibilities of enhancing the trade between these two countries. A delegation from IPGA met the Team Argentina and both the sides agreed to cooperate on the issues of mutual interest.

Before I end this note, I would like to thank the Managing Committee for having shown faith in me and I assure all the Patrons that Team IPGA will continue to work towards the betterment of Trade and all other stake holders in the Value Chain.

Jai Hind.

**ZAVERCHAND (JITU) BHEDA**  
CHAIRMAN  
India Pulses and Grains Association



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**Varinder Machhral**  
CEO IPGA

Dear Patrons,

It indeed is a matter of great pleasure to connect with you through this edition of Pulse India and I would like to thank the Managing Committee of IPGA for giving me an opportunity to work closely with you all in the capacity of CEO. This certainly is a great responsibility and I sincerely hope to live up to the expectations of you all. Patrons have extended their whole-hearted support to IPGA in the past and I am sure you will continue to support us in all our endeavours for the betterment of all the stake holders in the value chain of pulses.

As we all know that this year has been tough for the pulses trade. All the stake holders have their own set of difficulties. On one hand Farmers are not getting the appropriate realization of their produce despite the best efforts by The Government and on the other hand traders are in fix given the restriction imposed on the imports for various pulses. Millers are stuck up with their high-priced stocks. Government has taken various measures to push the prices of pulses towards the MSP level. MP State has introduced “Bhavantar Bhugtan Yojna” and Government of Maharashtra has announced a subsidy of up to Rs. 1000.00 Per quintal for the farmers whose produce has been sold below MSP. (subject to Verification). Government even extended the date of purchase from the Mandis, but all these measures have not given the desired results. So, the curb on Import becomes obvious choice for the Government in present day scenario.

Trade has witnessed lot of chaos in the aftermath of various notifications which were issued by DGFT restricting the quantity of import of Peas to 100000 Mts only and that too only against LCs and 100 % advance payment given before the date of notification restricting the quantity of import of yellow peas. In the process some of the traders are really feeling the heat as they have remitted part advance to the shippers and are now staring at the risk of their advances being forfeited as the Government has clarified that only LCs and 100% advance payment shall be accepted as the qualifying criterion for issuing the import permits for import of yellow peas. Another setback for the Importers and consumers is that all other kind of Peas like Kaspas, Dun and Green Peas have also been restricted as they share the same HSN code. Green Peas are not much produced in India and are a cheaper replacement for the fresh Green Peas for the consumers and we strongly feel that Government should allow the import of Green Peas and at the same time also waive the duty on these peas in the best interest of the consumers. Similarly timing of issuing the Import Permits for the import of Tur, Moong and Urad also seem to be out of sync as we have enough stocks and moreover our own produce is selling at a price much lower than MSP.

However heartening factor in all this time of disturbance is that India is fast moving towards self-reliance in the field of pulses and we are looking at record production in the coming season for Chana which is being estimated at 11.1 Million Mts. Monsoon is also being predicted as normal and we can expect the Agri output to be on the expected levels. IPGA from its side is constantly engaging with the Government to raise the issues of importance to ensure that our Agri Industry is on a healthy growth path and at the same time consumers are given the nutritional security at a reasonable price.

Before I sign off, I would request all of you to give us your valuable feedback from time to time and send in your contributory articles for Pulse India. You may write to me at [varinder.m@ipga.co.in](mailto:varinder.m@ipga.co.in) I also take this opportunity to thank all the advertisers for their support.

**Varinder Machhral**  
CEO IPGA

# Will Chana Regain Its Demand Share In The Market ?

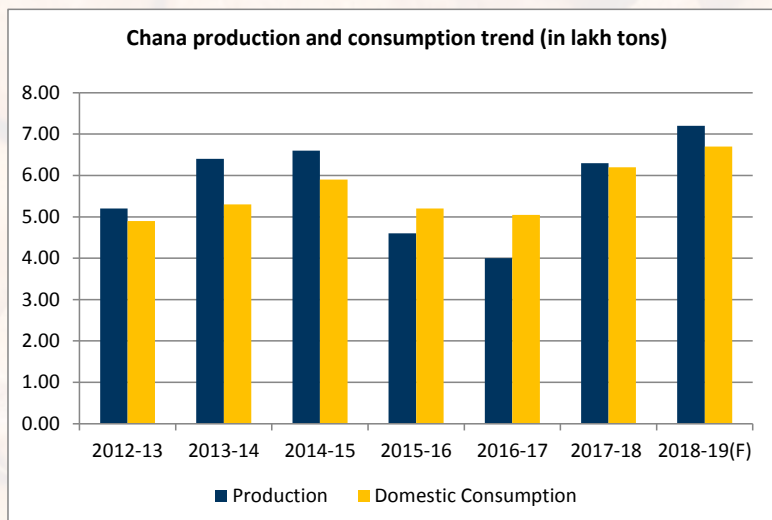
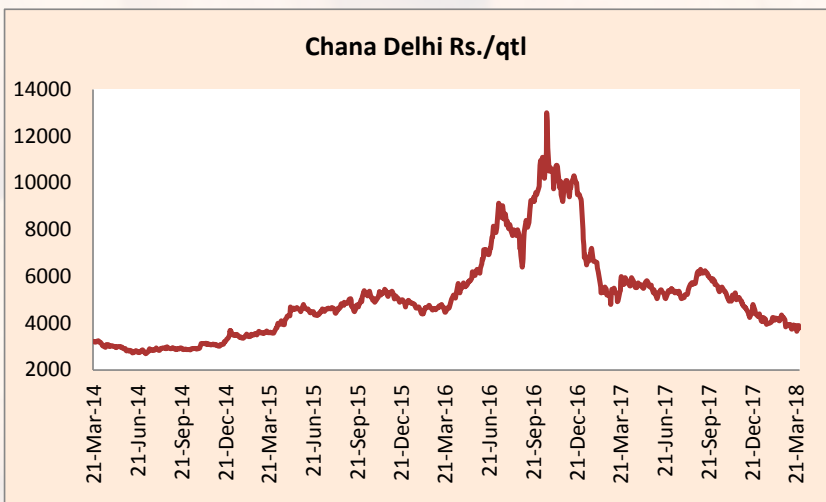
**Gaurav Bagdai**  
*Director of G.P. Agri Brokers*



The roller coaster ride in chana prices which began in October 2014 ended only by the end of August 2017. During this period chana prices rallied in the wide range of Rs.2950 and Rs.13000 per quintal. This historic rally in prices was triggered by acute shortage in production in 2015 due to sharp decline in acreage as price plunged to multiyear low just before the planting began for 2015 crop. This was followed by two consecutive drought seasons which failed to revive the production of this major Rabi pulse. Chana production during these two consecutive seasons fell below 5 million tons. The El Nino weather phenomena coupled with unseasonal event of rains and hailstorms during the harvest period had impacted the production of the entire pulses basket along with chana.

Record prices of Chana in 2016 encouraged the farmers to cover large acreage which in turn resulted in sharp increase in production during the year. Production during the season 2017-18 is estimated at 58 lakh tons. However, despite sharp increase in production and record imports of over 1 million tons chana prices were relatively higher as compared to other pulses. This was mainly due to the historic move of

Demonetisation of high denomination currencies in November 2016 which had made commodities dearer to cash. Also record prices tested in previous season induced farmers to hold back their produce. Hence the farmer selling was staggered throughout the season for chana. This was also followed by introduction of GST in July 2017 which changed the seasonality in most of the agri commodities during the period 2016-17 and chana was one of it. While most of the pulses were trading below their respective



MSP's, Chana was the only pulse which held well above MSP during the season thus making it attractive choice to the farmers to sow in 2017. The prices only started to decline after commencement of Rabi sowing operations in anticipation of higher acreage. The acreage for the crop season 2017-18 turned out to be at record at 107.6 lakh hectares. Record acreage along with favorable weather throughout the growth stage resulted in best ever production of chana for 2018. Market participants believe chana production for the season to the tune of 7.5 million tons including 0.7-0.8 million tons of kabuli chana.

Despite the import duty of 60%, imports of around 1.5-2 lakh tons are expected to arrive from Low Developed Countries (LDC). However imports from the major destination, Australia would be negligible as

uncertainty in Indian markets has reduced the production prospects to 0.5 million tons which would be its normal levels while sharply down from production of over 1 million tons in recent years. Expectation of low production in Australia and would help maintaining its prices at prevailing level of around \$540-\$580 per ton or at elevated levels. Hence, huge import disparity for chana would prevail throughout the season.

Prospects of record production coupled with record beginning stocks dragged down chana prices way below its MSP of Rs.4400 to make low of Rs.3600 at Delhi market. While all the pulses were trading way below MSP due to excess supplies. The falling trend in chana prices which began since August 2017 further attracted government attention. Thus in order to protect the farmers interest the government made series of policy changes and introduced various schemes in order to bail out prices from the bearish trend. The support came in the form of levying hefty import duties in chana at 60%, yellow pea 50% and lentils 30%, quantity restrictions in pulses like tur, urad and moong. The government opened doors for exports and also provided incentives of 7% for chana. Buffer stocks are also created for pulses for which government procured aggressively. Despite all these measures chana prices failed to seek any respite from its bearish trend due to superfluous supplies. Thus the government implemented the much awaited policy of quantitative restriction of import of yellow peas which would be at 1 lakh tons till 30<sup>th</sup> June 2018. With this major step taken by the government would certainly arrest chana prices from declining sharply going forward. The recent jeopardy in policy amendments has shoved away the trades in heavy volume in the markets, which in turn is vital factor for the government to achieve its objective of supporting the farmers.

