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# From the Editor's Desk SEEDS — THE FOUNDATION OF AGRICULTURE

eeds decide the direction of country's agriculture. The Indian seed sector has given a strong support to the country's farmers. The seed sector has the immense responsibility of not only producing certified seeds, but also supplying them at affordable rates and making them available at appropriate times



Indian seed industry ranked fifth in the world, has been traditionally dominated by the public sector, especially in the high volume low value seeds category. The New Policy

on Seed Development of 1988 played a big role in opening up Indian agriculture to world seed market. The Policy greatly liberalized import of vegetable and flower seeds in general and seeds of other commodities to some extent, and also encouraged multinational seed companies to enter the Indian Seed Market.

Indian policies have played a key role in developing India's seed potential. From the first Indian Seed Act in the year 1966 to the pending Seeds Bill, India has always been protective and supportive of the seed segment. Beyond being an exporter of agricultural commodities and processed food products, India holds immense potential as a seed exporter. Currently commanding a small share in world trade, India however, has immense potential to capitalize on this trade.India's varied agro climatic conditions with rich and fertile soils are suitable to a wide variety of crops. The presence of national and international research institutes is also a favourable factor for India in seed production segment. Also, the increasing research capability of private sector in India can catalyze the export oriented seed development programs of India. India's well established seed production systems and regulations, large number of trained seed growers, large number of seed producing companies are the enabling factors to make India a hub for seed export. By virtue of the diverse agro-climates, several geographical zones in the country have emerged as ideal seed storage locations under ambient conditions. To further consolidate India's presence in world seed trade, the Organization for Economic Cooperation and Development (OECD) granted eligibility to India to participate in the OECD Seed Schemes program in 2008. The program provides an international framework for the certification of agricultural seed movement in international trade.

However, the increasing production cost due to increasing labour charges and processing fees are disturbing many seed producers in the private sector. Another problem vexing the seed sector is the slow pace with which new seeds enter the commercial market. With the fate of GM technology hanging in the balance, research on many new varieties with improved traits have been stalled.

Indian seed sector has been able to cater to the large and varying needs of the farming community. In years to come, the sector has to work harder to address multiple threats of climate change, new pest and diseases and yield stagnation. We will be therefore needing a sharper research and extension system with equal participation from private sector.

Aniana Nair

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# **Bt Bit by Politics**

The future of Bt technology hangs in balance with recent cut in royalties

ndia's recent notification of bringing down prices of Bt cotton by slashing royalty fees by 74% has spread confusion and discontent among the biotechnology firms operating in India. The move has considerably reduced India's desirability among the biotechnology firms in investing and introducing new technology.

The maximum sale price according to the notification will be reduced to Rs.800 (per 450gm packet) from Rs.830-1,000 earlier. The trait value or the royalty would be reduced by 74%, from Rs.163 per packet to Rs.43 (excluding taxes). The latest prices which will come into effect from the next kharif crop season, is expected to benefit 8 million cotton farmers in India. The announcement is a bid to appease the farmers rattled by two consecutive droughts and a general apprehension that Bollgard II has become ineffective against pink boll worm. A section is even asking for cutting off the trait value itself, as had been done with the Bollgard I. Bollgard II launched in 2006, with a stacked combination of both 'cry1Ac' and 'cry2Ab' Bt genes superseded in performance to Bollgard I. However, a decade to its introduction and with allegations of its poor performance, the fate of the variety hangs in balance. The notification is expected to clam down the negative sentiments of the farmers and generate good will towards the government.

With elections round the corner and discontent seething among farmers, populist policies would be the norm of any government. But as usual, these populist policies are myopic in their vision and short lived in their effect. Seeds are critical to agriculture, and they decide the output from agriculture. The Indian government, therefore has an elaborate seed production and marketing mechanism with safeguards in quality control. The government bodies are dominant in supplying high volume low value seeds. The private sector also works shoulder to shoulder with the public bodies to supply seeds to the country. Their better infrastructure and capital advantage have helped them to introduce innovative technologies in the seed sector which has infact helped the country to increase its agriculture production. A case in point is India's cotton revolution which was powerfully backed by the Bt cotton technology. Post two generations of Bt cotton, India today sails high in the cotton production front. So it becomes necessary for the government to encourage private sector participation in the seed segment, if we intend to maintain that momentum.

GM technology is a promising technology adopted worldwide, and India has also emerged as a beneficiary in the last decade. The current situation, however, has raised concerns regarding the future of the technology in India. With an embargo on commercial cultivation of new GM crops, we have closed any further innovations in new crops. The move to reduce the trait value has also closed gates to further improvements in the Bt cotton technology. The next in line, a three-gene Bollgard III fortified with 'Vip3A' gene, in addition to the preexisting 'cry1Ac' and 'cry2Ab', is claimed to increase the longevity of the technology. It has already been introduced in US and Australia. India, an important cotton producer, however, has to wait as the company will surely be holding a wait and watch approach. Besides, any possible introduction in India would definitely come with riders and higher prices.

India's green revolution was the result of a strong political will and commitment towards raising the agricultural production of the country which arose out of desperation. Although not imminent, Indian agriculture would encounter an impasse in its agricultural production in years to come. We do not want to wait for that to happen. If we do not want to involve private sector, our government research bodies be better be equipped to carry out research in these lines. Innovation will be the key to success in agriculture.

# **Climate Changes Food Security**

Climate changes can affect India's Food Security

limate change is one of the greatest threats for today's agriculture. The threat has been reiterated on record multiple times by many researchers. A recent study, published in the journal Philosophical Transactions of the Royal Society A, specifically mentioned India among the top countries to be at the greatest vulnerability to food insecurity when moving from the present-day climate to 2 degrees Celsius global warming.

The assurance of food security is contingent upon a host of factors – man made and otherwise. Indian agriculture has been reliant on climatic parameters more so than any other agriculturally progressive nations. Monsoons are still lifelines of 52 per cent of our farm lands. So even a small change in the climate will be manifested in the output from half of the country's cultivated area. The annual economic survey, 2017-18 has specifically mentioned that changes in climate could shrink agricultural income by as much as 25 per cent in unirrigated farmland and 18 per cent in irrigated areas within the next 82 years. These figures concerns 22 per cent of our population who are involved in the profession, either directly or indirectly.

With every year, our anxieties regarding climate change are becoming more intense and well pronounced. The changing climate has a profound influence on water availability for agriculture. Our agriculture in this scenario should move towards sensible approaches of water usage. India pumps more than twice as much groundwater as China or the United States. Irrigation which has still not caught the fancy of majority of farmers has to be intensely propagated. Conventional irrigation must give way to micro irrigation which promotes judicious use of water. Indian government has consistently made provisions through various schemes and subsidies to accommodate MI in the Indian farming scenario. At this juncture, it becomes imperative that the farming population in the country espouse micro irrigation systems.

