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# TODAY

## FOOD PROCESSING ADDING VALUE AND INCOME



INTERVIEW

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## From the Editor's Desk

# OPPORTUNITIES GALORE IN FOOD PROCESSING

India holds immense potential in the segment of food processing. The abundance of agricultural produce, skilled man power, ambient environmental conditions and geographical location raise the chance of India to gain from food processing. Besides, in India, the food sector has emerged as a high-growth and high-profit sector due to its immense potential for value addition, particularly within the food processing industry.



India is the largest producer of many agricultural commodities, most often creating gluts and fall in prices.

The Indian food processing industry accounts for 32 per cent of the country's total food market, one of the largest industries in India and is ranked fifth in terms of production, consumption, export and expected growth. It contributes around 8.80 and 8.39 per cent of Gross Value Added (GVA) in Manufacturing and Agriculture respectively, 13 per cent of India's exports and six per cent of total industrial investment.

However, there are several unexplored arenas in food processing in India. Opportunities galore in the food processing segment especially beyond the conventional food processing activities. Indians are driving the demand for processed food in India. A space has also been opened up for healthy, safe and hygienic food. This space can be used up and in the process a stable market can be created for traditional healthy snacks. Another lesser explored area is the one of ready to eat food category. A few players have ventured into this segment. However, this category can absorb more. With more and more Indians living in different cities, dependent on themselves to meet their food requirements, options such as these will surely receive wider acceptance.

Newer requirements will be demanding and may create space for more technologies in packaging, and creation of innovative products. Packaging especially is a lesser explored area demanding new age solutions capitalizing on the need of easy handling, longer shelf life, better dispensing quality etc. Presenting conventional / traditional food in a variant with higher shelf and better taste also requires the aid of technology. Ventures thus concentrating on automation based technologies and robotics will have immense scope.

Food safety will emerge as an important challenge in the event of enhanced food processing demands. Inadequate knowledge about food hygiene and the standards and certification will be a major handicap. Measures to address this concomitantly will surely aid in the development and expansion of food processing sector.

Temperature controlled warehouses for the perishables, cold storage, appropriate logistics will also emerge as a prerequisite for the development of the sector. This area requires intensive efforts from the government and the corporates as it is investment intensive. The only way of revolutionizing the food processing segment is by channelizing capital to this niche area.

Today India's biggest weakness in agriculture segment is over production and the inability to timely channelize the excess production to deficit areas. Food processing, however, can to an extent convert this weakness into our biggest strength. If proper technologies are developed and made accessible at the farm level, not only can we address the issue of wastages, but also increase the income from agriculture.

*Anjana*

**Anjana Nair**



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# DHANUKA ADVT

## Peppered with Imports

*Pepper prices are spiraling down owing to cheaper imports*

A bad year for the black gold stayed put as production and prices crashed across the nation. With cheaper imports from Vietnam, Indian farmers are having a tough time trying to retain profitability in pepper farming.

The ongoing harvest season and the deluge of cheaper pepper from Vietnam through Sri Lanka have pushed down black pepper prices in India by nearly 20% in a year. Indian pepper prices have plummeted in the past few months as large quantities of cheaper Vietnam pepper made way into the Indian market. The imports facilitated under the guise of being imported from Sri Lanka with certificate of origin suitably manipulated takes advantage of the lower import duty structure prevailing with Sri Lankan imports and circumventing the Rs 500 minimum import price fixed by India. Pepper imports from Sri Lanka attract just 8 per cent duty as against 70 per cent from other countries as India and Sri Lanka are signatories to SAFTA agreement. Under the India-Sri Lanka Free Trade Agreement (Isfta), Sri Lanka is allowed to export 2,500 tonnes of pepper to India per annum at zero duty. Around 4,000 tonnes of pepper exported by Vietnam to Sri Lanka has found its way to India with certificate of origin issued by the Sri Lankan authorities by paying no duty under ISFTA or 8 per cent concessional duty. The MIP was fixed last year to protect the interest of the local pepper growers after over 40% decline in prices though productions were normal. The well connected network of importers now evade monitoring by resorting to importing smaller quantities in different ports in South India and taking them in small lots by road to interior places. The volume of pepper import into the country has gone up in the current year.

Production, on the other hand, has suffered immensely. Significant producers like Kerala

and Karnataka, at the hands of inclement weather, have suffered production declines. The floods that affected Kerala has wiped off many productive and profitable pepper plantations. The ones that remained are in the grasp of diseases that are driving down production and profits. Losses suffered from perennial crops like pepper is a significant blow to the farmers as these crops have a prominent non productive phase. Replanting them requires the farmers to endure this non productive phase once again prematurely while bearing the losses from the damaged crop.

The situation demands a rework of the policies that are governing the trade agreements. The 8% duty was fixed when the Sri Lankan production was hardly 10,000 tonnes. Now it has gone up to around 28,000 tonnes. The current duty structure must be changed taking into consideration the current state of affairs of pepper plantations. India should step up its vigil to prevent the import of pepper from Vietnam through Sri Lanka. Authorities should initiate steps to test for a minimum of 6% piperine content in imports if it is for extraction purpose. The Vietnam pepper has only 4 to 5 % of piperine. The subject should be treated akin to smuggling as India is also losing its share of tariffs since the supply of Vietnam pepper is happening by evading duty as the duty for import from Vietnam is 51%.

Free Trade agreements have long been alleged to distort the domestic market. This is a classic case where this accusation has proven true. While the government is consistently trying to prove its loyalties towards the farmers and is desperately trying to raise their incomes, incidents/scenarios such as these should not slip their attention. Pepper may not be a staple crop and hence not important from poll perspective, but the commitment of the government towards farmers should not be subject to electoral sentiments, it should be driven purely on the basis of national interests..

## Palm Oil – In the Eye of a Storm

*A trade war is in the offing with EU restricting palm oil in biofuel programmes*

Palm oil production has long been derided for its unsustainable ways of cultivation. The conversations surrounding this reached a crescendo with EU coming down heavily on its environmental implications and imposed stricter limits on how the crop can be used in green fuels. The European Commission recently restricted the types of biofuels from palm oil that may be counted toward the EU's renewable-energy goals and introduced a certification system. With the environmental groups' persistent demands to reduce use of the crop in fuels, which was eventually endorsed by the European Parliament, the palm oil producing nations have been facing some difficult times. Palm oil prices have dropped 18 percent since the start of 2018.

Palm oil has become an indispensable component in today's world. However, its environmental impact on Indonesia and Malaysia, which together produce about 85% of the world's palm oil, has been prominent contributing to a big increase in deforestation in both countries. Today, Indonesia is the world's fifth biggest emitter of greenhouse gases, mainly due to land use change. With aggravating climate change and green house emissions, a stricter code on their production is bound to affect the economies of these nations. Palm oil exports make up between 5% and 7% of GDP in both countries. Palm oil has become intrinsically linked to development in Malaysia, both as a vehicle for economic growth and as a way for the state to get smallholder farmers out of poverty.

The EU's desire to lead the battle against global warming has toughened the goals to reduce greenhouse gases blamed for climate change. It aims to cut emissions by at least 40 per cent by 2030 compared with 1990 levels, boost the share of renewable energy to 32 per cent and increase energy efficiency by 32.5 per cent.

These objectives will cast a shadow on the prospects of palm oil producing companies. A decade

ago a glowing future for biofuels was predicted on the premise that these can be used in biofuel production. In 2010, the EU drafted its first renewable energy directive, setting clean energy rules and targets for member states, and providing an incentive for member states to switch to palm oil-based biodiesel for cars. In anticipation, palm oil producers stepped up production and created new plantations. These plantations have now reached maturity, but with scientists and legislators increasingly aware of the environmental impact of crops like palm oil, the expected biofuels boom has not materialised, leaving producers with a mounting oversupply problem. Not to mention the livelihood of the millions involved in the production. The EU Parliament's campaign to limit the use of the vegetable oil in renewable fuels called for an end to public support for high-emission biodiesel from palm oil, rapeseed and soy. Forty-six percent of total palm oil imports into the EU is used for biofuels, according to data from the EU assembly.

The move by EU has apparently not got down with the palm oil producing nations and a trade war has emerged with threats exchange between EU and Producer nations. The Council of Palm Oil Producing Countries, whose members Indonesia, Malaysia and Colombia produce about 90 per cent of global supply, announced they will jointly challenge the bill through bilateral consultations, as well as through the World Trade Organization. Diplomatic channels are also being used to convey the message that they are unhappy and would resort to cancelling of trade deals worth millions.

The trade war is going to be detrimental to both the parties. The trade aspirations for both the sides will be affected and a stricter regime will affect many small holders involved in palm oil cultivation. Rather than completely cutting off the palm oil producers, EU must associate with palm oil producers and evolve ways to make it sustainable and environment friendly.

## ‘Nitrogen – The New Carbon’

*Nitrogen has been called the New Carbon, owing to the N pollution*

**T**he United Nations Environment Assembly (UNEA) had recently adopted two resolutions piloted by India on single-use plastics and sustainable nitrogen management. Nitrogen was thus acknowledged on a bigger platform to posing a grave environmental concern on a global level.

The annual Frontiers report 2019 published by the United Nations (UN), has included a chapter on nitrogen pollution in its latest edition. The report, released by the United Nations Environmental Assembly (UNEA) in Nairobi on March 4, 2019, highlights that “growing demand on the livestock, agriculture, transport, industry and energy sector has led to a sharp growth of the levels of reactive nitrogen – ammonia, nitrate, nitric oxide (NO), nitrous oxide (N<sub>2</sub>O) – in our ecosystems. Forms of nitrogen like N<sub>2</sub>O can have far reaching impacts for humanity. N<sub>2</sub>O is 300 times more potent as a greenhouse gas than carbon dioxide (CO<sub>2</sub>). The Frontiers report claims that the total annual cost of nitrogen pollution to eco system and healthcare services in the world is around \$340 billion.

Nitrogen, an important element required by most of the living forms, have emerged as a pollutant owing to over use and abuse. Nitrogen played an important part in the green revolution. The rampant use of nitrogen fertilizers, sometimes over and above the limits than is required, have led to pollution of natural resources. The subsidy regime of the country also favoured use of urea, a very important source of Nitrogen, over the other fertilizers, leading to an imbalance in the use of N fertilizers.

India consumes 17 Mt (million tonnes) of nitrogen fertiliser annually as per the data of the Fertilisers Association of India. Only 33 per cent

of the nitrogen that is applied to rice and wheat through fertilisers is taken up by the plants in the form of nitrates (NO<sub>3</sub>). The remaining 67 per cent remains in the soil and seeps into the surrounding environment, causing a cascade of environmental and health impacts. The European assessment puts an even higher number on such wasted agricultural nitrogen resources at 80 per cent.

Interestingly, India has become a prominent voice in international platform raising the issue of N pollution. In fact, in 2017, a large team of Indian scientists under the leadership of Raghuram, had come out with The Indian Nitrogen Assessment (INA). With the Assessment’s publication, India had become the third country/entity after the United States and the European Union to have assessed the environmental impact of nitrogen on their respective regions comprehensively.

Although not acknowledged as a problem requiring imminent attention, many countries are investing in dealing with nitrogen pollution. Recently, the United Kingdom invested of £20 million (Rs 187.51 crore) for research on nitrogen pollution and its consequences for the South Asian region. The world with pooled resources need to work towards developing ways to combat this rising problem. As fertilizers used in agriculture is accounted as one of the foremost reasons of N pollution, R&D must be diverted to evolving products that are efficient and effective. Technologies that enhance nitrogen use efficiency should be promoted. Moreover, a balance fertilization of crops becomes all the more important. The world as a whole must integrate and give a much wider propaganda to the issue. Reaching out to the greater public, farmers, fertilizer companies and organization can give a wider audience to the issue which will help in taking forward the cause.

## Poll Propaganda

*Election promises center around farmers*

**T**he pre poll months are the months that tally the highs and lows of the economy. Every sector is brought into scrutiny and are torn apart to expose the ineffectiveness and weaknesses.

These are also the times when marginal sections of the society assume center stage and suddenly their welfare becomes a central national agenda. This year, agriculture segment and farmers will be the focal point around which the election strategies of every single party will be based on. Farmers and agriculture, will be a crucial segment that will conquer most of the attention of the political parties.

The past few years were particularly difficult for the farmers. Farmer distress and suicides were reported from every nook and corner of the country. Over production and excess supply of farm produce once again exposed our weak storage and infrastructure. The resultant fall in prices of many agricultural commodities and the inability of the farmers to secure break even returns had aroused considerable anger and resentment among the farming population. The protests which were initially sporadic became more widespread spreading over larger geographical areas.

The measures that were mooted to assuage the farmers have hardly been able to bring in any positive response so far. The Union Budget for 2018-19 saw MSP increments. The following months saw government fulfill its promise as it increased the MSPs for all notified Kharif, Rabi and other commercial crops, however, the larger demand of the farmers of hiking the MSP according to the recommendations of Swaminathan Committee was not fulfilled. Eventhough the prices were increased, their immediate effects were not visible as the access of MSP to farmers have not been satisfactory. The much touted eNAM also cannot be considered as a success as the majority of states still have to amend its existing restrictive APMC laws to utilize the functionalities and privileges under eNAM. Agri-export policy, the last major initiative announced during the year, aims to double agricultural exports

from present \$30 billion to \$60 billion by 2022. The policy aims to capitalize on the production surpluses and thus to channel them to global markets, thereby ensuring farm income increments.

Most of these policies have been developed to support the farmers and help them realize better income from the farms. Unfortunately these haven't started to yield palpable results. And the last picture that emerges from the agriculture scene is that of farmer distress and farmers' protest. Farmers unlike previous years have risen as a formidable power in Indian polity. So it has become the prerogative of every political party to win them and confirm their allegiance. While it is a good sign, it can be used to appease the farmers using quick fixes like loan waivers, which are detrimental to the well being of agriculture credit system. If we consider the recently concluded elections too, all the winning parties had promised loan waivers and they are delivering on this promise too.

Eight state governments have given farm loan waivers worth Rs. 1.9 trillion since April 2017. With Prime Minister Narendra Modi promising debt relief to farmers ahead of the Uttar Pradesh elections in February 2017, a series of poll promises sprang up across the nation. The latest round of farm loan waivers was announced after Congress formed governments defeating the incumbent Bharatiya Janata Party (BJP) in Chhattisgarh, Rajasthan and Madhya Pradesh. Rs. 59,000 crore of waivers have been promised to farmers in these three states.

This election the political parties' agenda will be centered around short term policies for agriculture. Long term developmental strategies will take a back seat. Farmers' wrath will be placated by quick fixes, the effects of which will wear off with the next cropping season. The political parties should not view farmers as mere votebanks and should refrain from using them. Instead they should be treated as real citizens addressing their concerns with long term strategies.



## AgroStar Raises Rs 188 crore in Series-C round

► Pune-based agro-tech startup AgroStar has raised \$27million (Rs 188 cr) in Series C funds to scale up operations and strengthen its technology platform. The funding round was led by Bertelsmann India along with its existing investors Accel, Chirate Ventures and Aavishkar Bharat Fund. “We intend to invest more in data science and strengthen our technology capabilities so that we can provide better real-time and relevant information to more farmers in the country,” said Shardul Sheth, CEO, AgroStar. The company is also planning to strengthen its leadership team by bringing in top executives to lead various verticals like technology, data science and agriculture. “We have achieved more than a million downloads and wish to scale it up to 10 million beneficiaries within the next two to three years,” said Sheth. AgroStar is a platform which uses farm and farmer-specific data to provide real-time solutions to reduce farmers’ cost of production and improve yields. Active in Maharashtra, Gujarat and Rajasthan, the company now wants to scale up operations across more states.



## McLeod Russel to sell Assam tea estate to Jatinga Agro

► McLeod Russel India Ltd. (MRIL), a bulk tea producer in the B.M. Khaitan group has decided to sell its Boroi Tea Estate in Assam to the city-based Jatinga Agro Tech Private Ltd. In a regulatory filing, the firm said that it had decided to sell the estates and bearer plants and other assets of the Assam estate. With a turnover of Rs23.2 crore, this tea estate contributed 1.5% to MRIL's turnover in 2017-18, the company said. The deal consideration is Rs28.2 crore. Among the biggest bulk tea producers in India, MRIL's crop (118 million kg in 2017-18) came from its own gardens, from small tea growers and its overseas subsidiaries in Africa and Vietnam.

## CropIn Concludes First Phase of CCE Pilot Studies in Partnership With Central Government of India

► The Central government has partnered with CropIn along with nine other research institutions and private agencies, to make the Crop Cutting Experiments (CCE) more accurate, swift and scalable. The CCE optimization initiative using cutting edge technologies was carried out by the Pradhan Mantri Fasal Bima Yojana (PMFBY), Centre's flagship crop insurance programme, and monitored by Mahalanobis National Crop Forecast Centre (MNCFC). The objectives of these pilot studies were two-fold: (1) Optimisation of number of crop cutting experiments to bring it to more manageable levels, (2) A robust and self managed claim dispute resolution mechanism which enables swift resolution of claim disputes. The pilot studies, were initiated in September 2018, and concluded



with the CCE of Rabi crops in Feb 2019. The PMFBY requires the states to carry out minimum four crop-wise CCE in every gram panchayat for the submission of the yield data to insurance companies within 30 days of harvest. The government has traditionally been using a random survey method to estimate the crop yields of a given location. However, considering that there are 2.5 lakh gram panchayats in India, it is challenging to conduct reliable and accurate CCE in the country at scale within a short harvesting window. Applying technology to the otherwise rudimentary and time-consuming process of CCE will expedite risk assessment when processing insurance claims and loan applications made by farmers under the PMFBY. CropIn is currently conducting CCE through its scalable yield mapping technology through remote sensing in the Koppal and Bellary districts of Karnataka. CropIn's SmartFarm and SmartRisk collectively enables accurate and efficient execution of CCE, resulting in timely clearance of claims. Given that India is a country of small-hold/marginal farmers, CropIn's technology can also be used to evaluate varied/smaller unit areas, thereby rationalizing the entire process of CCE.

## SABC launches project to combat fall armyworm

► The non-governmental South Asia Biotechnology Centre (SABC), New Delhi, launched a major project to tackle fall armyworm (FAW) infestation, which devastates crops such as maize in different parts of the country. The multi-year programme, launched in collaboration with crop protection firm FMC India Pvt Ltd, hopes to develop a suite of techniques, good agricultural practices and control measures to tackle the menace of fall armyworm, a SABC release said. Currently, infestation has been reported in Karnataka, Telangana, Andhra Pradesh, Tamil Nadu, Maharashtra, Chhattisgarh, Bihar, Madhya Pradesh and West Bengal. This year, due to the FAW and unfavourable weather, maize production across the country fell by about 15-20 per cent. As a result, prices have shot up, making it unviable for the feed industry to sustain, it said. "Practical experiences of successfully dealing with pink bollworm in cotton through involvement of smallholder farmers will be explored and replicated to overcome the threat of fall armyworm," said CD Mayee, a renowned plant epidemiologist and SABC President.