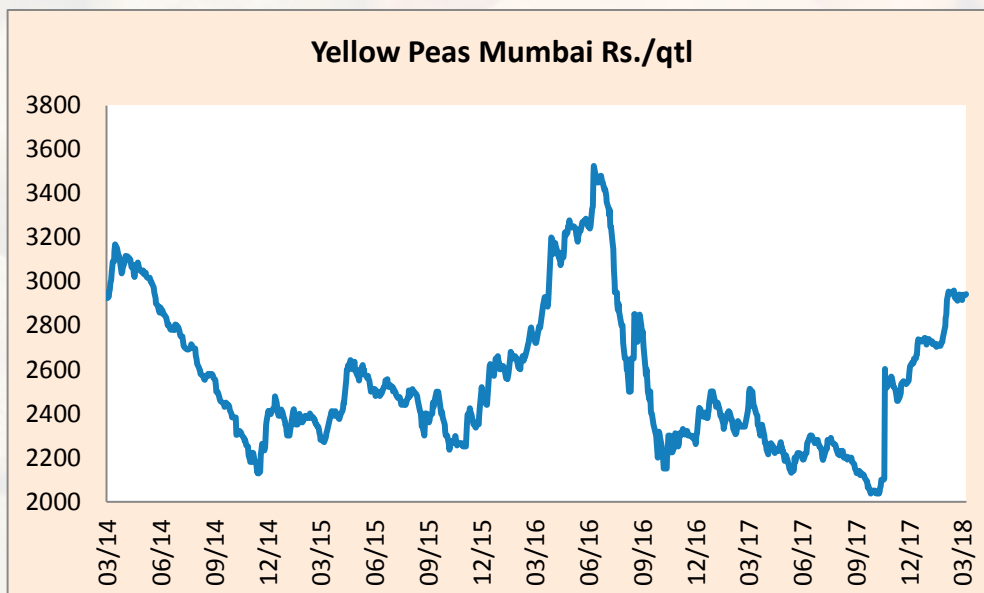
Yellow peas are the cheapest pulse available. Historically, production of total domestic pulses fall short of requirement, thus despite being the largest producer, India is also the largest consumer in world. In order to cater the need of increasing demand and stagnant growth of pulses production at home,

especially chana, the dependence on imported pulse has increased in recent years. Yellow pea is the largest imported pulse in India. Annual imports are in the range between 2.5-3 million tons and imports contribute to over 90% of the total supplies of yellow peas. Due to its unique characteristics of being cheapest and containing high nutritional value, yellow pea has managed to create its own market. Earlier this was imported as an alternative to chickpea, in recent years the demand in domestic food industry has increased substantially due to its attractive pricing.

With record chana production in country, prices have cooled down sharply for chana, while on other hand prices of yellow peas have increased substantially. This is due to exorbitant import duty of 50% imposed by the government. Also with restrictions in imports for 3 months the upward trajectory in prices would continue. At prevailing levels of Rs.3250-3300 per quintal at Mumbai market for Canadian variety includes import duty of 50%, makes it very expensive for the industrial users. When chickpeas, being a premium pulse are available relatively cheaper at Rs.3825 per quintal in Delhi the demand for yellow peas would certainly start rationing. At the spread of Rs.700-800 per quintal, earlier we have seen the demand for chana increases and that of yellow pea declines. This spread has emerged after November 2014, thus there is high possibility of demand for chana to increase additionally by 0.5-0.7 million tons apart from its growth in consumption during the season 2018-19.

While the supply of the pulse is surplus, expected growth in consumption at lower price levels coupled with shift in demand from yellow peas would definitely help chana prices to revive from its recent lows. Thus chana is expected to attract attention from traders during the season.

This season would be very interesting to watch, as apart from its own supply and demand fundamentals, chana prices will to a large extent take cues from its counterpart, yellow peas, changes in government policies, procurement by the government and monsoon.



# Technological And Policy Intervention For Increasing Chickpea Production In India

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In India, more than a dozen pulses such as chickpea, pigeonpea, mungbean, urdbean, lentil, fieldpea, lathyrus, rajmash, cowpea, mothbean, horse gram, rice bean etc. are cultivated on 27-28 m ha area in 10-12 major states. Out of these pulses, Bengal gram or chickpea (*Cicer arietinum* L.) is major one. It ranked first in area (8.93 m ha), production (8.37 m t) and productivity (937 kg/ha) during last 5 years (2012-17) on average basis registering positive growth in area, production and yields during last three consecutive Five Year Plans. Recently, chickpea production has attained new height and reached to double digits (>11.10 m t), thus may contribute about 45% to the total pulses basket of our country. This could happen to technological advancements made in terms of varieties development, emphasis on quality seed production and supply, massive efforts on transfer of technologies through various schemes and favourable policy support like minimum support price (MSP) and procurement, Pradhan Mantri Fasal Bima Yojana (PMFBY), Pradhan Mantri Krishi Sinchai Yojana (PMKSY), ensured supply of fertilizers, etc. from the Government of India. Later many state Governments followed these policies leading to all time high production (11.10 m t) of chickpea during 2017-18 (<http://pib.nic.in/newsite/PrintRelease.aspx?relid=176824>). Govt. of India and several State Governments are making all efforts to procure chickpea directly from farmers at remunerative minimum support price (MSP). These efforts will encourage Indian farmers to grow more chickpea in years to come and to produce additional 1.5 to 2 m t of chickpea.



by different vernacular names like *Gram* or *Chana* or *Chani* in Haryana, Rajasthan, Uttarakhand, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, Bihar, Jharkhand, Assam etc.; *Chhole* in Punjab, Jammu & Kashmir, Delhi and parts of Haryana; *Harbhara* in Maharashtra, *Chola* in West Bengal, *Boot* in Orissa, *Sanagulu* in Andhra Pradesh, *Kadale* in Karnataka, *Kadalai* in Tamil Nadu and *Kadala* in Kerala etc.. This also indicates that knowledge on chickpea cultivation and utilization is wide spread among people of our country. In India, chickpea is grown from 32° N in northern India in cool and long season (>140-170 days maturity) to 10° N in southern India under warm and short season (85-100 days maturity). However, the cultivation is mainly concentrated in central and part of the country where chickpea takes about 115-130 days to complete seed to seed cycle. Chickpea is broadly classified into two groups, desi and kabuli. Desi chickpea varieties are under cultivation from ages and have small seeds, angular to round in shape, dark seed color having smooth to rough seed coat; while kabuli varieties usually have large beaked seeds to ram's head shape or round seeds with white or beige seed coat colour and large size (30 to 65g/100 seed weight). All desi types have anthocyanin pigmentation usually on collar region, leaves, stem, and peduncle on in form of streaks on corolla of the flowers. In India, desi chickpea constitutes 85-90% and is commonly grown in different parts of the country.



## 2. Production statistics

Chickpea (*Cicer arietinum* L.) is the 2<sup>nd</sup> largest grain-legume crop in the world that is grown in more than 56 countries with total production of 12.65 m t from an area of 12.55 m ha registering about 1000 kg/ha average grain yields during 2016. India ranks first in chickpea production in the world followed by Australia, Myanmar and Pakistan etc. During 2017-18, 11.10 million tones of chickpea production is expected from 10.17 m ha area in India. The states like Madhya Pradesh, Rajasthan, Maharashtra, Uttar Pradesh, Andhra Pradesh, Karnataka, Chhattisgarh, Gujarat, Haryana and Bihar contribute more than 95% of the total chickpea production in our country. In India, chickpea has registered positive growth in area, production and yield during



## 1. Introduction

Gram or chickpea (*Cicer arietinum* L.) is cultivated in almost all parts of the world covering Asia, Africa and Sahara and Sub-Sahara Africa, Australia, Europe, North and South America,. In India, Bengal gram or chickpea (*Cicer arietinum* L.) is known

last three five year Plan periods (Table 1).

**Table 1.** Trends in area, production and yield over three consecutive Five Year Plan periods

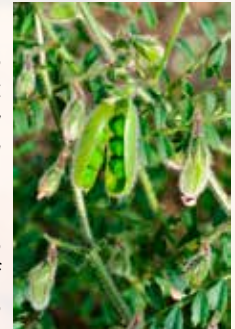
Plan	Area (m ha)	Production (m t)	Productivity (kg/ha)
X Plan (2002-2007)	6.82	5.47	802
XI Plan (2007-2012)	8.22	7.24	881
XII Plan (2012-2017)	8.93	8.43	944
2017-18 (Current Year)	10.17	11.10	1091

During 2016-17, chickpea production in India crossed 9 million tonnes mark after gap of three years and country could produce 9.33 million tonnes of grains from 9.62 m ha area that was lower by 0.29 m t in comparison to chickpea production of 2013-14 when it was ever highest. During current year (2017-18) again chickpea production and productivity has attained new height and it surpassed to 9.57 million tones and 1090 kg/ha, respectively. The impressive growth in chickpea production during last 15-16 years and its share in India’s export basket of pulses reached to 84.87% during 2015-16. It is expected that with the increase in indigenous production of chickpea, country may be in position to start export of chickpea to targeted countries based on the strategic advantages.

### 3. History of cultivation in India

Chickpea cultivation is known since ages in India as evident from De Candolle finding’s that gram has a Sanskrit name “Chanaka” which indicates that the crop was under cultivation in India longer than in any other country in the world. The earliest available records of chickpea cultivation in India suggest its cultivation back to 2000 BC at Ataranjikhera (Uttar Pradesh) and 300-100 BC

at Nevasa (Maharashtra). In India, chickpea cultivation is known since ages as its use has been mentioned in ancient holy books Vedas). Further, a commentary on the Rig-Veda, called *Brahadaranyaka* (c. 5500 BC) has mentioned a grain called *khalva* and the Yajurveda (c. 7000 BC), which followed the Rig-Veda specifies *khalva* as a pulse indicating that the use of chickpea in some form or other was known in Vedic era also. Later, Kautilyas (321–296 BC) mentioned *kalaya* as a post rainy season crop that is consumed in various ways including after roasting. It is well documented now that a large number of sweet and salty dishes are prepared after making flour (besan). Roasted chickpea grains are consumed commonly in several parts of the country as healthy snacks.



### 4. Challenges for achieving higher chickpea yield

A large number of biotic and abiotic stresses (Table 2) affects chickpea productivity which is otherwise possible to realize.