The fluctuations in climate patterns also

necessitates development of varieties that are tolerant to flood, drought, water logging and salinity. These are possible causalities that can emerge out of climate abnormalities. Many land races and traditional varieties that were cultivated during pre green revolution era can be handled as a contingency varieties and kept reserved during possible periods of these casualties. Having said that, drafting a contingency plan holds immense significance. It is also incumbent upon the weather forecasting division to broadcast data regarding the climate fluctuations in a useful format well in advance. The contingency plan should incorporate suitable varieties and package of practices for the same. The yield potential of these varieties may not be commensurate with that of the improved varieties which are bred purposefully for better yield attributes. So in this scenario, a revised MSP or other price support mechanisms must be roped in to compensate for the yield differences and to protect the farmers from income fluctuations.

Pest and diseases which has the potential to reduce the yield of the crops by 25- 40 per cent in a normal scenario can do the same and even more during weather extremities. The changed climate patterns can lead to resurgence of pest and appearance of new pest and disease. This can also affect the yield of crops. Aspects of crop protection, hence, must be appropriately cared for. Disease forecasting, a fairly neglected area in India, can do wonders in the climate changed world.

Agroforestry is another suitable option. It comes with the twin benefits of adding additional income and adding green cover to the earth's surface thereby mitigating the ill effects of global warming by carbon sequestration.

Climate change is a reality and we have to warm up to the idea. Being pro active is the key in managing agriculture in a climate changed world. Food shortage in today's world can have catastrophic effects. Our agriculture production system should be climate proofed by infusing technology, techniques and policy.

# **Draft Pesticides Bill Needs More Tightening**

The Draft Pesticide Management Bill has left many areas unattended

he new Pesticide Management Bill 2017 is all set to replace the five decade old Insecticides Act which has been dictating the pesticide regulatory segment in India. The draft which is already in the public domain, has however, not been able to elicit enthusiasm among the stakeholder as they believe that the draft is not a big improvement from a similar one presented in Parliament in 2008. A decade to its introduction the bill hasn't moved an inch not only withregard to its implementation but also with regard to the amendments suggested.

Spurious pesticides which lack efficacy and sometimes pose deleterious effects, have become widespread in India. Their regulation has therefore become an important and difficult task. Unfortunately, the lack of proper inspection and regulatory framework is encouraging sale of substandard and expired pesticides. The new bill has proposes an increase in penalties on violators. According to the bill, the maximum punishment for violation (such as sale of prohibited or spurious pesticides) is a penalty of up to Rs50 lakh and up to five years' imprisonment. Earlier, the punishment was limited to Rs2,000 and up to three years' imprisonment.

Last time, when the bill was introduced in 2008, it was referred to a parliamentary committee for inclusion of provisions tightening the sale of substandard pesticides. The Parliamentary panel then had suggested that pesticide inspectors should also be held responsible for growth and approval of spurious pesticide. The new draft, however vindicates the inspectors from this responsibility. Also, the bigger players who outsource production to smaller companies remain immune to any violations. It becomes the sole responsibility of the small manufacturers. Big pesticide companies should be made accountable and not the outsourced small manufacturer. Strong framework of legal penalties should be put in place to handle violations. The parliamentary

panel then had suggested that data protection be extended to five years and data submitted with application to not be reused by another applicant for three years, which the current draft does not state.

The draft has maintained a lax attitude towards imports of formulations. The draft allows import of formulations without having to register active ingredient. While the importers enjoy a free hand, the domestic companies go through a labyrinthine process to sell their products. When the local manufacturers passes through years pursuing the registration of pesticides, the importers get easy access to Indian markets. This is contrary to the Make in India campaign that the government is actively pushing.

Another serious objection towards the new policy is the diluted powers of the state in intervening in pesticide regulation. Many states expect more powers to regulate and control the use of agrochemicals and representation in the regulatory body. As the state governments have a better idea about (state-specific) agro-ecological aspects, they should be endowed with the authority to disallow use of pesticides. Currently the state governments have the power to ban a chemical for 60 days. Limited powers vested with the state government in testing, registration and regulating sales is causing delay to take any action. State governments should be given adequate powers to test and regulate sales of pesticides.

Five decades is a long time. The situation has changed and we are in need of a stronger, updated bill to manage the registration and the associated concerns of the pesticide in today's world. Many more new chemicals have arrived in the scene and sometimes the archaic bills are not enough to cope with the advances in technology. Many suggestions have been put forward by the stakeholders belonging to various sectors. Hope the government can incorporate the most pressing needs and come out with a comprehensive bill at the earliest.

# **Enhancing Agri Exports**

Expanding world agricultural trade can increase farmers' income

ndia's petite share in world agricultural trade, despite being world's second largest agricultural producer calls for a sturdy and stable agri trade policy. The draft agro trade policy currently in the public domain hence is a welcome step.

Value addition is an important area that India needs to focus on if we are to expand our world trade. Organic products especially those sourced from traditionally organic areas are another niche area which India can work upon. Development of organic export Zones/organic Food park with an integrated approach, Marketing and branding of organic products and Developing uniform quality and packaging standards for organic and ethnic products area can further enhance India's agro trade.

Greater involvement of State Governments in Agri Exports can be crucial for enhancing agri exports from India. A State Export Policy and an assessment of the State's potential in key agricultural sectors and drawing up an action plan to support the infrastructure creation will be crucial to promoting exports. There should also be institutional mechanism at state level and cluster level to support exports. Identifying suitable production clusters, Conducting farmer registrations, Digitization of land records and Promotion of Farmer Producer Organizations (FPO) can help in assessing the surplus available for global trade. Developing agri export zones (AEZs) can facilitate value addition, common facility creation and higher exports from such zones.

Emphasis must be laid upon R&D activities for developing new products. Specific areas to be focused are fortified foods and super foods as they have enhanced demands around the world. SHGs/ FPOs/Cooperatives/Artisan groups can be showcased by establishing a mechanism for linking all credible SHGs, FPO's, Cooperatives, Quality certified Private Processors and Traders etc. through a public private partnership mechanism including exploring the possibility of development of a portal to provide e-commerce platform for providing direct linkage to Farmers' cooperatives, producer societies.

Creation of commodity boards can help in aiding global exports. Global success stories of Commodity

Boards, such as California Walnut, Washington Apples, Canola Association of Canada etc. and our own Boards for Spices, Tea, Coconut etc..have done good job in promoting crop stewardship on one hand and global promotion of the concerned commodities and Brand India on the other hand. But, all future such boards will have to be created in the private sector, supported by the Ministry of Commerce & Industry. Few boards such as India Banana Board, Grapes Board, Apple Board, Rice Board, Meat Board, Poultry Board, Fisheries Board, Cotton Board, Pulses Board etc. are yet to be created.