## KDHP white tea bags silver medal in global contest

► Ripple White Tea from KDHP Company, Munnar has bagged the silver medal in the Global Tea Championship 2019 Fall Hot Loose Leaf Tea Competition and was ranked No 1 in the Loose / White tea category held at Boulder, Colorado, USA. Although ranked No 1 in the category, KDHP bagged the silver medal based on points scored on a scale of 100. The Global Tea Championship is an independent competition judged by industry professionals. The event judges score the teas through an organoleptic analysis that includes the analysis of dry leaf, liquor colour, aroma, flavour, and mouth feel, as well as overall harmony. Ripple White Tea was rated as a "beautiful leaf with exceptional flavour and exceptional aroma". K Mathew Abraham, KDHP Managing Director and CEO, said that the award for Ripple White tea which is produced from the finest selection of handpicked tea buds and retails at Rs 12,000 per kg, is a vindication of the company's efforts in producing specialty teas from its tea plantations spread across Munnar, ranging from an elevation of 4,000 to 7,200 feet. Combining 16 facilities in Munnar, KDHP, one of the largest producer-exporters in South India, produces 25 million kg of tea annually.

## Farm Aggregator Firm Aibono Raises Rs 17.5 cr

► Agriculture services provider and farm aggregator Aibono has raised \$2.5 million (Rs 17.47 crore) in pre-Series A funding led by impact fund Menterra Venture Advisors, the latest sizeable earlystage investment in India's fastemerging agri-tech space. The round also saw participation of Silicon Valley-based Milliways Venture, Zurich-based Artha Ventures, Japanese fund Rebright Partners and Mohandas Pai-backed 3one4 capital. Aibono uses data science to provide farmers with precision agriculture while also aggregating demand by working with small retailers. "Between 2017 and now we've aggregated 250 retailers and have pulled data on consumption patterns and built predictive analytics. This helps us estimate how much seeds farmers have to sow 60-90 days in advance, essentially synchronising production of highly perishable fruits and vegetables with the shelf-level pull," said Vivek Rajkumar, founder at Aibono. The startup, which works with 400 farmers in the Nilgiris belt and 250 retailers largely in Bengaluru, says it will utilise the capital to grow its service to 2,000 farmers and 1,000 small retailers. The growth for the next couple of years will be focused predominantly in South India.

## The Mosaic Company Foundation Award Ceremony honours agricultural scientists

► Mosaic India and the S M Sehgal Foundation celebrated The Mosaic Company Foundation annual awards ceremony that honors outstanding research in plant nutrition. Mosaic and Sehgal Foundation are long-term partners and have been working together on a project 'Krishi Jyoti' (farm enlightenment) in districts Nuh, Haryana and Alwar, Rajasthan since 2008 to enhance farm productivity and empower farmers. The Mosaic Company Foundation Annual Awards recognize individuals who demonstrate truly exceptional ability and originality of thought for contributions to the field of plant nutrition. In its fifth year now, The Mosaic Company Foundation honors agricultural scientists in categories Best Doctoral Research and Young Scientist Award. Additionally, the Young Scientist Award builds linkages within the scientific community associated with the promotion of balanced use of plant nutrients. The awards recognize thought leaders in the Indian scientific community who champion the use of potash, sulfur and zinc in promoting balanced crop nutrition. Dr. Sumanta Kundu, Scientist, ICAR-Central Research Institute for Dryland Agriculture (CRIDA), Hyderabad won the 2018-19 honors for Best Doctoral Research award. In addition, Dr. C. M. Parihar, Indian Council of Agriculture Research and Dr. Sanjib Kumar Behera, Indian institute of Soil Science were adjudged winners for the Young Scientist Awards. Honorees received a certificate, gold medal and blazer with a monetary award.

## Centre to work on seed traceability mechanism

▶ With spurious and low quality seeds swarming the markets causing extensive damage to farmers' incomes, the Centre has decided to bring in a mechanism to ensure traceability of seeds. The government will discuss the issue with stakeholders, including the seed producers, to come out with a technology-based solution that will help farmers to trace the origin of the seed that they had purchased. When a farmer buys a seed, he should know its origin till the foundation seed, Sanjay Agarwal, Secretary of Agriculture (government of India), said. Stating that there are about 130 seed testing and certification centres in the country, he



said all these labs needed to be linked. Earlier addressing the valedictory, NSAI President M Prabhakara Rao asked the government to reduce fee to register varieties as recommended by the Protection of Plant Varieties Authority. "Their recommendation is pending with the government," he said. He also wanted the government to take measures to control Fall Armyworm which has affected the maize crop extensively. The NSAI President also pointed out at the menace of HT cotton (herbicide-tolerant), which accounted for about 10 per cent of the cotton area in the country. "Though the area under these illegal seeds has not grown beyond 10 per cent, it has become a problem for organised players. We are facing allegations due to contamination of the seed," he said.

## Tea Board issues fresh guidelines with eye on quality

▶ The Tea Board of India has issued fresh guidelines for maintaining tea quality so that the country can remain globally competitive and sustain the domestic consumption. On a notice, the Board said that tea occupied an important place not only because of its contribution to the country's economy but also because the sector provided livelihood to a large number of people. Therefore, adherence to quality standards is of utmost importance in the world and India, it said. In a similar guideline issued earlier, the Tea Board had asked the tea growers to refrain from plucking before first flush this year for maintaining quality. An industry observer said that while these guidelines already existed in the Tea Act of 1953, they were hardly enforced by the Tea Board.



Tea Board, as the apex body for the tea industry, has undertaken several measures to maintain the quality by issuing directives from time to time to the tea producers, buyers, packagers and others to ensure that best quality teas were manufactured during the first flush season, it said. As part of its overall inspection, the Tea Board would draw random samples from tea factories and from stocks of packet and bulk tea stored in warehouses. According to the new guidelines, the cost of such sampling and analysis would have to be borne by the owner company. Those teas which fail to conform to the standards shall be treated as tea waste and destroyed. Stringent action will be initiated against the manufacturers or licensee according to the provisions of the Tea Act including suspension or cancellation of license.

## Govt lowers sale price of Bt cotton seeds for a 450-gram packet to Rs 730

▶ The Centre has marginally lowered the maximum sale price of Bt cotton seeds (BG-II) for a 450-gram packet to Rs 730 for the 2019-20 season. The licence, or trait fee, charged by companies has also been slashed by almost 49 per cent to Rs 20. The new price of a Bt cotton seed packet weighing 450 grams and 120 grams refugia for the 2019-20 season — October to September — will be Rs 730, including a trait fee of Rs 20. The maximum sale price of Bt cotton seeds in 2018-19 was Rs 740, including trait value of Rs 39. According to a gazette notification issued, for the second consecutive year after the central government started fixing its prices, following recommendations of a committee, the sale price of Bt cotton seeds, along with the trait fee, has been lowered. The licence fee is inclusive of all taxes. The planting of cotton crop starts in June. For the 2019-20 cotton season, the retail price of BG-I genetically modified cotton seed varieties was not touched, while the licence fee was maintained at zero, as was the case in the previous season. However, it is of little consequence as BG-I cotton is already off-patent. Lowering the retail price and the licence fee for Bt cotton seed packets (BG-II varieties) for the second year might impact the margins of seed companies, especially original licence holders, as it occupies almost 95 per cent of the country's cotton market. Bt cotton seed prices were first lowered in 2016-17 by a panel constituted by the Centre under the Cotton Seeds Price Control Order in December 2015. The panel brought down the price to Rs 800 a packet from the previous Rs 830-1,030, while trait value was lowered by about 70 per cent, from Rs 163 a packet to Rs 49.



## Centre extends TMA to specified farm exports

► The Centre has notified a scheme for Transport and Marketing Assistance (TMA) for specified agriculture products that will provide assistance for the international component of freight and marketing of agricultural produce. “This scheme is likely to mitigate the disadvantage of higher cost of transportation of export of specified agriculture products due to trans-shipment and to promote brand recognition for Indian agricultural products in the specified overseas markets,” said an official release from the Commerce & Industry Ministry. The scheme will be available for exports effected from March 1, 2019 to March 31, 2020. “All exporters, duly registered with relevant Export Promotion Council as per Foreign Trade Policy, of eligible agriculture products shall be covered under this scheme,” the release said. The assistance is available for most agricultural product exports with some exceptions such as live animals, products of animal origin, milk, cream, curd, butter, buttermilk, whey, rice, wheat, tobacco and garlic. The assistance, at notified rates, will be available for export of eligible agriculture products to the permissible countries, as specified from time to time. The assistance shall be admissible only if payments for the exports are received in Free Foreign Exchange through normal banking channels. The scheme shall be admissible for exports made through EDI (Electronic Data Interchange) ports only. The scheme covers freight and marketing assistance for export by air as well as by sea.

## All set to create 1 lakh food-processing entrepreneurs in every State: Minister

► The Food Processing Ministry is awaiting the the Cabinet nod to roll out the Gram Samridhi Yojana, a new scheme which will benefit the unorganised and micro food processing sector. The scheme, which will be launched in collaboration with the World Bank, will initially be rolled out in four States — Andhra Pradesh, Maharashtra, Punjab and Uttar Pradesh. Food Processing Industry Minister Harsimrat Kaur Badal said, “Talks were initiated with the World Bank about two years ago to launch a funding scheme for the grassroots level. We believe it will help create 70,000 to 1 lakh entrepreneurs who will focus on value addition in agro-processing in each State. It is expected to get a nod from the Cabinet soon.” The scheme aims to offer subsidies to small farmer-producer organisations and individual food processors, who make very low capital investments and have poor access to credit, to set up food processing capacities, enhance and upgrade their existing capacities, enhancing their performances and strengthening the farm-to-market supply chain.



## Govt forms panel to decide criteria for N-E beneficiaries

► The government has formed a three-member ministerial group to decide on the criteria for identifying beneficiaries from northeastern hill states for PM-KISAN, the cash-transfer scheme for small and marginal farmers, according to an official. In some parts of the north-east, land assets are typically community-held, rather than individually owned, making the process of identifying small cultivators rather complex and different from the rest of the country. Agriculture minister Radha Mohan Singh, rural development minister Narendra Singh Tomar and minister for development of the northeastern region Jitendra Singh make the panel. PM-KISAN, which offers direct income support of ~6,000 a year in three tranches, is meant for farmers counted as small and marginal farmers, whose individually owned farm size is limited to 2 hectares. To be included in the scheme, individual ownership (of only up to 2 hectares) or at least some verifiable authentication of the share of an individual in village farm land is required. In tribal-dominated hill districts of northeastern states, such as Meghalaya, Nagaland and Arunachal Pradesh, the land tenure system is quite different and much of the cultivated land in these states are held by village councils under customary laws.





## Rajasthan govt. identifies 10 lakh farmers for loan in next crop cycle

► 'Cooperative debt structure being strengthened, loans to be given without mortgage'

The Congress government in Rajasthan has identified 10 lakh farmers for grant of loans through cooperative banks during the next crop cycle amid allegations by the Opposition BJP that its "populist measure" of farm loan waiver had failed to extend benefit to the eligible agriculturists and led to scams in several districts. State Cooperative Minister Udailal Anjana said here on Saturday that the cooperative debt structure was being strengthened for the benefit of farmers who would get the loans without mortgaging their land. Those farmers getting themselves biometrically registered under the scheme would be given preference in loan disbursement, he said. The loans will be disbursed in two stages during the next crop cycle of kharif season from April 1 to August 31 and rabi season from September 1 to March 31. Mr. Anjana said the loan recipients would also get the benefit of other schemes operated by the Cooperative Department.



## 2.18 crore farmers covered under PM-Kisan scheme

► A total of 2.18 crore small and marginal farmers have so far benefited from the newly-launched PM-Kisan scheme and a sum of Rs 4,366 crore has been distributed to them in the first instalment, said an official statement. According to details available till Thursday evening, Uttar Pradesh, followed by Andhra Pradesh and Gujarat, led States in implementing the scheme. While UP, where Prime Minister Narendra Modi launched the scheme on February 24, has so far disbursed the first instalment of Rs 2,000 to 74.7 lakh farmers, Andhra Pradesh has distributed it to 32.2 lakh farmers and Gujarat has covered 25.6 lakh farmers. Under the scheme, farmers with holdings smaller than two hectares, are to be given Rs 6,000 annually to take care of agriculture and allied activities. The sum will be released in three equal instalments over the year, with effect from December 2018. The government estimates that 12.5 crore farmers are eligible for the scheme.

## Centre approves interest subvention scheme for farmers

► The Reserve Bank of India said the government has approved implementation of the interest subvention scheme (ISS) with modifications for the years 2018-19 and 2019-20. Under this, banks will provide farmers short-term crop loans up to Rs. 3 lakh at 7 per cent, and those repaying promptly will get loans at 4 per cent. This comes in the backdrop of the Union Budget unveiling the 'Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)', whereby vulnerable landholding farmer families, having cultivable land up to two hectares, will be provided direct income support at the rate of Rs. 6,000 per year. To ensure hassle-free benefits to farmers under ISS, banks are advised to make Aadhaar linkage mandatory to avail of short-term crop loans in 2018-19 and 2019-20. In order to discourage distress sales by farmers and to encourage them to store their produce in warehouses, the RBI, per the government's advice, said the benefit of interest subvention will be available to small and marginal farmers having Kisan Credit Card for a further period of up to six months after the harvest of the crop. This will be at the same rate as available for crop loans, against negotiable receipts issued on stored produce in warehouses accredited with the Warehousing Development Regulatory Authority. For farmers affected by natural calamities, an interest subvention of 2 per cent per annum will be made available to banks for the first year on the restructured loan amount. Such restructured loans will attract a normal rate of interest from the second year onwards. However, to provide such relief to farmers, an interest subvention of 2 per cent per annum will be made available to banks for the first three years/entire period (maximum of five years) on the restructured loan amount. Further, in all such cases, the benefit of prompt repayment incentive of 3 per cent per annum will also be provided to affected farmers.

## Nabard to set up 250 FPOs in Gujarat

► National Bank for Agricultural and Rural Development (Nabard) aims to set up 250 Farm Producers Organizations (FPOs) in Gujarat over the next three years. The announcement was made during a media briefing by senior officials of NABARD— a day ahead of its annual state credit seminar which will be held in Gandhinagar. Setting up of the FPOs – which are farmers’ collectives that help reduce cost of production by encouraging common cultivation and bulk transport – is a NABARD initiative to help boost the income of small and marginalized farmers in the state. Currently, there are 168 FPOs operational in Gujarat, spread across Banaskantha, Bhavnagar, Dahod, Narmada, Sabarkantha, Bharuch, Bhavnagar and Panchmahal districts. Explaining how FPOs help boost farmers’ incomes, Sunil Chawla, chief general manager, Nabard– Gujarat Regional office, said, “About 66% of farmers in Gujarat are small and marginal farmers, who barely have 30% of the total land holding by farmers. Smaller land parcels will not help boost farmer incomes. Therefore, by setting up FPOs, we are not just encouraging collective cultivation but also helping farmers through financial assistance as well as skill development. This way they can reduce cost of production and also adopt better farming practices to help boost individual incomes.” So far, Nabard has provided financial assistance to some 31 FPOs, with an average credit of more than Rs 3 lakh per FPO, Chawla added. According to Nabard data, small and marginal farmers in Gujarat have an average land holding of less than two hectare. However, after being part of the FPOs, individual income of farmers have increased significantly.



## Maharashtra instructs banks not to divert PM-Kisan money to farmers’ loan accounts

► Noticing that some banks had diverted the first instalment of the Pradhan Mantri Kisan Samman Nidhi (PM-Kisan) scheme to farmers’ loan accounts, the Maharashtra government has instructed the lenders to return the money to the farmers. Maharashtra’s Commissioner of Agriculture, SuhasDiwase, said that banks that had diverted the PM-Kisan instalment to farmers’ loan accounts have reversed the transactions after the government’s direction. “There are strict instructions from the government of India regarding this. We have instructed banks and a circular has been issued. Banks that had diverted money to loan accounts have returned it to farmers,” he said. Diwase explained that some banks have an auto mode system in place where the money deposited into a farmer’s account goes directly to his/her loan account and is adjusted against the farmer’s dues. Hence, many farmers could not get their first instalment. “This will not be repeated,” Diwase asserted.



## Capt clears debt relief for 2.85 lakh agricultural cooperative members

► Some 2.85 lakh people, 70 per cent of them Dalits, were given a major relief when the Punjab Cabinet gave in-principle approval to a debt relief scheme for farm labourers and landless farming members of Primary Cooperative Agriculture Service Societies (PACS). The scheme waives off H520.55 crore, including principal amount of H388.55 crore, Rs 78 crore as interest at 7 per cent till March 31, 2017, besides H54 crores on account of interest at 7 per cent with effect from April 1, 2017 to March 31, 2019, which were outstanding as on March 31, 2019. The government had during the recent Budget session of Vidhan Sabha announced a budgetary allocation to implement this scheme. Chief Minister Amarinder Singh had also assured that as the state’s financial condition improves, he will bring landless farmers and farm labourers into the ambit of the debt relief scheme. The beneficiaries would be individual farm labourers and landless farming members of PACS who have been availing advances from district cooperatives and boards. The amount eligible for debt relief would comprise the outstanding principal amount up to a limit of H25,000 as on March 31, 2017 and simple interest at 7 per cent per annum. The debt relief shall not be available to those members who are either employees, government pensioners, workers in semi-government institutions, PSU’s of any State or Central Government or an income tax payee. If an individual has more than one account, the relief would be given against one account only, which has higher outstanding amount subject to the maximum of H25,000 as principal. The accounts of the beneficiaries would be Aadhar-seeded to avoid duplication. The move comes as an extension of the Debt Relief Scheme of October 2017 for small and marginal farmers with loans up to H2 lakh. Under the scheme, till date, the government has waived off loans of Rs 5.47 lakhs small and marginal farmers.

