www.ipga.co.in / Vol: II / Issue 06 / July-August 2017

PULSE INDIA

AN INDIA PULSES AND GRAINS ASSOCIATION PUBLICATION

- Red Lentils -Soil To Table
- The Growing Place Of Pulses In The Australian Crop Landscape
- Millets The Answer To Climate Change Problems
- Red Lentil- The Powerhouse Of Nutrients

A RED LENTILS SPECIAL ISSUE

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

Present in over 140 countries, our global reach gives pulse processors unparalleled access to a wide range of capabilities including a comprehensive machine portfolio, supported by our full turnkey capabilities - successfully delivering equipment, service and support locally.

Got a question? Let's talk about it.

buhler.bangalore@buhlergroup.com, www.buhlergroup.com/pulses

Additional services

- Engineering, technology and project management
- Research and development support
- Processing of by-products
- Education and training programs
- Local on-site service

1	2	3	4	5	6	7	8	9	10	11	12
Pulses reception and handling	Pre-cleaning	Storage and drying systems	Cleaning	Grading	Hulling	Process dryers	Splitting	Optical sorting	Polishing	Plant Automation	Bagging

Innovations for a **better world.**

BÜHLER

From the Chairman's Desk

Dear friends,

The growing awareness of pulses as an important plant protein has led to it being recognized by FAO and 10th February being dedicated as the Day of Pulses. Further to this pulses are being branded through the "Half a Cup" strategy to enhance its visibility among the consumers in special.

Pulse India is persistently trying to foster attention on pulses .This issue of July August has selected the theme of Red Lentils. Red Lentil or masoor is one of the major ingredients of Indian cooking and recipe. Masoor is consumed on a large scale in South Asia.

It is a fact to be noted that Red Lentils are relatively tolerant to drought, and are grown throughout the world. Thus, it is an excellent opportunity to the Indian farmer who can use this crop as a rotational crop mostly in semi-arid and arid areas. Thus, I encourage the Indian farmers to adapt to informed farming methods and IPGA can actually help connecting the Indian farmer with modern technology not only to boost farmer's income but also stabilize pulses prices through steady and predictable productivity of pulses.

For a decade, IPGA has been acknowledged as a valued knowledge partner by many of the International counterparts in the domain of pulses. In this context, IPGA has actively participated in the Vancouver event of Pulses2017 Convention. Mr. Anurag Tulshan has graced the occasion being one of the eminent speakers. In addition to this, a GAFTA International Pulses Committee meeting on the side lines of Pulses2017 Convention took place in Vancouver. Mr. Anurag Tulshan, East-Zone Convener of IPGA, was unanimously elected as the new Chairperson of the GAFTA International Pulses Committee. IPGA congratulates Mr. Tulshan on this occasion.

Another such event, 2nd edition of 'Australian Business Week in India (ABWI) 2017', with Austrade was scheduled during the last week of August, 2017, in Delhi, in association with Department of Trade, Tourism and Investment, Government of Australia. This event was presided by His Excellency Steven Ciobo MP, Minister for Trade, Tourism and Investment. The event was themed as 'Mechanisms for strengthening cooperation between Australia and India'.

India has witnessed abundant rainfall this monsoon which will be beneficial to the Kharif crop. The improved water table will be favorable during Rabi sowing and increase overall production of pulses in the country. At the same time, Central Government has notified all states to remove Stock Limit on all pulses, which is a step towards ease of doing business for all trade stake holders and will also help the farmers to liquidate their produce.

The team at IPGA is going strong with preparations for The Pulses Conclave 2018 (TPC 2018) and online Registrations are now open during last week of August. In TPC 2018, IPGA with 25% increase in participation in every Pulses Conclave, we expect record participation in TPC 2018 as well. Your participation will make the pulses awareness strong in terms of food security in India.

Pravin Dongre
CHAIRMAN
India Pulses and Grains Association

Editor
Pradeep Ghorpade

Editorial Team
Poonam Vij

Facebook: @IPGAPulses

Twitter: @IPGAPulses

National Circulation:
16 States

International Circulation:
8 Countries

Printed at:
Apollo Printing Press, Nasik

For Editorial Content & Advertisement
Email: poonam@ipga.co.in

For Subscription
Email: info@ipga.co.in
poonam@ipga.co.in

Contents

Special Section

Red Lentils

- Red Lentils-Soil To Table
- Ethiopian Lentils (Miser)
- Red Lentil- The Powerhouse Of Nutrients
- Red Lentil Recipes

Red Lentils -Soil To Table

Huseyin Arslan
Executive Chairman, Board of Directors; President, The Arbel Group

Global pulse markets have changed and evolved over the past three decades. While pulses production, one of the oldest cultivated crops and an important source of vegetable protein in many areas of the world, was traditionally centered in the regions of consumption, such as India and Turkey, there has been a shift in where production is located—but not a significant shift in where they are consumed. This change has created a shift in how the global pulse industry operates, creating new challenges surrounding transportation and logistics, trade and tariff/non-tariff trade barriers.

The volume of pulses grown each year has not changed significantly: the United Nations Food and Agriculture Organization estimates that approximately 50,000,000 metric tonnes of lentils, dry peas, chickpeas and dry beans—the four major pulses grown in the world—are grown each year, as they have been for some time. However, while production was formerly dominated by the regions consuming these pulses, nontraditional production regions like Canada, Australia and the United States have emerged as the main production and export origins for pulses, supplying traditional regions and supplementing their local production.

In order for global pulse supplies to continue moving from production to consumption in this way, there are several key issues that must be addressed and resolved. Some have been addressed already, while others have not been a priority for importers, exports and governments looking to continue business arrangements and ensure that food security and availability of food does not become an issue.

In the past, pulses were a product grown locally and consumed locally. The market dynamics and trade were very simple: pulse consumption regions consumed what they produced, then supplemented stocks with imported products when local stocks ran low. This began to change in the 1990's, when advancements in sustainable agriculture led to producers in Canada, Australia and the United States introducing mass quantities of pulses into their rotational cropping plans. The dynamic changed, tilting the playing field for global trade towards regions that do not directly consume the pulses they produce.

That production has scaled up dramatically over the past fifteen years, with production of pulses in Canada rising from 3.5 million metric tonnes in 2001 to over 8 million metric tonnes in 2016. Virtually all of these pulses are destined for export markets in India, China, Turkey, the Middle East and North Africa. Similar, but not quite as dramatic growth has been reported in Australia and the United States. Today, the Global Pulse Confederation estimates that Canada, Australia and the United States make up three of the top five positions of the world's largest pulse exporters.

That production has scaled up dramatically over the past fifteen years, with production of pulses in Canada rising from 3.5 million metric tonnes in 2001 to over 8 million metric tonnes in 2016.

The success of pulses in nontraditional origins brings up a larger question: what has happened to the traditional producers of pulses? These traditional regions, which produced major volumes of pulses in the past, still have significant demand requirements. What shifted and changed? And what will pulse markets do about this shift?

There is no simple answer, but in most cases, production shifts have come from three areas. Firstly, farmers in many regions have simply shifted their production to other crops. Production levels for pulses are still high, but environmental challenges, including changing rain patterns and temperature shifts, have led to farmers changing their seeding plans to grow other crops that will maximize the revenue they can generate in a season, with the knowledge that markets can simply import the traditional, high-demand pulse products they consume on a daily basis.

Secondly, as populations in emerging markets increase, so does urbanization as cities and towns grow to accommodate them, decreasing the amount of arable farmland available for production.

Finally, scarce availability of proper seed for local growing conditions has reduced yields, impacting production volumes overall. While research into seed varieties and farming technology is being done in nontraditional production markets, demonstrated by production volume gains, the same cannot be said for traditional production regions in emerging markets—or the world pulse sector overall.

Ultimately, these shifts in production have resulted in a high supply and demand gap and a dramatic rise in imported products, introducing real food security issues with which local governments must now contend. Traditional producers have become dependent on imports to maintain food availability for staple items, and this has resulted in governmental policy to support local agricultural industries, attempt to reduce their need for imported products, and disseminate messaging to curb food inflation and food security concerns, either through production support or non-trade barriers.

Pulses are a sustainable and healthy source of protein and an important part of the world's diet, especially in developing nations.

Trade barriers, in the case of India, have manifested in issues surrounding fumigation of agricultural products from many countries in the world, a matter that is ongoing and in need of a permanent solution. India needs imported pulses, and the global pulses sector needs Indian markets. This is a partnership that simply cannot be broken.

One thing that has not changed is that traditional consumption regions continue to consume pulses—and a lot of them. Pulses are a sustainable and healthy source of protein and an important part of the world's diet, especially in developing nations. With a global population of 10 billion people expected by 2050, including emerging middle classes in countries such as India, China and Brazil, pulses will play an important part in feeding the world in this century. The UN FAO estimates an increase in total food consumption by up to 70% by 2050 globally, as well as an increased focus on health, wellness and sustainability in developed nations. All of these factors have given rise to a multi-billion dollar pulse industry, estimated by GPC at over $100 billion dollars at the retail level. The pulses business today is not as simple as it was thirty years ago.

The UN FAO has stated that in the next 40 years, we need to produce the equivalent of all of the food produced in the last 10,000 years. This will be a significant challenge, to put it mildly. One of the primary building blocks for civil societies is the availability of safe and plentiful food. Pulses have always been part of the traditional diet for much of the world's population and play a big part in feeding the world. It is only through partnerships between industry and government to support trade and remove non-tariff trade barriers that the guarantee of a reliable, consistent and safe supply chain for pulses, meeting the requirements of the industry's existing and future customers and consumers, can be met.

Ethiopian Lentils (Miser)

A comprehensive perspective on an important local staple food

Ketan Patel
CEO and Executive Director of ETG Group

Pulses are important for Ethiopia's smallholder farmers. It provides an economic advantage to small farm holdings as an alternative source of protein, cash income, and food security. Lentil, which is one of the key varieties of pulses, is grown in the highlands of Ethiopia. It is a staple food and is widely used as whole, split in stews, soups and in various forms of sandwiches. Hence it is a popular ingredient of every day diet in majority of households. As a result the local consumption is high as compared to other regional countries and also the local prices are generally higher than most other pulses.

Crop Cycle & Productivity

Lentil in Ethiopia is sown from end of June to mid-July on red soils. It usually matures in 3½ months and is harvested between Mid-September to October. Lentil production mainly depends on soil type, altitude and agro-ecologic climatic conditions. Moreover, its production is not mechanized and is produced by smallholder farmers with fragmented plots of land (2-10 hectare) without chemical inputs. Hence it is considered organic, although not certified.

Around 7% of cultivated land and 5% of production is contributed by Lentil. Productivity varies from region to region. While the national average productivity is between 0.4 and 0.5 tone/hectare, improved varieties yield 1.4-5 tons/hectare in research fields and 0.9-3 tons/hectare in farmers' fields.

Increasing Trend in Production & Areas under Cultivation

The production of lentil between 1990 and 2014 had increased from 30 thousand tons to 137 thousand tons, while the cultivated area had increased from 39,000 hectare in 1990 to 99,000 hectare in 2014 (source: FAOSTAT). This increase in production and area has not created a substantial surplus for export since most of the produce is consumed locally.

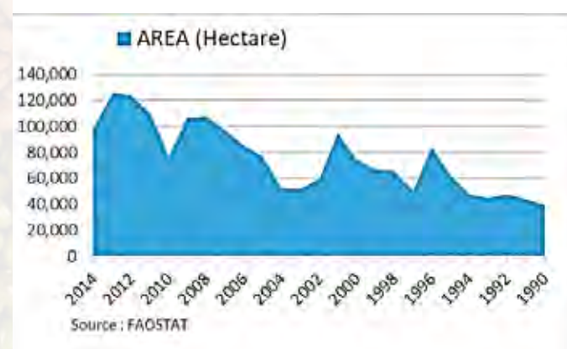
Since lentil has major role for the local small stack farmer, around 2 million farmers & other small merchants are involved in lentil trade. It is grown as winter crop in Ethiopia and is particularly important in Oromia region. The main growing areas are Ajer, Debrazit, Minjar, Gonder, Debraberhan, Kambolcha and also some parts of southern Ethiopia.

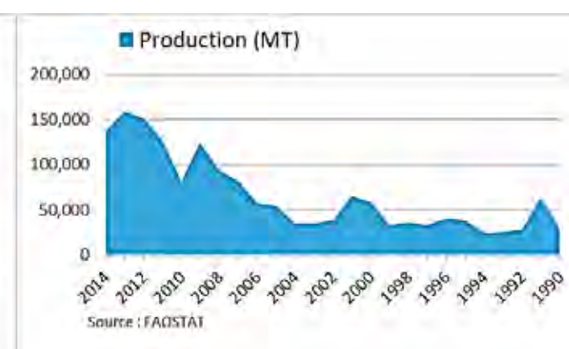
Since the production is matched with increase in domestic consumption and lentils play a big role in local food, Government has decided to ban the export of lentils from (G.C.) 2010

Value chain

Lentils are grown by Small farmers who in turn sell the lentils to consumers in either local market or small traders (assemblers), or else directly to wholesalers. Assemblers then sell it to consumers or wholesalers near production areas. Big traders (rural traders) sell lentils to retailers or wholesalers in the terminal markets such as Addis- Ababa, Bekie, Bahir Dar, Gondar, Dessie, and Nazareth. Substantial amount of lentil from different parts of the country is channeled to Bekie town where it is processed, graded, packed and sold in domestic market. The local market can be classified mainly as below:

Primary Markets (buyers who buy directly from the producers) include rural retailers, rural assemblers, brokers, and primary cooperatives.





Secondary Markets (buyers who purchase products primarily from originators) include Wereda retailers, Wereda wholesalers and farmers unions.

Tertiary Markets include Urban Wholesalers, Urban Retailers, Processors, Supermarkets, and Grain Exporters, which are located in large cities such as Addis Ababa, Nazareth, Dessie, Gondar, etc.

Quality

The work done by Debrezeit Research Center has led to the release of 7 improved varieties. Of which one variety, ADAA FLIP-86 41L is recommended for export due to its bigger sized seed and red color when the same gets split.

Consumption (demand)

Crop Utilization Agricultural Sample Survey conducted by Central Statistic Agency (CSA) indicates that out of the total lentil production 41.1% was used for household consumption, 18.8% for seed, 37.1% for sale, 0.32% for wage in kind, .01% for animal feed and 2.63% for others. (See table below)

Location	Production in Quintals	Percent Utilization					
		Household consumption	Seed	Sale	Wage in kind	Animal feed	Others
Country	1,591,212	41	18.81	37.14	0.32	0.1	2.63
Amhara	798,120	32.84	19.39	43.24	0.41	0.14	3.98
Oromia	689,425	46.44	17.92	34.53	0.07	0.09	0.94
Tigray	95,792	54.34	16.19	26.89	0.37	-	2.21
SNNP	7,597	52.25	21.5	23.26	0.89	0.04	2.05

High demand for lentil in the local markets, accompanied by high prices encourage the farmers to grow lentils. Its domestic price is usually higher than the international price.