Another crucial area that has rattled many agri exporters is with regard to quality standards. The lack of recognition of Indian testing procedures and conformity standards proves costly to exporters and therefore farmers. To expand India's global presence, the government must initiate concerted efforts during bilateral discussions for mutual recognition of ethnic and organic products and standards. To enhance quality and cost competitiveness, crop stewardship programs with GAP certification needs to be promoted, especially when globally, there is a move on the part of consumers, corporate and Governmental agencies to accept only certified produce in the years to come.

Lack of a stable trade policy has many times affected India's agro export interests. Lack of consistent policies in the areas of farm production, support prices and R&D to inland transportation, exit point infrastructure and export restrictions have the potential to result in uncertainty among the global stakeholders and loss of opportunity. Given the domestic price and production volatility of certain agricultural commodities, there has been a tendency to utilize trade policy as an instrument to attain short-term goals of taming inflation, providing price support to farmers and protecting the domestic industry. They end up distorting India's image in international trade as a long term and reliable supplier. Therefore, it is imperative to frame a stable and predictable policy with limited State interference to send a positive signal to the international market.

India has immense potential in global agri exports. India must capitalize on its strength and works on its weaknesses to increase its global presence.

# Phytelligence, Mahyco Grow group company in JV for horti crops

Seed major Mahyco Grow has formed a technology joint venture with USbased Phytelligence to provide planting material for horticulture crops. Mahyco Grow is the re-branded avatar of Barwale Group. All the brands of the Barwale Group are now grouped under the umbrella of Mahyco Grow. Seed, fruits and agriculture engineering businesses will be under Mahyco Grow. There is no change in the holding structure of the companies. A company spokesperson said that Phytelligence is a start-up company incubated from Washington State



University. It has been in operations for the past few years and has special skills in creating material for fruit crops using an innovative technology, which will be used by Mahyco Grow, for developing better quality planting material for the Indian market. The spokesperson reiterated that the Phytelligence technology is based on conventional breeding technology. The technology will have to pass all the mandatory regulatory requirements of the government. A joint press statement said that the plants produced by Seven Star Fruits, a company of Mahyco Grow, using the Phytelligence MultiPHY process will support higher density planting systems, which results in higher yields per acre and more sustainable production. The partnership will also enable the delivery of new varieties of apples, peaches, plums, berries, grapes, nuts, oranges and other tropical fruits to the Mahyco Grow's existing customers, and the region's farmers, the statement said.

# Ramesh Flowers to export potted plants

• An Indian nursery and dried flowers exporter will finally break into a niche market dominated so far by China and Europe – export of live potted plants. Ramesh Flowers, based in the southern port city of Tuticorin, will soon start supply of live potted plants to a multi-national retailer which is also starting operations in India. The Rs 220-crore company is a leading exporter of home fragrances, home decor and dry flower arrangements. Mahendra Raj Singhwi, Chairman and Managing Director, Ramesh Flowers Pvt Ltd, said it has tied up with a nursery in Hassan, Karnataka, where the potted plants will be produced and then nurtured at its own facility for 45 days before being shipped out in reefer containers. The company will initially supply areca palms, popular indoor ornamental plants, for the retailer's domestic and overseas markets. But enquiries are on for 26 more varieties including orchids and lucky bamboo, which are also popular in local markets and are now being imported from China. The only other supplier in the region for developed international markets is now in Colombo, according to Singhwi.

# Kamco eyes small agri machinery market

• Betting big on the Centre's initiative to mechanise farming operations, Kerala Agro Machinery Corporation (Kamco) aims to tap the small agricultural machinery market with its array of products. The State-owned company is catering to Madhya Pradesh, Odisha, Bihar, Assam, Uttar Pradesh with a slew of its products — power tillers, power reapers, mini tractors, pumpsets, etc. This small agricultural machinery market is expected to double in the next five years, thanks to the Budget allocation for mechanisation of farming operations, said P Suresh Babu, Managing Director, Kamco. Besides, the rise in small land holdings revival in interest among the youth for agriculture will boost the sale of farm equipments. To cater to the emerging demand, he said a proposal to install automated assembling line for tiller production under the Rashtriya Krishi Vikas Yojana assistance of Rs 24 crore is under consideration. The project aims at doubling

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tiller production with a cost saving of Rs 10,000-15,000 per tiller which can be passed on to the farmers. Similarly, the demand for power reapers is expected to improve substantially especially for low floor reaping of soyabean dwarf variety.

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# Acadian Plant Health™ patners with Van Iperen International

Acadian Plant Health<sup>™</sup> (APH<sup>™</sup>) announced its international partnership with Van Iperen International, with focus in Europe, Africa and the Gulf Region. Several years of successful collaboration has blossomed into a close working relationship dedicated to the needs of the grower. Van Iperen International is a Dutch producer of Specialty Fertilizer Solutions, leader in knowledge, production, development and distribution globally. Acadian Plant Health<sup>™</sup> is a world leader in marine algae-based biostimulants, with great knowledge in their application to overcome stresses and improve grower programs and results. Together, Van Iperen and APH<sup>™</sup> are creating a partnership that will benefit sustainable food production today and for future generations.

# Court dismisses Monsanto plea to enforce BT cotton seeds patent

The Delhi High Court dismissed the US-based agro major Monsanto Technology's plea to enforce the patent for its BT cotton seeds in India. A Bench of Justice S Ravindra Bhat and Justice Yogesh Khanna partially allowed the counterclaims of three Indian seed companies that Monsanto did not have a patent for its BT cotton seeds, a genetically modified variant that resists bollworms. Monsanto has expressed its disappointment over the high court order. The court also upheld the decision of a single judge on the issue of trait fee payable to Monsanto by the three Indian companies - Nuziveedu Seeds, Prabhat Agri Biotech and Pravardhan Seeds — under a sub-licence. The single judge had said the three companies would pay trait fees to Monsanto according to government-set rates. Monsanto wanted to charge a higher trait fee under the sublicence given to the Indian companies to use its seed technology. Both sides had .....

challenged the single judge's order before the division bench. After the verdict was pronounced, Monsanto sought that the decision be kept in abeyance for a few weeks so that it could file an appeal in the Supreme Court. The high court declined to keep the operation of its decision in Bench, but granted the US company a certificate of fitness to file an appeal in the apex court.