**Table 2.** Major biotic and abiotic stresses affecting chickpea

States	Biotic stresses			Abiotic stresses
	Diseases	Insect pests*	Nematodes	
Eastern Uttar Pradesh, Bihar, Jharkhand, West Bengal, Assam, Parts of Odisha	<i>Fusarium</i> Wilt, Dry Root Rot, Collar Rot, <i>Botrytis</i> Gray Mould	Gram pod borer ( <i>Helicoverpa armigera</i> ), Cutworm ( <i>Agrotis ipsilon</i> ), Semilooper ( <i>Autographa nigrisigna</i> ), Bruchid ( <i>Callosobruchus chinensis</i> )	Root knot nematode	Heat at flowering/ podding and seed filling stage, moisture stress
Punjab, Haryana, Himachal Pradesh, Jammu & Kashmir, Uttaranchal, Northern Rajasthan and Western Uttar Pradesh	<i>Fusarium</i> Wilt, Root Rot <i>Ascochyta</i> Blight, <i>Botrytis</i> Gray Mould	Gram pod borer ( <i>H. armigera</i> ), Aphid, ( <i>Aphis craccivora</i> ), Termites ( <i>Odontotermes</i> spp. ), Bruchid ( <i>Callosobruchus chinensis</i> )	Root knot nematode	Low temperature, frost, moisture stress
Madhya Pradesh, Chhattisgarh, Gujarat, Maharashtra, Southern Rajasthan, Bundelkhand tracts of Uttar Pradesh	<i>Fusarium</i> Wilt, Dry Root Rot, Collar Rot, Stunt	Gram pod borer ( <i>H. armigera</i> ), Termite ( <i>Odontotermes</i> spp.), Bruchid ( <i>Callosobruchus chinensis</i> )	Root knot nematode	End of the season drought, heat at early crop growth stage and pod filling, frost
Andhra Pradesh, Telangana, Karnataka, Tamil Nadu, parts of Odisha	<i>Fusarium</i> Wilt, Dry Root Rot, Stunt Virus	Gram pod borer ( <i>H. armigera</i> ), Bruchid ( <i>Callosobruchus chinensis</i> )	Root knot nematode	End of the season drought, heat at sowing/early crop growth stage

\* No variety is resistant to insect pests

### 5. Strategies for enhancing desi chickpea production

The production of chickpea can be enhanced further by ensuring both, vertical and horizontal gains.

#### 5.a) Productivity enhancement

The increase in average grain yield per unity area can be achieved through popularization and adoption of recommended package of practices including quality seeds of high yielding varieties, good agronomic practices (GAPs), and massive technology demonstrations. Such technologies have been described here.

**i. High yielding varieties:** To fulfill growing demand for better varieties and crop raising technologies, All India Coordinated Research Project (AICRP) on Chickpea was created in 1993 under the aegis of ICAR. Since then more than 200 high yielding varieties have been developed by ICAR Institutes, State Agricultural Universities and through collaborative research with ICRISAT and ICARDA. During last 15 years under ambit of AICRP about 80 chickpea varieties have been developed and released. Many of these varieties have traits like diseases resistance, earliness, heat and moisture stress tolerance and suitability to machine harvesting besides having high yield and market preferred traits. Centrally released new varieties for cultivation in different zones/states have been presented in Table 3. The salient features of the important varieties are also given here.

**Table 3.** Centrally released (<15 years old) varieties for cultivation in different zones/states

Crop	High yielding varieties
North Hill Zone (Jammu & Kashmir, Himachal Pradesh and Uttarakhand)	Desi: Phule G 0027, GJG 0809, Pant G 0109 Kabuli: CSJK 6
North East Plain Zone (Central and Eastern Uttar Pradesh, Bihar, Part of Odisha, West Bengal, Jharkhand and Assam)	Desi : Nil Kabuli: HK 2, HK 4
North West Plain Zone (Western Uttar Pradesh, Rajasthan, Delhi, Haryana, Punjab, Plains of Jammu & Kashmir and Uttarakhand)	Desi: GNG 1581, RSG 931, RSG 963, Pusa 547, Rajas, GNG 1958, GNG 2144, CSJ 515, GNG 2171 Kabuli: GLK 26155, GNG 1969, GLK 28127, WCGK-2000-16
Central Zone (Madhya Pradesh, Chhattisgarh, Maharashtra, Gujarat, Bundelkhand part of Uttar Pradesh and South Rajasthan)	Desi: JAKI 9218, RVG 202, RVG 203 Kabuli: BDG 128, IPCK 2002-29, IPCK 2004-29, Phule G 0517, PKV Kabuli 4
South Zone (Andhra Pradesh, Telangana, Tamil Nadu, Karnataka and South-West Odisha)	Desi: NBeG 47 Kabuli: MNK 1, NBeG 119

**Disease resistant/tolerant varieties:** Several varieties having wilt resistance (GNG 1581, GNG 2171, RSG 991, GNG 1958, RSG 959, CSJ 515, HC 5, JG 63, RVG 202, RVG 203, GJG 0809, JAKI 9218, Digvijay, BDNG 797, CSJ 140, JG 6, GJG 3, PKV Harita, Birsra Chana 3, Indira Chana 1, Phule Vikram) of desi chickpea have been recommended for cultivation. Similarly, desi chickpea varieties possessing tolerance to ascochyta blight (Pusa 1103, RSG 807, CSJ 515, GJG 0809) and Himachal Chana 1; and botrytis gray mold (CSJ 515, Pant Gram 3, RSG 974, Pant Gram 4) have been developed and being popularized in targeted parts of the country.

**Varieties with farmers' preferred traits:** There is growing demand from farmers and consumers of central and southern India for large seeded (>20g/100 seed weight) varieties of desi chickpea. Some developed chickpea varieties such as GNG 1958, GNG 1969, GJG 0809, Pusa 547, Rajas, BGD 128, Pusa 1088, Pusa 1105, Pusa 1108, GJG 3, Digvijay, PKV Harita, NBeG 3 and Pant G 043 have more than 20g/100 seed weight.



**Varieties suitable for combine harvesting:** Bringing down cost of cultivation through mechanization in cereals has helped farmers in past. In case of chickpea such efforts remain as concepts only until recently. Tall, erect and non-lodging varieties not only

ensures better sun light penetration inside crop canopy for higher photosynthesis but also help in reducing the humidity inside canopy which in turn minimizes foliar diseases. HC 5 is the most promising tall and erect desi chickpea variety released for cultivation in Haryana state. Initiatives were taken up at ICAR-IIPR including several centres of AICRP and ICRISAT to develop desi chickpea varieties with tall and erect/semi-erect plants for their suitability to combine harvesting. Now four chickpea varieties (NBeg 47, GBM 2, RVG 204 and Phule Vikram) having suitability to combine harvesting are available for cultivation in southern and central India.

**Varieties for horizontal expansion under delayed sowing conditions:** Development of short duration and heat tolerant desi chickpea varieties have paved the way for chickpea cultivation in rice fallow conditions for delayed sowing situations after other crops and vegetables. Now desi chickpea varieties can be sown till early December in eastern India where huge area is available for promotion of desi chickpea cultivation. Some of short duration varieties of desi chickpea are RSG 963, RSG 991, RSG 974, RSG 959, RVG 202 (JSC 55), RVG 203 (JSC 56), Pusa 547, Rajas and JG 14 etc.

**ii. Production technologies for maximizing grain yield per unit area**

Chickpea remain an integral part of the intercropping/mixed cropping systems due to ability to fix atmospheric nitrogen through bacteria, restoration of soil fertility, capacity to tolerate drought and to go well with other companion crops like linseed, rapeseed-mustard, safflower, barley etc. In dryland/rainfed ecologies of Rajasthan, Uttar Pradesh and Madhya Pradesh farmers are cultivating desi chickpea as mixed crop with mustard. Farmers need to grow chickpea as intercrop with rapeseed-mustard in row ratio of 4-6 rows chickpea : 2 rows rapeseed-mustard instead of mix cropping to achieve higher yields of both



the crops. More than 30% area of chickpea in India is still covered under mixed/intercropping system. The intercropping/mixed cropping systems are to be geared up for making efficient use of the natural resources to enhance productivity and provide stability under fluctuating weather conditions. The successful cultivation of chickpea in double cropping can be done in the areas where annual rainfall is more than 800 mm. Recommended

agronomic practices need to be adopted for ensuring maximum grain yields. Large number of annual and perennial grasses, broadleaved weeds and sedges affects chickpea growth and productivity in all growing parts of the country. Pre emergence application of Pendimethalin @ 0.75 kg a.i./ha + one hand weeding at 30-45 days after sowing ensures higher grain yield per unit area and net return besides effective weed control.

**iii. Protection technologies**

Large number of biotic (diseases and insect pests) and abiotic (heat, drought, salinity, cold/frost, crop lodging) stresses affects chickpea crop adversely. Popularization of high yielding varieties insulated against such stresses has paid dividends. As always it is not possible to have resistant/tolerant varieties against all stresses, integrated management of stress need to be followed. Some of these IPM modules for diseases and insect pest management are described here.

**Integrated diseases management:** Deep summer ploughing, soil solarisation and application of compost @5 tonnes/ha in field helps in minimizing wilt, dry root and collar rot incidence. Seed treatment with {1 g Carbendazim (Bavistin) or Carboxin + 2g Thiram} + 4g *Trichoderma viride* per kg of seeds or 2g Thiram + 1g Carbendazim per kg of seeds is recommended to minimize soil borne diseases. For foliar diseases like *Ascochyta* blight, secondary spread of the disease can be minimized effectively by 2-3 foliar sprays of Hexacap, Captaf, Indofil M-45 or Kavach @ 3.5 g/acre in 100 liter of water. Similarly, for botrytis gray mold foliar spray of fungicides like Dithane M 45 @ 350 g/ha or, Thiobendazole @ 500 g/ha in 500 litres minimizes losses due to foliar diseases.