## Demand from Bangladesh drives up price of Bengal's aromatic rice Gobindobhog

► Firm demand from Bangladesh and other markets in South India for Bengal's premium variety of aromatic rice — Gobindobhog — is driving prices northwards. The price of Gobindobhog paddy is up by nearly 17 per cent at Rs 3,500 a quintal this year, as compared with Rs 3,000 a quintal in the same period last year. Gobindobhog is a non-Basmati type indigenous aromatic rice from West Bengal. The paddy variety, which got the GI (Geographical Indication) status in August 2017, is primarily cultivated in East Burdwan district in the Raina 1, Raina 2 and Khandaghosh blocks. According to Suraj Agarwal, CEO, Tirupati Agri Trade, the price of Gobindobhog rice is up by nearly 9 per cent at Rs 5,100 a quintal, as compared with Rs 4,700 a quintal in the same period last year. "The price was ruling at around Rs 4,500 a quintal at the millers' end at the beginning of this season in January. Then it suddenly witnessed a spike and increased to Rs 5,100 a quintal by end February due to heavy demand from Bangladesh," Agarwal said. There was a sudden demand for around 10,000 tonnes of Gobindobhog rice from Bangladesh this year, market sources said. Tirupati Agri, which markets the rice under the 'Rice Villa' brand, has exported close to 550 tonnes of Gobindobhog so far during this season. It had exported around 1,000 tonnes the whole of last year. The company exports to Bangladesh and West Asia. Apart from Bangladesh, there has been a steady rise in demand from Kerala and other markets in South India, said Tamal Mal, Director of Greenstarline Udyog, manufacturer, trader and exporter of different varieties of rice from Bengal.

## Kutch racing ahead in Kesar mango cultivation

► Known for its dry land, Kutch district is gaining recognition as a fertile land for the 'Kesar' mango variety. Farmers claim that drip irrigation from groundwater is helping Kutch become a Kesar mango heartland — a title currently enjoyed by GirSomnath district in Saurashtra. The acreage of the fruit in the district saw a sharp increase of about 1,700 hectares or 7 per cent to 10,033 hectares in 2017-18, as compared to about 6 per cent in GirSomnath district to 14,820 hectares. "Growth in mango cultivation in the Kutch region is primarily attributed to the drip irrigation method and fertile land. This makes it a favourable condition for mango cultivation even in a place such as Kutch. More and more farmers are taking up mango cultivation by switching from conventional crops such as castor," PM Vaghasiya, Director of Horticulture, Government of Gujarat, said. Data provided by the Horticulture department show that mango production in Kutch has been promising. In 2015-16, Kutch produced 85,240 tonnes of mango, which jumped to 91,206 tonnes in 2016-17, the peak production year. Output, however, dipped in 2017-18 to 72,739 tonnes. "This year we expect a better crop. Even as there is water shortage in other parts of Kutch, we are able to provide adequate water due to drip irrigation through groundwater. We are waiting for the canal network to get completed, which will further boost the prospects for Kutch to become a kesar land," said Batuksinh Jadeja, a mango producer in Kutch. Jadeja has developed mango orchard on about 150 acres of land.

## Rajasthan set to pip Gujarat in cumin production

► Armed with estimated 20% increase in cumin seed (jeera) production this year, Rajasthan is expected produce more cumin than Gujarat, the largest producer of the spice so far. Unlike Rajasthan, Gujarat is likely to witness 3% reduction in cumin production during 2019 due to lower acreage. Cumin production in Rajasthan is estimated to rise to 2.50 lakh metric tonne (MT) in 2019 from 207.83 MT in 2018. As against this, the production in Gujarat is likely to decline to 1.67 lakh MT in 2019 from 1.73 lakh MT in 2018, shows trade estimates released at the Spice Meet 2019, which was recently organised in Ahmedabad by Federation of Indian Spice Stakeholders (FISS). Traditionally, Gujarat and Rajasthan account for most of the cumin production in India. "The cumin production in the country



is expected to rise 9% to 4.17 lakh tonne this year," said Ashwin Nayak, chairman, FISS. Till last year, divergent views prevailed about the highest cumin producing state. While FISS had last year also placed Rajasthan on top, Spices Board of India under union ministry of commerce and industry had put Gujarat as the top producer with production of 2.91 lakh tonnes in 2018. With lower production this year, Gujarat in all probability is going to produce less cumin than Rajasthan. Less availability of water for irrigation during the sowing season has resulted into lower production of the spice in Gujarat, say traders and market experts.

## Maha to set up 6 clusters to boost farm exports

➤ In a planned attempt to promote exports of the state's agricultural produce, the Maharashtra government is set to develop six clusters in accordance with the Centre's agri-export policy. The focus will be on these clusters, to come up in six zones, to export bananas, oranges, pomegranates, onions, grapes, and mangoes. Solapur, Ahmednagar and Pune districts have been identified for the export of pomegranates; similarly, Sindhudurg and Ratnagiri for mangoes; Nashik, Pune and Sangli for grapes; Nashik also for onions; Nagpur, Wardha and Amravati for oranges; and Jalgaon, Kolhapur and Solapur for bananas. Farmer groups, producer companies and cooperatives will receive infrastructural and logistical support from the state to promote these clusters, said Sunil Pawar, managing director at Maharashtra state agriculture marketing board (MSAMB) at a workshop on the state's agriculture export policy. Pawar said these clusters would replace the previously created agri-export zones. "Various schemes aimed at increasing exports will be implemented on these clusters. Farmers in these clusters will be trained to use inputs in order to meet the minimum residue limits (MRLs), as specified by export markets." Pawar said.



## Kerala extends moratorium on farm-loan repayment till Dec

➤ A series of farmer suicides in Idukki district seem to have prompted the State government to come up with debt-relief measures for the farming community in the State. A special cabinet meeting held at Thiruvananthapuram has decided to extend the moratorium on loan-recovery proceedings on agricultural loans to December 31 from the earlier deadline of October 31. The government had announced the one-year moratorium on agricultural loans in August in the wake of floods. It was also decided to raise the loan limit from Rs 1 lakh to Rs 2 lakh. The government's decision will be applicable to loans availed for agri-related and allied activities, the meeting noted. For long-term crop loans such as rubber, coffee and coconut, the meeting decided to give up to 9 per cent interest and the amount will be disbursed from the Chief Minister's Relief Fund. The meeting also decided to entrust both agriculture and planning departments to find ways to include commercial banks under the purview of the Agriculture Debt Recovery Commission. An amount of Rs 85 crore has also been sanctioned as compensation for crop-loss caused by natural calamities. The compensation for crop losses increased 100 per cent from the levels fixed in 2015.

## Punjab to unlock hidden potential in rural areas

➤ In an effort to reach out to budding entrepreneurs in smaller towns, the Punjab government plans to tap their potential to exploit the unlocked capital. Taking a step forward in this direction, the state has sought assistance of industry body CII to guide the rural youth about possible potential in various sectors. According to experts, a majority of youth comes from farming background in the state, but they don't see an opportunity to fulfill their aspirations in the farm sector. There is lot of unlocked capital ranging between Rs 5 and Rs 10 crore in B-towns or smaller towns. The youth have inherited the money but they don't have an idea about what kind of business they should pursue. The CII has an edge over us. So we have requested them to hold seminars or awareness drives in association with the state government to educate the youth about opportunities available in various sectors," said Rajat Agarwal, CEO, Punjab Bureau of Investment Promotion, on the sidelines of CII Punjab's Annual Session on "Making Entrepreneurial Punjab: Progressive and Inclusive". Experts believe entrepreneurship in small towns can transform lives if they are given proper guidance and provided with necessary linkages to set up small units such as food processing.

## Drought-proofing goes scientific in state

➤ Karnataka is taking data-driven, science-based measures to tackle drought in a first-of-its-kind project funded by the World Bank. Eleven drought-prone districts have been selected under the third phase of Sujala, the government's flagship watershed development project, where interventions are being made on the basis on meticulous land and water studies. A consortium of 15 research institutions has developed land resource inventory (LRI) for nearly 14 lakh hectares. Colour-coded maps drawn based on satellite imagery coupled with ground surveys will be used as a tool for drought-proof farming. This allows farmers to choose the right kind of crop to be grown based on what suits their soil. LRIs are prepared for every micro-watershed area spanning about 500 hectares. "Work on preparing the LRIs has been carried out for the last six years and we are now putting this to use," commissioner for Watershed Development Prabhakar Chandra Ray said.



## Entry of Cheap Vietnam Pepper Hits Domestic Prices

▶ The ongoing harvest season and the influx of cheaper Vietnam pepper through Sri Lanka have pushed down black pepper prices in India by nearly 20% in a year. The prices have declined to around Rs 324 per kg from around Rs 390 per kg a year ago and may fall even further. "But in the past few days, arrivals have slackened and prices may not fall below Rs 300 per kg level," said Kishor Shamji, a major exporter. Prices have plunged in the past few months as large quantities of cheaper Vietnam pepper were being imported into the country through Sri Lanka with certificate of origin from the latter taking advantage of the lower import duty structure and circumventing the Rs 500 minimum import price fixed by India. Expressing concern over the rising import, exporters had taken up the matter with the Centre with a request to tighten the monitoring of the imports. But so far, no concrete action has been taken, according to the exporters. "The traders have changed the mode of import. Instead of huge quantities, they are unloading 2-3 tonnes in different ports in South India and taking them in small lots by road to interior places in Kerala and Tamil Nadu and selling at Rs 280-290 per kg," Shamji said. As a result, the volume of pepper import into the country has gone up in the current year. "Apart from the 16,000 tonnes normally imported by value-added exporters, another 25,000 tonnes must have come into the country," said Jojan Malayil, CEO of Bafna Enterprises, an exporter.



## Basmati shipments set to rise 10%



▶ India's basmati rice exports for the current fiscal year are set to grow by a tenth in dollar value terms over last year on higher realisations. However, the volumes are likely to remain at last year's levels of four million tonnes. Basmati is the largest product in India's agri-export basket and accounts for about a fourth of the total farm product shipments. After a sluggish start during the early part of the fiscal, shipments of basmati have gained momentum over the past couple of months on good demand from key buyers such as Saudi Arabia, Iran and the European Union, said AK Gupta, Director, Basmati Export Development Foundation, under the Agricultural and Processed Foods Exports Development Authority (APEDA). The latest data (for the April-January period) indicate that basmati exports grew by 9 per cent in dollar value to \$3.6 billion as against \$3.31 billion in the same period last year. However, in rupee terms the growth was higher at Rs 24,919 crore (as against Rs 21,319 crore last year) at close to 17 per cent for the period, aided by a weaker rupee. In volume terms, the shipments for the period were marginally higher at 3.36 million tonnes as against 3.27 mt. So far, average per-unit realisations have been about 6 per cent higher at \$1,070 per tonne as against \$1,010 per tonne in the previous year.

## Top rubber producers to cut exports by 240,000 tonnes

▶ The world's top producers of natural rubber will curb exports by 240,000 tonnes for four months from April, they said on Wednesday, in a bid to prop up global prices of the commodity. The move was first announced in late February, following a meeting of the International Tripartite Rubber Council, which comprises Thailand, Indonesia, and Malaysia. However, the exact volume, start date and timeframe were not announced at that time. Formally known as the Agreed Export Tonnage Scheme (AETS), the export cuts will start in April and last for four months, the group said in a joint statement after a follow-up meeting in Bangkok this week to finalise details. The step follows an agreement in late 2017 to cut natural rubber exports by 350,000 tonnes for three months.

## Cotton exports set to fall 27 per cent

Notwithstanding robust demand, the Cotton Association of India expects exports to plunge 27 per cent to 50 lakh bales (lb) this cotton season, ending September, against 69 lb registered last year due to lower output. Overall export demand is looking up, with China emerging as the largest buyer. However, in its latest estimate, CAI has reduced cotton output for this year to 328 lb against 330 lb estimated in January. The output was at 365 lb last year. Atul Ganatra, President, Cotton Association of India, said the country has supplied 5 lb to China and another 8 lb will be shipped out by April. Overall cotton exports to China are expected to touch 15 lb against 8 lb logged last year.



Chinese cotton buyers are willing to purchase cotton at 80-81 cents a pound at a time when the global prices are hovering at 78-79 cents a pound, he said. CAI plans to sign a memorandum of understanding with Bangladesh to enhance India's cotton exports to that country by 30 per cent from 20 lb shipped out last year. India has shipped out 10 lb till now to Bangladesh. Ganatra said cotton exports to Pakistan have come to standstill after the recent tensions. India has already exported 8 lb and pending orders will be fulfilled once normalcy returns. Pakistan's annual cotton crop is estimated at 330 lb but its demand is about 570 lb, forcing it to buy cotton from other countries, said Ganatra. Lack of sufficient rain in states such as Gujarat, Karnataka, Telangana and Maharashtra is expected to pull down the cotton crop to a nine-year low this year. The previous lowest output was 305 lb, recorded in 2009. Moreover, the government of Maharashtra and Telangana had given instructions to the farmers to remove the cotton plants by December-end to avoid Pink Boll worm problems. The Cotton Corporation of India has so far purchased 11 lakh bales as prices at the start of season were lower than the minimum support price of Rs 41,000 a candy, said BK Mishra, former Chairman and Managing Director, Cotton Corporation of India.

## Global palm output to rise this fiscal year

Global palm oil production is expected to hit 74.9 million tonnes for 2018-2019, as prices of the commodity likely improve this year, leading palm industry analyst Thomas Mielke said. The forecast is a significant hike from the 70.5 million tonnes of palm oil produced in the 2017/18 period, according to data from the US Department of Agriculture. Mielke said palm oil was undervalued at the end of February, and he expected prices to rise. "In the course of the next 6, 10 months for the rest of the year, we should see on average a recovery in prices," said Mielke, editor of the Hamburg, Germany-based newsletter Oil World, while speaking at an outlook seminar in Kuala Lumpur. Production in Indonesia, the world's largest palm oil producer, was seen at 43 mt in 2019 while Malaysia's output was expected to hit 20.1 mt, he said. Biodiesel production was expected to rise in 2019 from the previous year to 7.5 million tonnes in Indonesia and 1.4 mt in Malaysia due to higher mandates in both countries. Mielke estimated that, worldwide, 18.3 mt of palm oil will be used for biodiesel production in 2019.

## US wins WTO ruling on Chinese grains; decision may affect India

The United States won a World Trade Organization (WTO) ruling on China's price support for grains, successfully challenging a calculation methodology that is also used by India. A WTO adjudication panel agreed on Thursday with the US complaint that China had paid farmers too much for wheat, Indica rice and Japonica rice in 2012-2015. A disputed corn subsidy had already expired. "China's excessive support limits opportunities for US farmers to export their world-class products to China," US Trade Representative Robert Lighthizer said in a statement. "We expect China to quickly come into compliance with its WTO obligations. China said on Friday it regretted the lack of support from experts, noting that government support for agriculture was a common practice and allowed under WTO rules. China would continue to promote development of its agriculture sector in line with WTO rules and safeguard the stability of the multi-lateral trade system, the Ministry of Commerce said in a statement. The US trade representative's office filed the complaint in September 2016, saying China had paid farmers nearly \$100 billion more than allowed by the WTO rules. That provided an artificial incentive for farmers to produce more, lowering prices worldwide. China's WTO membership agreement permits trade-distorting subsidies of up to 8.5 per cent of the total value of production. China argued that it was not breaching that limit because only the grains procured by government should be counted as subsidised. The United States successfully argued that state buying at a guaranteed price raised the whole market.



## Pink bollworm is out of control in India

➤ That pink bollworm has developed resistance to Cry1Ac and Cry2Ab (or Bollgard-II) — the two biotech solutions currently available in India to tackle pink bollworm — is no news. Virulent attack of the pest is destroying the fibre crop on lakhs of acres across the country, particularly in the West, Central and Southern parts. An American pink bollworm expert says that it is impossible to tackle the menace with the current two Bt toxins being used in the country. “It has gone out of control. It’s too late. Too little,” he points out, when asked about the likely control mechanisms. “The two genes that are being used in India are now ineffective. The resistance is widespread. There is no way we can set the clock back if we use these two Bt toxins,” Bruce Tabashnik, Head of Department of Entomology at the University of Arizona, who studies pest resistance and has done extensive study on pink bollworm and its resistance to Bt toxins. It, however, is not the end of the road. There is a way out, he asserts. “Use all tools. For now, shorten cotton season, destroy crop residues, go for deep summer ploughing, crop rotation, mating disruption, insecticides based on scouting and thresholds,” he points out. For the future, he says there are new Bt toxins that could help, including an edited form of Cry1Ac. “You need to engineer cotton to make two or more such new Bt toxins,” he says. Presence of two genes will make it more difficult for the worm to develop resistance.

## CSIR bats for green ‘biocoal’

➤ Against the backdrop of Prime Minister Narendra Modi’s clarion call to the scientists to find a ‘concrete solution’ to deal with the problem of stubble burning, the country’s premier research agency, Council of Scientific and Industrial Research (CSIR) has pitched in for conversion of paddy biomass into green ‘biocoal’ to be used in thermal power plants as one of the possible environment-friendly steps to check the menace which chokes Delhi and NCR region, particularly during winters. Scientists from one of the CSIR’s labs, National Physical Laboratory (NPL) in a study published in the latest edition of The Current Science, said this conversion of paddy stubble into green product biocoal through torrefaction process would also help farmers to earn money using the agriculture residue. They maintained that the biocoal which has the calorific value equivalent to that of bituminous coal can be used as an alternative fuel in thermal power plants. By optimizing the processing parameters of torrefaction process, desired calorific value of torrefied product has been archived, as per the study conducted in Haryana. It also pointed out that 10 per cent use of torrefied product with coal can consume 140 million tonnes of rice straw and as a consequence, it reduces the consumption of fossil fuels. If adopted, the technology which is already in vogue in the western countries can help reduce not only consumption of fossil fuels, but also cut down the environmental pollution and greenhouse gas (GHG) emission. Similarly, residue of other crops like wheat, sugarcane, oilseed, maize and cotton which is estimated to be around 500 million tonnes in the country can be used as biocoal in thermal plants after torrefaction.



## AK Misra is new ASRB chief

➤ Aditya Kumar Misra, veterinary professor and former Vice-Chancellor of GB University of Agriculture and Technology, Pant nagar, has been appointed as the new Chairman of Agricultural Scientific Recruitment Board (ASRB), according to sources. The Appointments Committee of the Cabinet approved the appointment of Misra, who will hold the position till January 5, 2022, said the sources in the know of development. Veterinary scientist specialising in economically important diseases of goat, Misra has been an acting Vice-Chancellor of the GB Pant University of Agriculture and Technology, India’s first full-fledged agricultural university.