With the current view of lentil producing area we can observe significant growth, in year 2016-17 lentil production estimated to achieve 200,000 MT. There are many new areas which are added under cultivation. This leads to increase in production and with increased consumption it has stabilized the local market price.

Uses

Lentil is part of staple diet and is one of the heavily consumed pulses in Ethiopia. It is usually eaten fried, roasted and boiled whole or split in the form of stews, vegetable soups mixed with other bean. It is also ground to powder to prepare 'shiro', 'azifa', and 'hilbet'. Lentils is also widely used in crop rotation practices to improve soil fertility.

Red Lentil- The Powerhouse Of Nutrients

Sheryl Salis
Practising Dietician

The use of lentils dates back to ancient times with lentils being used in the folk medicine of many ethnicities to treat different illnesses.

Red lentils also called Masur dal are not only tasty and versatile, they are also a storehouse of nutrition providing a vast array of nutrients offering numerous health promoting benefits

They form an essential food item for all, especially in the diet of vegetarians and vegans. Each serving of lentils provides considerable amounts of nutrients and hence they are an ideal food group to be included in a healthy and balanced diet.

Nutritive value of 100g of Red lentil is as follows:

Calories-331 calories, Protein 21.7 g, Carbohydrate-55g, Total Fat 1.56 g, Total Fiber- 9 g, Soluble Fiber-2.39g, Insoluble Fiber-6.67 g.

Like all other lentils, red lentils are low in fat and a rich source of protein and fiber mainly insoluble fiber and resistant starch. Being a vegetarian source, they are cholesterol free. Red lentils are a good source of beta-carotene, folate magnesium, phosphorus and selenium. In addition, they have a low sodium levels and relatively high levels of potassium thus helpful in lowering blood pressure levels. They are a rich source of phytosterols thereby providing a hypo-lipidemic and an anti-inflammatory effect.

According to a study published in the FASEB journal, dehulled Red Lentil are higher in bioavailable iron compared to other legumes In addition to all these nutrients, red lentils contain good amounts of antioxidants like anthocyanin that help in destroying free radicals.

Resistant starch resists digestion in the small intestine and acts like fiber in the large intestine. As it resists digestion, foods containing this type of starch have low glycemic index. Lentils contain about 25 g Resistant Starch (RS)/100 g total starch FM, representing about 48 % of total starch content with a value that reaches up to 65.2 %. Due to the presence of RS and other fibers, lentils and other fiber-containing food exhibit bifidogenic effect even it is low when compared with that of other pulses such as peas and chickpeas . As shown by in vitro fermentation studies, the indigestible fraction (IF) of lentils fermented by colonic bacteria is the best substrate for the fermentative production of short chain fatty acids (SCFA), especially butyric acid, which is important for intestinal health.

According to the USDA ORAC values 2007, lentils had a higher Oxygen radical absorbing capacity (ORAC) value than most of the common fruits and vegetables including apples, plums, blackberries, cherries, figs, peaches, pears, oranges, garlic, cabbage and almonds

Recent reports have indicated that quercetin diglycoside, catechin, digallate procyanidin, and p-hydroxybenzoic were the dominant phenolics in red lentils providing the highest antioxidant benefits. The high amounts of antioxidants present in these lentils destroy the free radicals and minimize the cell damage caused by them making it best anti-aging foods.

Red Lentils and Cardiovascular Health

In humans, Lentil consumption has been inversely associated with the incidence of cardiovascular diseases (CVD), including hypertension. Recently, Boye et al. found that lentils possess angiotensin I-converting enzyme (ACE) inhibitor activity. The authors concluded that red lentil protein hydrolysates could contribute to the blood pressure lowering effects of lentils. Accumulating evidence supports the cardioprotective, hypolipidemic, and hypo homocysteinemic effects of lentils. Hyper homocysteinemia has been linked to an increased risk of CVD. The Framingham Heart study found that lentils contributed 1.7 % of total folate intake. Also, they showed that serum folate concentrations were significantly increased, whereas serum homocysteine concentrations were significantly decreased in a dose-dependent manner regardless of the source of folate This finding led to speculation that lentils could exert a beneficial effect in reducing the extent of hyper homocysteinemia by virtue of their high content of folate, and thus in ameliorating coronary heart diseases (CHD). Red Lentils also contains important minerals like magnesium that helps to boost heart health.

Shams and colleagues found that addition of 50 g cooked lentils to the diet of a patient with diabetes led to a significant decrease in TC but not in LDL, HDL and TG. They explained their findings under the light of the low glycemic index (GI) value of lentils. In such low GI foods, the reduction in blood lipids is thought to be due to the greater amounts of amylose in comparison to amylopectin. Digestion and absorption of amylose part of starchy foods are much slower than that of amylopectin. Consequently, GI of amylose is less than that of amylopectin, a matter that could explain the blood lipid and glucose lowering effect of lentils which have higher amylose to amylopectin fraction. The hypo lipidemic effect of lentils had been ascribed also to increased biliary cholesterol and decreased biliary phospholipids in such a way that the biliary cholesterol saturation index rose from 110 to 169 %

Red lentils and Diabetes.

It has been strongly suggested that eating pulses is beneficial in the prevention and management of diabetes. Therefore, consumption of a wide range of carbohydrate foods from pulses and other rich sources both for the general population and for people with diabetes, especially those with type 2 diabetes is generally recommended. Lentil derived leguminous fibers have been found to prevent the impairment in the metabolic control for diabetic rats when total carbohydrates intake was increased, suggesting that lentil carbohydrates, including their dietary fibers, could have promising implications for diabetic patients

Glycemic index is a measure of the increase in blood glucose, which occurs after eating a preset portion of available carbohydrate from a test food, compared to a reference food. Consumption of foods with high GI and high GL is associated with hyperglycemia and hyperinsulinemia.

Red lentils have low glycemic index of 26, which makes them an ideal food for people with diabetes. They are rich in resistant starch which is not digested and hence does not cause sudden spikes in blood glucose levels. The American Diabetic Association recommends that people with diabetes should include lentils in their diet several times a week. Although lentils are healthy, people with diabetes should take care to keep a check on portions in order to manage their blood sugar effectively. Since red lentils and pulses in general come under the category of carbohydrates, too much consumption can cause changes in the blood glucose levels.

Shams et al found that addition of 50 g cooked lentils to the diet of a person with diabetes led to a significant decrease in fasting blood glucose. In this study, the administration of lentils significantly decreased serum blood glucose. The glucose-lowering effect of lentils was ascribed by the researchers to probable influences of low GI diets on glucose metabolism

Red Lentils and food intake and body weight

The high fiber content and low glycemic response of lentils have been looked at as a means for increasing satiety, reducing the food intake, and thus controlling body weight. Among four different pulses, lentils exhibited the strongest satiating properties, resulting in lower food intake compared to other dietary meals. Lentils led to 8 % lower cumulative energy intake compared to a reference meal. This evidence improves the observational studies that consistently show an inverse relationship between pulse consumption and BMI or risk for obesity

Red lentils and skin benefits

Red lentil works as an excellent cleanser by removing impurities. Applying face masks made with red lentils can leave skin looking young, supple and glowing .The red lentil face pack is very effective in tightening the pores of your skin and exfoliating it. It not only helps in cleansing skin, but also helps in making it soft and smooth. Red lentil also reduces excess oil on skin hence preventing acne. It increases the elasticity of skin and reduces the appearance of fine lines, wrinkles and dark spots.

Red Lentil and Cancer

Lentils are dietary component traditionally consumed in populations where cancers of the colon, breast, and prostate are low.

Poly-phenolics have shown chemo preventive ability against cancer with several plausible molecular, genetic and bio-chemical mechanisms. Plant lectins are unique group of proteins and glycoproteins in lentils with potent biological activity. Several lectins have been found to possess anticancer properties in vitro, in vivo, and in human case studies. Roy et al. suggested that most studies investigating anticancer effects of lectins used lectins from lentil and various pea varieties, further confirming the uniqueness of lectins from these pulses compared to other natural sources. Hence, lectins from lentils and other pulses may have great potential to be as functional foods for reducing the risk of certain cancers.

Red lentils contain considerably high amount of the pivotal folic acid, which is expected to be involved in the cancer preventive effect of lentils. Folic acid is considered to be among the most potent agents that suppress gene expression by DNA methylation. In animals, it was found that folate supplementation before the initiation of neoplastic foci significantly decreased the number of small-intestinal adenomas and colonic aberrant crypt foci (ACF) .In humans, higher folate intake has been inversely associated with the risk of colon cancer.

The presence of a wide spectrum of bioactive phytochemicals and peptides in lentils makes it a functional food with chemo preventive effect against colorectal cancer

Phytic acid present in red lentils and split lentils in general could reduce colon cancer via chelation of iron and suppression of iron related initiation and promotion of carcinogenesis. Further, it may have potential therapeutic use in cancer due to its property of enhancing the activity of natural killer cells associated with suppressed tumor incidence.

Conclusion

When comparing the vast amount of literature investigating red lentils, a compelling body of evidence confirms that red lentil is one of the most nutritious and health-improving foods known to man. According to recent definitions, lentil could be considered a prophylactic and therapeutic functional food due to its considerable content of essential macronutrients, namely functional proteins and low GI and GL carbohydrates, and essential micronutrients, as well as bioactive phytochemicals such as phytates and polyphenols promoting good health and reducing risk of several chronic illnesses

References:

1. Role of lentils in human health and nutrition: a review: www.academia.edu/2110576
2. Seed coat removal of red lentils enhances iron bioavailability in traditional Bangladeshi meals- The FASEB JOURNAL- Diane M. DellaValle1, Albert Vandenberg2 and Raymond P. Glahn1
3. http://www.medicalnewstoday.com/articles/297638.php
4. http://www.veg-world.com/articles/lentils.htm
5. http://www.seedguides.info/lentils/
6. http://www.lentils.org/about-lentils/about-lentils-org/faqs/
7. http://www.valuefood.info/1622/benefits-of-red-lentils-masoor-dal/

Onion Soup With Pardina Lentils

4 Serves

Ingredients

120 g pardina lentils | 3 large onions | 1 teaspoon butter | 2 tablespoons olive oil | 1 sprig fresh rosemary | 1 litre vegetable broth | 1 small glass Pedro Ximénez | 4 slices country bread | 2 cloves garlic | 4 tablespoons grated gruyere cheese

Preparation

Wash the pardina lentils well, put them to soak for an hour and cook them with a bay leaf until tender. Set aside. Peel the onions, cut in half and slice lengthwise finely. Heat the butter with the olive oil, add the onion and a pinch of salt and cook slowly for 30-35 minutes until tender and golden. Add the wine, raise the heat to evaporate the alcohol and then pour in the broth and add the rosemary. Leave to cook for 10 minutes, throw in the lentils and leave for 5 more minutes. Meanwhile, toast the bread slices, rub with the garlic and pile the grated gruyere on top. Put under the grill for a few minutes so that the cheese melts.

Serve the soup with the toast

Lentil Salad

4 Serves

Ingredients

1 onion | 1 leek | 1 carrot | 1 large ripe tomato | 250 g black beans | 16 king prawns | 400 g seasonal wild mushrooms | Olive oil | Salt

Preparation

Peel the onion. Wash the leek, carrot and tomato.Put all the vegetables (whole) into the pressure cooker along with the black beans. Cover with water and cook for 45 minutes over a medium heat.Meanwhile, prepare the prawns by removing part of the shell but leaving the heads and tails on; also remove the intestinal sac. Prepare the mushrooms by removing the stalks and brushing them gently to remove any bits of earth. Once the beans have been cooked, remove the vegetables and put the beans and their stock in to a saucepan; season to taste and keep covered.Sauté the prawns and mushrooms in separate pans with a splash of olive oil and a couple of pinches of salt. Put a generous portion of beans on each plate and arrange the prawns and wild mushrooms on top. Sprinkle over a little Maldon salt and serve.

Bread Sticks

6 Serves

Ingredients

150 gr. - Red lentils, cooked | 150 gr. - Strong flour | 150 ml. - Water, lukewarm | 10 gr. - Fresh yeast | 25 ml. - Olive oil | 5 gr. - Sugar | 10 gr. - Salt | 1 Tsp - Garlic salt | Grated cheese, oregano, cumins... for decoration

Preparation

Dissolve the yeast in the lukewarm water, add sugar, set aside until bubbly. In a large mixing bowl put together all the ingredients. Knead for about eight minutes it should be elastic but not sticky. Cover with plastic film and let the dough rise until it doubles its size.Knead slightly to eliminate the air. Take small pices of dough of about 20 grams. Make sticks, using a roller pin you may flatten them, form them as desired, and place on a baking tray covered with parchment paper. Cover and let them rise until they double their size. Brush with olive oil and sprinkle with grated cheese, oregano, cumin, salt...Bake at 180º-C for 10 minutes or until they get a nice golden color. Remove from the oven and let them cool.

Macaroni With Pardina Lentils And Pesto

4 Serves

Ingredients

300 g macaroni | Half cup fresh basil leaves | Half cup walnuts | 50 g de parmesan cheese | 2 cloves garlic | Olive oil and salt | 200 g cooked pardina lentils

Preparation

Prepare the pesto: put into the container of a processor the basil leaves, walnuts, parmesan cut into pieces, garlic and a little salt and pepper. Process until it has the consistency of breadcrumbs. Turn into a bowl and add the olive oil; mix.Cook the macaroni until "al dente", approximately 10 minutes. Strain and refresh for a few seconds under cold water. Heat a little olive oil in a frying pan and put in the pasta with the pardina lentils; sauté for 2-3 minutes. Add the pesto, stir, take off the heat and serve at once.

Pulse Recipe credit www.legumechef.com/en/

Lentils Market Outlook

Brian Clancey
Stat Publishing

Drought across most of the North American production zone created a lot of tension in red and green lentil markets during the growing period.

Lentils are relatively drought hardy, but high heat during flowering causes them to abort. If high heat and drought persists while pods are filling, yields will be further reduced, with some research suggesting crops can lose half their yield potential.