**Integrated pest (insect) management:** Many insect-pests damage the chickpea crop at various stages. Among them, gram pod borer (*Helicoverpa armigera* Hubner) is the most dreaded insect pest causing 20-30 per cent annual loss. Monitoring of pest population using sex pheromone traps can be used for early warning of insect pest incidence. When male moths catch crosses to 4-5 per trap per night, control measures to manage the pest should be adopted immediately. The economic threshold for gram pod borer larvae @1-1.5 larvae per meter of row length has been recognized. Various cultural practices like timely sowing,

popularization of early maturing varieties, deep ploughing, intercropping with mustard/linseed/barley etc. have significant impact for minimizing gram pod borer. wider row (40-45 cm) and plant spacing (8-10 cm) helps in reducing the pod damage by way of restricting free movement of larvae. Under field conditions, 20-76% parasitization due to *Campoletis chloridae* have been reported. Application of HaNPV @250 LE (Larval equivalent/ha) in combination with endosulfan 0.035% gave effective control of gram pod borer than HaNPV @250 LE/ha alone. To increase effectivity of HaNPV, addition of adjuvant like crude sugar, groundnut oil cake and ultra violet reflectant such as Tinopol, etc. is recommended. Spray of plant based insecticide, 5% Neem Seed Kernel Extract formulations effectively minimizes population of pod borer. Among recommended insecticides Cypermethrin (0.01%), Spinosad 45 EC @ 60 g a.i./ha (0.009%), Fenvalerate (0.01%), Profenofos 50 EC @ 750 g a.i./ha, Indoxacarb @0.0075%, Monocrotophos (0.04%), Rynaxypyr 18g a.i. @ 1.5 litre /ha in 600-700 litre water, and Chlorpyrifos (0.05%) provide effective control against pod borer. In case, liquid formulations are not available, application of Fenvalerate (0.5%), Methyl parathion (2%) or its dust @ 20-25 kg/ha provides effective management of *Helicoverpa* pod borer.

The seed treatment with Chlorpyrifos @1.0 liter per quintal of seed; application of Lindane dusts @25 kg/ha in the soil before sowing, spray of Chlorpyrifos @ 0.05% near to the roots in standing crop provides effective control against termites and cutworm. Among various cultural practices summer ploughing after harvesting of preceding crop to expose hibernating pupae of cutworm, clean cultivation, removal of undecomposed plant debris and conservation of natural enemies help in minimizing population of cutworm effectively. Similarly, to save chickpea from store grain pests seeds/grains should be dried properly to bring down moisture content below 12% and treated with edible oils like mustard, Mahua or coconut oil @10g/kg seed before storage in sealed containers. Even mixing of charcoal @8-10 g/kg seed can also help in avoiding losses during storage. In commercial storage, use of recommended fumigants (insecticides) ensures safe storage of seeds/grains. The storage of chickpea as Dal (split cotyledons) is the best practice instead of storing the whole seeds or grains.

**6. Horizontal expansion:** Ample scope exists for popularization of desi chickpea both, in traditional and non-traditional areas. There is scope to bring about 1 m ha rice fallow area under short duration varieties of desi chickpea. Some of these varieties such as Pusa 547, Rajas, JG 14, RVG 202, RVG 203, IPC 2006-77 etc. need to be promoted along with recommended good agronomic practices. At the same time, tall and erect varieties of desi chickpea can help in bringing chickpea area back in states like

Punjab, Haryana and western part of Uttar Pradesh where such varieties can be grown as intercrop with autumn planted sugarcane without having yield penalty in sugarcane production. In fact, progressive farmers have already started cultivating chickpea as intercrop with sugarcane.



Further, there is scope to popularize early maturing chickpea varieties as vegetable. Such varieties should be able to have immature green grains at physiological maturity. Similarly, green seeded chickpea varieties have potential in north west India where consumers have preference for green chickpea grains for consumption. Several green seeded chickpea varieties (BGD 112, Sadabahar) have been released in past but seeds/grains of all such varieties turn black when cooked therefore cultivation of these varieties remain limited. Efforts are being made to develop chickpea varieties with stable green colour (even after cooking) to fulfill consumers' demand.



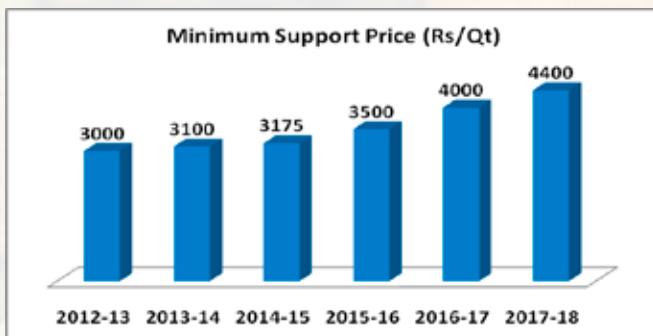
## 7. How chickpea yields can be further increased under rainfed ecologies ?

During the long process of evolution, acclimatization and adaptation to rainfed conditions chickpea has acquired most primitive characters such as long duration with indeterminate growth, bushy nature, excessive flower production, flower drop,

and reversal of reproductive phase to vegetative phase under high input (irrigation and fertilizers) for their survival rather than high yield. The intrinsic characteristic that this crop can be grown successfully under rainfed condition on residual soil moisture has gone against the crop as still >68% crop is grown as rainfed. The sincere efforts are required to tap available variability, and create additional variability for desired traits for per se yield enhancement. Lot of variability already exists for various traits like mean days to maturity, deep penetrating tap root systems, primary/secondary branches per plant, seeds per pod, pods per plant, seed size, etc. besides resistance/tolerance to biotic and abiotic stresses. The improvement strategies must be developed around enhancing *per se* genetic yield potential and bringing desired stability in performance by bringing genes/QTLs controlling multi-adversities resistance. To achieve the targets, integrated breeding approach involving off-season generation advancement, precise phenotyping, genotyping and deployment of molecular markers to transfer useful genes/QTLs to desired background. It is pertinent to mention here that recombination breeding involving diverse germplasm including primitive landraces and wild *Cicer* species need to be strengthened so that varieties with enhanced genetic yield potential are available. To minimize losses due to gram pod borer or other insect pests and diseases where sources of resistance are not available transgenic or genome editing need to be utilized.

### 8. Enabling policy environment

Chickpea production has attained new height during 2017-18 when it is expected to cross 11.10 m t. This could happen due to increased awareness about quality seeds of newly released high yielding varieties through Seed-Hubs located at various Krishi Vigyan Kendra (KVKs), ICAR Institutes and State Agricultural Universities (SAUs); good agronomic practices through cluster front line demonstrations (CFLDs), technology demonstrations, front line demonstrations (FLDs), phosphoric fertilizers and agro-chemicals, favourable weather, favourable policy support in terms of remunerative minimum support price (MSP) that is increased from INR 3000 (2012-13) to INR 4400 per quintal (2017-18), procurement of chickpea at MSP from major producing states, Pradhan Mantri Fasal Bima Yojana (PMFBY) and Pradhan Mantri Krishi Sinchai Yojana (PMKSY) etc. Govt. of India is supporting traders to promote export of chickpea to earn precious foreign exchange which is going to help in sustaining higher production of desi chickpea in India.



### 9. Issues

#### Researchable

- Enhancing per se genetic yield potential and desired stability by bringing genes from wild relatives and primitive landraces
- Development of early maturing chickpea varieties to enhance cropping intensity and for cropping systems diversification.
- Tailoring varieties suitable for combine harvesting having herbicide tolerance and higher nutrient use efficiency

#### Social

- Seldom use of fertilizers restricts promotion of chickpea cultivation in high input condition
- Low level of value addition and poor storage conditions
- Sale of produce at village level by small holders without aggregation often leads to panic sale
- Problem of stray cattle and wild animals

#### Policy

- Promotion of cutting edge technologies such as transgenic and genome editing for bringing desired improvement
- Development of global market monitoring system for issuing advisories to farmers on chickpea area coverage
- Policy support for large scale farm mechanization and single window delivery system for input supply
- Assured procurement at remunerative minimum support price
- Aggressive campaign for creating awareness among farmers about various schemes

**Concluding remarks:** As a result of development of farmers' and consumers' preferred high yielding varieties of desi chickpea insulated well against major biotic stresses and tolerance to high temperature and drought, matching good agronomic practices including integrated pest management modules by ICAR including AICRPs/SAUs and adoption of varieties and technologies by farmers, country is marching ahead toward attaining self sufficiency in pulses production in general and chickpea in particular. Chickpea production scenario changed considerably during last 15 years. This is also important to mention here that additional chickpea production has not only come from area increase but also due to increased productivity that has gone up from peak productivity of 1036 kg/ha (2012-13) to estimated 1091 kg/ha (2017-18). The role of positive support from Government of India and favourable weather in achieving all time high production of chickpea cannot be ignored. Authors are hopeful that with the sustained efforts of the ICAR, SAUs, ICRISAT and Government of India, researchers will provide newer varieties and technologies that will improve chickpea production and yields further. The positive policy support for promotion of chickpea cultivation and its trade will further encourage farmers to grow more chickpea in years to come.

# The Government Holds The Key To Chana's Prospects

Prerna Sharma

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Unfavourable regulations and policy flip-flops have led pulses to witness substantial price correction in the last two years. In 2016/17, India imported the highest ever quantity of pulses despite bumper production domestically that set a bearish trend for the commodity category. Chana (Gram) which forms the lion's share in India's total output of pulses accounting for over 40% is currently trading around INR3200-3400 per quintal, almost 25% lower from its minimum support price (INR4400/quintal) thanks to comfortable stocks, continued import, muted demand and expectation of good harvest.

Apart from the supply overhang, chana has been at the receiving end of unsupportive government's policy actions including the ban on future trading for more than a year before its relisting in July'18, stock limits, then the exclusion from Bhavantar Bhugtan scheme by the MP government, and the decade-old export ban (quantitative ban on chana) until late 2017. However, the worst days seem to be over for the commodity as the ruling BJP can ill-afford to anger the chana growers in MP, Rajasthan, and Chhattisgarh where assembly elections are due in 2018 and in Maharashtra in 2019 - all BJP ruled states. Madhya Pradesh, Rajasthan and Maharashtra together supply more than three-fourths of the chana crop in the country.

The extended monsoon rains and remunerative prices seen in the previous year influenced the planting decisions of farmers leading to its increased acreage significantly up especially in the state of Madhya Pradesh contributing nearly half of the country's total estimated output. That will help India to achieve a record chana harvest exceeding 11 million tonnes (MMT) in 2017/18 that would be much higher than the usual level considered good i.e. 9-9.5 MMT. In addition to the adverse price impact of good harvest, competition from cheaper peas (a substitute for chana) the pressure of continued imports seemed to have impacted the market sentiments negatively that pushed the chana prices down.