## Arecanut gets 'SirsiSupari' Geographical Indication tag

▶ Arecanut (also known as supari or betel nut) is the latest entrant in the list of agricultural produce with a GI (geographical indication) tag. On March 4, the Registrar of Geographical Indications, Government of India, accorded a GI tag, 'SirsiSupari', to arecanut grown in Sirsi, Siddpaur and Yellapurtaluku of Uttara Kannada district in Karnataka. The Totagars' Cooperative Sale Society (TSS) Ltd, a Sirsi-based agri cooperative, is the registered proprietor of the GI 'SirsiSupari'. The World Intellectual Property Organisation defines GI as a sign used on products that have a specific geographical origin and possess qualities or a reputation that are due to that origin. 'SirsiSupari' is medium sized and round in shape. It has a somewhat ash coloured hard seed, Hegde said. The fruit of 'SirsiSupari' turns from yellow to scarlet as it ripens, and consists of a thick fibrous pericarp (husk) that encloses this seed. Grown on an area of around 40,000 acres, the annual production of 'SirsiSupari' is estimated to be around 40,000 tonnes. Production of arecanut in these three taluks is around 7 per cent of the production of Karnataka State.



## IFFCO to launch nano fertilizer

▶ Indian Farmers' Fertilizer Cooperative Limited (IFFCO) will soon launch nano fertilizer (nitrogen) after patenting the product, said the IFFCO Managing Director and CEO, Dr. Uday Shanker Awasthi at its IFFCO Phulpur unit. He said that it would minimize the ill effects of the use of chemical fertilizers on crops and the soil. Only two grams of nano fertilizer would be equal to 100 kg urea, he added that the work on this project was in progress at IFFCO Kalol in Gujarat and the product was expected to be marketed within two years. At Anola near Bareilly, IFFCO had taken initiative to protect trees which were on verge of extinction including those of Kaitha, different varieties of desi mango etc... Dr. Awasthi said that IFFCO had been working on two projects. One of the projects was of processing and marketing organic food in collaboration with the Sikkim Government, while the other was in Punjab for freezing vegetables and making frozen vegetables available in the market. Research was on to produce biofertiliser in the form of capsules. Regarding IFFCO Phulpur, Dr. Awasthi said that latest technology was being introduced to reduce power consumption by 25 per cent. IFFCO had planted 45 lakhs tissue cultured neem trees which grow in five years and produce better quality 'NEEMBOLI' used in making pesticides. Farmers grow economically viable crop and efforts were being made to make neem a financially viable tree. Neem was used for coating urea so that the farmers need not worry about the market for neem products.



## e-Adangal mobile app launched to help farmers

▶ Revenue Minister RB Udhayakumar launched e-Adangal mobile application, developed by Tamil Nadu e-Governance Authority (TNeGA) to simplify the process of entries in 'Adangal', a document containing details of farmlands and crops cultivated there. The facility will be helpful to farmers since they themselves can enter the details regarding crops being cultivated by them, yield obtained etc., with photographs of the crops. At present, in every revenue village, separate registers are being maintained manually for entering the crops cultivated, yield, details of trees in government land and other information. Every month, only after verifying the different registers, VAOs issue copies of Adangal to farmers. So far, copy of Adangal is given to farmers only on the basis of information entered by VAOs. Hereafter, farmers themselves can enter details about crops and their yield through the mobile app. This app can be downloaded from Google Play Store. If there is any difference between the information entered by farmers and Village Administrative Officer, it would be automatically referred to higher officials. If the farmers concerned have any grievance in this regard, they can bring it to the notice of RDO and Tahsildar. Information regarding cultivation received through e-Adangal will be accurate and it would be helpful during periods of drought and natural calamities. Using these data, farmers will get appropriate assistance at the earliest. Farmers can download the e-Adangal just by paying the amount fixed for it and this would be useful in getting crop loans.





# FOOD PROCESSING

## ADDING VALUE AND INCOME







**A**gricultural commodities form the base of the agriculture production. A year's worth of effort by the farmers combined with monsoon factors yield results that lay the foundation of the farmers' well-being and welfare. Most often, a bumper yield alone does not guarantee a concomitant increment in farmers' income. The profit from farm output is hugely determined by the market forces and infrastructure for handling the excess production. Food processing which often can enhance the shelf life of otherwise perishable farm commodity is fairly at a nascent stage in India. Although there have been concerted efforts by the government to expand the reach of food processing, at a pan India level, the idea is still at its infancy. Food processing can change the fortunes of agriculture. With a plan in place to strategically initiate food processing as a natural progression of harvest of commodities in different phases can organically transform the mindset of farmers. India needs a national food processing plan, if we are serious about raising farmers' income.

### The Rising Agriculture Production

The Department of Agriculture, Cooperation & Farmers Welfare (DAC & FW) has estimated the

production of foodgrains in the country during Kharif 2018 at 141.59 million tonnes (1st Advance Estimates) against 140.73 million tonnes (4th Advance Estimates) during kharif 2017, which is higher by 0.86 million tonnes. Further, kharif foodgrain production is 11.94 million tonnes more than the average production of five years (2012-13 to 2016-17) of 129.65 million tonnes.

Total production of Kharif rice is estimated at 99.24 million tonnes. This is higher by 1.74 million tonnes than the last year's production of 97.50 million tonnes. Further, it is higher by 6.64 million tonnes over the average production of Kharif rice during the last five years.

The total production of Nutri / coarse cereals in the country has decreased to 33.13 million tonnes

The total production of Kharif pulses is estimated at 9.22 million tonnes which is lower by 0.12 million tonnes than the last year's production of 9.34 million tonnes. However, kharif pulses estimated production is 2.67 million tonnes more than the last five years average production.





as compared to 33.89 million tonnes during 2017-18. Production of Maize is expected to be 21.47 million tonnes which is higher by 1.23 million tonnes than that of last year's production of 20.24 million tonnes. Further, this is more than 4.40 million tonnes than the average production of maize during the last five years.

The total production of Kharif pulses is estimated at 9.22 million tonnes which is lower by 0.12 million tonnes than the last year's production of 9.34 million tonnes. However, kharif pulses estimated production is 2.67 million tonnes more than the last five years average production.

The total production of Kharif oilseeds in the country is estimated at 22.19 million tonnes as compared to 21.00 million tonnes during 2017-18, i.e., an increase of 1.19 million tonnes. Also, it is higher by 2.02 million tonnes than the average production of last five years.

Production of Sugarcane is estimated at 383.89 million tonnes which is higher by 6.99 million tonnes than the last year's production of



376.90 million tonnes. Further, it is higher by 41.85 million tonnes than the average production of last five years.

Estimated production of Cotton is 32.48 million bales (of 170 kg each) and Production of Jute & Mesta estimated at 10.17 million bales (of 180 kg each).

India's horticulture production is estimated to rise by 1 per cent to record 314.67 million tonnes in 2018-19. Onion production in the current year is likely to be around 23.62 million tonnes (MT) as against 23.26 MT in 2017-18, while potato output is estimated at 52.58 MT compared to 51.31 MT. Tomato production is estimated to rise 2 per cent to 20.51 MT as against 19.76

MT in 2017-18. The production of fruits is estimated at 97.35 MT, while that of vegetables at about 187.5 MT.

The final production in 2017-18 was 3.7 per cent higher in the previous year. Among vegetable crops, even though there was a drop in the area under potato and onion crops, the quantum of their production went up.

On the other hand, the production of tomatoes dropped by almost 1 mt, even though there wasn't much of a drop in area. The production of major fruits, on the contrary, rose significantly in 2017-18 as compared to the previous year, the estimates showed. Among fruits, citrus fruits output is expected to rise strongly to 9.6 per cent at 12.51 mt (11.42 mt). The production of mangoes is projected to grow 9 per cent to 21.25 mt. As is the case with banana production, which is expected to go up to 31 mt from 30.5 mt in 2016-17.

Spices production in 2017-18 remained almost unchanged at 8.12 mt even though there was a marginal increase in the acreage to



3.88 mh from 3.67 mh in 2016-17. Among plantation crops, arecanut and cashewnut recorded impressive growth in production. While the production of arecanut went up to 8.33 lakh tonnes in 2017-18 from 7.23 lakh tonnes in 2016-17, production of cashewnut in 2017-18 was 8.17 lakh tonnes as against 7.45 lakh tonnes in the previous year.

India's coffee production is likely to drop by 20 per cent in the new marketing year starting October 2018 to around 2,53,000 tonnes because of severe floods in parts of Karnataka and Kerala. The country is estimated to have harvested 3,16,000 tonnes of coffee in the 2017-18 marketing year (October-September). The industry is estimating coffee production in 2018-19 to fall by at least one-fifth due to floods. Karnataka and Kerala account for 90 per cent of the country's coffee production. As per the government's assessment, coffee crop has been damaged in 2.26 lakh hectare due to heavy rains, and losses are estimated to have been to the tune of Rs 654 crore. The heavy rains that lashed during August had triggered flash floods and landslides in multiple locations in coffee-growing districts of



Kodagu and Hassan, as well as in Kerala. In the current 2017-18 marketing year, Karnataka is estimated to have harvested 2,22,300 tonnes of coffee and Kerala 65,735 tonnes.

Rubber also suffered a backlash owing to the floods in Kerala. From the expected 700,000 tonnes of rubber production during the 2018-19 financial year, the production is likely to come down to 600,000 tonnes in the current fiscal due to the floods. Spices have also borne the brunt of Kerala floods. The state suffered a production loss of more than 25,000 tonnes of spices, valued at Rs. 1,254 crore

Spices production in 2017-18 remained almost unchanged at 8.12 mt even though there was a marginal increase in the acreage to 3.88 mh from 3.67 mh in 2016-17.







in the devastating floods that wiped out 58,379 hectares of agricultural land, according to a study carried out by the Indian Institute of Spices Research (IISR). The State cultivates 1,62,660 hectares of spices with an annual production of 1,40,000 tonnes.

Milk production on the other end has witnessed an uptrend. Milk production was reported at 165.4 million tonnes during 2016-17 and is estimated to be 176.35 million tonnes during 2017-18. The trend is expected to continue as the projected milk production by 2021-22 is 254.5 million tonnes as per the vision 2022 document. The meat production is expected at 7.4 million tonnes. India has emerged as one of the fastest growing poultry producer over the last decade and is currently the fourth largest in volume terms.

### Promising Agriculture Trade

India is among the 15 leading exporters of agricultural products in the world. The country has emerged as a significant exporter in certain agriculture items like

Agriculture imports are constantly monitored and appropriate decisions are taken as per the prevailing situation. India's agricultural imports decreased from Rs. 1,64,726 crores in 2016-17 to Rs 1,52,061 crore in 2017-18 registering a decline of nearly 7.66%.

rice, meat, spices, raw cotton and sugar. India has developed export competitiveness in certain specialized agriculture products like basmati rice, non-basmati rice, spices, cotton, coffee, cashew, guar gum, marine products, buffalo meat and castor oil.

Total agricultural exports from India grew at a CAGR of 16.45 per cent over FY10-18 to reach US\$ 38.21 billion in FY18. Between Apr-Oct 2018 agriculture exports were US\$ 21.61 billion. India is also the largest producer, consumer and exporter of spices and spice

products. Spice exports from India reached US\$ 3.1 billion in 2017-18. Tea exports from India reached a 36 year high of 240.68 million kgs in CY 2017 while coffee exports reached record 395,000 tonnes in 2017-18. Food & Grocery retail market in India was worth US\$ 380 billion in 2017.

Considering the potential of agricultural products in global market and the abundance of farm production in India, together with the impact the same could have on the farmers' income status, the government introduced a new agriculture export policy. The Agriculture Export Policy was approved by Government of India in December 2018. The new policy aims to increase India's agricultural exports to US\$ 60 billion by 2022 and US\$ 100 billion in the next few years with a stable trade policy regime.

The Department of Commerce also has several schemes to promote exports, including exports of agricultural products: Trade Infrastructure for Export Scheme

(TIES), Market Access Initiatives (MAI) Scheme and Merchandise Exports from India Scheme (MEIS). In addition, assistance to the exporters of agricultural products is also available under the Export Promotion Schemes of Agricultural & Processed Food Products Export Development Authority (APEDA), Marine Products Export Development Authority (MPEDA), Tobacco Board, Tea Board, Coffee Board, Rubber Board and Spices Board. These organisations also seek to promote exports through participation in international fairs & exhibitions, taking initiatives to gain market access for different products in different markets, dissemination of market intelligence and taking steps to ensure quality of exported products.

The exports of agricultural products depend on several factors such as international and domestic demand and supply situation, international and domestic prices, concerns of food security, diplomatic and humanitarian considerations.

Agriculture imports are constantly monitored and appropriate decisions are taken as per the prevailing situation. India's agricultural imports decreased from Rs. 1,64,726 crores in 2016-17 to Rs 1,52,061 crore in 2017-18 registering a decline of

nearly 7.66%. Decrease in value of agricultural imports during this period was primarily on account of imports of wheat, pulses and sugar. Share of agricultural imports in the total imports is 5.08% in 2017-18.

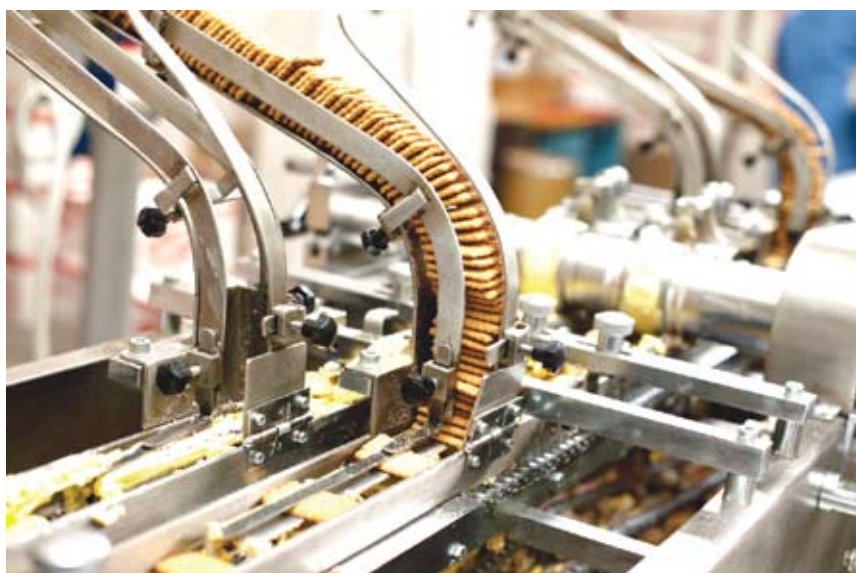
### Food Processing – The Rising Star

India holds immense potential in the segment of food processing. The abundance of agricultural produce, skilled man power, ambient environmental conditions and geographical location raises the chance of India to gain from food processing. Besides, in India, the food sector has emerged as a high-growth and high-profit sector due to its immense potential for value addition, particularly within the food processing industry.



The industry engages approximately 1.77 mn people in around 39,319 registered units with fixed capital of \$ 29.2 bn and aggregate output of around \$ 144.6 bn. Major industries constituting the Food processing industry are grains, sugar, edible oils, beverages and dairy products. The key sub-segments of the Food Processing industry in India are: Dairy, Fruits & Vegetables, Poultry & Meat processing, Fisheries, Food retail etc.

The Indian food and grocery market is the world's sixth largest, with retail contributing 70 per cent of the sales. The Indian food processing industry accounts for 32 per cent of the country's total food market, one of the largest industries in India and is ranked fifth in terms of production, consumption, export and expected growth. It contributes around 8.80 and 8.39 per cent of Gross Value Added (GVA) in Manufacturing and Agriculture respectively, 13 per cent of India's exports and six per cent of total industrial investment. The Indian gourmet food market is currently valued at US\$ 1.3 billion and is growing at a Compound Annual Growth Rate (CAGR) of 20 per cent. India's organic food market is expected to increase by three times by 2020.







According to the data provided by the Department of Industrial Policies and Promotion (DIPP), the food processing sector in India has received around US\$ 7.54 billion worth of Foreign Direct Investment (FDI) during the period April 2000-March 2017. The Confederation of Indian Industry (CII) estimates that the food processing sectors have the potential to attract as much as US\$ 33 billion of investment over the next 10 years and also to generate employment of nine million person-days.

Indian government has been keenly promoting the food processing sector and that has started to yield results considering the interest evinced by many players. "At the first edition of World Food India last year, we had investment proposals of more than \$14 billion, of which ground has been broken for projects worth \$11 billion. So, next year, we are targeting to at least double the figure, as investments," said Ms. Harsimrat Kaur Badal, Union Food Processing Minister. The minister is expecting more than \$28 billion worth of foreign direct investments (FDI) in the food processing sector in 2019.

The Government of India aims to boost growth in the food processing sector by leveraging reforms such as 100 per cent Foreign direct investment (FDI) in marketing of food products and various incentives at central and state government level along with a strong focus on



supply chain infrastructure. The Government of India has relaxed foreign direct investment (FDI) norms for the sector, allowing up to 100 per cent FDI in food product e-commerce through automatic route.

The Food Safety and Standards Authority of India (FSSAI) plans to invest around Rs 482 crore (US\$ 72.3 million) to strengthen the food testing infrastructure in India, by upgrading 59 existing food testing laboratories and setting up 62 new mobile testing labs across the country.

The government has sanctioned 42 Mega Food Parks (MFPs) to be set up in the country under the Mega Food Park Scheme. Currently, 17 Mega Food Parks have become functional.



### The Uncharted Territory

Opportunities galore in the food processing segment especially beyond the conventional food processing activities. Indians are driving the demand for processed food in India. A space has also been opened up for healthy, safe and hygienic food. This space can be used up and in the process a stable market can be created for traditional healthy snacks. A large number of companies are coming up with offerings in healthy snacking category including roasted makhanas in numerous flavours, dry fruits / nuts with a twist, vacuum fried vegetable based snacks (palak, okra, kale snacks), freeze dried fruits, smoothies, juices etc. The key to create and sustain interest in this category among younger consumers is through attractive and user friendly packaging and innovative taste.

Another lesser explored area is the one of ready to eat food category. A few players have ventured into this segment. However, this category can absorb more. With more and more Indians living in different cities, dependent on themselves to meet their food requirements, options such as these will surely receive wider acceptance.

Newer requirements will be

demanding and may create space for more technologies in packaging, and creation of innovative products. Packaging especially is a lesser explored area demanding new age solutions capitalizing on the need of easy handling, longer shelf life, better dispensing quality etc. Presenting conventional /traditional food in a variant with higher shelf and better taste also requires the aid of technology. Ventures thus concentrating on automation based technologies and robotics will have immense scope.

Food safety will emerge as an important challenge in the event of enhanced food processing demands. Inadequate knowledge about food hygiene and the standards and certification will be a major handicap. The tiny, small- and medium-scale industries—find it difficult to identify relevant procedural and compliance changes and they lack the capacity to track regulatory changes. The unawareness is also prevalent among the producers, consumers, food handlers, and even officials. The awareness among Indian consumers regarding food safety has been heightened in the recent years. Rural consumers also deserve safe, high-quality food, and the government can reach them through mass-media campaigns. When consumers demand safe

foods, industry, producers, and food handlers will comply. The Food Safety and Standards Act (FSSA) of 2006 was designed to improve the overall food safety of the population and the food trade within and outside the country. The FSSA consolidated responsibility for food safety in the hands of the Food Safety and Standards Authority of India (FSSAI). In spite of the decade-old transition from the previous food safety laws into the FSSA's integrated standards and regulations, there remain overlapping and residual/pre-existing standards maintained by other regulatory bodies. Clarity is needed if all stakeholders are to conform to FSSA regulations.