# Syngenta India Limited enters into an agreement with Crystal Crop Protection Limited

Syngenta India Limited and Crystal Crop Protection Limited, announced an agreement under which Syngenta India Limited has



agreed to divest the pearl-millet, sorghum and fodder business including seed brands viz., Mahalaxmi (Sorghum), Atheeva (Pearl Millet) and SX-17 (SSG) to Crystal Crop Protection Ltd. "With this acquisition we will get a world class breeding program in Sorghum and Millet and will strengthen Crystal's seed portfolio and improve market penetration in relevant markets." said Ankur Aggarwal, Managing Director, Crystal Crop Protection Limited. Commenting further he explained that "with acquisition of these seeds from Syngenta, we will strengthen our seed portfolio and strive to be market leader in these crops."Dr. K C Ravi, Vice President, Business Sustainability, South Asia, Syngenta India Limited said, "Syngenta is divesting the pearl-millet, sorghum and fodder business to bring stronger focus and synergy to its core diversified field crop and vegetable seeds strategy." Crystal will now have strong breeding program in all its focus crops, viz., Cotton, Maize, Rice, Grain Sorghum, Pearl Millet and SSG.

# Icrisat, Dow DuPont in pact for breeding technologies

♦ The International Crops Research Institute for the Semi-Arid Tropics (Icrisat) and Corteva Agriscience, Agriculture Division of DowDuPont, have signed a Master Alliance Agreement (MAA) for crop improvement. "It is aimed at strengthening food security by improving crops that feed millions through sharing of high-tech and modern breeding technologies," an Icrisat statement said. The pact calls for sharing of gene editing tools and adapting transformation techniques to new crops. "DuPont Pioneer, now part of Corteva Agriscience, will provide access to intellectual property, material and know-how," it said. "With Corteva Agriscience and Icrisat scientists working together, we will see rapid improvement in technologies towards developing more productive crops," Pooja Bhatnagar-Mathur, Principal Investigator at Icrisat, said.



# Centre finalises option of 2 MSP models for states

The Narendra Modi government has devised two potential mechanisms to ensure farmers get the federally fixed minimum support prices (MSPs) for their crops, a key assurance made in the latest Union Budget, and will give state governments the option of choosing either. The first is the so-called Market Assurance Scheme, under which states will directly buy 20 major crops out of 25 for which MSPs are fixed by the Centre. The scheme leaves out wheat, rice, jute, cotton and coconut because these are already procured by government agencies at MSPs. The second is the socalled price deficiency payment scheme, under which all farmers who register for the programme will get paid the difference between the MSP and the

prevalent average market price. A third proposal to allow private participation in procurement is not being considered at this stage, an official said. Ahead of a general election next year, the government faces the task of ensuring profitable farming, amid falling commodity prices and protests by farmers. Nearly twothirds of Indians depend on agriculture for a living According to the 2011 Census, 56.6% of the labour force also depends on agriculture and allied activities. Under the market assurance scheme, the Centre will fully reimburse a loss of up to 35% of procurement cost to the states. A loss of 35-40% will be shared by the Centre and states on a 50:50 basis. "Beyond 40%, states will have to bear their own losses because this means the state has been -----

inefficient in procuring and handling the procured produce," an official familiar with the plan on condition of anonymity said. Although there is no cap on how much quantity can be procured, the government's policy think tank NITI Aayog expects the maximum quantity of each crop available for procurement not to exceed 40% of the marketable surplus. The second scheme is a generic version of the MP government's Bhavantar scheme. Under this, if the market price of a farm commodity dips below the "modal" price - a kind of an average price - then the farmers will be paid the difference between the MSP and the actual price. If any state chooses the second scheme, the Centre will reimburse it up to only 25% of the MSP.

#### Urea to be sold in 45-kg bags

• Urea, the commonly used and highly subsidised fertiliser, will be sold in the market in a 45-kg bag instead of 50-kg from this month, a move aimed to cut its consumption and promote balanced use of fertilisers. A 45-kg urea bag will be sold at Rs 242 excluding taxes, a government notification said. The price is determined on the basis of government's fixed price of Rs 5,360 per tonne. The Centre bears the difference between the maximum retail price (MRP) and cost of production. A senior Fertiliser Ministry official said fertiliser companies will be allowed to sell the old stock of 50-kg bags for next two months. The purpose is to reduce urea consumption and promote balanced use of fertilisers. Since urea is cheaper than other fertilisers, farmers are using this product widely, he said. As per the notification, the sale of 45-kg bag is effective March 1, 2018. The government has also permitted dealers to sell urea in smaller quantities not exceeding 25 kg. Annual urea subsidy is around Rs 40,000 crore. The country is producing over 24 million tonnes of urea since last year and importing around 6 million tonnes to meet the domestic demand.

# Centre Planning To Promote Yogik, Gou Mata Farming

• The agriculture ministry plans to offer cash incentives to farmers who take up yogik farming, gou mata kheti and rishi krishi, obscure methods of cultivation that have little scientific evidence to prove they are beneficial. According to revised guidelines of the centre's flagship scheme to promote organic farming, Paramparagat Krishi Vikas Yojana (PKVY), farmers will be eligible for an assistance of Rs.48,700 per hectare for a three-year period for adopting these traditional methods of cul-



tivation. The guidelines were issued on 2 April and the government has budgeted Rs360 crore for the scheme in 2018-19. Some of these cultivation techniques were also displayed at the Krishi Unnati Mela organized by the ministry in March in New Delhi. An of-

ficial from the National Centre for Organic Farming, an arm of the ministry that promotes organic cultivation, said that despite objections raised by it, the ministry included the non-scientific cultivation methods for financial assistance. According to the revised guidelines, farmers practising traditional methods of organic farming like yogik farming, gou mata kheti, Vedic farming, Vaishnav kheti, Ahinsa farming, Adhvoot Shivanand farming, and rishi krishi will be eligible for financial assistance, in addition to those adopting standard organic farming practices like zero-budget natural farming and permaculture.



# Millets to be bought at MSP for PDS sale

◆ The Narendra Modi government has decided to include millets in the public distribution system for which it is procuring these grains at federally fixed minimum support prices, agriculture minister Radha Mohan Singh said. The agriculture ministry has started a new programme to focus on millets or coarse cereal production, mostly grown by small and poor farmers. Millets are a naturally rich source of vitamins and micro-nutrients. Rajasthan is the top producer of coarse cereals in the country. Millets are mostly cultivated in low-fertile lands, mountainous terrain, tribal and rain-fed areas in states such as Andhra Pradesh, Chhattisgarh, Gujarat, Haryana, Madhya Pradesh, Maharashtra, Karnataka, Uttar Pradesh, Tamil Nadu and Telangana. Supply of cheap millets to poor households and through school mid-day meals will improve nutrition outcomes among the poor and also boost incomes of small farmers, the minister said.



# Govt set to procure 50,000 MT potato

● In a major move aimed at making available politically sensitive commodity potatoes at an affordable price throughout the year, the government has decided to procure 50,000 MT potatoes from farmers to stabilise the prices of root vegetable. According to a senior official, procurement of potatoes would be initiated under the Price Stabilisation Fund (PSF). "The Ministry of Consumer Affairs has asked Nafed and National Cooperative Consumers' Federation (NCCF) to procure the essential commodity from farmers. Both the Central agencies would procure 25,000 MT potatoes each," the official said. The official further stated that procurement of potato would start only after getting a detailed crop production data from the Union Agriculture Ministry. "It's not yet clear about the shortfall in the production of the crop. The quantity of procurement would be increased or decreased on the basis of production data," the official said.