It is worth noting that in its last crop report for 2016, Saskatchewan Agriculture said topsoil moisture was adequate in half the province and surplus in the other half. By the time of the first crop report for 2017, the provincial agriculture department complained that "Adverse weather has delayed spring field work. . . . Many fields remain wet. Warm and dry weather will be needed in the coming weeks before seeding can get fully under way."

"Much of the province received large amounts of precipitation (in April), and fields remain wet in many areas. Provincially, cropland topsoil moisture is rated as 30% surplus, 69% adequate and 1% short."

By the middle of July, high temperatures and limited rainfall since April had reduced top soil moisture reserves to the point where 41% was considered adequate, 46% short and 11% very short. Conditions are worst in areas which mainly grow lentils and chickpeas, extending from the southern crop districts in Saskatchewan through North Dakota and Montana.

Forecasters expected little break in conditions through July, with some forecasts looking for conditions to return closer to normal in August and September, with a risk of a wetter than normal harvest.

Despite the hot and dry conditions, crops reporters in Saskatchewan thought 62% of the province's 3.932 million acres of lentils were rated in good to excellent condition after the first week of July, while 31% was considered in fair conditions and 7% poor.

As Montana's harvest got underway in the middle of July, half the lentils were in poor or very poor condition. Over 61% of all lentils planted in the United States are located in that state, with the result yields there will have a profound impact on the total harvest. Only 9% of the area is located in the U.S. Pacific Northwest, where conditions are significantly better. North Dakota accounts for the balance of the crop. Ratings for lentil crop condition are not available, but 34% of the field peas are rated poor or very poor and 38% fair.

There seems little doubt that while farmers in the United States planted a record area of mostly green lentils, production will be down from last year. If yields are 5% below average in Montana and North Dakota, output will drop from 575,000 to 554,000 metric tons. A 10% decline from the recent five year average would result in a 527,000 ton crop, while a 20% drop would see output collapse to 475,000 metric tons.

In the 2002 drought, yields in Montana sank under 600 pounds per acre and under 1,000 pounds in North Dakota. They were down 69% and 51% respectively from the previous five year average. Better varieties and more experience with the crop could moderate the impact of this season's drought, but markets clearly face the risk of a rapidly tightening green lentil supply and demand situation during the coming marketing year.

Canada grows mainly red lentils. In that country, some market participants are talking in terms of some of the more serious droughts experienced in the past 20 years. In the drought of 2000 to 2003, lentil yields fell sharply in western Canada. Yields in 2000 were down 9% from the previous year, though they were 1% above the previous five year average. In 2001 yields dropped 38% below average, while yields in 2002 sank to less than half the previous five year average.

Where this year's yields end up depends on the extent to which current high temperatures caused flowers to drop off plants. If yields end up 10% below the recent average, lentil production in Canada would drop from 3.25 million metric tons last year to 2.36 million. A 20% decline in average yields would see production sink to around 2.1 million metric tons. Because usage has the potential to range up to 2.6 million MT, including just over two million MT of exports, there is also a risk Canada will be fundamentally short of green lentils and looking at a tight red lentil supply relative to demand.

Canada and the United States are two major lentil exporters in the world. The implication is clear, production problems in those country affects the world's exportable surplus.

Current forecasts are looking for world production to reach 6.07 million metric tons. If yields in North American are 10% below average, global output in 2017 could slip to 5.844 million metric tons and with a 20% decline in average yields output may sink to 5.532 million. Assuming global lentil consumption remains

around six million metric tons, as North American output declines, so does the stocks to use ratio.

It looked like the stocks to use ratio would come in around 13.3% this season or enough lentils to cover 48 days of demand. If North American yields are 10% below average that ratio would drop to 10.6% or enough residual supply to cover 38 days of demand. At a 20% reduction in average yields it would fall to 2.7% or just enough residual supply to cover 10 days of usage.

It is important to understand that the world is unlikely to have a day where there are only enough lentils available to cover 16 days of demand. What it means is that pipeline inventories will reach the point where any production problems in 2018 could result in a fundamental shortage of product around the globe, creating the potential for significant price increases.

Higher prices normally generate production response. It is not unreasonable to think that global lentil output could climb back to 6.3 million metric tons in 2018. But, if this year's yields are 10% or more below average in North America, residual stocks could continue to tighten, with the stocks to use ratio remaining under 10% heading into the 2019 production cycle.

The need to maintain or increase lentil area in 2018 means that the crop must compete for land use with grains, oilseeds and other crops. This summer's drought resulted in a bullish weather market situation for those crops, which will influence the thinking of farmers when deciding what to plant in 2018. Competition for acreage could be intense. Lentils and other pulses will have difficulty maintaining area in net exporting countries unless prices generate competitive returns with other crops during through January and February of 2018.

Of the two classes of lentils, red lentils may face more difficulty because of its reliance on the Indian subcontinent and buyers in Turkey and some Middle Eastern destinations.

Markets face two fundamental issues: India's record rabi season red lentil harvest this year; and reports resellers in Turkey and other destinations are golding significant quantities of unsold product. Both point to a potential reduction in demand through the end if the calendar year.

Problems in India are compounded by the fact that any shipments from Canada after September 30 will be subject to fines if the cargo is not fumigated with methyl bromide at origin. The same is not true of shipments from the United States, which could see more Canadian product flow through processors in that country through early December.

Demand is expected to recover in 2018. Pulse production in India is expected to decline in the coming rabi season because of the poor price performance of pulses relative to other crops on that country's domestic markets. However, it is not clear prices would recover early enough to prevent farmers from switching to other crops.

Without price recovery in both red and green lentils, the world could be facing an unusually tight supply situation well into 2019 .

World Lentil Outlook Ranges for 2017-18

(metric tons)

	Average	Good	Bad	Ugly
Area (hectares)	4,523,000	5,329,000	5,346,000	5,487,000
Yield (kg/ha)	1,179	1,139	1,093	1,008
Production	5,334,000	6,070,000	5,844,000	5,532,000
Carry-in	776,000	735,000	798,000	635,000
Supply	6,110,000	6,805,000	6,642,000	6,167,000
Trade	2,971,000	3,340,000	3,340,000	3,340,000
Inferred Use	5,428,000	6,007,000	6,007,000	6,007,000
Ending Stock	682,000	798,000	635,000	160,000
Stock-Use Ratio	12.6%	13.3%	10.6%	2.7%

The Growing Place Of Pulses In The Australian Crop Landscape

Cheryl Kalisch Gordon
Senior Grains & Oilseeds Analyst, Rabobank

Introduction: How will pulse crop 2017/18 compare to last year's record?

Sitting as the world's eighth largest producer of pulses, and accounting for just 4 per cent of global production, Australia's 2 – 2.5 million tonne annual crop pales by comparison to the mammoth 18 million tonnes produced by India, the world's largest producer. The increasingly valuable place of pulses in the Australian cropping system, the high proportion of Australian pulse crop available for export, makes Australian production trends and the seasonal outlook of interest to those in the pulse market.

Chickpeas, lupins, lentils, faba beans and field peas make up the bulk of Australia's annual pulse crop. Western Australia is very much the home of Australian lupin production, along with some field peas, while chickpeas are grown across the eastern Australian states of Queensland, NSW and Victoria. Lentils are mostly grown across South Australia and Victoria, along with faba beans and field peas.

During the decade 2000-2010, lower farm gate returns and increased production risk during the dry years of that decade drove down pulse farming to only 7 percent of yearly cropped area. Pulses in the Australian cropping landscape are now trending up, and in 2016-17, pulses accounted for around 10.5 percent of cropped area, and in 2017-18 are expected to be up even further, and accounting for closer to 11 percent.

Price relativities have driven this comeback of pulses, coupled by growing recognition of the strategic and operational benefits of pulses. In particular, there is a growing adherence to crop rotations, planned 4-5 years in advance and the valuable role that pulses play in these rotations. The value of pulses as a contributor to farm profitability over a crop rotation is relatively higher in Australia, due to the on average lower fertility of Australian soils, compared to many other crop regions of the world. Australian farms are also tending to increase in size (as well as reduce in number). This consolidation in many cases is leading to specialisation in either cropping, or in livestock. Where cropping becomes the speciality, and livestock infrastructure is removed (fencing in particular), the capacity to manage risk with a 'mixed' farming approach, is increasingly meaning the planting of pulses, where once it might have been including sheep in the farm's annual operations. This has all been underpinned by reduced production risk as pulse agronomy practices have been improved.

Australia's 2016-17 harvest was its biggest on record. Total wheat produced was increased by 45 per cent year-on-year, and 40 percent over the five year average. The volume of barley, Australia's second largest crop, was up 60 percent year-on-year and 55 per cent over the five year average. Production was up due to a very favourable season for almost all of the Australian cropping regions. Hectares planted to cereals were typical of previous years, but it was the ample and well timed rainfall during the season that lead to record production levels.

While pulses play a much smaller role in Australia's harvest output in volumetric terms, the equivalent increases in Australian pulse production belittle those of wheat and barley. Total pulse production was up 96 per cent year-on-year, and 108 per cent over the five year average. For pulses, the massive increase in production was driven not only by excellent seasonal growing conditions, but also by increased area planted to pulses. Hectares planted to almost all pulses were up, with the stand outs being the increase in chickpea hectares (60 per cent year-on-year, and 104 per cent over the five year average), and lentils (up 32 per cent year-on-year, and 64 per cent over the five year average).

As this year's Australian winter crop planting began (late March, April), expectations were for pulse hectares to again increase, for harvest 2017/18. Especially on the back of a still favourable outlook for chick pea prices, although down on last season, chick pea hectares were expected to increase by a further 10 per cent (year-on-year).

As the season has progressed, and dry conditions have taken hold across much of the Australian cropping region, the increase in pulse plantings has been tempered. Current yield potential has also been tempered by delayed planting in some regions and reduced soil moisture. The outlook for rainfall over the coming three months, the critical period for pod filling of pulses in Australia, continues to be dry, placing further pressure on production expectations.

This outlook means we will certainly see a sizeable reduction in the volume of pulses produced by Australia in 2017/18, from 2016/17. With reductions in volumes ranging from chick peas being forecast down 26 per cent, through to an anticipated reduction in lupin volume of almost 60 per cent, the overall pulse crop is expected to be down around 40 per cent on 2016/17. These falls are important for short-term planning, but obscure the big picture on Australian pulses.

These large falls on 2016/17 belie the fact that Australian pulse production is still trending up. Pulse production for 2017/18 is forecast to still be up on 2015/16, and the preceding five year average by almost 20 per cent. A focus on year-on-year changes hides the growing the importance of pulse production to the Australian cropping complex.

This is good news for international pulse buyers, because Australia is itself only a small consumer of pulses. Over 90 per cent of Australian chick peas, faba beans and lentils are exported. Even for less export dependent pulse crops such as lupins and field peas, more than 50 per cent of the annual crop is generally available for export.

Whilst, the strategic and operational contributions of pulses to Australian farms will continue to contribute to their growing importance in Australian, returns at the farm gate will of course continue to be the critical driver. Price levels in recent years have provided incentive for increased Australian pulse production: should these prices fall too far the strategic and operational contributions of pulses will need to grow, to ensure Australia's pulse production continues upward.

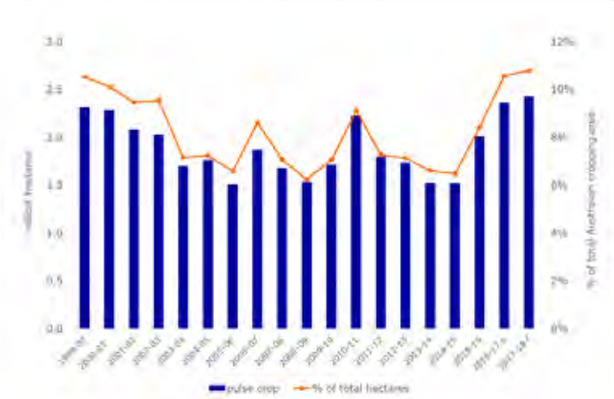


Figure 1: Australian pulse cropped area, 1999-00 to 2017-18 forecast

Source: ABARES, Rabobank 2017

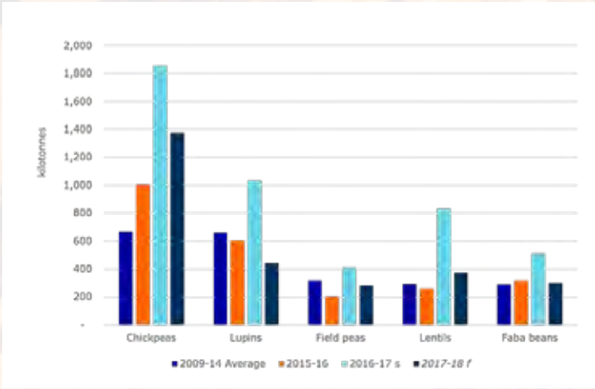


Figure 2: Australian pulse production, 1999-00 to 2017-18 forecast

Source: ABARES, Pulse Australia, Rabobank 2017

Millets The Answer To Climate Change Problems For Sustainable Development

M. V. Ashok
Chief General Manager
National Bank for Agriculture & Rural Development, Mumbai

Abstract

The Green Revolution of the 1960s may have made India food secure by introducing the high yielding varieties of rice and wheat which registered a whopping increase in production levels between 1956 and 2006, while millets suffered a decline after the Green Revolution.

Climate change is posing a threat to both wheat and rice as wheat an extremely heat sensitive crop and can't withstand temperature rise. Once the ceiling of two degree celsius temperature rise is crossed, wheat may decline from our farming system. Current methods of cultivating paddy are affecting the environment owing to standing water emanating methane, a greenhouse gas from inundated rice fields. Climate change portends less rain, more heat, reduced water availability. This would make it increasingly difficult to achieve sustainable development. If these two crops disappear from the farming sector, then we need to identify alternate crops that will fill the gap.

Millets are the answer to both climate change and food and nutritional security and sustainable development. Millets can be cultivated throughout the year, whereas wheat and paddy are seasonal crops. Millets are capable of growing under drought conditions; they can withstand higher heat regimes. Millets grow well on soils that are less than eight inches deep. They do not demand rich soils for their survival and growth and can be grown on diverse soils with low fertility, acidic and saline. While rice and wheat have so far succeded in producing food security for India, millets can do more by contributing to securities such as nutrition, fodder, fibre, health, livelihood and ecology besides food. Thus, millet farms do not just use soil fertility for their growth, but also return this fertility to the soil and maintain their balance of and soil health. Also most of the millets are inherently biodiverse. Millet farming in the country has several crops planted in the same place at the same time like they do in the Himalayas.