Temperature controlled warehouses for the perishables, cold storage, appropriate logistics will also emerge as a prerequisite for the development of the sector. This area requires intensive efforts from the government and the corporates as it is investment intensive. The only way of revolutionizing the food processing segment is by channelizing the capital to this niche area. The government has taken up this massive responsibility and has committed to spend Rs6,000 crore over the next three years to create the infrastructure which will leverage investments worth Rs.31,000 crore. Considering the seasonality in the procurement of the raw materials, infrastructure can play a significant role.

Food processing has to be integrated as a significant component of agriculture. It is a stated fact that a massive amount of agricultural produce is wasted due to the peculiar situation of abundance against the lack of adequate storage facilities. This calls for an intervention that can convert the abundance into products with longer shelf life. The value addition not only addresses the surplus but also conserves the value of agricultural commodities in the market.





# 'ITALY IS WILLING TO COLLABORATE WITH INDIA IN THE FOOD PROCESSING SECTOR'

**One of the top exporters of agricultural products, Italy stands out as an interesting trade ally for India. Italy also is a renowned exporter of high-tech food processing equipment. India, one of the largest producers of agricultural commodities are at a point where we need a reliable partner in expanding its food processing capabilities. In an interview with Agriculture Today, Mr. Michele Geraci, Deputy Minister of Economic Development of Italy, shares his views and perspectives of how Italy and India can cooperate in these segments.**

## **How significant is India as a trade partner in agricultural products?**

Italy stands out as one of the top exporters of agrifood products at global level with agriculture being one of our key economic sectors, accounting for around 2.1% of GDP and employing approximately 4% of the population. Italian trade relations with India in agriculture have grown steadily over the past decade. In 2018 the value of Italian agrifood products exported to India amounted approximately to 78 million euros. A respectable share (36%) of total Indian imports in the fruit and vegetable sector come from Italy. Italy is the fourth top apple exporter to India (20 million euros in 2017, + 80% compared to 2016) and it also ranks fourth in the export of apricots, cherries, peaches and plums, (0.40 million in 2017, + 23% over 2016). These figures are encouraging but, given the growing size of the Indian "aspirational" middle class and the premium quality of the Italian agricultural production, there is terrific room for improvement. During my visit to India I saw a growing appetite for the scrumptious products of the Italian tradition such as cheese, oil and wine. Indians are increasingly appreciating the Italian excellence in food but, as for now, they still stick to the traditional

best-sellers such as Parmigiano Reggiano (by the way, a curiosity: Punjabi settled in Italy became the backbone of our most famous cheese-making industry) and Chianti. However, the unique Italian biodiversity offers many more niche products to be explored by true connoisseurs and foodies.

Just to give few data, Italy produces over 400 varieties of cheese in a multitude of different flavours with undisputed quality and is the world leader in wine production with over 800 different grape varieties. We also hold the world record for the number of olive species. Also Indian Agro-exports to Italy are going well, recently reaching the value of almost 11 million euros. Top Indian agro-exports to Italy include basil, onion, tomato, coffee, potatoes and peri-peri chilly.

### **From the point of technology transfer in agriculture, where does India and Italy stand?**

Italy is the second largest manufacturer in tractors and is also a leader in agriculture mechanization. From high precision seeding machines to world class reel irrigator systems from state-of-the-art, post-harvest technology to advanced sorting lines allowing for the standard-compliant selection of fruit and vegetables, Italy has an edge and could help India in unlocking its high agricultural export potential and increasing the competitiveness of its produce.

Italy is among the top world exporters of high-tech food processing equipment. With approximately 2,600 enterprises employing about 140,000 persons, Italian food processing industry is burgeoning. More than a third of the companies are located in Emilia Romagna, which therefore generates 63% of total revenues. The Food Processing equipment sector exports around 80% of what it produces, making Italy, along with Germany, the world leader in the sector with a share of total global exports of approximately 26.5%. The high quality and the high performances of the Italian food processing machinery are undisputed both in traditional areas (such as canned tomato and fruit) and in innovative sectors such as cold chain, cold storage, international standard-compliant heat treatment and aseptic packaging solutions for low-acidity foodstuff, technologies for fine pastry and confectionery, refrigerated, listeria-free ready-to-eat foods with extended shelf-life. In recent years, a trend leading to full automation has been unfolding, with the diffusion of mechatronics, the robotization

of an increasing number of operations and the online surveillance of both individual machines as well as entire production lines.

Thanks to the government subsidies incentivizing the adoption of agricultural machinery in India, Italy was the 4th largest exporter to India as per the financial year 2017-18 with a share of 9.65% whereas, in the current FY 2018-19 (April-Nov), this share has so far decreased to 5.53%. Apart from export, Italy is willing to collaborate with India in the food processing sector, widening the scope of bilateral cooperation so as to include the promotion of capacity building, skill development, joint research programmes, exchange of experts and students from the both sides. These potential synergies will be discussed in the forthcoming first meeting of the WG on FP.

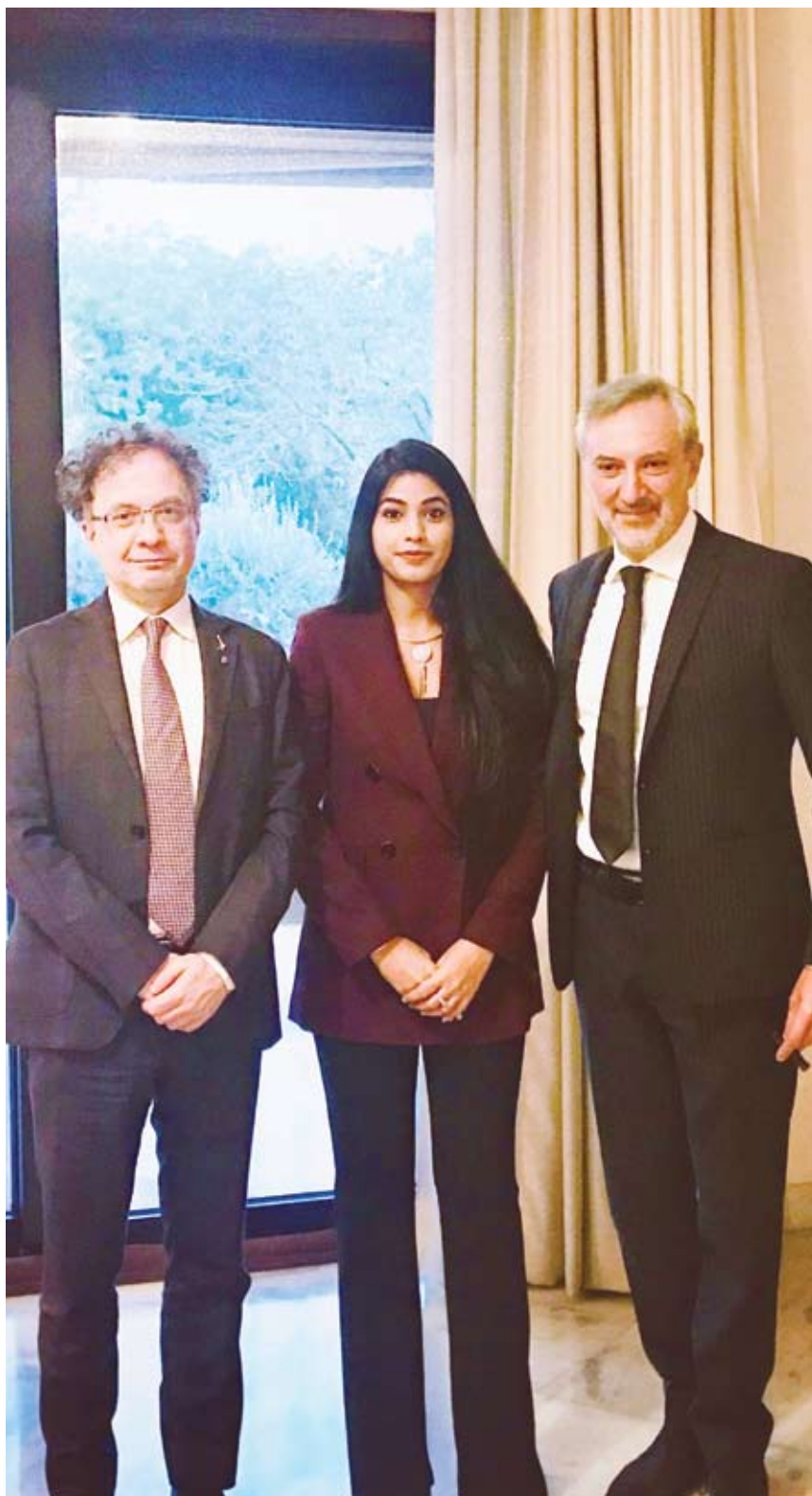
### **Are there any trade agreements between India and Italy in agriculture related trade?**

There is no specific agreement related to trade per se. However, during the visit of the Italian Ministry of Agriculture to Delhi in November 2017, a MOU was signed on cooperation in agriculture and phytosanitary issues. We could say that such a MOU is in a way “prodromal” to trade since it aims at reducing phytosanitary risks in exported goods also through the definition of specific joint procedures, thus ultimately facilitating the establishment of commercial links in accordance with respective national phytosanitary legislation.

### **Does this visit hold any significant developments in agricultural trade or allied sectors?**

The main focus of this visit is exactly trade, also in agricultural goods. Agriculture and market access of agricultural products will be key areas of discussions in the XX Joint Commission of Economic Cooperation which will meet on 27th February. I am also here to inaugurate the first meeting of the Working Group on Food Processing where we expect to explore many opportunities of trade and investment for both countries in such a promising sector. India has the fifth largest area of arable land in the world, ranks second in global production of fruits and vegetables but, due to the high perishability of those categories, it encounters enormous losses and wastes. Italy is a leader in food processing and cold chain/cold storage technology. Our two countries are complementary and my visit here is expected to build momentum on such a complementarity.





(L-R): Mr. Michele Geraci, Deputy Minister of Economic Development of Italy; Fariha Ahmed, Managing Editor, Agriculture Today; and H.E. Mr. Lorenzo Angeloni

### **What are the challenges associated with agriculture trade with India?**

India is a land of opportunity but of course some challenges remain. There are sometimes criticalities arising from the different kinds of phytosanitary requirements to be compliant with. Our legislations are not perfectly in tune on some aspects. For example, in Europe the fumigation with methyl bromide was banned because, according to abundant scientific evidence, it is harmful to human health. However, such a fumigation is still compulsory here in India for many imported products and India does not accept alternative and less harmful treatments such as phosphine. Other pieces of legislations are de facto hindering trade. For example India does not recognize truffles as edible fungi thus depriving Indian connoisseurs of one of the finest Italian delicacies. Another challenge is the high duties which are bluntly hitting one of the healthiest staples of the Italian Mediterranean diet: extra virgin olive oil.

### **How do you view India as an investment destination in agriculture?**

India is a very interesting investment destination in agriculture considering the size of the internal market and the immense variety in climatic zones allowing virtually for the cultivation of each and every agricultural product and crop. Food processing offers interesting perspective too. We are already present in India with two Italian corporate giants, Perfetti Van Melle (confectionary) and Ferrero (manufacturer of branded chocolate) and we are looking forward to expanding our presence. That is why an Italian technical delegation is going to visit the privately owned mega food park in Tumkur, near Bangalore in order to explore the incentives and potentialities of Indian food parks.

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# ALLEY CROPPING CREATES A DYNAMIC AND VERSATILE AGRISILVICULTURAL SYSTEM

**A**lley cropping is an agroforestry exercise relating to the production of agricultural or horticultural yields in alley between line of trees or shrubs. It is an agroforestry practice where agricultural crops are grown in the alleyways between widely spaced rows of woody vegetations. Alley Cropping can diversify farm profits, enhance crop production, develop landscape aesthetics, improve wildlife habitat and give protection and conservation profits to crops. By mixing annual and perennial crops that yield several products and profits at diverse times, a landowner can utilize vacant space, time and resources more successfully. Alley Cropping

can be utilized for other reasons like short-rotation woody plants of fast growing woody species that are combined with forage or row crops to produce fuel wood and fodder. Plantings to enhance wildlife and pollinator habitat also can be planned with suitable species. Alley cropping is a significant system to enhance whole-farm yield in the long term. Alley cropping is used to conversion from one farming system to another. Such conversions are made easy by the improved shade and changes in microclimate that occur as trees and shrubs grow. The annual crops grown in alleys can supply short-term annual income until the trees are mature. The trees control as hedge rows are grown in wide rows and the





crop is planted in the interspace or alley between the tree rows. In the cropping phase the trees are pruned and the pruning used as green manure or mulch on the crop to enhance the organic matter status of the soil and to supply nutrients mainly nitrogen to the crop. There are unlimited planting combinations for alley cropping systems. The main purpose of alley cropping is to maintain to increase crop yields by development of the soil and microclimate and weed control. Farmers may also obtain tree products from the hedgerows including fuel wood, building poles, food, medicine and fodder and on

sloping land, the hedgerows and pruning may help to control erosion. Alley cropping generally works best in places where people feel a need to intensify crop production but face soil fertility problems. This situation is often characteristic of crowded, densely populated regions but may also occur wherever some farmers wish or are forced to enhance production on a plot of limited size.

### Design of alley cropping

Woody plants are introduced as hedgerows in farm fields to maximise the positive and minimise the negative effects of trees on crop management and yields. Without doubt, trees compete with farm crops for soil nutrients, soil moisture and light. However, the right class of trees at the correct spacing with appropriate management may really create a net increase in yields from crop lands. Trees may also give new products like fuel wood, fodder or food in accumulation to the annual crops. The situation and spacing of hedgerow and crop plants in an alley cropping system depend on plant species, climate, slope, soil situation and the space essential for the movement of peoples and tillage equipment. Preferably hedgerows should be positioned in an east-west direction so that plants on both sides collect full sunlight in the day. The spacing used in fields is generally 4 to 8 metres between rows and 25 cm to 2 metres between trees within rows. The closer spacing is generally used in humid areas and the wider spacing in sub-humid or semi-arid regions. The position and spacing of hedgerows may also be affected by slope and the placement and design of soil and water conservation structures when these are combined with alley cropping. On sloping land, hedgerows should always be placed on the contour. If this means that they do not have the desirable east-west orientation then they may need

regular thinning to prevent excessive shading adjoining crops.

**Alley Crop Options:** There are a number of reasons to consider when selecting alley crops, including light requirements throughout the year, nutrient needs of companion crops and the opportunity of rising undesirable wildlife populations. Diverse crops will be more or less affected by these reasons. Alley cropping systems utilize five basic groups of companion crops between rows with many types of crops in each group.

**Row/cereal crops** - corn, soybeans, wheat, barley, oats, potatoes, peas, beans etc.

**Forage crops** - orchard grass, desmodium, blue grass, rye grass etc. The production of some types of forage such as orchard grass may be enhanced by the shade of tree rows.

**Specialty crops** - landscape or decorative woody floral plants like blue spruce, dogwood, Christmas trees, small fruit and nut trees or shrubs or medicinal crops like goldenseal or ginseng. The production of some specialty crops may be enhanced in the shade of the tree rows.

**Short rotation shrub or coppice biomass crops** - trees including poplars, willows, silver maple, birches, herbaceous crops like switch grass etc.

Vegetable crops- squash, cabbage, beans, asparagus, pepper, melon, tomato etc.

### Benefits of Alley Cropping

- Improved crop performance due to the addition of nutrients and organic matter to the soil and plant system.
- A decrease of the use of chemical fertilisers.



- A development in the physical nature of the soil environment.
- The addition of mulch can lower soil temperatures, reduce evaporation and improve soil fauna activity and soil structure resulting in better infiltration, reduced runoff and improved water use efficiency.
- On sloping land, the tree rows act as a physical barrier to soil and water movement resulting in significant reductions in erosion losses.
- The provision of additional products such as forage, firewood or stakes when a multipurpose tree legume is used as the hedgerow and improvement in weed control.
- During the fallow period shading of the interspaces may reduce weed growth while in the cropping phase the mulch may inhibit germination and establishment of weeds.
- It should form a deep taproot system with few lateral root branches near the surface so as not to compete with crop roots.
- It should have shallow lateral roots that are easily pruned by ploughing along the hedgerow without serious damage to the plants
- The leaf litter or some portion of it should decompose at a rate that makes nutrients available when they are needed in the cropping cycle.
- Ideally trees and shrubs used for alley cropping should fix nitrogen and should also produce wood, food, fodder, medicine or other products used by farmers or other local community.
- The species selected should grow well under the specific limitations of the site such as saline or acid soils, drought flooding, heavy winds, insect pests or other hazards.
- size of available equipment used for the alley cropping will in part dictate the width of the alleys. Take into account growth in both height and width of trees and shrubs on either side of the alleys. Optimal tree row orientation depends on the specific alley crop and alley width. Tree rows planted on contours or aligned in a key line system can help reduce soil erosion. Managing the light for crops is important. As trees and shrubs grow they will create more shade on the companion crops. To address this change trees can be thinned or crops can be planted that are more shade-tolerant or have a complementary growing season with the trees. Try to choose plants that have root structures that are less likely to compete for valuable resources. Understand the producer's goals for the system. Most producers have other goals beyond optimizing or maximizing income. Wildlife and water quality are also common interests of producers.

### Species for alley cropping

- It should have a sparse, small crown to permit sunlight penetration or should resprout rapidly after pruning, cropping, pollarding or lopping.
- The tree and crop species should be suited to the soils, climate and the site. Species and spacing should ensure accessibility for timely management activities such as spraying, pruning or harvesting. The

The producer should consider the value of the tree and crop products as well as their primary markets. Alley cropping takes advantage of the beneficial interactions between crops. As a result, the yields from



growing two crops together can be greater than growing the same crops in monocultures or pure stands.

Alley cropping designs are highly diverse and can range from simple to complex. The growth characteristics of trees and companion crops as well as the goals of the producer will help determine whether trees should be planted in single or multiple rows and whether single or mixed species should be used. Some trees have a stronger response to light than others. Producers also need to understand growth characteristics of juvenile trees. Growth rates of different species may conflict especially when species are mixed in the same tree row. If not properly designed, one or more species may dominate the site and have a negative effect in mixed species plantings.