## Nafed to buy 25000 tonnes of onions from Maharashtra

• Cooperative Nafed will procure 25,000 tonne of fresh rabi onions from Maharashtra and the buying will commence next week, Managing Director Sanjeev Kumar Chadha informed. The procurement is being undertaken on behalf of the government to serve the dual purpose of ensuring better price to farmers during peak arrival and storing the commodity for later disposal in the market when retail prices spike. About 25,000 tonne will be purchased mainly from Lasalgaon, Asia's biggest onion market, as well as Pimpalgaon mandi in Nashik district. Nafed (National Agricultural Cooperative Federation of India) will store 5,000 tonne in its unit, while the rest will be kept in hired storage godowns in and around these two mandis, he added. Chadha said the stored onions will be disposed of after 2-3 months as per the government's directions. Besides Nafed, the government has directed cooperative NCCF and government agency SFAC to procure 5,000 tonne and 1,000 tonne of onions, respectively from Maharashtra. At present, onion is sold at Rs 7-8 per kg at Lasalgaon mandi and the prices are expected to show a downtrend once the arrival peaks in the coming weeks. Rabi onion contributes 65 per cent of the country's total output, which is estimated to be 4.5 per cent lower at 21.4 million tonne in the 2017-18 crop year (July-June) when compared with last year, as per official data.

# Govt disposes 7 lt pulses from buffer stock

• The Centre has disposed of around 7 lakh tonnes (lt) of pulses so far from a buffer stock of 20.50 lt, according to a senior Food Ministry official. The government, for the first time in October 2015, decided to create a buffer stock of pulses through imports and later by domestic procurement to ensure better prices to farmers and to use the stock to augment local supply in times of price rise. "Around 7 lakh tonne of pulses including tur has been sold so far. The efforts are made in order to clear the old stock and create space for new crop," the official. The government is disposing of stocks through e-auction to private traders, army and paramilitary forces as well as States, besides for central welfare schemes like mid-day meal.

# Dry spell in J&K to reduce saffron produce by 68%

Saffron production in the country is estimated to decline 68.15 per cent to 9.12 tonne in the current crop year because of a dry spell in the top growing state of Jammu and Kashmir, according to the government data. Saffron is also cultivated in Himachal Pradesh. Much of the produce is exported. As per the agriculture ministry data, saffron output is pegged at 9.12 tonne in 2017-18 crop year (July-June) as against 28.64 tonne produced last year. The output is expected to go down due to the dry spell in the critical stage of the crop's growth, it said. The production was hit badly in 2014-15 crop year (8.51 tonne) because of floods. According to the ministry, the demand for Indian saffron has increased in the global market due to the presence of high quality active components like crocin, picrocrocin and safranal. Saffron Cultivation and export is being promoted under the National Saffron Mission. A saffron



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park at Dusoo in Pulwana district has got the authorities' nod to provide improved facilities of grading, packaging, e-auctioning and certification that would boost export of the spice. The Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu is implementing innovative practices to boost saffron production and productivity.

# Sikkim Lifts Ban on Veggie Supply

• The Sikkim government has lifted the ban on supply of non-organically grown carrot, tomato and green chilly from outside due to acute shortage of these commodities in the domestic market. The notification lifting the ban with immediate effect was issued by the Additional Chief Secretary (Home) SC Gupta. The Pawan Kumar Chamling government had banned the sale and consumption



of 27 non-organically grown agricultural and horticultural commodities comprising vegetables, fruits, spices with effect from April 1 so that people consume only organic food items. Opposition parties and vegetable vendors have slammed the state government's ban on non-organic food from outside without ensuring availability of organic vegetables and allied items. Sikkim Agriculture and Cash Crops Development Minister Somnath Poudyal has urged the people and vegetable sellers to cooperate with the state in making the drive for consumption of organic food a success.

# Kochi to host India Rubber Meet in August

The Rubber Board and the stakeholder associations are jointly organising the India Rubber Meet 2018 (IRM 2018), the fourth edition in the series in Kochi on August 30 and 31. The meet will have representation from all segments of the rubber industry. IRM is a regular forum for interaction, networking and exchange of information. The theme of IRM 2018 is 'Towards a sustainable rubber value chain'. The discussions will focus on topics related to the rubber scenario, present trends,



challenges and strategic planning for sustainability and advancement. There will be invited talks by internationally renowned speakers. There will also be panel discussions involving experts and key stakeholders from different segments of the rubber industry. A national level organising committee under the chairmanship of MK Shanmuga Sundaram, Chairman and Executive Director, Rubber Board, with representation of all segments of rubber industry, will organise the event. IRM 2018 is targeted to attract around 700 delegates from India and abroad.



## Telangana, farmers' union make a pitch for non-Bt cotton seeds

• With the kharif season fast approaching, the Telangana government and farmers' union have launched independent campaigns to discourage people from illegal bio-tech cotton seeds or Roundup Ready Flex seeds. The third generation seed technology developed by Monsanto gives cotton plants protection against glyphosate, which is sprayed to kill the weed. Though the technology doesn't have permissions in the country, farmers have been using it extensively. The fact that a third of 45 lakh acres of cotton area in Telangana alone was covered by the illegal seed shows the depth of its penetration. Both Monsanto and private companies that sell bio-tech seeds denied any role in the production of these seeds. With unscrupulous players flooding the market with these seeds, the State government has begun a campaign across the State to spread awareness. It warns of Preventive Detention and arrest of those in possession of these seeds. "These seeds don't have any permission for sale. Don't buy them. The government holds no responsibility if you plant them. Glyphosate is not environment-friendly," a government official warned the farmers. The district level officials are printing banners, informing the farmers about the ill-effects of the herbicide-tolerant seeds.

## NCML sets up silo for maize in Bihar

• The National Collateral Management Services Limited (NCML), a leading warehouse service provider, has inaugurated its public silo complex of 36,000 tonnes for storing maize at Purnia in Bihar on Monday. Designed in line with global best practices, the silo complex is equipped with facilities like dryer and chiller for safe and efficient preservation of maize , said the company in a statement. Inaugurating the silo, Prem Kumar, Bihar's Agriculture Minister, said silo complex storage mechanism is the need of the hour in the State which has a large agrarian population. Sanjay Kaul, Managing Director, NCML, said technological advancement is playing a key role in stimulating growth with modern scientific facility gradually replacing conventional warehouses for agricultural storage. The storage of grain in a silo is possible for long period without quality loss and transportation is much easier compared to food grains storage in bags in conventional warehouses. NCML is building 13 silo complexes at an estimated project cost of Rs 780 crore in Bihar, Punjab, Haryana and UP in partnership with the Food Corporation of India.