Millets are ideal climate change compliant crops and are highly energy and resource efficient, as with the least utilization of inputs it yields considerably by virtue of its acclimatization, thus capable of mitigating the effects of global warming. They requires the least utilization of inputs and provide considerably high yields by virtue of its acclimitisation, structural and physiological adaptability and drought and disease-pest evading mechanisms. Indian agriculture with more dependence on monsoon and seasonal rains, could well readopt the forgotten crops to regain the dominance over these nutritious traditional grains and reorient the agricultural prosperity in the state with the available resources.

Millets grown under traditional practices constitute a farming system and merely a crop. Indian agriculture with more dependence on monsoon and seasonal rains, could well readapt the forgotten crops to regain the dominance over the coarse and reorient the agricultural prosperity in the country with the available resources.

This paper would try to capture the eminence of millets over paddy and and wheat and how many NGOs are doing their bit for millet which successfully combating climate change and leading to sustainable development.

Climate Change and Indian Agriculture

1.0 Recent reports from the United Nations' Intergovernmental Panel on Climate Change has raised the threat of climate change to a whole new level, warning of sweeping consequences to life and livelihood, particularly to the world's food supply. Most climate scenarios depict a world warmer by two degrees or more by 2100, predicting sharp crop yield declines for major grains like wheat and maize. The report further states that, "the one message that comes out of this is the world has to adapt and the world has to mitigate."

1.1 Climate change is making the drylands a tougher environment to develop and survive in. It has been predicted that there will be a 10% increase of the world's dryland areas with climate change, with more variability and occurrences of short periods of extreme stresses (drought and heat) during the crop growing season. India has more than 70% of cultivable area under drylands. According to a World Bank report of 2013, "it is the world's most vulnerable people who will suffer most from the convulsions of climate." Some estimates suggest that 40% of the land now used to grow maize in sub-Saharan Africa will no longer be able to support that crop by the 2030s. This will have hugely disruptive implications for African livelihoods and lives.

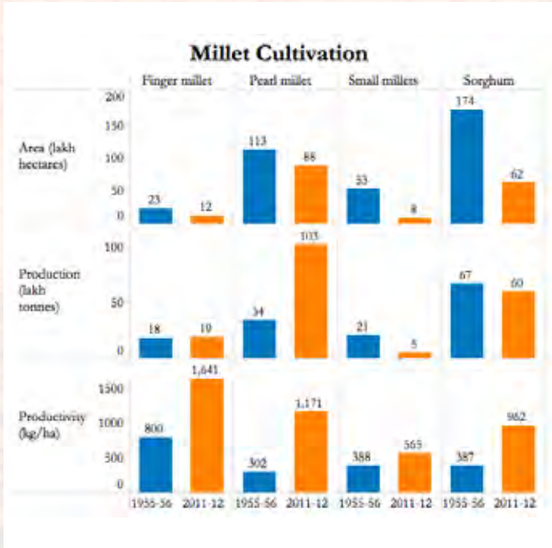
1.2 Hidden hunger, or micronutrient deficiency, is a major health concern in developing countries, particularly in the drylands, as people are too poor to be able to afford foods that are more nutritious, or otherwise lack access to these foods. Millets and sorghum are important for diversification and complementing other foods in resource-poor environments.

Green Revolution and after

2.0 Between 1966 and 2006, 44% of millet cultivation areas

in India were occupied by other crops. Declining state support in terms of crop loans and crop insurance has significantly contributed to this decline and fall of millets in Indian agriculture. Post Green Revolution, there has been a systematic decline in the production of millets. This is clearly evident from the production trends of millets vis à vis, other crops such as rice and wheat, that were relentlessly promoted for intensive farming in a few select resource rich areas under irrigated conditions.

2.1 Agriculturally, nutritionally and environmentally, this is quite tragic. While wheat and rice registered a whopping increase of 285 and 125 percentage points respectively between 1956 and 2006. Simultaneously, state policies pushed millets to suffer a decline of 2.4% after the Green Revolution in agriculture. Much of the decline in production can be attributed to the way millet cultivation areas have shrunk over the last fifty years. Between 1956 and 2006 nearly 42% of all millet growing areas moved away to other crops. In 1958, 36.2 million hectares were growing millets. By 2006, millets were being farmed in only 21.3 mha and during the same period wheat dramatically climbed from 12.8 mha to 26.2 mha to double its area of cultivation. Much of the decline in production can be attributed to the way millet cultivation areas have shrunk over the last fifty years. Between 1956 and 2006 nearly 42% of all millet growing areas moved away to other crops. In 1958, 36.2 million hectares were growing millets. By 2006, millets were being farmed in only 21.3 mha and during the same period wheat dramatically climbed from 12.8 mha to 26.2 mha to double its area of cultivation.



Similarly while they occupied pride of place at 36 % of all cereals cultivated area in 1956, they dropped to a dismal 21% in 2006. Unless this is halted urgently through a slew of policy and financial incentives, millets might disappear from the agrarian landscape of India over the next fifty years. This will not only be a loss for India's food and farming systems but also a civilizational and ecological disaster.

2.2 Why millets and why not other food crops ? The answers are many. Topping them all is the fact that millets are extremly eco-friendly for the following reasons:

They thrive on non-chemical agronomic practices:

- In broad sense they are pest-free crops
- Millet farming is home to agro-biodiversity
- They do no to need irrigation for cultivation
- They can grow on poorest of soils
- in the hands of the farmers it is a zero energy crop

Impact on agriculture

3.0 Millets can grow without synthetic fertilisers. Millets do not demand chemical fertilizers. In fact under dry land conditions, millets grow better in the absence of chemical fertilizers. Therefore most farmers grow them using farmyard manure under purely ecological conditions. In recent years, farmers have also started using bio-fertilisers such as vermicompost produced in their backyard and growth- promoters such as panchgavya, amritpani, etc. These practices make millet production not only ecological, but also keep it under the control of farmers.

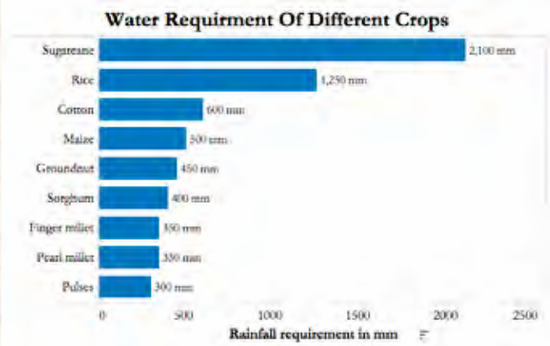
Millets are pest free crops

3.1 Grown with traditional local landraces and under ecological conditions, most millets are totally pest free and hence do not need any pesticides. Even in storage conditions, most do not have any need for fumigants. E.g. The Foxtail millet acts as an anti-pest agent in the storage of delicate pulses such as green gram.

Millets can grow without irrigation

3.2 Do you know how much water we use for growing a kilo of rice? It is an incredible 3000-4000 litres of water. Assuming that the minimum yield of rice in a chemically-grown Green Revolution model is about 2000 kilos per acre, that acre uses between six and eight million litres of water. If, on the same field you grow millets, you can save six to eight million litres of water for the nation. Even if you price this water at one paisa a litre, a millet farmer contributes nearly Rs.60, 000 per year for every acre of the farm she/he cultivates, to the national kitty. According to IWMI "…..currently, over 80% of irrigated agriculture in India is supported by groundwater, resulting in severe overexploitation of this resource". As green revolution was largely for wheat and rice which are water intensive, its growth is unsustainable unless India switches towards small millets.

Small millets are drought tolerant and thrive in harsh agroclimatic conditions. Hence they indirectly conserve the precious and expensive groundwater resource. In a sense, millet farmers are the only ones who do not demand any subsidy from the state, on the contrary subsidise the state exchequer. Consider the fact that nearly 60 million acres of land in India are under millet cultivation. This area contributes in terms of water close to Rs. 350 billion every year to the national income as its own water cess! A contribution never discussed in the august chambers of celebrated economists at the national level. Through such silences, the millet farmers have been completely marginalized.



The Water Crisis

3.3 One of the major challenges confronting human kind today is that of climate change. It is estimated that with rising global temperatures, there will be drastic and far-reaching effects of climatic and weather patterns across the globe, and that some of the poorest and most vulnerable sections of the population across the globe will be effected by this. One of the forecasted characteristics of climate change is erratic rainfall patterns and a reduction in the number if rainy days. This is sure to have an impact on the availability of water, especially in the arid and semi-arid belts, which in India comprise of more than 65% of the total area under cultivation. Under these circumstances, over-exploitation of groundwater becomes a looming prospect, and if the crops grown are water-intensive like paddy, sugarcane and soy bean, then there is a real threat that the precious groundwater resources will be exhausted within this generation, and that none of this invaluable resource will be left for the benefit of the future generations. The table given herewith indicates the criticality of groundwater levels in some of the states where MINI is working, and across the country.

Table No. 1 Groundwater levels in select states

State	Safe	Semi-Critical	Critical	Over-Exploited
Andhra Pradesh	78	93	26	84
Gujarat	156	20	6	27
Karnataka	154	34	11	71
Madhya Pradesh	224	61	2	24
Tamil Nadu	136	67	33	139
India	4277	523	169	802

Source: Central Groundwater Board, Groundwater Year Book 2011-12

As can be seen in the table given above, out of the more 4277 blocks assessed by Central Ground Water Board, 523 blocks/ talukas/mandals, 169 fell under the critical category and 802 came under the over-exploited category. As the table indicates, a number of crisis-ridden blocks are located in Andhra Pradesh, Karnataka and Tamil Nadu; these are states where MINI has substantial interventions going on. It has been proven that millets need very little water in order to grow; on the other hand crops like rice and sugarcane require obscene amounts of water. It is estimated that 400,000 liters of water is needed to grow one quintal of paddy and 25,000 liters of water is needed to grow a quintal of sugarcane. Such profligate consumption of water in times of climate change is criminal. On the other hand, millets need hardly any water, and can grow under conditions of both high and low rainfall, making them ideal in the face of climate change when rainfall patterns are likely to get more and more erratic.

Millets can grow on poorest of soils

3.4 Millets are adapted to a wide range of ecological conditions, often growing on soils that are less than eight inches deep. They do not demand rich soils for their survival and growth. Most millets can be grown on low fertility soils, some in acidic soils and some on saline soils. Millets such as Pearl millet can be grown on sandy soils as is done in Rajasthan; so for the vast dryland area, they are a boon. Poor farmers especially in dryland India are owners of very poor lands. Much of the cultivable fallows and low fertility farms have been handed to them through the process of land reforms and the Jajmani system of Inam lands. The only crops that sustain agriculture and food security on these lands are millets. The capacity of millets to grow on poor soils can be gauged from the fact that they also grow in sub - Sahelian soil conditions in West Africa - which produces 74% of all the millets grown in Africa and 28% of the world production. If they grow in such zones where rainfall can average less than 500 mm, using soils that are sandy and slightly acidic, it is a testimony to their hardiness and extraordinary capacity to survive very harsh conditions. That is why millets can withstand drought-like conditions in the Deccan and Rajasthan and produce food and fodder.

Millets mean biodiversity

3.5 Most millets grown under traditional practices constitute a farming system and not merely a crop. Most millet fields are inherently biodiverse. This is the tradition of millet farming in the country where six to twenty crops are planted in the same space at the same time. The famous Baranaja cropping systems in the Himalayas are a testimony to this. In this millet-led system, 12 different crop varieties are embedded in the same field at the same time. Saat Dhan in Rajasthan also is a host to a large variety of millets. The Pannendu Pantalu system of the South encourages growing millets in combination with pulses and oilseeds, thus making it a holistic farming system.

Millets produce multiple securities

3.6 While single crops such as rice and wheat can succeed in producing food security for India, millets do more. They contribute to securities of food, nutrition, fodder, fibre, health, livelihood and ecology. Most millets have edible stalks which are the most favoured fodder for cattle. Sometimes, crops such as sorghum and pearl millet are grown only for their fodder. They offer not only food but also fodder, health, nutrition, livelihood and ecological security. Thus, while other food crops can offer us food security, millets can offer multiple securities. The legume crops that are companion crops for millets are also prolific leaf shedders. The fallen leaves act as natural manure and maintain soil fertility. Thus, millet farms do not just use soil fertility for their growth, but also return this fertility to the soil. Ultimately, their energy balance sheet stays clean. All the energy they import for their cultivation is returned by them to the soil.

Store house of Nutrition

3.7 By any nutritional parameter, millets are miles ahead of rice and wheat. In terms of their mineral content, millets dwarf rice and wheat. Each one of them has more fibre than rice and wheat - some millets have as much as fifty times that of rice. If there is any single factor that should tilt the scales in favour of millets in the food and farming landscape, it is nutrition. Fodder, millets are storehouses of nutrition and hence provide nutrition security. Being hosts to diverse crops such as red gram and amaranth, millet fields produce fuel wood and fibre. See the table below and you will discover this amazing quality of millets.

Table No. 2 Nutritional content per 100 gram of crop

Crop	Proteins (g)	Fiber (g)	Minerals (g)	Iron (mg)	Calcium (mg)
Pearl millet	10.6	1.3	2.3	16.9	38
Finger millet	7.3	3.6	2.7	3.9	344
Foxtail millet	12.3	8	3.3	2.8	31
Proso millet	12.5	2.2	1.9	0.8	14
Kodo millet	8.3	9	2.6	0.5	27
Little millet	7.7	7.6	1.5	9.3	17
Barnyard millet	11.2	10.1	4.4	15.2	11
Rice	6.8	0.2	0.6	0.7	10
Wheat	11.8	1.2	1.5	5.3	41

Source : Deccan Development Society (DDS)

Finger millet has thirty times more calcium than rice, while every other millet has at least twice the amount of calcium compared to rice. In their iron content, foxtail and little millet are so rich that rice is nowhere in the race. While most of us seek a micronutrient such as Beta Carotene in pharmaceutical pills and capsules, millets offer it in abundant quantities. The much privileged rice, ironically, has zero quantity of this precious micronutrient. In this fashion, nutrient to nutrient, every single millet is extraordinarily superior to rice and wheat and therefore is the solution for the malnutrition that affects a vast majority of the Indian population. Remember in the Global Malnutrition Index, India occupies a position far below that of sub - Sahelian Africa, a region known as the poorest in the world. Therefore, experts say that India is in a state of Nutritional Emergency.

Apart from the poverty-induced malnutrition in the disprivileged rural belts, the nutritional crisis that the urban world faces is also a matter of grave concern. Obesity, diabetes, heart diseases among the urban populations of the world can be traced back to their dietary imbalance and the presence of carbohydrates and absence of other nutritional elements in their diet. To overcome these problems, increased use of millets in our diets can be the answer. In fact, with their low glycemic index millets can be a dietary panacea for the diabetics.