The dal millers/processors bought chana in bulk at relatively high prices expecting better prices in the future. However, they made huge losses as the prices started dipping one-sided. In a normal situation, mills buy raw material first and then process the products to sell in the market at higher prices. However, this year, they are selling the processed products to buy raw material to keep their mills running. That explains why mills are not coming ahead for aggressive

buying despite chana prices are trading at low levels.

## Government measures

To restrict the free fall in the chana prices, the government took a slew of measures starting with the imposition of 50% import duty on yellow peas followed by 30% import duty on chana and opening up of exports of all kind of pulses including desi chana towards the end of 2017. However, these support measures came too late to limit the fall in chana prices and the government has to further increase import duty to 40% in February 2018 and then to 60% a month later to restrict cheaper imports from Canada and Australia. Of late, the Central government has extended support to the chana exporters by providing them incentives at 7% for a limited period of three months. Despite that, the exports are not happening as Indian chana remain highly uncompetitive in the global markets due to high support prices.

The high MSP sounds quite supportive but in reality, it has neither helped the farmers nor exporters. The increase in MSP every year remains unhelpful as it's not backed by effective procurement (like in the cases of paddy and wheat) but it discourages exports for sure especially to gulf regions, Europe and the USA by artificially jacking up the prices of Indian pulses.

## Demand prospects

The Madhya Pradesh government went a step ahead by announcing to include chana in Bhavantar Bhugtan Scheme but had to withdraw the same due to the cartelisation of traders that was pushing the prices down and the lack of financial support from the central government. However, in an effort to fix the mess in chana and woo the farmers ahead of the crucial state elections, the political dispensations of MP and Rajasthan have started procuring chana which is expected to continue until the peak arrivals.

The procurement and the support measures extended by major producing states. The peak demand of chana generally falls in between August to mid-November and this year Diwali too falls in the November month. The major impact of duty hikes will be seen after May when the flow of new crop arrivals will decrease, and by then the excess stock will be consumed. Moving ahead, things are likely to get better for chana and for that we must give credit to the state and the general elections.

**A version of this article has been published by The Hindu Business Line newspaper.**

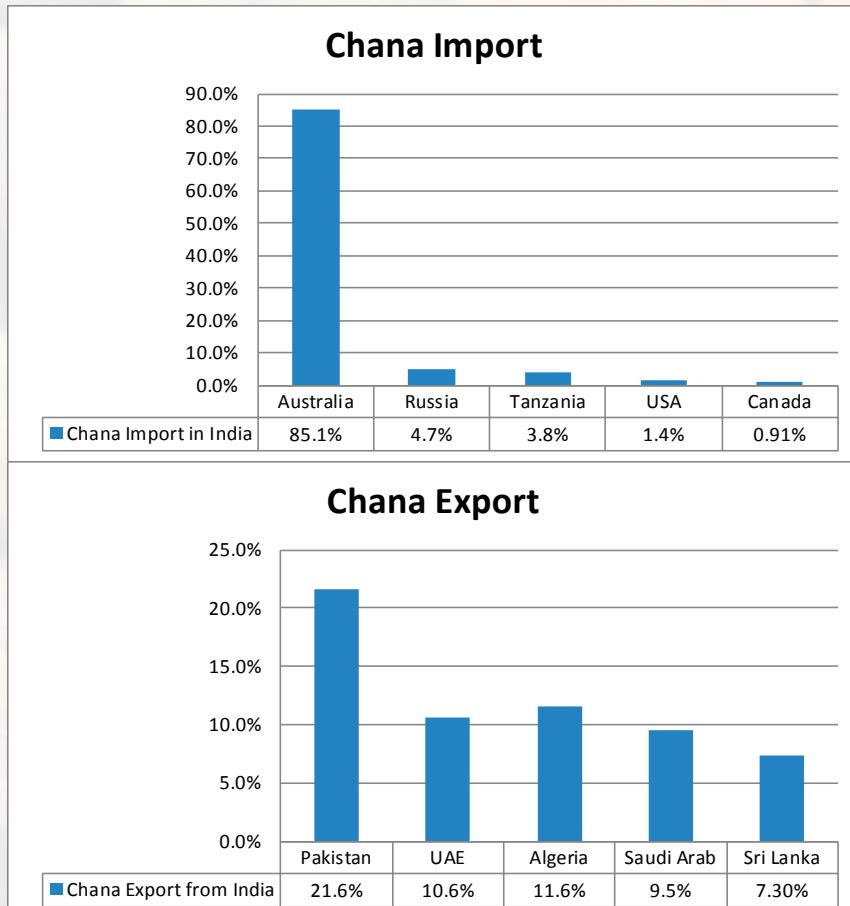


# The Desi Chana Market Round Up

**Dr. Bharat Kulkarni**  
*Chairman of Indo Global SME Chamber*

Chick peas, also known as Bengal gram is one of the prominent category of pulse that is grown and consumed in India. Chana, as it is known in India, accounts for close to 40% of India’s production. Out of the total global production, India produces a lion’s share with more than two third of the global chana is produced in India. Chana is categorized in two with Desi chana and kabuli chana. Desi chana ranges from yellow to dark brown in color and size is usually small. This is the most common variety in India. Kabuli Chana, on the other hand, is white in color and is bigger and bolder in size. In terms of production, the Desi variety dominates with close to 90% of world production in Chana.

India is the major producer of Chana, both desi and Kabuli. The major producing state of India is Madhya Pradesh. It is followed by Maharashtra, Rajasthan, Uttar Pradesh, Andhra Pradesh & Karnataka. The cultivation of pulses in India is mostly under rain fed conditions. Chana production in India is primarily a Rabi crop, with sowing happening in October- November and harvesting in March – April. India also imports Chana from different countries. India’s major imports is from Australia (85.1%), followed by Russia (4.7%), Tanzania (3.8%), USA (1.4%), and Canada (0.91%). With the opening of exports of pulses, India also exports Chana. Major export of India is to Pakistan (21.6%), followed by United Arab Emirates (10.6%), Algeria (11.6%), Saudi Arab (9.5%), and Sri Lanka (7.3%).



In terms of consumption pattern of desi chana is more used for dall processing or flour processing. About 25% of the total consumption is in form of dall, whereas close to half of the total production is in form of flour. Since the quality in terms of size and color is not important, a lot of locally produced desi chana are used for flour. For the milled dall consumption, the Australian desi chana are considered better. Further, for direct food, the preference is given to bright or golden yellow colour, soft and light seed, with good taste. Overall, the Indian chana demand is going up at a average of 5-6% annually. The growth of industries like the snack food industry, the demand for desi chana is also growing.

In 2016-17 the total chana production (including Kabuli and Desi) in India has been estimated to be 9.38<sup>1</sup> Million tons. This was due to a record increase in acreage and the favorable conditions resulted in increase in yields. Acreage for Chana was estimated to be as high as 9.8 Million Hectares in the 2017 Rabi season which was 10 per cent higher than 2016 season. The high prices in 2015 and 2016 had led to an increase in this record increase in the acreage. Supported by a favorable weather, the production in India went up to excess of 9 million tons.

However, the high production coupled with record imports, lead to serious decline in prices. India imported around 1.1 million tons of desi chana from Australia. The prices declined to a level of Rs.5500 per quintal from a high of Rs.9000 per quintal. Since then the prices of desi chana in India has been on a downward trend. Even the imported chana prices dropped from 1100 USD per ton to 730-750 USD per tons. In order to protect the farmer, the government responded with an increase in the MSP from Rs 3425 per quintal to Rs 4000 per quintal. Also, the government imposed a duty of 50% (which was further increased to 60%) on imports.

In the Rabi season of 2018, the acreage had again gone up, but the yields are debatable. The government of India estimates a total production of 11 million tons<sup>1</sup>, which is debated by the industry experts. In calculating the production, the government is using a yield factor that may not be so accurate and as a result, the total production figures may be a lower than these estimates. Industry experts estimate the production to be somewhere between 9 to 9.5 million tones.

The government, for the Rabi 2018 season announced the MSP to be Rs 4250 per quintal, with a bonus of Rs. 150 per quintal, making a total of Rs 4400 per quintal. However, the markets are trading desi chana below the MSP. Clearly the market in India this year is grappling with oversupply. After two successive seasons of excess demand the market has been struggling from increased supply, large inventories and slows off takes since last two years.

Desi Chana balance Sheet<sup>1</sup> ( in million tons)

Particular	2016-17	2017-18
Beginning Stock	0.10	0.5
Production	5.80	6.8
Import	1.00	0.3
Total Desi Chana Availability	6.90	7.6
Less: Seed use	-0.60	-0.6
Less: Consumption	-5.80	-6.6
Less- Exports	0.00	-0.1
Total Carry over stock	0.50	0.3

Fig 1: Desi Chana Balance Sheet in India

**Global Scenario-** In South Asia, apart from India, Pakistan also consumes a lot of desi chickpeas. Pakistan produced around 350 thousand tons of Desi Chick peas, which was about half of the consumption. Pakistan annually consumes 700 thousand tons of desi chickpeas and is a major importer. Pakistan imported close to 75000 tons by June 2018 and will be looking for import another 250 thousand tons over the year.

Apart from Pakistan, United Arab Emirates and Bangladesh are also consumers of desi chick peas. UAE, which is home a large south Asian diaspora population, is making it a growing consumer. UAE imported around 100 thousand tons of desi chickpeas last year, which was consumed in UAE as well as re-exported to other gulf countries. In case on Bangladesh, it consumes about two hundred thousand tons annually. The consumption pattern in Bangladesh is also different from that in India and Pakistan, as only 5 to 10 percent of the total consumption is in milled (dall) or flour form. More than 90% is consumed as either roasted or cooked. This makes the demand from better size and colour.

The glut in India is not only affecting the Indian industry, but is also affecting the global markets as India plays a major role in the global production and consumption. Apart from India, another major producer is Australia that produced around 850 thousand tons, much lower than the 2016 production of 2.2 million tons. Still, the prices that Australians fetched were far below the 2016 prices. With the export to India being hit by duty, Australia exported a lot shipments to Bangladesh and some to Pakistan.

With the current situation, on desi chickpeas, the prices are expected to improve from here. The prices have already hit the bottom of around Rs.3700-3800 per quintal and will recover from here. The prices are expected to go upto Rs. 4500 per quintal. As the season picks up, the prices might strengthen and we can see an upward rebound in the desi chick peas prices.