# NABARD's long-term loan segment saw 17 per cent growth

▶ The National Bank for Agriculture and Rural Development (NABARD) saw a 17 per cent growth in long term refinance due to the stress on boosting the long-term loan segment through refinance. The balance sheet of the institution stands at Rs 4, 06,473 crore. Harsh Kumar Bhanwala, Chairman, NABARD said, "Boosting long term credit for capital formation, banking technology for rural financial institutions, enhancing area under irrigation, improving irrigation efficiency and rural housing stayed at top on our 'To-Do List' during 2017-18." NABARD stated that as against the target of Rs 10 lakh crore, actual agri credit flow during 2017-18 stood at Rs 10.46 lakh crore (provisional data -term loans – Rs. 3,69,624 crore; crop loans – Rs 6,76,653 crore) as on 28 February 2018. NABARD's refinance played a catalytic role in the ground level credit flow. Its total refinance disbursements of Rs 1, 45,061 (Long term: Rs 65,240 crore + Short term:



Rs 79,821 crore) were about 14 per cent of the total ground level credit. In case of RRBs and Cooperative Banks, the same was nearly 55 per cent of their total disbursements. A significant development this year was diversification of NABARD's client base with loan disbursements of Rs 3,900 crore to Small Finance Banks and Rs 2,794 crore to NBFCs/ NBFC-MFIs. The Cooperative Banks witnessed significant progress in their transition to digital banking during the year 2017-18 with 350 Cooperative Banks supported by NABARD for on boarding to RuPay Kisan Card (RKC) platform as on 31 March 2018. These banks issued 1.76 crore RKCs during the period. RRBs increased their tally to 1.13 crore in FY 2017-18. During 2017-18, NABARD spent Rs 293.79 crore under the Financial Inclusion Fund (FIF) towards a host of initiatives like Financial literacy camps, demonstration of banking technology through ATM vans, centers for financial literacy and various other types of capacity building projects.

## For RRBs, first uniform NPA norms then corrective action: Officers' federation

The National Bank for Agriculture and Rural Development (Nabard) should implement the prompt corrective action framework for Regional Rural Banks (RRBs) only after ensuring that they follow standardised non-performing asset norms, according to the All India RRB Officers' Federation. Shyamal K Bhattacharjee, General Secretary, AIRRBOF, cautioned: "There is no standardisation in following regulatory guidelines among RRBs. Adoption of PCA in RRBs at this moment will have disastrous consequences on them. "Any hasty implementation without addressing the issue of standardisation will be fraught with inherent risk – the risk of faulty determination of the financial health of individual RRBs." Nabard has come up with a PCA framework to enable RRBs that fail to meet prudential requirements relating to capital adequacy, net non-performing assets (NNPAs) and return on assets (ROA) to take self-corrective action so that further deterioration in their financial position is prevented and they are nursed back to health.

## Nafed settles with its lender banks

National Agricultural Cooperative Federation of India Ltd. (NAFED) signed the Debt Settlement Agreement with its eight lender banks at its Headquarter, New Delhi. The One Time Settlement



with the lender banks has been made at Rs. 478 Crore with cash payment of Rs. 220 Crore and assignment of sale rights of one of its prime properties located at Lawrence Road, New Delhi. In addition, the lenders are entitled to the assignment of auction right of the property of one of the defaulters of its tie-up business conducted in the years 2003-05. The Deputy General Manager, Central Bank of India, signed the agreement on behalf of lender banks with Addl. Managing Director AMD, NAFED. It may be recalled that the Federation had mired itself with a number of controversial businesses conducted with private parties, when the borrowings made from banks were diverted to the private associates without proper collateral/securities. This has led to the default by Nafed to its bankers as the monies were not returned by the business associates. Such defaults had reached a level, when Nafed had no money to pay in the years 2011-12, forcing banks to declare Nafed's account as NPA.

## 73,000 farmers in Punjab benefit in latest tranche of debt relief

◆ Over 73,000 farmers from six districts were given debt relief certificates worth ₹.485.69 crore at a function in Rampura, Sangrur district, on Thursday. The relief was provided under the farm debt waiver scheme of the Punjab government. Farmers from Sangrur, Barnala, Patiala, Fatehgarh Sahib, SAS Nagar and Rupnagar districts were the beneficiaries in the current phase of the implementation of the farm debt waiver scheme.



# Grape exports to Europe set to beat last year's figure

India has exported around 85,000 tonne grapes to Europe this season till date and is likely to cross last year's shipment of 1.08 lakh tonne, exporters said. Last year, the country had exported more than 1.08 lakh tonne grapes to Europe, thanks to the favourable weather and good crop. Jagannath Khapre, president, All India Grape Exporters Association ( AIGEA), said that the country could either better last year's exports or come close to it by the end of the season which is likely to last for another couple of weeks. However, the country has not been able to crack the issue of stricter residue monitoring plan norms by several countries. Like Europe, countries that import grapes from India, including China, Indonesia and Russia, have decided to issue stricter Residue Monitoring Plan ( RMP) norms to the country . India has been trying to make inroads into new export markets such as China, Russia, Indonesia and Saudi Arabia. However, these countries have now decided to come up with norms for Indian grapes, which may affect the export prospects of India this season. A couple of years ago, the EU had agreed to retain the residue levels of chlormequat chloride (CCL), a plant growth regulator, at 0.05 ppm (parts per million ) for two years.



# Indian Tea in Demand as Global Rates Rise

India's tea exports rose 3% in the first two months of 2018 from a year ago following an increase in the prices of Sri Lankan and Kenyan teas that made Indian teas more competitive in the global market. Sri Lanka's premium orthodox teas are priced at \$5 per kg while Indian varieties are 20% cheaper on average, at \$4 per kg. Similarly, in the case of the traditional black teas or CTC, Indian teas are selling at \$3 per kg, lower than \$3.5 per kg being charged for the Kenyan varieties. India has an edge over both Sri Lanka and Kenya in tea exports this year, said Azam Monem, director of McLeod Russel India, the world's largest integrated tea company. "Although prices of Kenyan tea, our biggest competitor in the world

export market, have seen a correction of 20-30 cents per kg, they are still ruling higher." In 2017, India clocked the highest tea exports in 36 years, at 240.68 million kg, with a yearon-year increase of 8.2%. In 1981, the country had exported 241.25 million kg of teas. The total value of tea exports in 2017 stood at 4,731.66 crore, up 5.9% or 263.55 crore in a year. "Orthodox tea is expected to be a game changer this year for Indian tea exports," said Monem, who is also the chairman of Indian Tea Association. "Iran and Iraq will be the two major destinations for orthodox teas this year. China and Egypt are also emerging as major black tea markets for India. So this year we can expect a good export market."