While the alley cropping system is getting established there are a

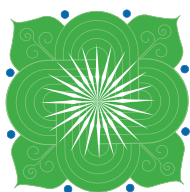
number of management needs are to be considered

- Fencing or other mechanisms to protect tree seedlings from grazing and browsing
- Weed control during initial years until trees reach adequate size to survive on their own
- Fertilizer application when soil tests indicate the need
- Regular inspection of crops for insects and diseases along with the use of Integrated Pest Management (IPM) practices
- Inspection of trees and shrubs for damage along with corrective pruning if needed
- Root pruning to reduce root competition between trees and crops.

As the alley cropping system grows, tree and shrub forms will change potentially affecting alley

width and shade. Changes occur below ground as well with the potential for root competition developing between the rows and the alleys. Root pruning which involves subsoil ripping at the outer edge of the tree canopy during tree development may reduce root competition. Producers may shift crops grown in the alley to those more suited to new alley width and shade levels. While understanding markets for unfamiliar crops can be challenging, the ability to shift crops may also provide an opportunity to take advantage of new markets.

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# SECONDARY AGRICULTURE

## ENHANCING FARM INCOMES



India is urbanising, and by 2050 the habitation ratio between rural and urban is expected to be 50:50. Based on projections of 150 crore population by then, the absolute size of rural India will be an elephantine 75 crore of people. Welfare of such a large number necessitates creation of sufficient employment and income opportunities. Over the last few decades, the structure of rural economy has changed, and it would not be correct now to assume direct equivalence of agriculture with rural economy. Manufacturing and service sectors are also sizeable components of our rural economy now.

Notwithstanding the evolution of a substantive part of India's subsistence agriculture into commercial agriculture, many farm-families continue to be challenged in meeting their income and nutrition requirements. Of the cumulative rural inhabitants, only 26 per cent remain

as "pure farm households" and the rest complement their farm incomes with non-farm incomes by engaging in other activities like labour, small business etc. During the period of 1970-71 to 2011-12, when rural incomes increased by 7 times, the share of agriculture in income however reduced to 39 per cent. Considering there were 110 million farm households in 2011, the per capita income of the population dependent vis-à-vis agriculture is less than desired. Obviously more opportunities need to be created to enable farmers to earn higher incomes.

The traditional understanding of farm productivity, as measured by output per unit of area, is now archaic. What appears more rational is to estimate income returns per man-day. From the perspective of farmers' welfare, that is largely predicated upon incomes, the income that an asset or activity can return is more important than the yield



per se. In adopting this approach, it is clear that the traditional agricultural primary activities alone may not be enough to generate desired level of income for the farmers, suggesting utilising the available resources at the secondary stage.

Two of the valuable assets that farm families own in India are land and human resource. Both must be utilised intensively to generate jobs and incomes. Both experience lag in Indian conditions, reflected in a low cropping intensity of 145 per cent, and a gainful employment on farm for about 180 days per annum. It is in this context, that secondary agriculture activities are proposed to enhance efficiency of these two basic assets and generate additional jobs and incomes for the farm households. Land for example, considered as inelastic, can be imparted vertical elasticity by adding value through use of by-products from the farm land, during the post-harvest seasons. Farm families can undertake such value adding activities if equipped with necessary skills, appropriate technology and required capital. When optimally blended, secondary agriculture can put these idle resources, i.e. the land and manpower, into more productive uses.

### Defining secondary agriculture

Economists consider agriculture sector as a primary economic sector. Since farmers' income comprises both farm and non-farm incomes, sources of income growth include primary agriculture; farm linked on-farm and off-farm activities; as also non-farm activities. The farm linked on- and off-farm activities will come under the purview of secondary agriculture. Thus agriculture, a primary economic sector can be held to consist of primary agriculture and secondary agriculture, both of which need to grow by harvesting supplementary & complementary relationships.

During the period of 1970-71 to 2011-12, when rural incomes increased by 7 times, the share of agriculture in income however reduced to 39 per cent. Considering there were 110 million farm households in 2011, the per capita income of the population dependent vis-à-vis agriculture is less than desired.

Secondary agriculture can be defined as a productive activity at enterprise level that,

- utilizes as raw material the primary product and by-products of agriculture, and other biological resources available locally in its rural agrarian neighbourhood; and
- deploys locally available skills or a high level of rural manpower, to operate/ manage/maintain the production of goods and services.

In examining the concept and relevance of the secondary agriculture, the Doubling of Farmers' Income (DFI) Committee describes it, first as an activity that can be considered as a cottage or village level industry contributing to economic well-being, and secondly as an activity that is integrated into the neighbourhood of farm households for factors of production such as manpower.

To illustrate, any farm-linked activity that uses the land or labour beyond the cultivation seasons would amount to secondary agriculture. These include those using crop residues, like paddy straw for fodder

blocks, or bio-methanation; pre-conditioning of farm produce for markets (cleaning, sorting, packing, etc); and bee keeping, mushroom cultivation, etc. These do not compete for time with the primary activity of agriculture production. Likewise, various income generating activities of animal husbandry that do not compete with primary agriculture for their resources (land & labour) also qualify to be defined as secondary agriculture. These include dairy, backyard poultry, sheep rearing etc. that utilise the lag time of family labour. However, distinction has to be made between dairy (or other similar activity) taken up as the primary commercial agriculture activity, and that practised as a secondary activity. In most of the cases, the scale of the activity, given the resources it commands for production purposes, will determine whether it is secondary or primary in its nature as an agriculture activity.

Given that 86 per cent of the country's farm households are small and marginal, their welfare cannot be straight-jacketed only by incomes from primary agriculture. Rolling out secondary agriculture would yield additional incomes and enlarge the size of farm incomes. Currently, farm and non-farm incomes that constitute farmer's income are in ratio of 60:40. Promoting secondary agriculture would result in using both land and manpower assets more productively, thereby generating higher ratio of farm incomes. Simultaneously, the viability of small farms will also improve, making them a more profitable enterprise. It is time, the governments recognise the importance of adopting secondary agriculture as integral to core agriculture and farmers' welfare.

**Ashok Dalwai, Chief Executive Officer, National Rainfed Area Authority and Chairman, Doubling Farmers' Income (DFI) Committee**  
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# A SENSOR BASED GENIUS AUTOMATED APIARY BOXES



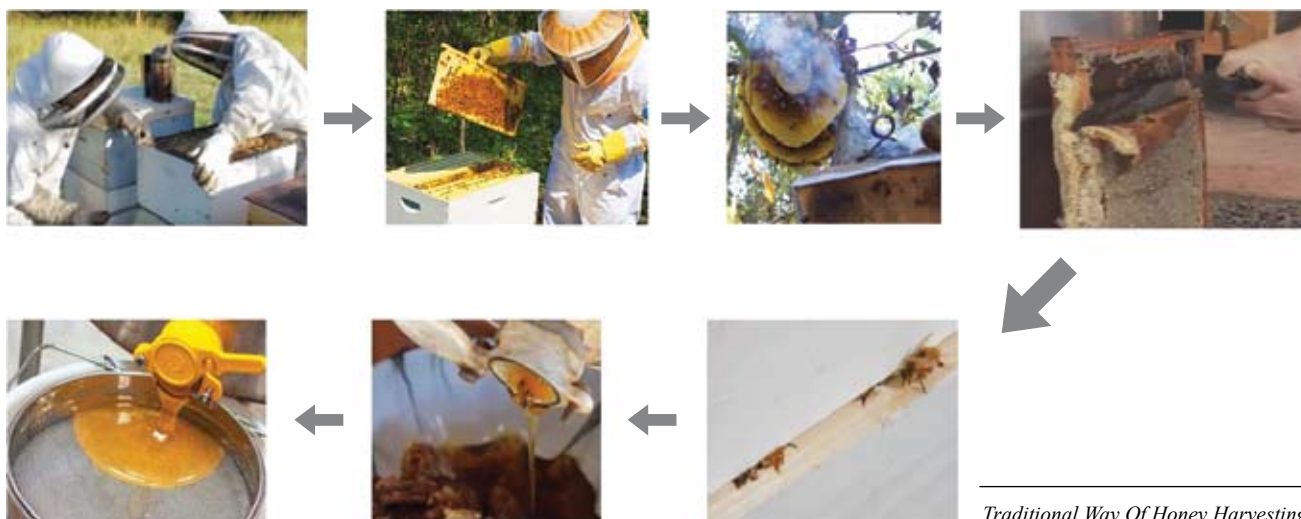
**H**arvesting honey was never that easy from apiary boxes. In traditional ways of apiculture it was a messy job for workers. The new innovations have brought the re-engineered process of getting honey

in an easy way by just turning the taps on and off.

These days, beehives are not just hanging from the tree, but hacked to the ground and honeycombs can be manipulated and regulated as per the need to collect the honey. This seamless geometrical and structural

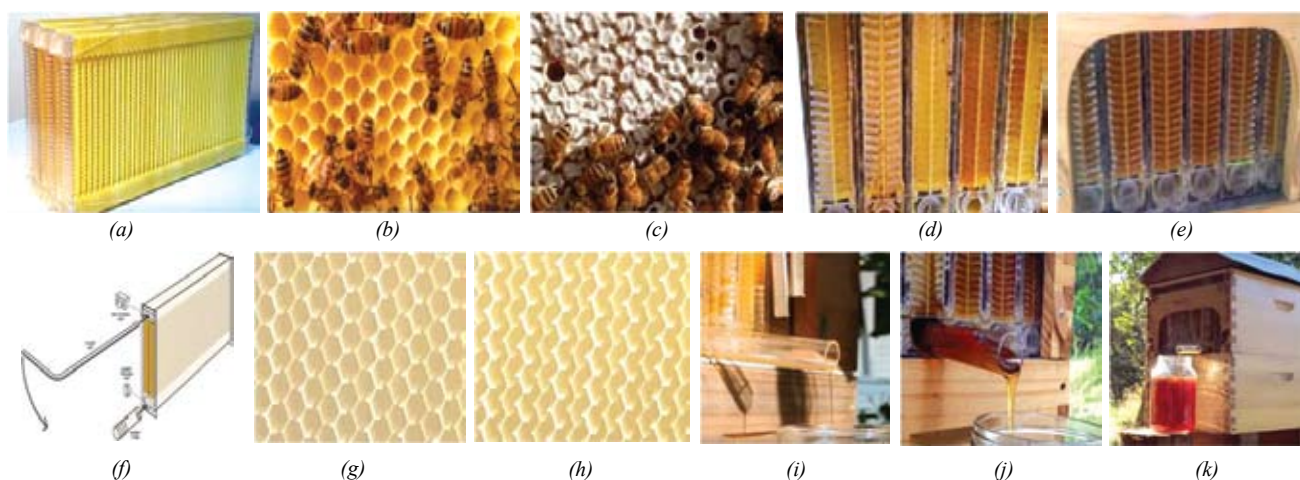
formation is a new achievement that made the extraction of honey a cup-of-tea for apiarists. This makes it mechanically efficient and user friendly.

Conventional way of harvesting honey involves splitting of the hive boxes manually, making smoke



*Traditional Way Of Honey Harvesting*





*Automated Process of Honey Extraction & Collection*

under the trees to drive away the bees from the hive, removing the frames, cutting of the wax caps from the honeycomb, then extracting and cleaning the honey by filtering it. This was a long and laborious process which was often messy and complicated that required skilled person to extract the honey safely out of the comb. The technological innovation helped the apiarists to easily extract the honey bee products within few minutes.

### **AUTOMATED APIARY STRUCTURE**

The new design of shape changing honey comb has created a revolution in Apiary industry. This artificial honey comb is shaped like real honey comb when the bees are producing the honey. And at time of harvesting honey, it could be transformed into vertical channels for easy flow of honey through a tube out to a container. It consists of many components like single

panel roof shingles, wing screw, double side observation windows, flow frames, inbuilt spirit level, deep handle, ventilated tray cover, integrated adjustable hive stand, brass hardware.

### **WORKING**

The artificial honey comb frames have a partially formed matrix that stores honey within a transparent frame to know the filled-up tubes. Honey bees are an important part to complete the comb and they fill the cells with honey and cap them. The honey harvester or beekeeper extracts the honey by inserting a tool, called as Key. This tool is inserted into the top of each frame one by one and turned clockwise. This opens up the locks in the frame filled with honey. This clockwise twist splits each cell within the honeycomb into vertical channels. This allows the honey to flow freely out from a tube into a collecting vessel.

### **Remote Monitoring Interface of Beehive**

The application of sensors in the hive allows the beekeeper to remotely monitor various bee related activities that proposes many benefits and features. These sensors sense the change in physical parameters like ambience of light, rise & fall of temperature and many more



*Labeled Diagram of Automated Apiary Box*



User Interface of Beehive on Internet-enabled Device[13]

happenings of the hive. This sensed data is then stored in cloud database and can be monitored using a beehive user interface with various clickable icons. The sensor based remote beehive monitoring system proposes numerous benefits and features.

**Remote Monitoring:** Remotely monitor the hive by login from any internet-enabled device whether it is a computer or a smartphone.

This would give an idea on the user interface about busyness of each hive by plotting the activities in graphical representations. Each of icons on user interface will showcase current monitored data as well the history of a particular parameter like weather etc. This also shows the maximum or minimum temperature at any duration of a day, week, month, year or overall data based on the readings from the sensors.









**Data Analysis:** It also proposes the data analysis report which can be obtained by clicking on any specific parameter icon. These are plotted to graphs for knowing all troughs and crests to see how things like humidity, temperature etc. fickle with change in time. This keeps tracks of Queen Status like mating, laying eggs or brood less state.

**Theft Resistant:** These hives are theft resistant and send the text messages and alerts to the owner whenever they are moved. This parameter works based on sensitivity sensors that monitors the change in physical state of the hive. Sometimes due to heavy wind, the hives may fall down which may cause bees to die until someone reaches and addresses it. This sensitivity sensor can help in recognizing it remotely resulting in reducing the unpredictable losses.

**Foraging Information:** Automated apiary boxes can also give daily account of foraging of bees which by looking to graphs can be correlated to weather conditions. This can be seen from a particular day, comparing foraging data between different hives. This allows the beekeeper to know which hives have frequent foraging on some particular days than other days.





<p><b>LIGHT SENSOR</b></p>  <p>Light sensors help in observing the intensity and the spectrum of ambient light within the bee-hive.</p>	<p><b>TEMPERATURE</b></p>  <p>Temperature sensor supports apiarist to monitor temperature within bee-hive</p>	<p><b>AIR QUALITY SENSOR</b></p>  <p>Air quality sensor is detecting the quality of air, oxygen and carbon dioxide present in hive.</p>	<p><b>SOUND SENSOR</b></p>  <p>Sound sensors help in recording to beehive sound</p>
<p><b>WEIGHT SENSOR</b></p>  <p>Weight sensor help in measuring of total weight of honey in beehive.</p>	<p><b>WEATHER SENSOR</b></p>  <p>These sensors help in weather forecasting so that apiarist can take prior decisions over beehives.</p>	<p><b>HUMIDITY SENSOR</b></p>  <p>Humidity sensors help in observing humidity in beehive.</p>	<p><b>MOTION SENSOR</b></p>  <p>This sensor helps in protection for our beehive.</p>

**Temperature Monitoring:** In beehives there can be temperature monitoring of two types: Brood Temperature monitoring and Temperature within the hive. Brood temperature is of extreme importance and requires high precision between 32°C and 36°C as it helps in developing the broods. While the temperature within the hive must also be set to maintained that helps in sustaining bees in hive. Beekeeper is warned for a high temperature within beehive so any appropriate action can be taken which may involve relocation of hive to shady area to reduce heat stress.

**Humidity Sensor:** At winter, the hives may get too wet so readings of humidity sensors noted on the graph tells the beekeeper to ventilate the hive for better humidity control. The activity of the bee hive is shown by fanning of bees above the beehives which monitors the moods of bees like if they are processing the nectar there would be more activity during the evening time. The humidity sensor data is shown by a water drop icon. Brooding temperature and beehive

temperature are shown separately by a yellow color hexagon and red color thermometer icons respectively. Similarly, various other like the weather details (history & forecast), battery life of hive (in green cell like icon), Wi-Fi connectivity (with range icon), weight of hive (in black color weight icon), statistics (green vertical lines) and other details are shown in these diagrams.

**Cloud Storage:** All the data collected 24 x 7 by the sensors working in sync to each other needs to be maintained on a persistent storage accessible remotely. This need is harnessed by the adopting the cloud related storage conventions that allows non-susceptible to power failures and can be accessed remotely to generate data analysis report.

### Sensors in Automated Bee Hive

The data collection is done at hardware level in beehives, for which various types of sensors work in coordination with each other. This collected data is send to cloud for

storage and later on can be analysed on user devices like computer or smartphone. This data analysis helps the beekeeper to monitor the beehive activities at varying parameters like temperature, availability of light, etc. The use of sensor in the beehives has transformed a long used term “bee-keeping” into “bee-sensing”.

Bees play a crucial role in human life by process called pollination. It is been observed by various scientists that bees are dying because of CCD (Colony Collapse Disorder) for which reasons are still unobvious,. This technological invention is a promising solution to save honey bees and their colonies. The sensor based honey sensing has saved honey bees taking it one step ahead in terms of knowing and helping them grow in more favourable conditions.

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# BETTER FOOD WITH BETTER MANAGEMENT

## COLD CHAIN AND ITS BENEFITS FOR FARMERS

India is predominantly an agricultural country. However, the emergence and rise of other sectors has led to it no longer having an agriculture driven economy. The food processing industry, for instance, makes up about 32% of the total food industry of India. India's digression from being an agrarian society, have given rise to a number of problems which need to be pointed out and resolved. A large portion of the produce is exported, which makes it surprising that the one area in which India seems to be behind is Cold Chain. Cold Chain is

the process of introducing temperature controlled storage and transportation facilities to prevent rotting of easily perishable food produce.

The bottlenecks encountered when looking to improve the processes are large scale wastage of food, inadequate transportation facilities and lack of technical knowledge. With over 50% of the population engaged in farming opportunities, it becomes imperative to provide services and processes which are capable of aiding this sector. The obvious solution to the problems being faced seems to be Cold Chain Management.

So what are some of the challenges being faced by farmers when it comes to the implementation of Cold Chain? The lack of infrastructure allotted to the cold chain sector seems to be the biggest issue. Without the appropriate technical knowledge, farmers are unable to store produce in a manner which keeps it fresh long enough to be exported. Another glaring issue is that the farmers depend heavily on middlemen. This inefficiency of the supply chain, makes it near impossible for farmers to access those facilities which can help reduce wastage. At

the moment, the Cold Chain Market in India is a niche area which assures hygiene, longevity of produce and a boost to the food industry, which will carry it through to the upcoming boom on the global front.