In 2010, an urban Indian consumed 52 kg of wheat, almost twice the 27-kg annual consumption of the mid 1960s. As a result, since 1956, the area under millets shrunk: 23% for pearl millet, 49% for finger millet, 64% for sorghum and 85% for small (or minor) millets.

3.8 Nutritionally, millets are richer than wheat and rice:

- Barnyard millet has 531% the iron in wheat, 1,033% that in rice. Pearl millet has 314% the iron in wheat, 611% that in rice. Little millet has 265% the iron in wheat, 516% that in rice.
- Finger millet has 839% the calcium content of wheat and 3,440% that of rice. Pearl millet and wheat are comparable in calcium content, both of which have four times the calcium density of rice.
- Barnyard millet has 313% the mineral content of wheat, 783% that of rice; foxtail millet has 220% the mineral content of wheat, 550% that of rice.
- Proso, foxtail, pearl and barnyard millets compare with wheat in protein content. Sorghum and all millets are richer sources of protein than rice.

7.0 Why millets are good

- Gluten-free millets and sorghum are good sources of micronutrients that could bring various health benefits. For instance, finger millet is rich in niacin (or vitamin PP), that helps reduce high cholesterol level.
- Millets have multiple benefits1. Their low glycemic index helps manage blood glucose levels and prevent diabetes.
- Millets are high in anti-oxidants, which lowers heart disease and cancer risks and is recommended for pregnant women: highest folic acid among cereals (46 mcg/ 100 g); highly digestible and gluten-free.
- Finger millet is very high in calcium (340 mg per 100 g, three times more than milk) 2 3 4 making it important for lactating women and children.
- Pearl millet5 and sorghum are rich sources of energy (about 350-360 Kcal/100 g), with comparable levels as wheat and rice.
- 1 kg of pearl millet contains about 75 mg of iron, roughly the daily iron requirement of a young child (below 3 year-old),

and 43 mg of zinc; high levels of iron and zinc help reduce anemia and stunting.

- In India, government is urging states to include millet as part of school feeding program to boost nutrition and support local production, as other food sources are under threat of climate variations.
- ICRISAT works with partners in developing high iron pearl millet to help reduce iron deficiencies among the poor in developing countries; and with community health centers in Africa to train women's groups on health, hygiene and child nutrition, including infant recipes using sorghum and millet mixed with legumes and leafy vegetables, and promoting whole grain.
- Millets and sorghum are critical for diet diversity. Fewer crops species are feeding the world than 50 years ago, with a stark decline in millets and other traditional crops.
- This globalized non-diversified diet of energy dense crops fuels the rise in diabetes and heart disease. Millets are part of the answer to reverse this trend.
- Dryland cereals like millets and sorghum are the most hardy, resilient and climate adaptable crops for harsh, hot and dry environments.
- Millets are often the only cereal crops that can grow in arid lands, needing only 350-400 mm annual rain.
- 1 kg of pearl millet contains about 75 mg of iron, roughly the daily iron requirement of a young child
- With global warming, 40% of land where maize is grown in sub-Saharan Africa may not support that crop by 2030.
- Drought-tolerant alternatives like millets will be vital. They need less water than other cereals to survive.
- Some pearl millets survive at temperatures up to 64oC.
- Millets and sorghum are adapted to smallholder farmers production systems:
  - » Grow quickly; some millets need 60-65 days to mature against 100-140 days for wheat.
  - » Can adapt to a wide range of soil conditions, including poor and low fertility soils; easier to grow for poor farmers with difficult access to inputs.
  - » Can have large yield increases through improved farm conditions.
  - » Good response to sustainable application of fertilizers and water. In Mali, Niger and Burkina Faso, fertilizer microdosing led to 100% yield increase in millet in 120,000 households.
- Greater biodiversity on-farm reduces pests and climate risks, improving farmers' overall resilience.

9.0 How millets and sorghum can help fight poverty and food insecurity?

- Dryland cereals production offers a new solution to meet the demand to feed 9 billion people by 2050, since 1/3 of rice, maize and wheat growing arease have experienced yield plateaus or yield decrease in the last decade.14
- Better seeds, better inputs and better farm practices can boost millets and sorghum production to significant levels.
- Yield gain potential for sorghum is great. Average rainfed sorghum yield is only 600 kg/ha, but realistic potential is 3 times higher.
- Millets are well-known traditional crops for most of the 2.5 billion people in the drylands; 80% is eaten by farmers' family.
- Millets and sorghum have multiple uses:
  - » Fodder – pearl millet straw, with up to 50% dry matter, is the main animal feed for dryland herders in the dry season.
  - » Biofuels and fermentation industries have the potential to be fully developed.
  - » Health foods and other consumer products can have potential, untapped markets.

10.0 Therefore, there is an urgent need for Indian policy makers to refocus their attention towards millet farming systems and enact policies that create an enabling environment for millet farmers.

Sustainable cultivation of nutri-millets by small and marginal farmers in semi arid regions of India, with value addition in the wake of climate change assures income, employment, savings, investment, gender and natural resource dependence and coping mechanisms in the wake of climate change.

Development initiatives for Millets

4.0 Sadly in the absence of any support policy or otherwise from the Government, it the civil societies who have taken it on themselves to champion the cause of Millets and they are doing it well. The Deccan Development Society and the Timbaktu Collectives both based in the state of Andhra Pradesh are doing yeomen service to the development of Millets in terms of awareness creation and advocacy and have formed an alliance of NGOs working for this cause.

Millet Network of India

4.1 Millet Network of India (MINI) is an alliance of over 120 members representing over 50 farmer organizations, scientists, nutritionists, civil society groups, media persons and women who largely represent over 15 rain fed states of India which emerged as a continuation of one dedicated NGO Deccan Development Society's relentless efforts in promoting millets over the last 25 years in the Zaheerabad region of Andhra Pradesh.. The MINI sees millets not just as crops but as a concept and above all its ability to help the millet farmers make their agriculture autonomous. Having reached significant milestones in community action for revival of millet based farming and food systems placing control over food, seeds, markets and natural resources in to the hands of the poor - especially the women who are from multiple marginalization,

MINI Partners at a glance

4.2 MINI comprises of more than 120 members—farmers' groups, NGOs, activists, professionals-- spread across 15 states of India. Out of them, we are working with eight organisations and activists in undertaking various field-level interventions aimed at reviving millet-based biodiverse farming. These partners and the states where they function are given below.

Name of the Organisation	State	District
SABALA	Andhra Pradesh	Vizianagaram
Sarada Valley Development Society (SVDS)	Andhra Pradesh	Visakhapatnam
Deccan Development Society (DDS)	Andhra Pradesh	Medak
Karnataka Rajya Raita Sangha	Karnataka	Bidar
Bayalu Seeme Rural Development Society (BSRDS)	Karnataka	Gulbarga
Pargjyothi Rural Devleopment Society (PRDS)	Karnataka	Gulbarga (Chincholi taluka)
RAPID	Karnataka	Dharwad
SCOPE	Karnataka	Dharwad
North-East Network	Nagaland	Phek (Chizami)
Paryavaran Vikas Kendra	Gujarat	Rajkot and Bhavnagar
Paryavaran Mitra	Gujarat	Ahmedabad
Nirman	Odisha	Kandhamal
Ahinsa Club	Odisha	Bargarh
Lok Shakthi Sanghathan	Odisha	Bolangir
RCDC (Starting January 2013)	Odisha	Bhubaneswar
Lok Vigyan Kendra	Himachal Pradesh	Karasog
Foundation for Ecological Security	Madhya Pradesh	Mandla
Women's Collective	Tamil Nadu	15 districts across the state

Indian Institute of Millets Research (IIMR – www.millets.res.in)

4.3 The IIMR based at Hyderabdad is upgraded from Directorate of Sorghum Research (DSR), is the central agency to work on all aspects of millets research and development under the auspices of Indian Council of Agricultural Research (ICAR). While the main centre at Hyderabad campus is principally engaged in both basic and strategic research on millets, region-specific research and services are organized through two other centres - Solapur in Maharashtra and OSN, Warangal in Telangana.

What needs to be done for Millets

5.0 If India needs to secure its food and farming for this century, there is an urgent need to recognize millets as the future of this country and adopt relevant steps. It is also important to realize that for a New Age crisis such as the Climate Crisis, millets are a New Age Answer. The Millet Network of India in its recent Second National Consultation came up with the Delhi Declaration on Millets. A few major points from this Declaration are the signposts for the food and farming future of India: accord highest priority to the introduction of millets in India's Public Distribution System, incentivize millet cultivation in order to mitigate the alarming state of malnutrition in India, urgently start a massive awareness campaign on the nutritional value of millets and revise our educational curriculum to include learning on traditional millet agricultural practices, amongst other things.If this voice of the millet people of the country is heard, acknowledged and implemented, there is no doubt that we will see a dramatic change in the food and nutrition picture of India.P V Satheesh is the Director of the Deccan Development Society (DDS) in Hyderabad and the National Convenor of the Millet Network of India. DDS is a grassroots organization working in about 75 villages with women's sanghams (voluntary village level associations of the poor) in the Medak District of Andhra Pradesh.

Some stray initiatives for millet development

6.0 Small millets in Kolli Hills

Kolli Hills located in the Eastern part of Namakkal district in Tamil Nadu State of Southern India. This area of about 440 square kilometers, at an altitude varying from 1,000 to 1,350 meter above mean sea level, and is inhabited by the tribal group called Malayalis. During the early days of settlement by this community in this region, diverse millets used to be their main food crop. The lack of communication for the hill dwelling community with the plains increased their dependence on these grains for their food security for very long time. This over years generated substantial genetic variability in these millet species and the region has become notable for this diversity, which is unique in many ways. Local community had developed different cropping systems around the millets by choosing crops such as maize, pigeon pea and mustard. These intercropping systems involve smart risk protection combinations, while addressing diversified food and cash needs. Different regions depending the rainfall and distribution, they deploy millet varieties of different maturity periods and abilities to withstand adverse climatic conditions. The introduction of commercial crops like cassava, which feeds the starch manufacturing industry, and horticultural crops like pineapple, have shifted the farmers from subsistence to commercial farming, with enhanced income earning opportunity. Another reason that led to the decline of millets is the ready availability of food grains like rice and wheat supplied at highly subsidized rate by the government under its anti-poverty programme. Third reason for lesser preference to the cultivation and consumption of millets is the drudgery associated with its traditional processing in the context of supply of grains which are easier to process and consume.

Millets in Odisha state

6.0 Nirman, an NGO, which has been promoting the production of millets in the state, said these crops have several positive points which need to be included in the food menu. "Though the state government has started a mission to promote

millet in the state, it is not started yet. It has only focused on seven tribal districts, but we demand the government to execute the mission in 15 districts where tribals are living in large numbers,' he added.

A ONE-STOP SOLUTION TO CLIMATE CRISIS

11.0 Experts warn us that Climate Change will confront us with three major challenges :

- Increase in temperature between two and five degrees celsius
- Increased water stress
- Severe malnutrition

And millets have the capacity to meet these challenges.

- Since they are already capable of growing under drought-like conditions, they can withstand higher heat regimes.
- Millets grow under non-irrigated conditions in such low rainfall regimes as between 200 mm and 500 mm. Thus, they can also face the water stress and grow.
- Every one of the millets is a storehouse of dozens of nutrients in large quantities. They include major and micro nutrients needed by the human body. Hence they can help people withstand malnutrition.

If this area dwindles further, India stands to lose:

- A crop that is native to the sub-continent, according to a new study detailing the origins of food crops, offering a sustainable livelihood, as we shall show.
- An opportunity to address India's continuing malnutrition problem. India loses about 1 million children under the age of five from malnutrition-related causes every year.
- Anaemia among women is static at 48.1% in India, one of the world's worst-off (170th out of 185) nations, we reported in July 2016.
- A chance to ensure food security in the eventuality of climate-change-triggered drought, a likely scenario. In the worst-case scenario for 2030, the number of people exposed to droughts worldwide could increase 9% to 17% over a no-climate-change scenario. Since millets and sorghum require less water than other crops—pearl and finger millet can make do with 28% of paddy's rainfall needs—they are better adapted for current and future droughts.
- If this trend can be reversed, a diverse range of problems related to malnutrition, farming and water use could be addressed.
- When the climate crisis deepens, two of the trusted crops for India's food security viz., rice and wheat will face a severe setback. The projected 2 degree Celsius temperature rise might force wheat to disappear from our midst since it is an extremely thermal-sensitive crop.
- Similarly, the way rice is grown under standing water makes it a dangerous crop in context of the climate change conditions. Methane emanating from water-drenched rice fields is a green house gas that adds to the global warming. Millets are all-season crops cultivated round the year, whereas wheat is season-specific.

Bibiliography

1. Basavaraj GP, Parthasarathy Rao, Shraavya Bhagavatulaand Wasim Ahmed (2010) Availability and utilization of pearl millet in India. Journal of SAT Agricultural Research. An Open Access Journal published by ICRISAT.
2. Sateesh PV (2010) Millets: Future of Food and Farming. Bhoomi.
3. Rao P, Parthasarathy, Basavaraj G (2013) Status and prospects of millet utilization in India and global scenarioIn: Millets : Promotion for Food, Feed, Fodder, Nutritional and Environment Security, Proceedings of Global Consultation on Millets Promotion for Health & Nutritional Security. Society for Millets Research, ICAR Indian Institute of Millets Research, Hyderabad.
4. RESMISA (2012) Supporting Millets in India; Policy Review & Suggestions for Action. Prepared by DHAN Foundation and WASSAN.
5. Swaminathan MS (2000) Government-Industry-Civil Society: Partnerships in Integral Gene Management, Ambio
6. Sandeep K (2012) Promoting millets: the wheel need not be reinvented.
7. Oliver King ED, Israel, Nambi V, Arivudai Integrated Approaches in Small Millets Conservation: A Case from Kolli Hills, India MS Swaminathan Research Foundation, India.
8. Passi SJ, Jain A (2014) MILLETS: The nutrient rich counterparts of wheat and rice . Press Information Bureau. Government of India.
9. Sahu RK, Sharma ML (2013) Medicinal and other uses of small millets by the tribal farmers of the Bastar Plateau Zone of Chhattisgarh.
10. Jadegowda M, Ramesh MN (2008) Empowerment of Soliga Tribes. Leisa India:.
11. Bohri C (2016) A Millets Revival Could Solve India's Malnutrition Problem, Benefit Farmers.
12. Gautam RS, Kumar A, Kumar S, Singh D, No Year. Understanding Livelihood Opportunities: Mandal District Madhya Pradesh. Report Published GIZ and The Livelihood School.
13. Pallavi, Aparna (2014),How central Indian tribes cope with climate change impacts, Down to Earth
14. Patil S, Patil, Ketaki S, Sawarkar Prafulla, Kulkarni DK (2015) Germplasm conservation of Maize, Sorghum, Millets and vegetables from Dhadgaon and Akkalkuwa tribal block of Nan durbar district, Maharashtra State. Science Research Reporter.
15. Rao, Kavitha (2017) A Forgotten Group Of Grains Might Help Indian Farmers – And Improve Diets, ET
16. The Hindu (2016) Smart crops getting more from less.
17. Times of India (2016) Millet cultivation can save farmers fighting drought.
18. Samuel J (2016) Eat millets, pay less, stay healthier, save earth. India Climate Dialogue.