# Non-basmati exports rise 34% on Africa demand

India's non-basmati rice export jumped 34 per cent over a year before in the period between April 2017 (start of the earlier financial year) and January 2018. The prime reason given is that Africa's import demand shifted to here from Thailand, on cost competitiveness. Basmati export, however, remained stable. Data from the Agricultural & Processed Food Products Export Development Authority (Apeda) showed non-basmati export at 7.01 million tonnes worth nearly \$2.89 billion for these 10 months, compared to 5.25 mt valued at \$1.97 billion in the same period a year before. Apart from geographical advantage, currency movement is a major determinant for rice export, in comparing Thailand and India. Till a few months earlier, however, Thailand was the preferred choice for African rice importers. However, a rising Thai currency (the baht) pushed them to look for alternative suppliers. "India has got a little extra share in world rice markets due to lower stock and shipment from Thailand. Non-basmati export from India would continue to surge for the next couple of months," said A K Gupta, director, Apeda. The Food and Agricultural Organization of the United Nations has estimated 33.7 mt of rice output in Thailand for calendar year 2017, a three per cent increase from 32.6 mt a year before. Production in Thailand jumped 19 per cent in 2016 from 27.4 mt in 2015.

# Coffee exports hit a new record; up 12% near 4 lakh tonnes in 2017-18

● India's coffee exports set a new record in financial year 2017-18, both in terms of volume and rupee value terms. Robust demand from key buyers in Europe and Russia, higher domestic production and a continued increase in re-exports aided the shipment trend. Exports fell short of the 4-lakh tonne-mark in volume terms, registering a 12 per cent growth over last year. Of the export permits issued by the Coffee Board for 3.957 lakh tonnes during the year, the robusta variety accounted for 2.257 lakh tonnes (It), while arabicas were 52,569 tonnes. The instant coffees continued to register an increase and accounted for 1.169 It. Coffee imports for re-exports were estimated at 68,142 tonnes, sources said. In rupee terms, the shipments touched a new high of Rs 6,226 crore — a 11



per cent growth over previous year, despite rupee being stronger for large part of the year. In dollar terms, the exports stood at \$965 million. But for the prevailing bearish trend in the global prices, the shipments in dollar terms could have exceeded the previous high of \$999.7 million achieved during 2011-12. Ramesh Rajah, President of the Coffee Exporters Association, attributed the growth in exports to the increase in availability of coffees for shipments on good crop harvested in past couple of years. India's coffee output stood at 3.48 It in 2015-16 and 3.12 It in 2016-17.

# Cotton exports seen billowing to 70 lakh bales on Chinese demand

• Cotton exports are expected to revive with China placing big orders with Indian traders. Moreover, Indian cotton prices are 10 cents cheaper at 80 cents per pound compared to the global price on the ICE. Atul S Ganatra, President, Cotton Association of India (CAI), said exports will touch 70 lakh bales (lb) as the country has already shipped out 55 lb till Marchend and has 10 lb committed orders which will be executed by May-end. Of the overall exports, China has bought 6 lb so far and is likely to look to India as it is planning to levy 25 per cent duty on imports from the US, he added. China has almost exhausted its cotton inventory and will be in the market to import the fibre and India has a good chance especially with the new duty on imports from the US, said Ganatra. However, he said the acreage in Maharashtra and Telangana will reduce sharply as the farmers.

# Oilmeal export earnings rise by 39% in 2017-18

The overall exports of oilmeals during 2017-18 has been provisionally reported at 2,839,623 tonne compared to 1,885,480 tonne during the same period last year. The rise is due to higher export of rapeseed meal (up by 26%), ricebran extractions (up by 27%) and castor seed meal (up by 51%). In terms of value, the total earnings has increased to `4,489 crores compared to Rs 3219 crores, a raise to 39%, the Solvent Extractors Association of India (SEAI) has said. In November 17 last year, government raised the import duty on edible oils to 15% across the board and increased MEIS (Merchandise Exports from India Scheme) on soybean meal from 5% to 7%. These steps resulted in higher export of oilmeals during the current year, BV Mehta, executive director of the association stated. As per the data, the export of oilmeals during March 2018 is provisionally reported at 75,393 tonne compared to 170,496 tonne in March 2017, i.e. a reduction of 56%.

# Cashew exports under pressure on Vietnam sale

Ocashew exports are under pressure with Vietnam selling at a discount in global market coupled with revival of domestic demand from the impact of demonetisation and GST, which could support the Indian market. Besides, good supply of raw cashew is seen in India, Vietnam and Africa. India produces 6-7 million tonnes of raw cashews per annum and was until recently the leading supplier of kernels to the global market. Pratap Nair of Vijayalakshmi Cashews, one of the oldest cashew exporting companies and chairman of the International Nut and Dried Fruit Council (INC) Congress said that there has been a small correction in cashew kernel prices due to discounted selling by Vietnam which is the market maker in cashew nut trade. "Vietnam is the biggest exporter of kernels and also the biggest importer of raw cashew. The processing charges in Vietnam are lower than other processors and they can sell at a discount when compared to India,"he said. Cashew kernel prices have gone down to \$ 4.60-4.70 from \$ 5.30 per pound a year ago, but is still at a premium to almonds selling at \$3.50, Nair. Demand is robust for cashew nuts despite competing nuts like Almonds and Hazel nuts selling at a discount, he added.



# North Bengal Agricultural University develops new ginger variety

Scientists at the North Bengal Agricultural University in Cooch Behar have developed a new variety of ginger called Mohini that they say has a "natural sweet aroma " and offers higher yields than conventional ginger. Soumendra Chakraborty, who developed Mohini with his colleagues after more than a decade of research, said the new variety is more resistant to various plant diseases than ordinary ginger. "Its yield is almost twice that of traditional varieties --- 14 tonnes per hectare compared with 6 to 10 tonnes per hectare. More importantly, it has a natural sweet aroma, "he said. "We expect it to be ready for cultivation by farmers within a year or two. "Mohini was developed from a variety of ginger found in Morolpara, Alipurduar. The new research has been published in the International Journal of Science, Environment and Technology.



Some 70 per cent of India's ginger comes from Kerala. The crop is grown also in Assam, Andhra Pradesh, Himachal, Bengal and Sikkim. " Mohini has been recommended for all the ginger- growing states, " said Ashok Choudhury, director of research at the university.