1 Final estimates - Department of Agriculture, Cooperation and Farmers Welfare, Agricultural Statistics Division, Government of India.

2 Third Advanced estimates - Department of Agriculture, Cooperation and Farmers Welfare, Agricultural Statistics Division, Government of India



## The Powerhouse of Nutrients

Sheryl Salis

Founder & Director- Nurture Health Solutions

**Desi Chana** also known as kala chana or Black Chickpeas (*Cicer arietinum* L) is popularly used in the Indian cuisine. It is mostly grown in India and other parts of the Indian subcontinent as well as in Ethiopia, Mexico and Iran.

As opposed to 'Kabuli chana' or 'Chickpeas', its lighter counterpart, Desi chana is smaller in size and darker in colour. When the outer skin of the whole black chick peas is removed and the kernels are split, it forms chana dal which is equally nutrient dense as the whole desi chana.

Being hard in texture, soaking the desi chana for few hours prior to pressure cooking for about 15 to 20 minutes makes it more digestible and prevents bloating.

In addition to proteins, desi chana contains a good source of carbohydrates, minerals and trace elements. The high fibre content in the desi chickpeas as compared to other varieties contributes to its low glycemic index thereby making them more suitable for people suffering from diabetes<sup>3</sup>

### Nutrient composition (Values per 100g)<sup>2</sup>

**Energy** – 120 kcal, **Protein**- 18.7g, **Dietary fibre**- 25.5g, **Carbohydrates**- 39.56g, **Vitamin B1**- 0.37mg, **Vitamin B2**- 0.24mg, **Vitamin B3**- 2.10mg, **Vitamin B6**- 0.36mg, **Iron**- 6.78 mg, **Magnesium**-160 mg, **Total Folates**- 233 mcg, **Lutein** – 385mcg, **Zeaxanthin**- 24.74mcg

A study conducted on the acceptability properties and antioxidant potential of Desi chana (*Cicer arietinum* L.) showed that phenolic compounds present in desi chana have been associated with a reduction in the risk of cancer, heart disease and diabetes, as well as possess antibacterial, antiviral, anti-inflammatory and anti-allergenic activities. Most of these benefits result from their antioxidant potential

An inhibitory effect on the tumors and cancers were also reported

by some studies<sup>1</sup>. The flavonoids present in desi chick peas have also found to improve the antioxidant defences of blood and could contribute significantly to the management and/or prevention of degenerative diseases associated with free radical damage.

### Health Benefits

- **Weightloss:** It is a known fact that adding fiber rich foods to your diet contributes to weight loss. Fiber makes you feel full thereby making you feel satiated for a longer time and curbing your hunger pangs. An abundance of both soluble and insoluble fiber is present in desi chana. Soluble fiber promotes the excretion of bile by forming a gel like substance in the digestive tract. Insoluble fiber on the other end prevents constipation and treats other digestive disorders. Thus, consuming desi chana in any form can prove to be effective in weight loss.
- **Cardiovascular Benefits:** Desi chana possess a unique combination of antioxidants anthocyanins, delphinidin, cyanidin and petunidin as well as phytonutrients that prevents oxidative stress; helps maintain health of the blood vessels thereby minimizing the risk of heart diseases. Desi chana also contain adequate amounts of folate and magnesium. Folate lowers the homocysteine levels thereby reducing the risk of narrowing of arteries by plaque formation, blood clots, heart attacks and strokes.
- **Lowers Cholesterol:** As the soluble fiber present in desi chana binds with the bile acids, it prevents them from being absorbed by the body, thereby reducing the cholesterol levels. Ferulic acids and p- coumaric acids are polyphenols present in chick pea seeds and have been shown to reduce blood lipid levels in rats.<sup>5</sup> Moreover, the dietary fiber of black chick peas is of a superior quality to that found in other foods.
- **Diabetes and Blood pressure:** The higher amount of resistant starch and amylose present in black chick peas renders the starch in the chickpea more resistant to digestion in the small intestine thereby resulting in lower availability of glucose.<sup>5</sup> The lower bioavailability of glucose results in a gradual entry of glucose into the blood stream thereby reducing the demand for insulin leading to lowering the glycemic index and insulinemic post prandial response.



Lowered Glycemic index is an important aspect in minimizing the incidence and severity of type 2 diabetes. In addition, increased consumption of resistant starch is also associated with improved glucose tolerance and insulin sensitivity.

Polyunsaturated fatty acids such as Linoleic acid plays an important role in the production of prostaglandins that are involved in lowering of blood pressure and smooth muscle constriction.

Phytosterols like B- sitosterol is helpful in reducing blood pressure. Linoleic acid and  $\beta$ -sitosterol are the major PUFA and phytosterol in chickpea seeds respectively. Therefore chickpea seeds incorporated as a part of daily diet may help to reduce blood pressure.<sup>5</sup>

- **Good Source of Iron:** Desi chana being abundant in iron can help prevent anaemia and boost your energy levels. This is particularly beneficial for women of child bearing age, lactating mothers as well as growing children.<sup>6</sup> Iron plays a crucial role in haemoglobin formation by transporting oxygen from the lungs to the various cells of the body and also serves as an important component of various enzyme systems for energy production and metabolism.

#### Prevention of Cancer:

- B- Sitosterol, the major phytosterol present in chickpea when introduced in a rat diet reduced N- Methyl- N- Nitrosourea (carcinogen) – induced colonic tumors. Lycopene, a carotenoid present in the chick pea seeds may seem to reduce the risk of prostate cancer. Biochanin A, a chickpea isoflavone have been found to inhibit the growth of stomach cancer cells in vitro and reduced tumor growth when the same cells were transferred to mice. In addition, the chick pea isoflavone extract specifically inhibited epithelial tumour growth and did not render any effect on healthy cells.<sup>5</sup>

The colon cancer protective effect of black chickpea can also be attributed to the soluble fiber present in it. The soluble fiber on reaching the colon is broken down by the bacteria into short chain fatty acids which are absorbed by the colon cells for energy. Thus the colon cells are able to stay healthy and the risk of cancer, particularly colon cancer is minimized.<sup>6</sup>

- **Good Source of Protein for Vegetarians:** Desi chana serve as an alternative source of protein for vegetarians as these legumes when combined with a cereal or whole wheat protein provide significant amounts of protein which are comparable to that of dairy and meat. In addition, the desi chana are not high in calories or saturated fats.
- **Beneficial for Women:** Post menopausal women can benefit a lot from chickpeas as the phytonutrients such as saponins contained in these legumes help to reduce the risk of breast cancer, prevent osteoporosis and minimize hot flushes.
- **Treatment of Digestive Disorders:** The insoluble fiber present in desi chana is vital for maintaining the health of digestive tract. The fiber reduces the risk of painful diverticulitis disease and constipation by reducing the strain on your intestines. In case of dysentery, soak two handfuls of chick

pea seed coats in 500 ml of water overnight and drink the strained water the next morning for relief. Constipation can be managed by soaking chickpeas in water overnight and consuming them in the morning after sprinkling ginger powder and caraway seeds (jeera). Also, drinking the separated water for better relief.<sup>6</sup>

- **Other Benefits:** Patients suffering from Jaundice can eat a handful of desi chana soaked in water along with jaggery and drink the same water when thirsty for improvement in the condition. Drinking the broth obtained from boiling chickpeas may also relieve obstruction of the liver, spleen, kidneys and serve well against jaundice.<sup>7</sup> This water is also effective in preventing frequent vomiting.<sup>6</sup>

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A. K. Jukanti<sup>1</sup>, P. M. Gaur<sup>1\*</sup>, C. L. L. Gowda<sup>1</sup> and R. N. Chibbar<sup>2</sup>  
<sup>1</sup> International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru, AP 502 324, India.  
<sup>2</sup> Department of Plant Sciences, University of Saskatchewan, Saskatoon, Saskatchewan, Canada S7N 5A8.  
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## CHEESE AND CHICKPEAS MUFFINS

6 Serves 40min

### Ingredients

200 gr. - Chickpeas, cooked  
100 gr. - Flour  
150 gr. - Blue cheese  
4 - Eggs  
50 ml. - Olive oil  
1 - Garlic clove  
50 ml. - Milk  
50 gr. - Almonds, ground  
1 Tsp. - Baking powder  
1 - Apple, sliced

### Preparation

Pre-heat oven at 180°C. Line a 12 muffin cups tray with parchment paper or regular paper liners. Sift together flour, salt and baking powder, set aside. Pureé cooked chickpeas with eggs, olive oil, cheese, garlic and milk. Transfer the mixture to a large bowl. Stir in the ground almonds and the dry ingredients. With a spatula fold the dry ingredients into the wet ingredients and mix well. Fill the cups to 1/3 of their capacity, place two slices of apple on top of each muffin. Bake for about 20 minutes or until when a toothpick inserted in the centre of a muffin comes out clean. Remove from the oven and let them cool.



## CHICKPEAS AND RED PEPPER DIP

4 Serves 5min

### Ingredients

200 gr. - Chickpeas, boiled  
200 gr. - Red pepper, roasted  
1 Tsp. - Tahine  
25 ml. - Olive oil  
1 - Garlic clove  
1/2 Tsp. - Cumin, ground  
1/2 Tsp. - Salt

### Preparation

Place all the ingredients in the bowl of an electric mixer. Reduce all the ingredients to an homogeneous mixture. Serve with pita bread or vegetables cut in sticks.



## NAAN-E NOKHCHI – CHICKPEAS COOKIES (PERSIA)

4 Serves 30min

### Ingredients

150 gr. - Chickpea flour  
100 gr. - Sugar  
50 gr. - Butter, melted  
1 - Egg  
1 Tsp. - Cardamomo, ground  
1 Tsp. - Baking powder

### Preparation

Pre-heat oven at 170° C. Cover a baking tray with parchment paper.

Beat egg with sugar and baking powder until light and fluffy. Add cardamom powder and butter, mix well. Add the chickpea flour, mix to obtain a homogeneous batter.

Using your hands make small balls and place them on the prepared baking tray. Bake for about 15 minutes or until golden brown.

Remove from the oven and let them cool.

Tip: You may add rose water, or replace cardamom for cinnamon powder.