It is important here to note that almost 40% of produce goes to waste due to improper storage and transportation facilities. UK at present stores 70% of its agricultural produce in Cold Chains, while India is at only 4%. Implementation of a cold chain management system can reduce food product wastage by almost 75%, thus increasing the capacity to export produce and increasing the overall GDP of India. The advantages of this are manifold – an extended lifecycle for perishable products, reduced wastages of food products and a larger market reach which then leads to a greater customer base.

While the current capacity is nowhere close to being enough to support cold chain management, resolving the issues requires cold storage facilities to be implemented in the supply chain. By cold storage, ISB identifies the following features: Pre-cooling facilities, Refrigerated Carriers, Cold Storages, Warehouse Information Management systems, Financial and Insurance Institutions and Traceability. The fixing of the supply chain also needs to be done in a manner which keeps in mind the requirements of the farmers and should take care to not hamper their livelihoods. On the one hand, investment by Walmart and other such multinational corporations would lead to development of cold chain management systems, as they would need to transport perishable materials countrywide. However, care should be taken that this does not hamper the jobs presently being created for storeowners or single farmers. On the other hand, companies working directly with farmers to implement better supply chain man-



agement systems, have reported a 25% increase in prices.

Thus, it is clear that there is not one single approach which will improve the condition of the Indian agricultural market. Rather, a combined approach of taking care of the supply chain, as well as investments by MNCs, will on the whole result in a better process which will benefit farmers. The need to implement cold chain to prevent the wastage of perishable goods needs to be realised on a large scale.

Another critical problem being faced by the food industry is climate change. Recent studies have revealed extreme fluctuations in the weather with increased maximum temperatures and lesser rainfall. In order to prevent these extreme climates from having a long lasting effect on the produce, certain processes can be introduced. For instance, proper transportation systems to reduce post-harvest loss. Small landholders are unable to use large scale preservation and processing technologies, thus resulting in a lot of wastage. Middlemen, upon whom farmers

are dependent, are also sometimes forced to sell produce at a price lower than the production cost. There needs to be an implementation of better transport systems, which can store produce at required temperatures, and which is available at a local level.

All in all, we can identify an unorganized supply chain as the major problem faced by farmers in India. An appropriate remedy to this situation, as we can see, is maintaining a proper cold chain system. Proper storage facilities, along with appropriate temperature controlled transportation will help to reduce the problems of wastage which occurs most at the post-harvest stage. Efforts also need to be made to educate farmers regarding the proper steps which need to be taken to manage food better and reduce wastage. If all of these processes are taken care of, Cold Chain could soon become a linchpin in the wheel of the agricultural economy in India!

**Mr. Karthikeyan N (Regional Business Manager -North, Snowman Logistics)**



# COMPOUND FEED PRODUCTION FOR LIVESTOCK



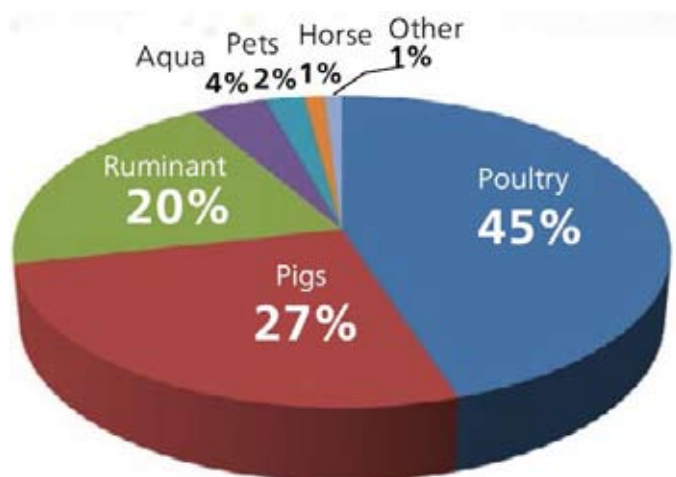
India is endowed with the largest livestock population in the world accounting about 57.3% of the world's buffalo population and 14.7% of the cattle population, and livestock sector alone has overall contribution of about 4.11% to the total GDP at current prices. Dairying is an important source of subsidiary income to small/marginal farmers and agricultural labourers and total number of workers in farming of animals is 20.5 million (according

to NSSO 66th round survey) and farmers of marginal, small and semi-medium operational holdings (< 4 ha) own about 87.7% of the milch animals.

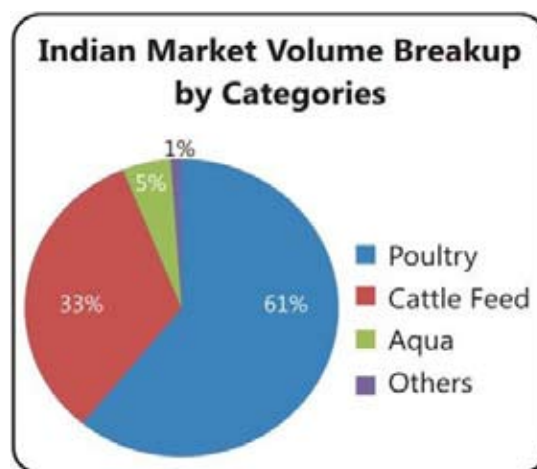
Cattle feeding practices are very traditional and most of the feed comes from grazing. In traditional feeding practices, in addition to shortage of feed, imbalanced nutrition is one of the major factors responsible for low livestock productivity. But, as time elapsed, due to shortage of feed, there has been gradual shift from

the age-old pattern to Compounded Feed (CF) which can supply balanced nutrition (supply of nutrients based on the physiological conditions of the animal and keeping in view the objective of raising an animal). This ultimately contributes to improve animal output as well as to reduce the cost of production per unit of animal product produced. In this respect, the technology for making Densified Total Mixed Ration Blocks (DTMRBs) or Densified Total Mixed Ration Pellets (DTMRPs) based on straw/





Global livestock feed production distribution



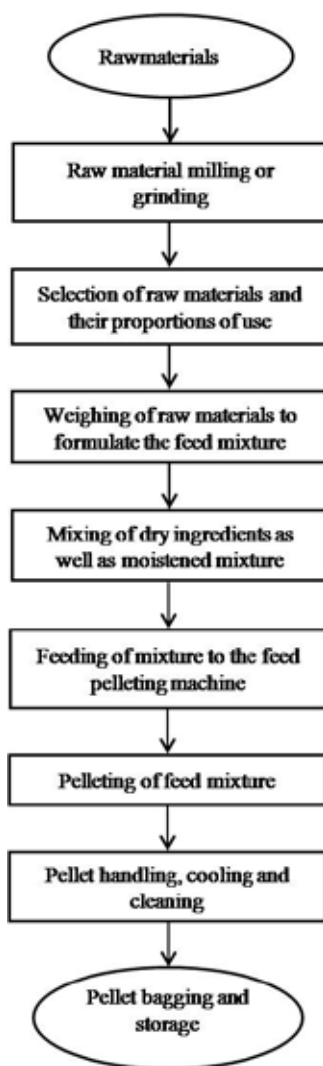
Indian livestock feed production distribution

stover, milling by-products (Agro-processing waste) and oilseed meals is an innovative approach, which provides an opportunity for feed manufacturers and entrepreneurs to remove regional disparities in feed availability and to supply the balanced feed to dairy and other livestock farmers on a large scale. As far as FAO is concerned, feeding of total mixed rations have several advantages such as decrease in feed loss, higher nutrient availability and higher animal performance over feeding ingredients separately which is conventionally practised in many countries. Cattlefeeds are used as supplement rather than alternative to the cattle diets and that might be the reason for this lower production; however feed per herd given to cattle is much more than the poultry.

The CF products, particularly the branded ones are fast gaining popularity in India (both in rural and urban area). As far as the experts are concerned, pellet form is the most preferred form of CF with specified advantages like balanced diet, convenience to use and better yield.

### Compound Feed Production Process

The compound feed production technology for livestock feeding has



Schematic flow chart of industrial compound feed pellet production

industrial application in all regions and industries. Hindustan Animal Feeds, Amul Cattle Feed Industries, SKM Animal Feed and Food India Ltd., Indian Poultry Feeds, Amrit Feeds Ltd., Animal Health India, Godrej Agrovet Ltd., Mayur Processors, Prime Avian Feed India Pvt. Ltd., Henraajh Feeds India Pvt. Ltd., etc. are the some leading compound feed producer for livestock in India.

The ingredients for compound feed formulation depends especially on farmer's objective, animal species and their physiological state for which these supplements will be given. The suitable ingredients will be selected for the compound feed production and relative proportions of feed mixture for compound feed production can be selected either by manual calculation or by using feed formulation software which can formulate at least-cost basis. The formulated compound feed must provide 20-22% of crude protein, 2.5-4% crude fat, 10-12% crude fibre and 68 to 74% of total digestible nutrients, all by per cent mass. One kilogram of any of these mixtures would be required per 2.5 kg of milk in cows or 2 kg of milk in buffaloes.

Mixing is the next step after the individual ingredients are selected for feed production. The mixing of



*Manually operated feed block making machine*



*Power operated feed block making machine*



*Electrically powered hydraulic plunger/ piston press type feed block making machine*



*IC engine operated, tractor trolley mounted hydraulic plunger/piston press type feed block making machine*

different ingredients usually takes place through mechanical mixer. Compound feeds are either blocks or pellets and mash form. Feed blocks are also named as multinutrient blocks and feed block technology in India was first introduced by National Dairy Development Board, Anand, Gujarat. For feed block production, the mixture of ingredients, most preferably a tree leaves and cereal crop straws (chopped to small pieces) along with crushed grains, oil cakes, binders (like molasses) and other feed ingredients viz., minerals, vitamins are selected to the predetermined proportions and are mixed thoroughly and fed to the feed block former. But in case of feed pellet production, only grains (crushed), oil cakes and other feed ingredients viz., minerals, vitamins are selected to the predetermined proportions and are mixed thoroughly and fed to the feed pelleting machine.

Compound feed making machines produce feeds either in densified blocks or pellets form and is termed

as feed block former and feed pelletizer. Expected benefits from the adoption of feed block technology may be summarised as follows:

- Simple and efficient technique for long term conservation of high-moisture agro-industrial by-products (e.g. olive cake, tomato pulp, citrus pulp, date pulp, etc.).
- Ease of transport and of feeding stall-fed and free grazing animals.
- Reduced use of conventional concentrate feeds, thereby feeding cost would be alleviated.
- Allows a synchronous and fractionated supply of essential nutrients for ruminants fed on low quality roughages.
- May be used as carrier of several chemicals and anthelmintic medicines
- Environment pollution may be reduced.

Power operated feed block making machine can compress all kinds of feed material to rectangular/square shape and of desired thickness and weight. The bulk density of the roughage based feed blocks produced by this kinds of machine may have 4 to 5 times more than the original feed and would increase even more if fixed with binders and concentrates.

The term pellet is described in ASAE standard as agglomeration of ground ingredients (individual or mixed) commonly used in animal feeds, formed by extruding

ingredients by compacting and forcing through die openings by any mechanical process called extrusion. Pellets generally have diameters not over 19 mm and lengths less than 25 mm. Some of the advantages of using pelleted feed are:

- Pelletizing prevents the segregation of ingredients in a mixing, handling or feeding process, thereby preventing waste.
- By feeding a pelleted feed, each animal receives a well-balanced diet by preventing the animal from picking and choosing between ingredients. Therefore feeding pelleted feed improves animal performance and feed conversion compared with feeding a meal form of a diet.
- Furthermore, feed pellets are much more precise and easier to control over the desired feed ration for individual animals or groups of animals with greater nutritional needs, such as immature stocks or lactating females
- Bulk density increases, which enhances storage capabilities of most bulk materials.

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# GAMMA IRRADIATION USED TO PRESERVE FOOD FOR LONGER TIME

**F**ood preservation prevents the growth of microorganisms as well as slowing the oxidation of fats that cause rancidity and increases shelf life of food. Food preservation may also include processes that inhibit visual deterioration, such as the enzymatic browning reaction in apples after they are cut during food preparation. A range of traditional methods are in practice for extending the shelf life of foods— salt curing, cooling, boiling, smoking, pickling, freezing, heating, commercial sterilization, sugaring, pickling, fermentation and canning.

Within the past decade, food safety has been an increasing concern for consumers, retailers and all production and processing areas of the food industry. Food safety is also of crucial importance to a nation's economy and health system. Now different modern methods are available for the preservation of food for longer time with increased shelf life. Pasteurization, Vacuum packing, artificial food additives, irradiation, pulsed electric field electroporation, modified atmosphere, non-thermal plasma, high-pressure food preservation, biopreservation, hurdle technology etc., are just to name a few. The benefits of an extended shelf life for manufacturers are wide-ranging: the product can remain on sale on the shelf for longer, wastage and product returns from the retailer are reduced, more extensive product distribution is possible and highly seasonal products can be stockpiled, to name just a few.

In modern society, irradiation is routinely used to sterilize medical equipment, including most of the

disposable items used in hospitals every day. Nor is irradiation of food itself a new development. Multiple types of ionizing radiation can be used, including beta particles and gamma rays. Irradiation can kill bacteria, molds, and insect pests, reduce the ripening and spoiling of fruits, and at higher doses induce sterility. The technology may be compared to pasteurization; it is sometimes called "cold pasteurization", as the product is not heated. Irradiation may allow lower-quality or contaminated foods to be rendered marketable.

Consumers may have a negative view of irradiated food based on the misconception that such food is radioactive; in fact, irradiated food does not and cannot become radioactive. Activists have also opposed food irradiation for other reasons, for example, arguing that irradiation can be used to sterilize contaminated food without resolving the underlying cause of the contamination. Approximately 500,000 tonnes of food items are irradiated per year worldwide in over 40 countries.

## EXTENSION OF SHELF LIFE

The shelf life of many fruits and vegetables, meat, poultry, fish and seafood can be considerably prolonged by treatment with combinations of low dose irradiation and refrigeration that do not alter flavor or texture. Maintaining or creating nutritional value,

and flavor is an important aspect of food preservation. Many spoilage microorganisms, such as pseudomonas are relatively sensitive to irradiation. Extension of the very short shelf life of many commercially important plant commodities is highly desirable and in some cases, critical. Exposure to a low dose of radiation can slow down the ripening of some fruits. Control fungal rot in some other and maturation in certain vegetables, thereby extending their shelf-life. Not all fruits and vegetables are suitable for irradiation because undesirable changes in color or texture or both limit their acceptability. The time of harvest and the physiological states also affects response of fruits and vegetables to irradiation. For example - If strawberries are irradiated before they are ripe; the red color does not develop satisfactorily. For delaying to irradiate them before ripening starts.

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■ Countries which apply food irradiation for commercial purposes  
□ Do not yet apply food irradiation





## GENERAL GUIDELINES FOR TAKING UP POLYHOUSE CULTIVATION AS A BUSINESS VENTURE

**O**f late cultivation of vegetables, flowers and seedlings under polyhouses especially naturally ventilated polyhouses is gaining popularity amongst the progressive farmers of India in enhancing the economic returns per unit area. Though, the structures are designed to withstand a wind velocity of 150 kmph, often it has been observed even in plain areas of India that the polyhouse structures are overtopped. The damage to these structures is more se-

vere during the months of June and July when the monsoonal rains occurs with high wind velocities. High initial investment of structure damaged with high speed winds is a cause of worry for the farmers who have adopted this technology and at the same time those who want to adopt it. The reasons for failure are many, it may be natural or man made.

In order to avoid such failures the following guidelines need to be followed by the farmers for establishment of proper structure and crop

cultivation under polyhouses.

- East and South for the sun is excellent for the green house, which can remain open on both these sides, but it should be shaded on the north and the west to protect from winds.
- The Polyhouse gutters should be preferably installed in North – South direction.
- All the vents should preferably face to East direction and the last vent of eastern direction to face to west direction.
- The site should be free from

shadow.

- Long trees/wind breaks are preferred in West direction atleast 20 m away from the west corner of the structures.
- The site should be at a higher level than the surrounding land with adequate drainage facility.
- Availability of good quality irrigation water and electricity.
- pH of irrigation water should be in the range of 5.5 to 7.0 and EC between 0.1 to 0.3mS/cm.
- pH of soil should be in the range of 5.5 to 6.5 and EC between 0.5 to 0.7 mS/cm.
- Structure should withstand to minimum wind velocity of 150 km/h
- Provision be made for opening one portion at either side for entry of small tractor/ power tiller.
- Structure should be aerodynamic in shape i.e., semi circular shape.
- Proper closure of side curtains in the evening hours (5.00 pm) and their opening at around 10.00 am every day.
- Operation of foggers should be short period i.e., 15-30 sec and should not be operated after 2.00 pm.
- Use of micro sprinkler for controlling excess heat during summer from outer side of film of structure.
- Trellising systems design should design at minimum load bearing capacity about 25 kg/m<sup>2</sup>

Inorder to minimize the structural as well as crop related problems associated in naturally ventilated polyhouse cultivation the following general guidelines needs to be followed by the farmers. Naturally Ventilated polyhouse with minimum ventilation area should be 30% of total polyhouse floor area. During high velocity winds it is recommended side curtains must be closed. Length of polyhouse in (East-West) direc-

tion should be as per requirement, however in North South direction the length should not exceed 45.0 m. Aerodynamic shape all along the four sides with curvature shape (semi circular) and structural material used should be Hot dipped Galvanized tubes (pipes). All the structural components i.e., the tubes (pipes) should be as per IS 1161. Welding of the pipes should be avoided. All the fixtures like brackets, clamps, nuts & bolts etc., should be made of galvanized material. Gutter should be made of Galvanized sheet of 2 mm thickness in trapezoidal shape having 500 mm wide perimeter (in a single length without joint). The polyhouse ridge height should be 6.5 m from foundation level. Pipe foundation should be of telescopic type. Side curtains are to be operated using 20 mm GI pipe having 2 mm thickness and curtain rod length should not exceed 20 m. Curtain wall may be provided around the polyhouse in the form brick masonry of 0.2m thick, 0.70 meter high (0.3 m below GL and 0.4 m above GL). Double door entry must be provided to the poly house. Only one door open at time on entry of or exit from polyhouse. Shadenets used inside the polyhouse should be with 50 per cent Shade factor and for vegetable cultivation the preferred colour of the net should be white/black/red. Side curtains net for vegetable cultivation should be insect proof net (40 / 50 mesh) incase of flower cultivation shadenets are preferred. Trellising system must be installed at a spacing of 1.2 m X 1.2 m. GI wire rope of 4 mm thickness to support the plant and 3 mm cross wire to support the trellis system, by providing trellis purlin of 42 mm OD, 2.6 mm thickness, GI pipe on all four sides separately. Trellising system for vegetables should be designed in such away that it can take minimum load of 25 kg/m<sup>2</sup>. Inorder to manage the humidity inside the polyhouse

foggers are to be installed. Four way anti leak fogger with 28-30 lph flow rate with drop let size of 65-70 microns and foggers spaced at 2.5 m X 2.5 m, connected with 16 mm lateral class-3 which in turn properly connected to PVC pipe (63 mm), ISI 6 kg/cm<sup>2</sup>, valves, filter, end caps and appropriate capacity of pump exclusively for foggers to be connected with 2000 l water tank with all the necessary fittings and accessories installed completely in ready to operate condition, which is separate from irrigation system. In Naturally ventilated polyhouse, the preferred direction of beds for planting is East-West, therefore drip irrigation sub main should be in North-South direction. Proper selection of crops and their varieties is important. Some of the predominant crops and their varieties that are available in commercial/R&D institutions are: Rose Gold-strike, Grand gala, Noblesse, Revival, Bordeaux, avalanche, etc. ; Gerbera North star, Ornella, Paradox, Tropic Blend, Topaz, pink fantasy, etc.; Capsicum (Bell Pepper) Red colour: Bomby, NS-280, Nun-3019, Bharat etc ; Yellow colour: Orebelle, NS-281, Swarna etc. ; Green colour: Indra, California wonder etc. ; Tomato Avinash-3, Badshah, Himsonha, Nun-7730, Naveen, ArkaRakshak, Tanuja etc. ; Cucumber Keon, Citis, Hilton etc

By following the information provided in the article the farmers can address the problems associated in polyhouse cultivation to make such cultivation practices as a successful business venture.