India's Flawed Pulses Policy

Prerna Sharma

Research and policy advocacy specialist

Vice president and Head Agriculture, Food and Retail,

Biznomics Consulting, Mumbai.

Pulses are the main sources of protein in most Indian households. However, bad regulations for production and trade are hurting one of the key stakeholders in the value chain: the farmers. Pro-consumer government policies may not work in the long run in dealing with the wide fluctuations in production that often leads to food inflation, or sharp price correction in times of good monsoon. The long- term solution lies in raising productivity, strengthening buffer stocking, and freeing internal and external trade.

The agriculture and allied sector grew 4.9% in FY 2016-17. This is in contrast to the growth rates of 0.8% and (-) 0.2% in previous two financial years: 2015-16 and 2014-15, and one of the major contributing factors was impressive growth in the pulses output. Yet, India's pulses cultivators are getting a raw deal from the government.

Because of drought-induced production shortfalls in 2014-15 and 2015-16, the prices of major pulses categories, tur (pigeon pea) in particular started to rise from August'14 onwards and the retail prices were up by 150% or so by Jan/Feb 2016.

To deal with surging prices, the government took a series of measures such as the imposition of stock limits on food processors, traders and retailers. Nationwide raids were carried out to curb hoarding of stocks meant for black market sales. Future trading in chana/gram which accounts for over 40% of the total pulses production in India was banned in June'16 – SEBI has finally lifted the ban on July 12. The import of pulses at zero duty was extended to all categories of pulses, while export remained prohibited except for white chickpea and 10,000 tonnes of organic pulses and lentils per annum.

India imported 5.8 million metric tonnes (MMT) of pulses to supplement the domestic production of 16.35 MMT in FY 2015-16 by spending $4 billion on imports which were roughly double the amount spent a year before in 2014-15. Yet the prices of most pulses categories didn't fall much or remained sticky until April/May 2016. The import didn't help much either. The reason is simple: though India is the top producer of pulses (accounts for close to 70% of the world's total production of tur), it's also the largest consumer of pulses, and any news of its production deficit or intention to import, leads to a price surge in international markets.

It's therefor obvious that only the increase in domestic production could help moderate the prices. Thus, to boost domestic production, the government announced hikes in the minimum support prices, e.g. 400 rupees increase for pigeon pea (tur) and 350 for green gram (moong) including a bonus of 200/Q in Kharif season to incentivise production. Some states such as Maharashtra also announced an additional bonus of 425 rupees a quintal for tur. The government also announced that it would maintain buffer stocking of pulses on the lines of rice and wheat to rein in prices.

Incentivized by high prices in the pre-sowing period, the forecast of better monsoon, hikes in support prices, increased acreage by 25% for the cultivation of pulses, led to a whopping 60% increase in the pulses output in last Kharif season. That started the fall in pulses prices in the second half of 2016. The reports of increased acreage in Rabi season (Nov-March) has further added to the slide in prices.

Price surge to crash

The anticipation of a record output of pulses in 2016-17 (22.14 MMT) has completely reversed the scene from a situation of price surge to price crash with the prices of most pulses categories falling even below MSPs. A price compilation data from Agmarknet shows that prices of major Kharif pulses such as tur were sold at 15-20% below MSP while moong at 18% below support prices and Urad at 11% below the MSP in wholesale mandis in February. There is no surprise here. Over-production often leads to price crash of agri. commodities especially when there are restrictions on trading including exports.

What should the government have done?

The government should have supported the farmers by increasing procurement to check the slide in prices. However, in reality, the procurement by the government agencies remained quite insufficient against the set target of 2 MMT due to lack of storage and high economic cost of procurement (actual cost plus the cost of transport and wastage). Even for the procurement which has been done by the government, except for the few southern states, most Indian states have not shown much interest to lift the stocks from the federal government as they don't have the necessary infrastructure to store and distribute pulses which is a costly item. Moreover, prices are no longer as high as they used to be, so distributing pulses at lower prices is no longer a political priority for the states.

To make it worse for the farmers, the government continues with the export ban, stock limits and restrictions on future trading in most cases – thereby keeping pulses extra cheap for the

consumers at the cost of farmers which can't be sustainable. India has banned export of pulses in 2006. Finally a 10% import duty was imposed on tur but only the end of March 2017. By that time, farmers had already made huge losses and that's one of the most probable causes of agrarian protests.

Such trade-distorting measures are likely to induce farmers to switch over to rice and wheat (which are backed by effective government procurement) and supply of pulses may fall again next year. Tur acreage is already lower by 6% (as on July 12) compared to last year. Things can worsen if there's a monsoon deficit as 84% of the area under pulses cultivation is dependent on unpredictable rains. Bad rains always mean a substantial shortfall in the production accentuated by lower productivity.

Ideally, in the response to overproduction and price crash, the government should free the export and trading in the domestic market. It seems illogical to support farmers through hikes in MSPs on one side and ban exports on the other side when imports are happening at zero duty except for tur which got a 10% import duty in March. Allowing exports may help check the sliding prices and minimise farmers' losses.

The way forward

Though the increased government procurement may help check the falling prices, there's a limit to how much the government can purchase to support prices. However, it can indirectly support the farmers by allowing exports and removing the ban on future trading so that farmers can sell in future markets. It will also help the bulk buyers including FMCG companies to hedge their price risks.

The government should ensure immediate delisting of pulses from archaic Agricultural Produce Marketing Committee (APMC) laws to let farmers sell their produce wherever they want and improve their net price realisation.

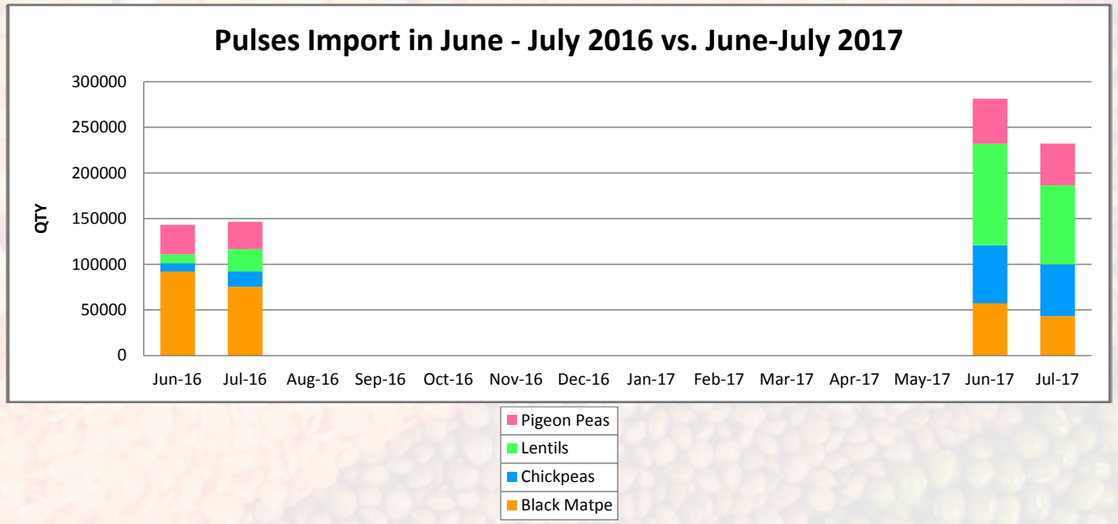
Lower productivity remains a serious problem. For instance, tur (pigeon pea) yield averages 725 kg per hectare in India that is roughly half its yield in Myanmar (top pulses supplier to India). Thus, long-term measures should include reducing dependency on unpredictable monsoon by improving irrigation facilities and raising productivity through increased investment in R&D and encouragement to GM technologies as breeding in pulses is limited by narrow genetic base and vulnerability to pest and disease attacks. Increased productivity will ensure better income to farmers even at lower prices.

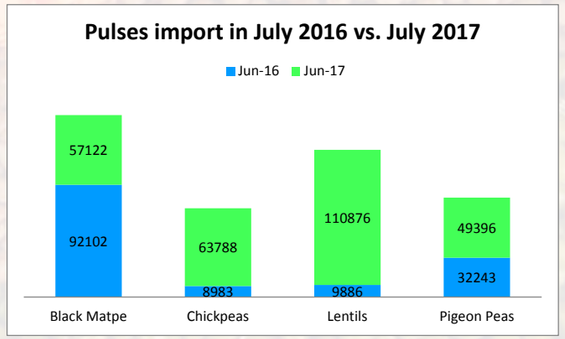
Yet, only 12% of Arun Jaitley's last budget allocation for agriculture and rural sector is proposed for productivity-boosting investment, the rest goes to subsidies and dole outs. That needs to change.

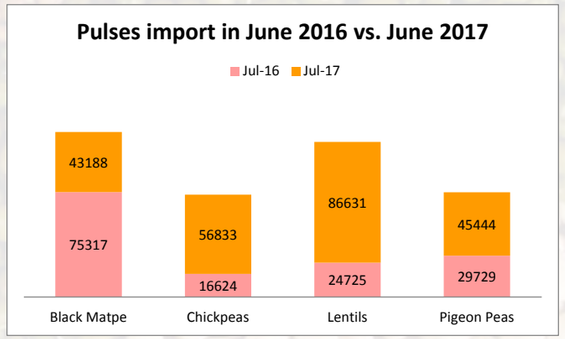
The views expressed are those of the author.

A modified version of this article catering to international readership has been published by Nikkei Asian Review, March 16, 2017.

IPGA Pulses Import Statistics June - July 2016 - 2017

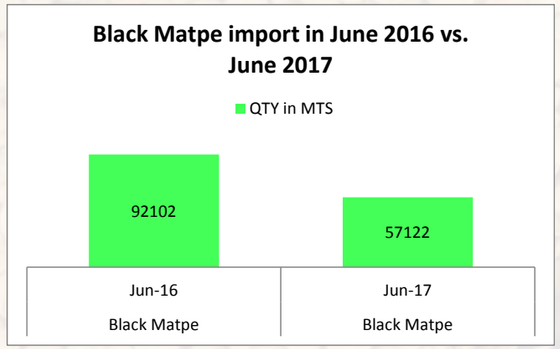


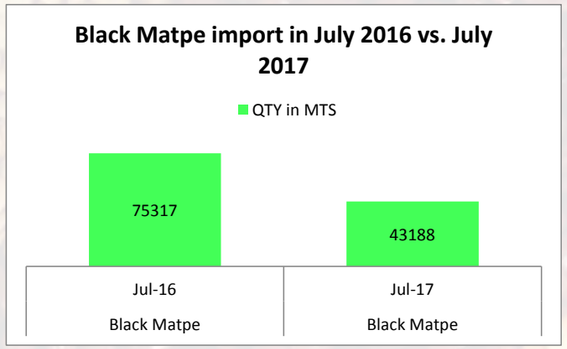


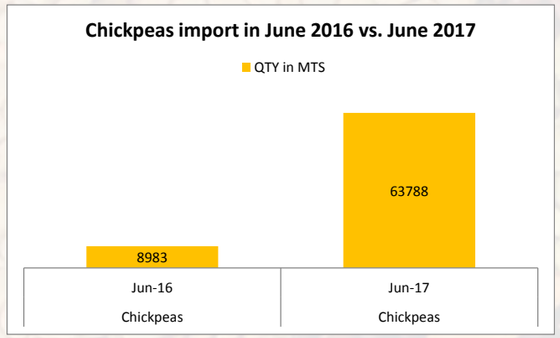


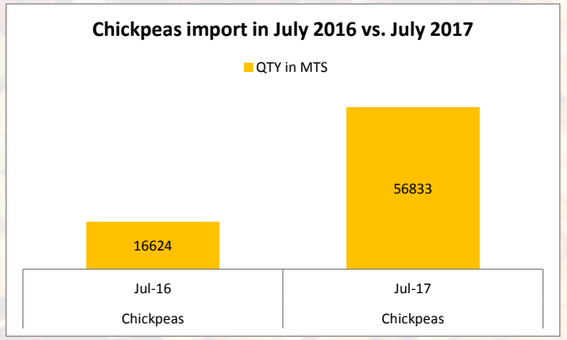
* All Qty. in MTS

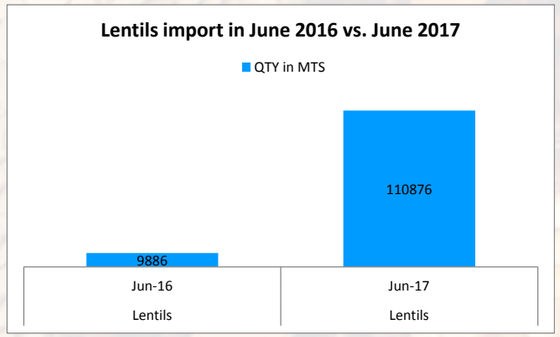
**Disclaimer-The above data is sourced from variable sources and the comments included are general in nature based on various dependable sources. The same is not to be used for monetary decisions.