## PINEAPPLE AND CHICKPEAS CAKE

6 Serves 60min

### Ingredients

200 gr. - Cooked chickpeas  
150 gr. - Brown sugar  
150 gr. - Flour  
100 gr. - Butter  
3 - Eggs  
6 - Pineapple slices in syrup  
100 ml. - Pineapple syrup  
1 cuch. peq. - Vanilla extract  
1 cuch. peq. - baking powder

### Preparation

Preheat the oven to 18 ° C. Cover the bottom of a removable mold with vegetable paper. Grease and flour the mold.

Make a puree with the chickpeas, egg yolks and the syrup of the pineapple. Reserve.

Sift the flour with the yeast.

Beat the sugar with the butter until there is a spongy mixture, add the vanilla essence and the chickpea puree. Beat the whites until stiff, mix carefully in the dough. Add the flour and stir, taking care not to lower the egg whites. Cut the pineapple slices in half to make it thinner. Cover the bottom of the mold with half the pineapple. Pour the dough and cover it with the rest of the pineapple. Bake for about 40 minutes, or until a toothpick inserted in the center comes out clean. Remove from the oven, let cool before unmolding.

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Agricultural Statistics Division  
 Directorate of Economics & Statistics  
 Department of Agriculture, Cooperation and Farmers Welfare  
 Third Advance Estimates of Production of Foodgrains for 2017-18

As on : 16.05.2018

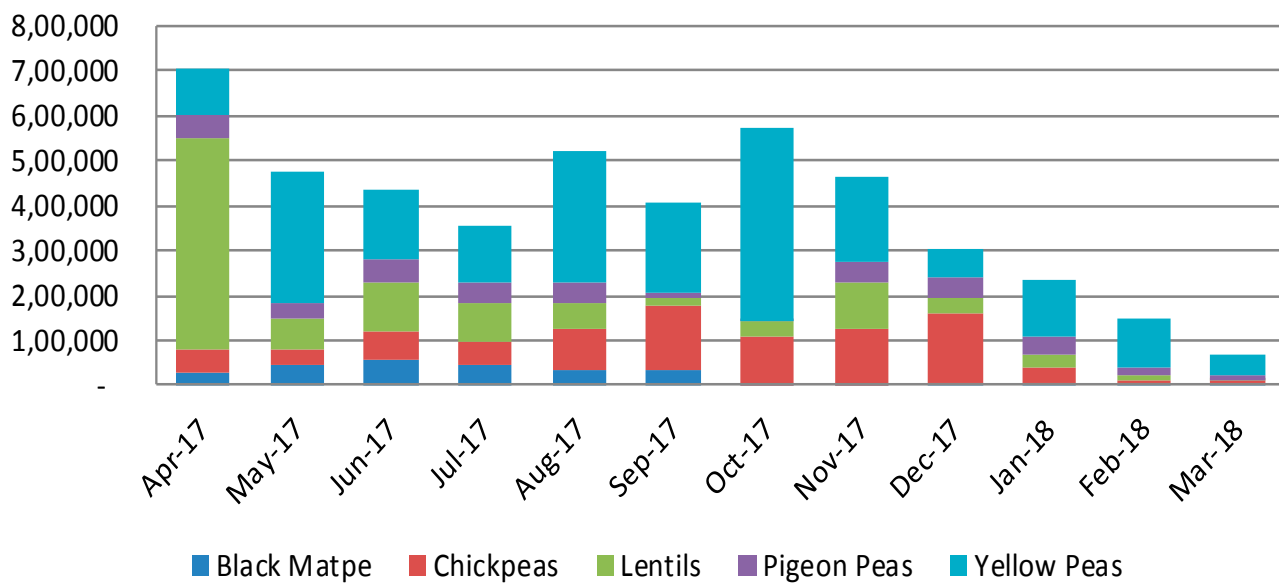
Crop	Season	Million Tonnes																			
		2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
Rice	Kharif	78.62	72.23	78.27	80.17	82.66	84.91	75.92	80.65	92.78	92.37	91.50	91.39	91.41	96.09	96.30	94.50	96.39	96.39	96.39	
	Rabi	9.91	10.90	13.52	13.18	14.03	14.27	13.18	15.33	12.52	12.87	15.15	14.09	13.00	13.06	13.40	14.00	15.12	15.12	15.12	15.12
	Total	88.53	83.13	91.79	93.36	96.69	99.18	89.09	95.98	105.30	105.24	106.65	105.48	104.41	109.15	109.70	108.50	111.52	111.52	111.52	111.52
Wheat	Rabi	72.16	68.64	69.35	75.81	78.57	80.68	80.80	86.87	94.88	93.51	95.85	86.53	92.29	97.44	98.51	97.50	98.61	98.61	98.61	98.61
	Kharif	4.84	4.04	4.07	3.71	4.11	3.05	2.76	3.44	3.29	2.84	2.39	2.30	1.82	1.95	1.96	2.75	2.04	2.04	2.04	2.04
	Total	1.84	3.20	3.56	3.44	3.81	4.19	3.93	3.56	2.69	2.44	3.15	3.15	2.42	2.50	2.60	3.00	2.69	2.69	2.69	2.69
Bajra	Total	6.68	7.24	7.63	7.15	7.93	7.25	6.70	7.00	5.98	5.28	5.54	5.45	4.24	4.74	4.57	5.75	4.73	4.73	4.73	4.73
	Kharif	12.11	7.93	7.68	8.42	9.97	8.89	6.51	10.37	10.28	8.74	9.25	9.18	8.07	9.86	9.73	9.50	9.08	9.08	9.08	9.08
	Kharif	12.73	11.48	12.16	11.56	15.11	14.12	12.29	16.64	16.49	16.19	17.14	17.01	16.05	19.17	18.92	19.00	19.81	19.81	19.81	19.81
Maize	Rabi	2.25	2.70	2.55	3.54	3.85	5.61	4.43	5.09	5.27	6.06	7.11	7.16	6.51	6.97	6.98	7.00	7.07	7.07	7.07	7.07
	Total	14.98	14.17	14.71	15.10	18.96	19.73	16.72	21.73	21.76	22.26	24.26	24.17	22.57	26.14	25.90	26.00	26.88	26.88	26.88	26.88
	Kharif	1.97	2.43	2.35	1.44	2.15	2.04	1.89	2.19	1.93	1.57	1.98	2.06	1.82	1.43	1.39	2.00	1.96	1.96	1.96	1.96
Small Millets	Kharif	0.56	0.48	0.47	0.48	0.55	0.44	0.38	0.44	0.45	0.44	0.43	0.39	0.39	0.44	0.44	0.50	0.44	0.44	0.44	0.44
	Rabi	1.30	1.21	1.22	1.33	1.20	1.69	1.35	1.66	1.62	1.75	1.83	1.61	1.44	1.79	1.75	1.90	1.79	1.79	1.79	1.79
	Total	32.22	26.36	26.74	25.61	31.89	28.54	23.83	33.08	32.44	29.79	31.20	30.94	28.15	32.84	32.44	33.75	33.33	33.33	33.33	33.33
Nutri/Coarse Cereals	Rabi	5.39	7.10	7.33	8.31	8.86	11.49	9.72	10.32	9.58	10.25	12.09	11.92	10.37	11.55	11.33	11.90	11.54	11.54	11.54	11.54
	Total	37.60	33.46	34.07	33.92	40.75	40.04	33.55	43.40	42.01	40.04	43.29	42.86	38.52	44.39	43.77	45.65	44.87	44.87	44.87	44.87
	Kharif	110.84	98.59	105.01	105.78	114.55	113.45	99.75	113.73	125.22	122.16	122.70	122.34	119.56	128.93	128.74	128.25	129.73	129.73	129.73	129.73
Cereals	Rabi	87.45	86.64	90.21	97.30	101.46	106.45	103.70	112.52	116.98	116.63	123.09	112.53	115.66	122.05	123.24	123.40	125.28	125.28	125.28	125.28
	Total	198.28	185.23	195.22	203.08	216.01	219.90	203.45	226.25	242.20	238.79	245.79	234.87	235.22	250.98	251.98	251.65	255.00	255.00	255.00	255.00
	Kharif	2.36	2.35	2.74	2.31	3.08	2.27	2.46	2.86	2.65	3.02	3.17	2.81	2.56	4.60	4.87	4.25	4.18	4.18	4.18	4.18
Tur	Rabi	5.72	5.47	5.60	6.33	5.75	7.06	7.48	8.22	7.70	8.83	9.53	7.33	7.06	9.08	9.38	9.75	11.16	11.16	11.16	11.16
	Total	1.20	0.95	0.90	0.94	1.12	0.84	0.81	1.40	1.23	1.48	1.15	1.28	1.25	2.16	2.18	1.85	2.64	2.64	2.64	2.64
	Kharif	0.27	0.38	0.35	0.50	0.34	0.33	0.42	0.36	0.53	0.47	0.55	0.68	0.70	0.76	0.66	0.75	0.65	0.65	0.65	0.65
Moong	Total	1.47	1.33	1.25	1.44	1.46	1.17	1.24	1.76	1.77	1.95	1.70	1.96	1.95	2.93	2.83	2.60	3.28	3.28	3.28	3.28
	Kharif	1.43	0.81	0.69	0.84	1.25	0.78	0.44	1.53	1.24	0.79	0.96	0.87	1.00	1.53	1.64	1.65	1.39	1.39	1.39	1.39
	Rabi	0.28	0.25	0.26	0.28	0.27	0.26	0.25	0.27	0.40	0.40	0.65	0.64	0.59	0.54	0.52	0.65	0.51	0.51	0.51	0.51
Lentil	Total	1.70	1.06	0.95	1.12	1.52	1.03	0.69	1.80	1.63	1.19	1.61	1.50	1.59	2.07	2.17	2.30	1.90	1.90	1.90	1.90
	Rabi	1.04	0.99	0.95	0.91	0.81	0.85	0.49	0.94	1.06	1.13	1.02	1.04	0.98	*	1.22	*	1.51	1.51	1.51	1.51
	Kharif	1.18	0.61	0.54	0.70	0.96	0.80	0.93	0.93	0.93	0.62	0.71	0.77	0.72	0.83	0.89	1.00	0.80	0.80	0.80	0.80
Other Kharif Pulses	Rabi	1.44	1.32	1.36	1.37	1.19	1.28	1.28	1.33	1.34	1.60	1.51	1.74	1.50	2.90	1.77	3.00	1.68	1.68	1.68	1.68
	Total	6.16	4.72	4.86	4.80	6.40	4.69	4.20	7.12	6.06	5.91	5.99	5.73	5.53	9.12	9.58	8.75	9.01	9.01	9.01	9.01
	Kharif	8.74	8.41	8.52	9.40	8.36	9.88	10.46	11.12	11.03	12.43	13.25	11.42	10.82	13.29	13.55	14.15	15.50	15.50	15.50	15.50
Total Pulses	Total	14.91	13.13	13.38	14.20	14.76	14.57	14.66	18.24	17.09	18.34	19.25	17.15	16.35	22.40	23.13	22.90	24.51	24.51	24.51	24.51
	Kharif	117.00	103.31	109.87	110.58	120.96	118.14	103.95	120.85	131.27	128.07	128.69	128.06	125.09	138.04	138.33	137.00	138.73	138.73	138.73	138.73
	Rabi	96.19	95.05	98.73	106.71	109.82	116.33	114.15	123.64	128.01	129.06	136.35	123.96	126.47	135.34	136.78	137.55	140.78	140.78	140.78	140.78
Total Foodgrains	Total	213.19	198.36	208.60	217.28	230.78	234.47	218.11	244.49	259.29	257.13	265.04	252.02	251.57	273.38	275.11	274.55	279.51	279.51	279.51	279.51