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# LIVING THE SUSTAINABLE FARMING LIFE WITH PARACHUTE KALPAVRIKSHA



**P**romoting sustainability through Corporate Social Responsibility entails a much deeper contribution to the society by bringing about significant change in the economy and environment, thereby benefitting the society at large.

As a value driven organisation, Marico has always consciously worked towards the upliftment and catering to the well-being of various communities whose life we observe & understand to some extent. This led to the conception of our flagship program – Parachute Kalpavriksha, which was designed for the betterment of the coconut farmers.

A Farmer Support Program was established in 2015, in which farmers in Thanjavur district for improving their crop yield and thus increasing farm income. Six agronomists were deployed on Fields for Farmer

Training, enrolment and support. Mass and Micro trainings were the key communication tools deployed for project implementation. We were able to train 4800+ Farmers across 91 Villages. It took us almost a year to study the various farm practices and university recommendations, conduct experiments and introduce practices which led to promising results for increasing farmer productivity by upto 20%, thereby increasing the income by 40%.

Considering need of farmers and having established the effectiveness in Thanjavur, we decided to launch an expanded Program across 4 states (Tamil Nadu, Kerala, Karnataka, Andhra Pradesh) under the brand name of Parachute Kalpavriksha for benefiting the larger population of coconut farmers.

In 2017, on World Coconut Day, we formally launched this initiative

as Parachute Kalpavriksha Program. It facilitates the coconut farmers to increase their yield by providing them training on various important aspects of farm management, like nutrient management, pest management, disease management and water management. Several training sessions and interventions have been conducted through which we have successfully educated the farmers on scientific and modern practices that boost the agrarian tradition with technological innovation.

## Integration of technology and new-age means to Make A Difference

The programme has instituted Farm Care Personnel (Agronomist) that interact with the farmers, help them understand the program and also provide on-field support. They provide training modules which comprises of



scientific farm practices for nutrient and disease management. This is further amplified through the farmer trainings' digital library comprising 35 videos developed in five languages - Tamil, Telugu, Malayalam, Kannada and English.

Agronomists can only reach farmers on the planned route and on the planned day of visit. But many more farmers needed our help and with an aim to provide instant support to them, we have built a Parachute Kalpavriksha Care Centre (IVR toll free number) where farmers can call to seek support from agricultural experts. This is again available in multiple regional languages including Malayalam, Tamil, Telugu and Kannada. So far we have reached over 72,000 farmers through the IVR toll free line.

Physical reach has limitations which can be trounced by digital reach. Adding more layers of digital augmentation, the programme has a dedicated Facebook page specially developed to support the farmers. Platforms like Blogs and YouTube are also chosen to create awareness among the coconut farmers. So far, the estimated impact through digital promotions is 1.6 Lakh followers on Facebook, over a million YouTube views and 22,000 views on the Blog. The program is telecast at a dedicated timeslot on local TV channels for educating farmers.

Visuals and demonstrations are the most impactful means of inducting new practices. Therefore, we are creating a Parachute Kalpavriksha Knowledge Centre, wherein we can invite farmers and demonstrate to them various aspects that can help improve productivity. As a first step, we have planted a masterdemo farm which is designed to demonstrate yield variance with varying inputs. The demo farm consists of 6 varieties (Tall, Dwarf and Hybrid) trees planted across 3 panels treated with different inputs (3 Panels with combination of these varieties – one panel is water fed



with minimum bio-fertilizers required for survival, the second is water fed with bio-fertilizer and regular dosage of other fertilizers and the third panel has additional micro nutrient dosage. In addition to this master demo farm we also have around 20 demo farms under development in various locations in Kerala and Tamil Nadu.

Currently, Marico has enrolled 10,262 farmers (72,609 Acres) in our Parachute Kalpavriksha programme. Farmers enrolled have experienced around 16% increase in productivity after implementing best farm practices.

Yet another effort to shift the needle in agriculture is working together with the Marico Innovation Foundation (MIF), our not-for-profit arm established in 2003. Through its programs, MIF aims to nurture innovation in India across the business and social sectors by working closely with organizations that are innovative and impactful.

With a sharp focus on agriculture, this year MIF launched the #Innovate2Cultivate Program to solve current linear agricultural challenges with the help of innovations and bring the relevant ecosystem together to support these innovations. This is in line with their efforts to spur and then

nurture innovations in the country, one sector at a time.

The endeavour is to encourage innovations in the agricultural sector for a single crop addressing challenges across the spectrum like water harvesting and management, pest and disease management, soil quality and nutrition, agri-input management.

Our concerted efforts on this program use the power of innovations for the benefit of the farmers. The Program leverages MIF's strength in identifying and nurturing start-ups and Parachute Kalpavriksha's strength of knowledge and access to coconut crop and experts.

The response to the program has been overwhelming, and we have found multiple solutions to assess the potential impact on the income and productivity of the farmers.

Marico, through various interventions and key innovation, aims to scale up the Parachute Kalpavriksha initiative to fulfil the objective of doubling the incomes of farmers enrolled. In the years to come, we aspire to touch the lives of a large portion of the 20 lakh coconut farmers in India.

**Udayraj Prabhu, EVP & Head – Business Process Transformation and IT, Marico**

# ESCALATION THROUGH ICT EXTENSION SERVICES WITH INNOVATIVE MEDIA PLATFORMS

**W**orld population is expected to surpass the 9 billion mark by 2050, and agricultural production will need to increase by 70 percent from its 2016 levels to meet this additional food demand. ICT applications can make a significant contribution to meet this future global food needs. Information and Communication Technology can do so by collecting and sharing timely and accurate information on weather, inputs, markets, and prices by feeding information into research and development initiatives by disseminating knowledge to farmers by connecting producers and consumers, and through many other avenues. Millions of smallholder farmers are the foundation of agricultural and food supply chains in most developing countries. So far agricultural practices of smallholder farmers are at times not economically viable and struggle to be sustainable. Small farms produce low yields, adversely affecting farmers' economic conditions. Lack of information about critical inputs and inadequate knowledge about modern and efficient agricultural practices contributes to low farm yields.

Information and communications technology (ICT) extension services involve the dissemination of practical knowledge and exchange of market information through ICT platforms. These solutions relate to agricultural



and rural transformation processes, especially for smallholders. ICT extension service imparts range of information services to the smallholder farmers from pre-harvest stage to post-harvest stage. They help the farmers understand and adopt agricultural best practices on crop selection, input management, land selection and preparation, finance, transportation, packaging processing, and marketing of the agricultural produce. The enterprises provide these services via radio and television shows, mobile applications, Demonstration, Training, digital video disks (DVDs) and interactive voice response (IVR) technology. Enterprises deliver information services which can help improve agricultural yields and

guide farmers in procuring and using the right inputs and participating in commercial value chains.

## ICT in developing and developed countries:

Transaction costs explain why markets are missing or do not function well because Smallholders are not well integrated into markets due to high transport costs and their lack of ability to timely deliver consistent, quality and large volumes of produce. Even if well-developed infrastructure reduced transport costs, small family farmers would face transaction costs to form a cooperative and aggregate their produce in larger volumes. They would also face costs to obtain information about consumer preferences and

decide what and how to plant, and incur costs related to searching and screening for a partner with whom to negotiate a deal, bargain, reach and monitor an agreement. Similar transaction costs characterize other markets such as those for labour, credit, and insurance. For example, low population density, isolated communities, and lack of information on collateral, increase the costs of financial services and result in missing credit and insurance markets. For a bank, often the fixed cost to establish a branch in a remote area is very high compared with the quantity of business it will conduct. ICTs have the potential to reduce these costs – digital technology can be transformational. For example, in India financial institutions for smallholder farmers, retailers and agricultural product buyers can function through a cashless microcredit programme. Farmers can gain access about inputs i.e. seeds, fertilizers, pesticides from local input providers by using a pre-established line of credit. In India, e-Choupal, one of the trading platforms, reduces transaction costs by connecting

buyers with farmers, using Internet kiosks. Through its ICT-kiosk platform, e-Choupal also offers farmers additional services, such as sharing of best practices to improve productivity, and price benchmarking to increase sales prices. The increase in the use of digital technologies has created benefits for all through easier communication and information sharing, and improving social connectedness. Inclusion, efficiency, and innovation are the main mechanisms for digital technologies to promote development. Nearly 70 percent of the population in developing countries own a mobile phone. The number of internet users has more than tripled in a decade, from 1 billion in 2005 to an estimated 3.2 billion at the end of 2015.

The digital divide between developing and developed countries is nowhere more evident than in agriculture. Farmers, their cooperatives, large, medium and small input suppliers, traders, processors and retailers use ICTs throughout the food value chain, from testing the soil in the farm to using 3D printers to process food.

Over the last twenty years, farmers in developed countries have already been using ICTs in large scale farming for Precision Agriculture (PA) in soil analysis, irrigation, farming equipment, weather forecasting, and more. The fast pace of technological development, which allows for increasing data storage and analytics and progressively lower costs have helped reach these farming advances.

### Development Challenges:

There are over 500 million smallholder farmers globally. Nearly 80 per cent of the food supply in Asia and Sub-Saharan Africa is produced by these smallholder farmers. Limited access to technology, lack of productivity enhancement inputs, and low awareness about farming best practices, and weak links across the agricultural value chain are some of the major challenges that smallholder farmers face. Further, severe climatic conditions lead to crop failure when farmers are not able to take pre-emptive steps due to lack of weather forecast information. Improper planting and harvesting practices result in loss of productivity and lower profit margins for farmers. ICT can facilitate wide dissemination of relevant information at the right time in a cost-effective manner. Its increasing penetration of mobile phones and internet, more specifically budget friendly smartphones can support a business model that expands information sources and farmers' ability to access the same. Such solutions have significant impact in the rural and remote regions of developing countries with large farmer populations. ICT can be applied to address various aspects of agriculture including identification of farmers' pre-harvest needs, devising solutions to meet those needs, and collection of feedback from farmers regarding

### Some of the broad areas where ICT plays a crucial role in agriculture





a specific service or solution. Popular information dissemination models using ICT include online platforms, mobile applications, training content through videos, personalized call centers, and radio and television programs. Some of these are interactive and help smallholder farmers solve problems in real time. The quality and type of ICT extension services vary based on telecommunication facilities and nature of demand from farmers. A critical factor for adoption of ICT extension services is the ease of use of information. Enterprises offering these services should address issues such as ICT illiteracy, and the need for relevant and localized content.

### Business Model

Many social enterprises (SEs) have introduced ICT applications to enable farmers to access vital pre-harvest information. The diffusion of ICT devices i.e. mobile phones and infrastructure has eased constraints in supply-chain management and farmer aggregation. ICT extension enterprises enable farmers to access information related to agricultural inputs, weather forecast, market prices, and best practices in agriculture being followed by fellow smallholder farmers in general as well as other developing countries



or regions. These services connect smallholder farmers at the global level, facilitate cross-learning, and help them increase their agricultural productivity.

### Disseminating pre-harvest related information

Some enterprises leverage information technology to share and replicate best farming practices from one region or country. The solution includes a digital video database that is produced for farmers by farmers. Participating villages are provided with a TV, DVD player and camcorder operated by local NGO staff and managed by farmers, along

with DVDs or flash drives that are shipped to the village. The enterprise organizes shows in different areas of the village for small groups of 10 to 20 farmers. Also, weekly radio program featuring agricultural news and responding to the business and market access needs of rural farmers in India. The hour-long program covers a wide range of topics, including market prices and trends, farming techniques, weather and seasonal issues, financing opportunities, inputs, land use, and quality standards.

### Imparting advisory and consultancy services

Online dissemination and sharing of knowledge among experts, farmers, students and research scholars can encourage rapid adoption of efficient and modern farm practices. Some enterprises have developed virtual platforms to disseminate expert advice and technical knowledge, cutting across geographies and time zones to reach a potentially large audience. India-based Farmers Helpline operated by Kisan Call Centre, KVK, ATMA, and ATIC service established by agricultural experts which are providing information support to smallholder.

#### Element used in this Model:



### Cost factors and Cost break-up

ICT extension service providers incur high capital expenditure for solution and platform development, and content creation (including research and development costs). Some enterprises such as Digital Green are able to cover these costs through their partners either the government or private sector companies. These costs constitute a smaller component of the total cost, and are also lower compared to that incurred by non-ICT extension service providers. A number of ICT extension enterprises partner with local stakeholders to further lower these costs.

### Revenue Streams and delivering value to the Poor

ICT extension service providers earn revenues in two ways: the first, through sale of content that includes provision of advisory services, and management information system (MIS) solutions; and second, by charging segment fees per episode of broadcast content. The advisory services are provided to smallholder farmers either free of cost or at very nominal rates. The enterprises sell content to government and private extension service providers. Digital Green, for instance, earns revenues from sale of videos and technology to government and private extension service agencies that work directly with farmers. ICT extension enterprises are changing the manner in which smallholder farmers communicate with stakeholders and access requisite information to improve their agricultural productivity with these approaches such as Awareness, Acceptance, Accessibility and Affordability.

### Some Successful ICT initiatives in India

In India ICT applications such as Warana, Dristee, E-Chaupal, E-Seva, Lokmitra, E-Post, Gramdoot,

### SOME OF THESE HAVE BEEN DEALT IN DETAIL BELOW:

SR. NO.	NAMES	OBJECTIVE
1.	e-Extension	Aims to analyse the soil of all the villages of the state & proposes to provide online guidance to farmers on their soil health condition.
2.	AGRISNET	Uses state-of-the-art broadband satellite technology to establish the network within the country.
4.	Agri Business Centres	It provides a web based solution to the small and medium Landholdings.
5.	e-KRISHI VIPANAN	Using latest advancement in ICT by collecting and delivering real time information, online.
6.	Query Redress Services	Empowering the farmer community through effective, need-based interventions
7.	Kisan Call Centres	The sole objective is to make agriculture knowledge available at free of cost to the farmers as and when desired.
8.	Tata Kisan Kendra	The concept of precision farming being implemented by the TKKs has the potential to catapult rural India from the bullock-cart age into the new era of satellites and IT
9.	e-Sagu	Improve farm productivity by delivering high quality personalized (farm-specific) agro-expert advice in a timely manner to each farmer.
10.	AKASGANGA	AKASHGANGA's success demonstrates the potential of information technology to impact livelihoods in poor, rural Communities.

Dyandoot, Tarahaat, Dhan, Akshaya, Honeybee, Praja are quite successful in achieving their objectives.

### Scaling up with Challenges

ICT extension services face a number of challenges that restrict the expansion of the business model. These few challenges are broadly categorized as technology challenges, human resource challenges, and content development challenges.

- Adequate internet and mobile bandwidth and connectivity are a limiting factor.
- Data is expensive in most remote rural areas and hence cost becomes a major barrier for internet or mobile usage
- Lack of relevant content limits the application of proposed solutions.
- Role of Government and Policies

The ICT extension services business model addresses the development challenge of information inadequacy on best practices in agriculture, weather updates and prevailing market prices that support the income potential of smallholder farmers in a number of developing countries. This said, the business model is very impactful if it is provided along with on-ground support. In the absence of market linkages for the produce grown, any information, however great and useful, will not raise farmers' incomes. In spite of this, most ICT models don't focus efforts on markets or partnering with enterprises doing this.

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Gone are those days when the government used to send Rs. 100 rupee, but Rs. 85 was lost in between corrupt middlemen and only a fraction of the total amount reached the beneficiary. PM-KISAN has been made foolproof so that nobody can snatch farmers' rights

**NARENDRA MODI**  
Prime Minister

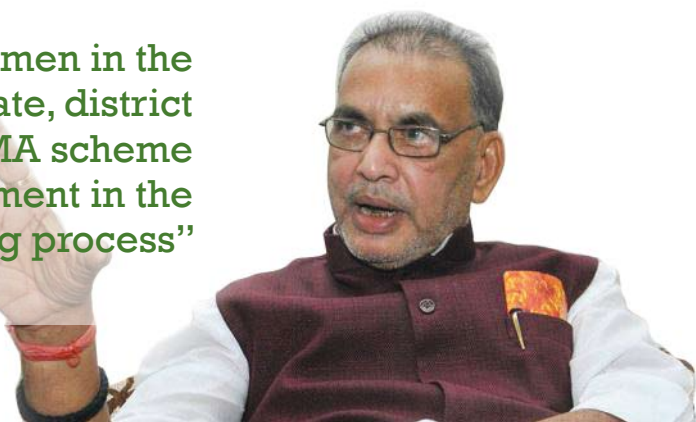


"Bargarh is known as rice bowl of Odisha. But today, the famers are forced to commit suicide. Not a single day elapses when farmer suicide does not take place in a family either in Odisha or in India"

**RAHUL GANDHI**  
Congress President

"The participation of women in the decision-making bodies at the state, district and block levels under the ATMA scheme has ensured their involvement in the planning process"

**RADHA MOHAN SINGH**  
Agriculture Minister



"As many as 52 per cent of farming families are indebted today with an average outstanding loan of Rs 1 lakh. From July to December 2018, the minimum support price (MSP) increase merely covered the input cost and was way below the Swaminathan Commission recommendations"

**KAPIL SIBAL**  
Senior Congress Leader