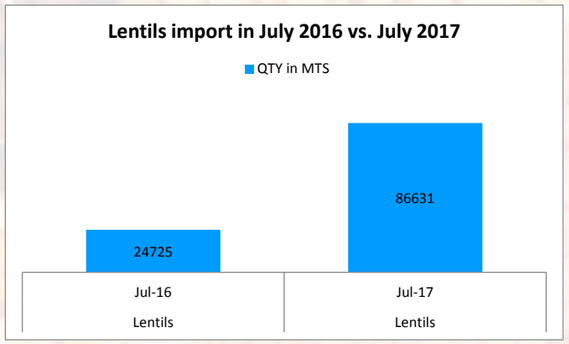


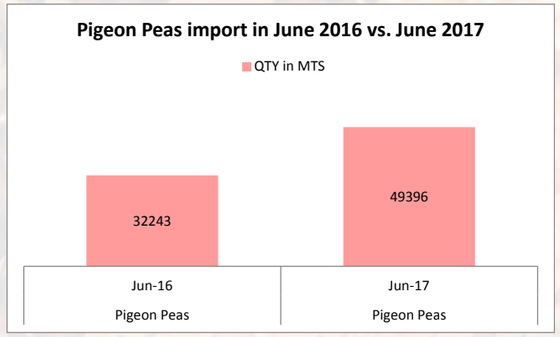


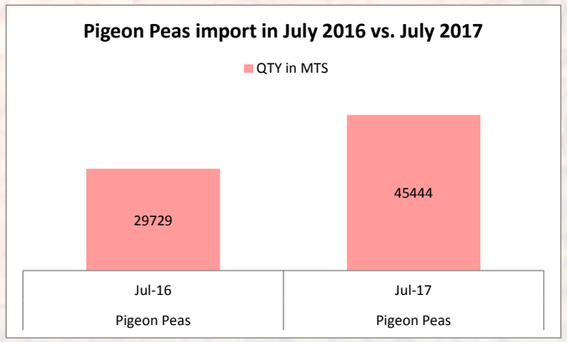












Goods & Service Tax…A Revolution In Tax Reform…

Kishor Pradhan
CEO, Global Trade Consultancy Services.

Member of Banking Commission, ICC, Paris, Member of Executive Committee of ICC India and Co-Chairman, ASSOCHAM National Council for Factoring

India is one of the fastest growing economy in the world and continues to implement strategic initiative like Make in India, Demonetisation, technology initiatives, etc. making it land of opportunities. India is being perceived as leading region for growth potentials. And now, another milestone achieved….

Goods & Service Tax….

The Indirect taxation has been a complex system with multiple taxes levied by Central & state Government on goods and services. India has now taken a revolutionary step in its biggest Tax reforms; **Goods & Service Tax (GST)** has been launched on 1st July, 2017. GST is a single tax on the supply of goods and services, right from the manufacturer to the consumer. There was long pending demand from Industry for Single Taxation, which has finally been implemented. GST aims to streamline the taxation structure in the country and replace a gamut of indirect taxes with a singular GST to simplify the taxation procedure.

GST would not only help to mitigate cascading effect of taxation, but also develop a common national market and Simpler tax regime.

GST has eased the process of international trade for Indian companies too. Export would be treated as zero-rated supply i.e. GST would not be charged on export of goods and services and Exporter can also avail credit against CGST / SGST / IGST paid on goods & service consumed in goods exported. This would help make exports competitive in International market.

On the imports side, additional duties of Customs, like Countervailing Duty (CVD) and Special Additional duty of Customs (SAD), are replaced with the levy of Integrated Goods and Services Tax(IGST), barring a few exceptions. However, there would be no impact on levy of Basic Customs duty (BCD), Education Cess, Anti-dumping duty, Safeguard duty, etc.

Key changes in Import under GST

Importer Exporter Code (IEC)

In GST regime, GSTIN would be used for credit flow of IGST paid on import of goods and would be key identifier. DGFT has already clarified that PAN would be the Import Export code (IEC). However, while PAN is identifier at the entity level, GSTIN would be used as identifier at the transaction level for every import and export. It is advised that all importers need to quote GSTIN in their Bills of Entry in addition to IEC. In due course of time IEC would be replaced by PAN / GSTIN.

Bill of Entry Regulations and Format

To capture additional details in the Bill of entry such as GSTIN, IGST rate and amount, GST Compensation Cess and amount, the electronic as well as manual formats of Bill of entry including Courier Bill of entry are being amended.

Import under Export Promotion Schemes

Under the GST regime, Customs duties will be exempted on imports made under export promotion schemes namely EPCG, DEEC (Advance License) and DFIA. IGST and Compensation Cess will have to be paid on such imports.

Duty payment through EXIM scrips

The EXIM scrips under the export incentive schemes of chapter 3 of FTP (for example MEI S and SEIS) can be utilised only for payment of Customs duties or additional duties of Customs, on items not covered by GST, at the time of import. The scrips cannot be utilized for payment of Integrated Tax and Compensation Cess. Similarly, scrips cannot be used for payment of CGST, SGST or IGST for domestic procurements.

Input Tax Credit (ITC)

Input Tax Credit is available for IGST and GST Compensation to importer and later to the recipients in the supply chain, however, the credit of basic customs duty (BCD) would not be available. Importer has to mandatorily declare GST Registration number (GSTIN) in the Bill of Entry to avail ITC of IGST and GST Compensation Cess. (Provisional IDs issued by GSTN can be declared during the transition period.)

Key changes in Export under GST

Bond or LUT along with Shipping Bill:

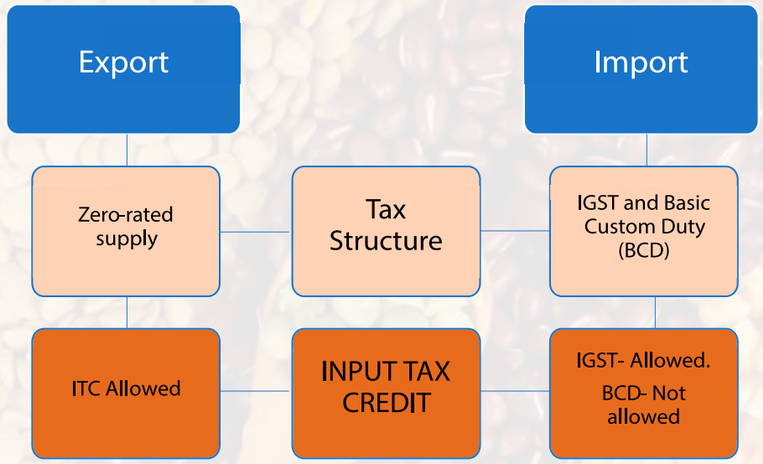
Any Exporter exporting goods without payment of integrated tax is required to furnish a bond or a Letter of Undertaking (LUT) in FORM GST RFD-11. (Rule 96A of the Central Goods and Services Tax Rules, 2017)

Eligibility for submission of Letter of Undertaking in place of a bond: -

a. a status holder as specified in the Foreign Trade Policy 2015-2020; or

b. who has received the due foreign inward remittances

amounting to a minimum of 10% of the export turnover, which should not be less than one crore rupees, in the preceding financial year, and he has not been prosecuted for any offence under the Central Goods and Services Tax Act, 2017 (12 of 2017) or under any of the existing laws in case where the amount of tax evaded exceeds two hundred and fifty lakh rupees. (Notification No. 16/2017-Central Tax dated 7th July, 2017).



The bond need to be furnished on non-judicial stamp paper of the value as applicable in the State in which bond is being furnished. The exporters shall furnish a running bond in FORM GST RFD -11. The bond would cover the amount of tax involved in the export based on estimated tax liability as assessed by the exporter himself.

Based on the track record of exporter, a bank guarantee required to be submitted along with the bond may be waived off by the jurisdictional GST Commissioner. The bank guarantee should normally not exceed 15% of the bond amount. (Circular No. 4/4/2017-GST dated 07th July, 2017)

Drawback

In past, Duty Drawback Scheme under Section 75 used to neutralise Customs duty, Central excise duty and Service Tax chargeable on any imported materials or excisable materials used or taxable services used as input services in the manufacture of export goods. Under GST regime, Drawback under Section 75 shall be limited to Customs duties on imported inputs and Central Excise duty on items specified in Fourth Schedule to Central Excise Act 1944 (specified petroleum products, tobacco etc.) used as inputs or fuel for captive power generation

For a transition period of three months i.e. 1.7.2017 to 30.9.2017, existing duty drawback scheme would continue. Exporters can claim higher rate of duty drawback (composite AIR) for exports during this period subject to conditions that (i) no input tax credit of CGST/IGST is claimed, (ii) no refund of IGST paid on export goods is claimed and (iii) no CENVAT credit is carried forward.

A declaration from exporter and certificate from jurisdictional GST officer is required. This would prevent double availment of neutralisation of input taxes.

Re-export of imported goods

On re-export of imported goods, drawback of all duties paid at the time of importation was admissible earlier. Drawback of Basic Customs Duty plus Additional Duty of Customs (CVD) plus Special Additional Duty (SAD) paid on the goods imported prior to 1st July 2017 will be paid even if the re-export is made after 1st July 2017. Similarly, in respect of the goods imported after 1st July 2017, Basic Customs Duty plus IGST plus Compensation Cess will be paid and Drawback of all of these would be paid on re-export of such imported goods

Change in Shipping Bill

Electronic as well as manual Shipping Bill formats including Courier Shipping Bill are being amended to include GSTIN and IGST related information so as to ensure that the export benefits like refund of IGST paid as well as accumulated input tax credit can be processed seamlessly.

Supply to SEZ

Supplies made to an SEZ unit or a SEZ developer are zero rated. The supplies made to an SEZ unit or a SEZ developer can be made in the same manner as supplies made for export.

Impact on Pulses

The pulse industry is not impacted much as there is no GST on unbranded pulses. However, in case of branded Pulses, the GST of five percent (5%) has been announced. This may marginally impact the corporate players & small scale Dal mills in Branded pulse. However, the market share of these players is small but certainly growing with increase in demand.

These are just few key aspects of GST. This is just a beginning of implementation. There would be multiple technicalities and multiple solutions over next few months of transition. India has again taken another giant step in economic reforms...

"Aut Viam Inveniam Aut Faciam" ("I shall either find a way or make one")

Pulses 2017: The Future of Food Convention and Pulses Sector Familiarization Program

A report by Dr Yadnya Pitale

The Canadian Special Crops Association (CSCA) and Global Pulses Confederation (GPC) led the Pulses 2017 Convention, which was held from 10th to 13th July, 2017, at Vancouver this year. Along with this convention, the Alberta –Saskatchewan Pulses Sector Familiarization Program was organized by the High Commission of Canada in India, in collaboration with provinces of Alberta and Saskatchewan. This program was planned around the Pulses 2017 Convention so as to facilitate attendance to both the schedules.

The familiarization program in Alberta was conducted during 6th and 7th of July and that for Saskatchewan during 14th and 15th of July. The schedule included visit to pulse processing facilities, pulse farms, storage facilities and elevators, meets with pulse exporters and meets with government officials. The stay and partial food responsibility for this program was undertaken by the by Alberta Agriculture and Forestry Investment Attraction and Saskatchewan Trade and Export Partnership (STEP).

In Alberta, the knowledge facilities visited were Future Farm Expo, Olds - Olds College and Alberta Agriculture and Forestry Offices and elevator and export facilities visited were WA Grain and Pulse Solutions, Bowden, Providence Grain facility, Fort Saskatchewan. The stay arrangements were made at Edmonton.

In Saskatoon, STEP facilitated visits to export and elevator locations of ILTA Grain and Viterra along with a tour to a family farm. A visit was made to Saskatchewan University-College of Agriculture and Bioresources, to meet Dr Bob and Dr Bunyamin who are into pulses research. Dr Amit Deokar and Dr Shweta Kalve were the post doctoral students in pulses research amongst the others.

The familiarization program and visit to the Saskatchewan University and Old's College helped profound exchange of knowledge. The visit to elevators and processing plants helped understanding the huge capacities that offer grain drying, storage, off farm pickups, specialized marketing services, hedging, futures and options, logistic operations of CP & CN rail service and the capability to load up to 135 cars within 24 hours. Visit to the Future of Farming Expo organized by Old's College helped understanding the various stakeholders of the Canadian farming market. The display of precision equipment like the seeders and harvesters gave an insight of the huge farm sizes of the Canadian farming landscape. A meet with the government officials of Alberta and Saskatchewan helped understanding the needs of trade.

The visit to Saskatchewan University and its 20000 sq ft plant breeding laboratory consisting of different varieties of pulses being bred for disease-resistance and growth helped understanding the depth of pulses research.

The Pulses Convention 2017 at Vancouver witnessed 1000+

100 year old elevator

New Generation Elevator

Framer's truck carrying grains to the elevator

delegates around the world with over 100 being from India itself. The convention received special attention owing to the year 2017 being the 150th anniversary of the confederation. This convention was brought to the fore by CSCA and GPC and lasted for four days 10th-13th of July, 2017. The convention was supported by numerous sponsors who helped making it a fantastic show of being the best organized one. Point to be noted was that the convention included highest number of delegates from India about 103 in total.

Non- Hybrid Desi Chickpea variety under testing

Hybrid Chickpea variety under testing

The convention started with a cultural event depicting the dance form of original inhabitants of the land of Canada followed by the addresses of the respective Presidents. The welcome dinner hosted on the first day witnessed exquisite business meets. The convention was themed as, "Future of Food" and on the second day carried interesting pieces of information on the same by Richard Black and Tim Mcgreevy who spoke about how pulses

Dr Yadnya Pitale with Dr Bunyamin in Saskatchewan University- Agriculture Department

can replace high calorific foods and help attain good health, how pulses can influence the consumer attention and shape up a healthy food industry.

An important announcement regarding declaring February 10 as designate "World Pulse Day" was declared with the success of IYP 2016. Mr Huseyin Arslan delivered the welcome address in which he conveyed that there is a need to increase awareness of pulses and their benefits among the general public and food industry. Thus, it is necessary that the message reaches governments around the world that policies should be aligned with goals of the pulses industry and recognize the important role for pulses in improving global food security and nutrition.

GAFTA related insights were provided by the Jonathan Waters and team with Mr Huseyin Arslan moderating the same. The GPC contract prepared in association with GAFTA was discussed in detail. The team spoke about how GAFTA can help resolve major issues in trade and can be used as a standard document for trade. The GPC pulse contract committee has worked extensively to develop and provide contracts which would be even and just for buyers and sellers.

The second day was packed with outlooks giving delegates the most accurate and up to date supply and demand outlooks on all pulse crops. The outlooks commencing with kabuli chickpeas, was followed by pea, faba beans, black matpe/pigeon pea/mung bean outlook and concluded with desi chickpeas outlook on the second day. The green lentils outlook was presented on the second and fourth day of the convention. The outlooks described in detail the production in MT for country specific varieties.

In the Indian context, the Indian outlook for pigeon peas indicated higher production with stocks to last for next eight months marked by lower market prices. The welcome and the gala dinners witnessed business networking activity.

Overall the event was a success in terms of knowledge dissemination and trade development.

Linking Pulses Farmers with Processors

Rahul Bhojwani

Over 300 Farmer Producer Companies (FPCs) have been formed in the Maharashtra under the Maharashtra Agricultural Competitiveness Project (MACP), a program funded by World Bank. The process of formation of these FPCs involved diligent identification of clusters of villages in each district and appropriate social mobilization efforts to form a shareholder group for each company. As a matter of fact, each of these companies has about 300 farmers (on an average) as their shareholders. Under the project, each of these FPCs has been availed with grant to develop a "Farmer Common Facilities Center", which includes of 1000 to 2000 square feet of construction also housing Primary Processing machinery to clean/grade their produce.