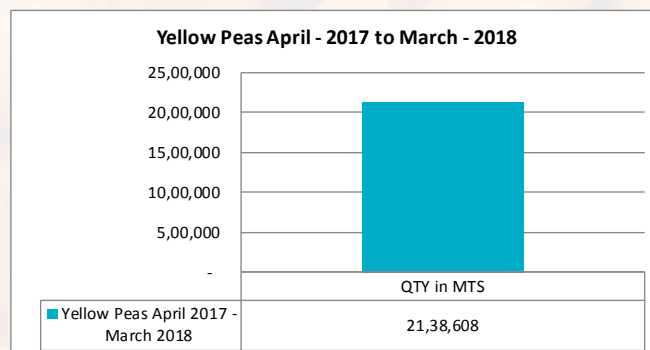
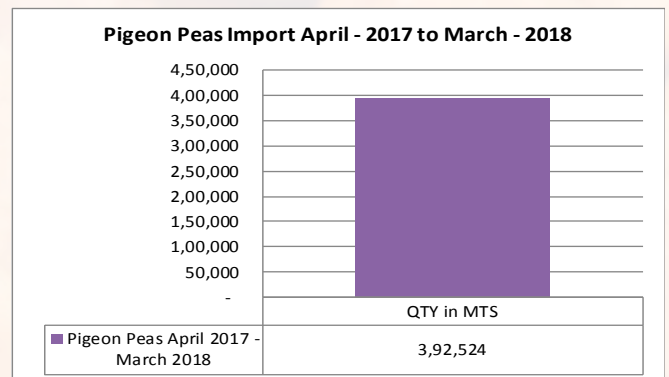
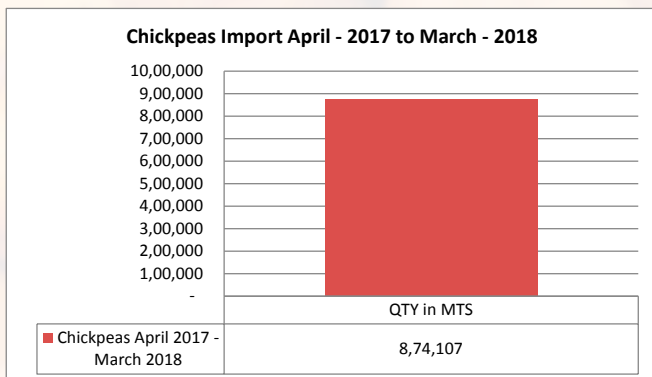
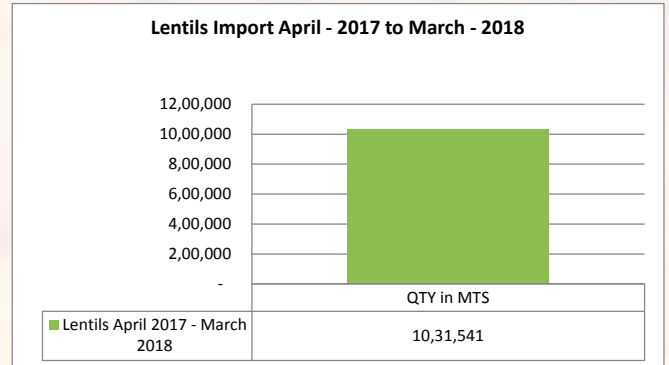
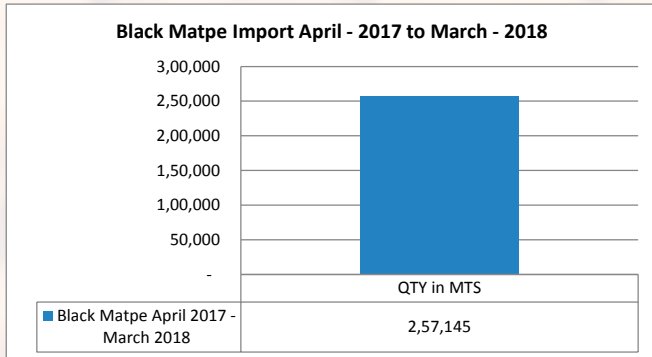
\* Included in Other Rabi Pulses.



## IPGA Research

### Pulses Import from April 2017 to March 2018







# The Pulses Conclave 2018, Delhi

The Pulses Conclave is one of the world's largest conference-cum-exhibitions on the Pulses sector and this time it took place at The Leela Ambience Convention Hotel, New Delhi from February 14<sup>th</sup> to 16<sup>th</sup>, 2018.

The Conclave witnessed attendance from over 750 delegates from many countries like Canada, United State of America, Africa, United Kingdom, Australia, Spain, and Asia to name a few.

Hon'ble Minister for Commerce and Industry, Shri Suresh Prabhu

was expected to grace the Conclave but was called away due to other pressing engagements. However, Hon'ble Minister took time out of his schedule to record a special video message for the delegates of the Conclave. The Conclave was supported by dignitaries like Hon'ble Oniel Carlier, Minister for Agriculture & Forestry, Alberta, Canada, Hon'ble Charity Kaluki Ngilu, Governor – Kitui County, Kenya, Dr. B. Rajender, JS - Crops & Seeds, Ministry of Agriculture and Farmers Welfare, Government of India and Mr. Huseyin Arslan, President - Global Pulse Confederation

**On 14th February, 2018, the morning began with the Taj Mahal visit...**



**Lunch at Jaypee Palace**



**And the day ends with the Networking Dinner at The Leela Ambience Convention Hotel, New Delhi.**



**On 15th February, 2018, the morning began with a welcome address by IPGA**

Vice Chairman, Mr. Bimal Kothari. The keynote presentation was addressed by Mr. Huseyin Arslan, President of Global Pulse Confederation who gave special address to the audience and Dr. J P Mishra, Advisor (Agri) - Niti Aayog who spoke about Developing and deploying Agri Policies for self-sufficiency.

The Conclave showcased dignitaries of the agriculture world from across the globe, who shared their specialty by being a part of seminars and business session's on the 15th and 16th February, 2018. The many important functions of pulses have been discussed in the business sessions. Some of the presentations included Origin Presentation for India by Mr. G

Chandrashekhar - Global Agribusiness and Commodities Market Specialist. Dr. Ashok Dalwai, National Rainfed Area Authority and Chairman, Committee on Doubling of Farmers' Income, Ministry of Agriculture and Farmers Welfare, Government of India spoke about Doubling the Farmers Income. Prof. Vijay Paul Sharma, Chairman – CACP spoke about the Mechanism of MSP. Business sessions were followed by panel discussions about opportunities / demand for warehousing in India, rabi's production and various pulses like yellow peas, lentils, desi chick peas, tur, moong, kabuli chick peas and urad.





Exhibition Stall



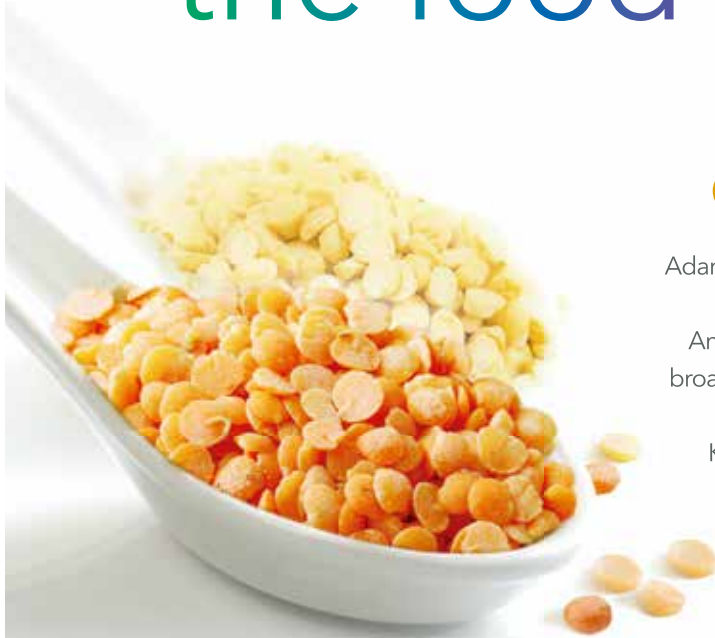
15th February, 2018 evening was filled with lots of entertainment and fun as the famous Bollywood singer Ms. Shibani Kashyap gave live singing performance at the Gala Entertainment night where all the delegates danced to the tunes of her songs.



In all everyone had a stupendous time and the conference concluded with the promise to meet again in next Conclave in 2020 and are looking forward to your continued support.

All presentations can be viewed and downloaded from the IPGA website.  
Please visit <http://thepulsesconclave.in/>.

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