Primarily, these companies collectively aggregate & clean/grade their produce (like Tur/Chana/ other pulses/Soyabean/Spices/ fruits & vegetables/ paddy/ wheat/ oilseeds/ other cereals, grains, etc., predominantly grown in their region) to directly sell in bulk to processors/consumers. The project basically aims at increasing farmer income by way of enabling larger aggregation of farmer produce, its primary value addition and sale. To enable direct sale by to processors, these companies have also been provided with "Direct Marketing Licenses". Various other capacity building interventions are also undertaken under the project by the Agri Business Promotion Facility of the project operated by Grant Thornton India LLP (GT). On this line, a major objective of the project is to build an alternative market for direct transactions between farmers and processors/buyers.

Notably, shareholders and non-shareholding farmers of about 180 of these companies in various districts of Amravati, Akola, Washim, Yavatmal, Ahmednagar, Latur, etc. are involved in cultivation of various pulses. In general these companies, under the assistance of the project, have installed about 2 TPH pulses cleaning and grading machines (grader and gravity separators).

A Divisional level Conference was organized at Hotel Gouri Inn at Amravati by MACP and its ABPF operated by the GT. The Conference was attended by Directors of about 70 FPCs formed in the Amravati Division (comprising of Amravati, Akola, Yavatmal, Washim and Buldhana districts). Several key officers from MACP and ATMA, some prospective buyers and subject experts were present at the conference.

Representing the Pulses Industry, some industry & association representatives like Pradeep Ghorpade from Indian Pulses & Grains Association, Prashant Dixit from ETG Group, Mahendra Kakrania from Kakrania Industries, Manohar Bhojwani from Dayalu Dall Mill, Suresh Bhojwani from Yash Pulses and Rushabh Jain from Jai Pulses also attended the conference.

Notably, dal mill industry participants expressed that they are interested in direct procurement of Maruti variety Tur, chana and other pulses from FPCs, considering such raw material will be cleaned and graded at the Common facility Centers already setup by these FPCs. Better rates than prevailing market rates (upto 4-4.5%) can be easily offered if the quality is as per specifications.

Representatives of GT informed that together many of these FPCs aggregated, processed and sold about 35,000 tons of Tur to SFAC in 2017 at MSP. This basically gives an indication of capabilities these FPCs have developed now. Manohar Bhojwani stated that 2017 was particularly a very difficult year considering the prices of major pulses like Tur. He expressed hope that market prices of these pulses breach MSP soon which will enable both FPCs and processors to engage in direct transactions. He also thanked and congratulated Indian Pulses & Grains Association and All India Dall Mill Association who made major representations and recommendation for restriction of imports, which now Govt. has implemented. He also hoped that exports of pulses begin soon. Both, restriction on imports and start of export would mean appropriate price levels in market which basically will lead to rightful remuneration to farmers.

Pradeep Ghorpade, CEO-IPGA, expressed that their association seeks to address issues that impact production, productivity and marketability of pulses in the country. He expressed that he was happy to know the setting up of FPCs in Maharashtra which will enable farmers to gain through joint efforts. He further said that their association shall create a special cell to involve FPO membership to avail them with best possible support in their activities.

The initiative of MACP does look promising in developing an alternate market, which will be mutually beneficial to both farmers and traders/processors. It would mean a less long marketing chain and will provide farmers the right opportunity to evolve from mere growers to farm level processors, which will also increase their negotiation power.

Editorial

Yadnya Pitale
COO, IPGA

Pulses have played an important role in per capita food security of human population as an important source of protein in a diet. Lentils value add in terms of nutrition being eaten as a whole grain which adds fiber in the food at low price thus termed as a ,"humble peasant food". Lentils especially as a whole grain is fervently used in many recipes of the Indian and mid-eastern countries. The daal makahani an Indian food recipe is quite popular among the masses. Certain varieties of lentils found on both the hemispheres are,

1. Green and brown: Ideal for warm salads, casseroles and stuffing as they tend to retain their shape after cooking.
2. Puy lentils: These grey-green lentils, grown in the French region of Le Puy, are often more expensive than other common cooking varieties and are thought to be superior in texture (which they retain after cooking) and taste. This makes them the perfect accompaniment to more expensive ingredients such as fish and game, as well as sausages.
3. Red split lentils: When cooked these lentils form a rich puree and therefore are superb for thickening dishes such as soups and casseroles. They are also often cooked with spices to make the Indian side dish, dhal.
4. Yellow lentils: Being quite similar to Red Split lentils, the yellow variety are used in a similar way and are great for adding colour to winter dishes.

Lentil (Lens culinaris Medik.) cultivated more than 8,500 years ago is a cool season annual crop spread from the Near East to the Mediterranean area, Asia, Europe and finally the Western Hemisphere. It grows well in limited rainfall areas of the world. However, Lentils are slow to establish and produce limited vegetative growth and therefore sensitive to weed competition. Selection of clean fields with histories of low weed pressure is paramount towards lessening the impacts of weeds, as the weed control options are limited. In disposition, owing to its use as a substitute, the crop has received little research attention to improve its yield and quality.

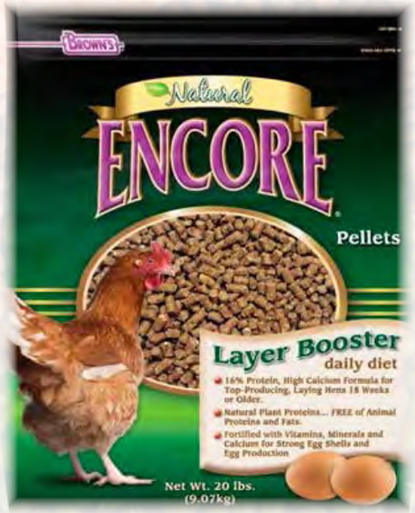
Lentil a protein crop with protein content ranging from 22 to 35% has lower nutritional value and deficiency in the amino acids methionine and cysteine has made lentil more of a substitute. Lentil is more preferred as a whole grain than in its split form in regular diets in various lentil eating regions in its consumption history. Lentil adds as an excellent supplementary to cereal grain diets of high carbohydrate content because lentils do not alter the taste of carbohydrates as it happens with the other pulses. It is used in soups, stews, casseroles and salad dishes. The lentil grain coat is lot thinner than that of the other pulses adding a rich source of fiber to any diet.

Apart from human consumption lentils are extensively used for the pest food industry and used as a livestock feed especially, chickens and other barnyard animals. The lentil crop does not need to be threshed and winnowed since the animals eat the whole plant or pick the seeds out themselves. In case of poultry farming lentil is used as one of the sources of feed for producing high protein quality chickens and higher production of eggs. The lentil crop is planted only in moderate conditions with restrictions in soil to be used for its cultivation. Weed resistant soil is another requirement for the cultivation of lentils. Owing to these restrictions lentils which fail to meet food grade standards (grade #3 or below) are used as livestock feed because of their high protein content and lack of digestive inhibitors. At the same time, lentil production has gained momentum owing to the demand from pest food making companies which do not require high grade lentil quality. This also ensures alternate lentil consumption in terms of its productivity making its price sensitivity immune to higher production of pigeon pea.

Another non consumption based use of lentils is that, it is used as a green manure crop and as an excellent rotation input crop, one particular Canadian variety, Indianhead, provides a large amount of fixed nitrogen (estimated to be 20 lb/acre). Around the time of Charlemagne (800 AD), people in medieval Europe started planting a lot more of lentils as part of three-field rotation: they planted a third of their fields in wheat and oats, a third in lentils, peas, or other beans, and a third was left to rest. Lentils both fertilized the wheat fields and provided another good source of protein. In areas where drier growing season conditions prevail and there is an intense wheat cultivation lentil is used as a rotation crop with wheat. Lentils also provide the means to break the disease and weed cycle in winter cereals, conserve soil moisture relative to other rotational crops, improve soil fertility by fixing nitrogen and increase yields in the following crops. Lentils, like other spring crops in rotation with winter cereals, limit soil erosion compared to summer fallow on land that is highly erodible.

Price economics for pulses is subject to its yield and quality of production .Lentils have been experiencing a very volatile price distribution owing to reasons such as,

- Lentils are being considered as a substitute to tur or arhar or pigeon pea. If pigeon pea production drops or suffers in quality especially if the country is having a large production and export base then there is always an eventual plunge in prices of pigeon pea. This leads to shift of attention to import of lentils which sets a horizon for price pick up in case of lentils. Thus lentils prices are sensitive to pigeon pea prices.
- Quality of produce as lentils is a very delicate crop grown at specific weather conditions. As explained in the earlier sections lentils do not grow well in extreme weather conditions and need very moderate climate for its qualitative growth. Drop in quality of production leads to drop in prices of lentils. Seed damage, presence of foreign material and high moisture content reduces the grade of lentil and results in a lower price.



Lentils breeding needs a lot of research and owing to its nutritional substitution with pigeon peas. Lentils needs a recommendation for PDS subscription in event of volatility of prices which will help focus attention on this crop. This will make this crop seek potential attention from not only market makers but also farmers in true sense. In a world which is affected by synthetic nitrogen fertilizer which have led to disastrous effects like CO_2 emissions and Run-off, lentil farming enhances soil quality, nourishes it and leaves it healthy for the next crop thus reducing farmer's burden and reducing negative effects of climate change.

Agricultural Statistics Division
Directorate of Economics & Statistics
Department of Agriculture, Cooperation and Farmers welfare
Fourth Advance Estimates of Production of Foodgrains for 2016-17

As on 16.08.2017

Million Tonnes

Crop	Season	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	
														4th Advance Estimates	Final	Targets	4th Advance Estimates
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
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	91.31	91.41	93.00	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	13.01	13.00	15.50	13.76
	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	104.32	104.41	108.50	110.15
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	93.50	92.29	96.50	98.38
Jowar	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	1.71	1.82	3.00	1.85
	Rabi	1.84	3.20	3.56	3.44	3.81	4.19	3.93	3.56	2.69	2.44	3.15	3.15	2.70	2.42	3.00	2.72
	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	4.41	4.24	6.00	4.57
Bajra	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	8.06	8.07	9.50	9.80
Maize	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	15.24	16.05	17.50	19.24
	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	6.56	6.51	7.00	7.02
	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	21.81	22.57	24.50	26.26
Ragi	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	1.79	1.82	2.00	1.40
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	0.37	0.39	0.50	0.42
Barley	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	1.51	1.44	1.85	1.74
Coarse Cereals	Kharif	32.22	26.36	26.74	25.61	31.89	28.54	23.83	33.08	32.44	29.79	31.20	30.94	27.17	28.15	32.50	32.71
	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	10.77	10.37	11.85	11.48
	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	37.94	38.52	44.35	44.19
Cereals	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	118.48	119.56	125.50	129.10
	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	117.28	115.66	123.85	123.63
	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	235.76	235.22	249.35	252.73
Tur	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	2.46	2.56	3.62	4.78
Gram	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	7.17	7.06	9.60	9.33
Urad	Kharif	1.20	0.95	0.90	0.94	1.12	0.84	0.81	1.40	1.23	1.43	1.15	1.28	1.39	1.25	1.45	2.17
	Rabi	0.27	0.38	0.35	0.50	0.34	0.33	0.42	0.36	0.53	0.47	0.55	0.68	0.81	0.70	0.70	0.63
	Total	1.47	1.33	1.25	1.44	1.46	1.17	1.24	1.76	1.77	1.90	1.70	1.96	2.20	1.95	2.15	2.80
Moong	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	1.02	1.00	1.22	1.62
	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	0.59	0.65	0.55
	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	1.60	1.59	1.87	2.16
Other Kharif Pulses	Kharif	1.18	0.61	0.54	0.70	0.96	0.80	0.49	1.33	0.93	0.62	0.71	0.77	0.67	0.72	0.96	0.86
Other Rabi Pulses	Rabi	2.48	2.32	2.31	2.29	2.00	2.23	2.31	2.27	2.40	2.73	2.53	2.77	2.37	2.47	2.55	3.02
Total Pulses	Kharif	6.16	4.72	4.86	4.80	6.40	4.69	4.20	7.12	6.06	5.91	5.99	5.73	5.54	5.53	7.25	9.42
	Rabi	8.74	8.41	8.52	9.40	8.36	9.88	10.46	11.12	11.03	12.43	13.25	11.42	10.93	10.82	13.50	13.53
	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	16.47	16.35	20.75	22.95
Total Foodgrains	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	124.01	125.09	132.75	138.52
	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	128.21	126.47	137.35	137.16
	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	252.22	251.57	270.10	275.68

KPCT
KRISHNAPATNAM PORT
India's Largest Container Terminal on the Horizon

PULSES GATEWAY OF INDIA

Advantage KPCT

- Plant Quarantine (PQ) office available near the port
- Food Safety and Standards Authority of India – Getting certification at the earliest
- Additional movements for CFS not required
- Avoid multiple handling
- Quicker clearance at the terminal
- Most competitive handling charges
- Clean & modern warehousing facilities
- Save minimum USD 100 / 20'
- FSSAI currently at Chennai coming soon at KPCT
- Distance advantage to various Dhall Mills in Andhra Pradesh

KPCT
Sales Team

Chennai:
Mr Vivek Nair
+91 87544 10789
vivek.n@krishnapatnamport.com

Singapore:
Capt Gagan Mehrish
+65 9061 3751
gagan@kpcl.sg

PULSES IMPORT THRU CONTAINERS
1800 x 20' discharged from Dec 2016 – Jan 2017

PULSES IMPORT IN BULK
Cargo - Red Lentil
Vessel Name - MV Amis Fortune
Manifested Quantity: 38,000 MT
Average Performance: 10,000 MT / PWWD
Bagging undertaken at the Port

www.krishnapatnamport.com

INDIA PULSES AND GRAINS ASSOCIATION

the pulses conclave 2018 NEW DELHI

AN INTERNATIONAL EVENT

National And International Speakers

Exhibition

1500+ Delegates

Panel Discussion

Origin Country Presentations

Online Registrations Now Open For

THE PULSES CONCLAVE 2018

February 14th - 16th, 2018

THE LEELA AMBIENCE CONVENTION HOTEL, NEW DELHI

Register now at :
www.thepulsesconclave.in / www.ipga.co.in

You can write to the IPGA team at ipga@thepulseconclave.in
or call at +91 22 26479132/33