# Depleting resource: Nabard's water atlas of India to aid crop planning ready

▶ India will soon have a water atlas, thanks to an initiative by National Bank for Agriculture and Rural Development (Nabard). The facility will help the country improve crop planning for judicious use of water, a rapidly depleting resource. The Organisation for Economic Co-operation and Development had estimated that about 80% of India's total available freshwater is used for agriculture. It is estimated that 50-55% of the irrigation water across India is used up by just two crops: Rice and sugarcane. The Indian Council for Research on International Economic Relations (Icrier) has just completed mapping the physical and economic productivity of water available in India. Rice, wheat, maize, chana, tur, groundnut, mustard, sugarcane, cotton and potato are the crops whose water use has been mapped.

## Farmers' organisation launches daily MSP alert

Farmers' organisation Jai Kisan Andolan has launched a daily news alert, tracking the ground reality regarding MSP. The MSP alert will be published on social media

handles of the Jai Kisan Andolan and associated organisations.

### The Mango Bond & its benefits



• A Mango bond is a Rs 50,000 bond signed to transact mangoes online. This is basically a bond scheme started by a Pune-based e-commerce trader, where the customer invests Rs 50,000 as deposit, and in return, the trader offers the customers 10 per cent interest, in the form of Devgad mangoes for the next five years. The customers are allowed to pull out of the deal at any time. Farmers from Ratnagiri decided to take the e-commerce route to sell their produce instead of setting up stalls in different markets. Devgad Taluka Amba Utpadak Sahakari Sanstha (DTAUSS), a body of mango producers, launched an online mango retail site — Devgadmango.com — in the year 2011, along with a pilot scheme — The mango bond. The organisation comprises around 700 farmers from Devgad.

Explaining the concept, OmkarSapre, who conceptualised the mango bond, said, "The customers keep the deposit with us and every year, we give them mangoes worth 10 per cent of the amount deposited. This scheme really works in the interest of the investors — they earn more in interest than any bank would provide, plus they get their due supply of mangoes. Meanwhile, we further invest the deposited money to boost our trade." Like any other product, social media and online websites have been the go-to option for mango-lovers to order any variety of the fruit, including Alphonso.



# TNAU devices a 'pitfall' for flour, millet pests

• The Tamil Nadu Agri University (TNAU) has come up with another gadget, a 'Pitfall Trap' to do away with pests in flour, spice powders and minor millets. "This will bring huge relief to those who who store flour, spice powders and minor millets in bins or bag, and sieve the flour before use," according to S Mohan, Professor, Department of Agricultural Entomology, TNAU. Insect problem in flour and powdered food items is a given. People usually discard the flour if they find it infested with insects or other pests. But the pitfall trap can help avoid waste. It works like a probe trap used in grains but is modified to trapinsects in flour and minor millets, he said. A perforated top lid is fitted to a cylindrical tumbler-shaped container with a fine sieve at the bottom. A rod is fitted to the top of the lid to insert the trap inside the flour or spice powder container. Insects generally surface for air, so the trap should be inserted into the container. The pest will fall through the perforation on the top of the tumbler and settled over the sieve portion at the bottom. Any spill over flour into the trap can be sieved by shaking the trap unit, he explained. The TNAU is yet to start commercial production of the trap but enquiries are coming from millers. The device is simple to use, chemical-free and helps in early detection of insects, he said and added that the device will be priced between Rs 140 and Rs 150.

### White tea – The new Fad

• White tea, straight from Assam's Brahmaputra and Barak Valley regions is the costliest among all varieties of specialty tea: the average price is around Rs 10,000 per kg. Known for health properties, white tea comes from unopened tea buds rich in anti-oxidants helping in boosting cardiovascular health, lowering cholesterol and helping in weight reduction. When you think of Assam tea, you usually refer to the CTC variety that gives strong flavour. Growing orthodox variety of tea has been an age-old practice in Assam tea estates. In recent years, a few planters and tea manufacturers have taken to producing specialty tea varieties such as green, red and white tea as these varieties are sold at very high prices in the domestic as well as in the global market. This is at a time when the prices of conventional varieties have not shown much upswing in tune with the steep rise in cost of production. So, white tea offers the planters an opportunity to earn extra. But it takes efforts.



# Gujarat adopts 'transparent' agri-procurement through video, CCTV monitoring

• In a first for the agri-procurement mechanism in the country, the Gujarat government plans to make videography and CCTV monitoring mandatory for the procurement of agricultural produces through State agencies. According to top government sources, the State, which is currently procuring tur and groundnut under the price support scheme at the minimum support price (MSP) level, will videograph the entire process at all the procurement centres and install CCTVs at all the warehouses to keep a close vigil on the commodities. "This is going to be a big booster for the farmers' confidence as it will ensure fair practices. After online registration and fund transfer through Aadhar-linked bank accounts, now videography of the procurement process will discourage illegal activities and unfair practices," said Bhagavandas Patel, Director, Gujarat State Warehousing Corporation (GSWC). According to top government officials, initially, the videography will be done for the current procurement that is being done for 1 lakh tonnes of groundnut and 1.2 lakh tonnes of tur (pigeon pea) beginning first week of March. "We will also conduct videography of the samples, to help in monitoring of right quality. Although we are being careful in current practices, we want to be extra careful. In immediate basis, CCTVs will be installed at the warehouses where the immediate unloading is taking place, and in due course other warehouses will also be covered," said a senior State government official. The State is preparing itself for a mammoth task of procuring record groundnut at about 9 lakh tonnes after witnessing record crop of 32 lakh tonnes in the kharif 2017-18.



# **SOWING THE FUTURE OF AGRICULTURE**

Seeds – the biological point of origin of a crop, decides the future of a nation. A strong agriculturally sound nation must essentially have a robust seed sector to support it. The seed sector has the immense responsibility of not only producing certified seeds, but also supplying them at affordable rates and making them available at appropriate times. The seeds of requisite quality is a constant need and the onus rests with the plant breeding community. The traits are most often decided by the demand, geographical and ecological needs, stresses and most importantly their economic advantage.



ndia todav is one of the most agriculturally developed nations. The country owes this status to a sound and well established seed sector. A slew of policy measures enacted by the government facilitated the development of the seed industry. The New Seed Development Policy introduced during 1988 - 1989 gave access to Indian farmers to the best of seed and planting materials available anywhere on the world and the policy stimulated appreciable investments by private individuals, Indian Corporate and MNCs in the Indian seed sector. The vibrant seed segment with equal participation from public and private seed sector had thus so far ensured that needs of Indian farmers are well met in terms of quantity and quality. However, for a country as diverse and vast as India, maintaining quality becomes critical.

#### Indian Seed Industry So Far....

Over the last decade, global seed industry has tripled in size reaching USD 45 billion and is estimated to grow at same rate crossing USD 92 billion by 2020. USA, France, China, Brazil and India are top markets contributing to 66 per cent of total global market together. The global organic seed market is expected to reach USD 4.59 billion by 2022, according to a new report by Grand View Research, Inc. Growing health consciousness and environmental awareness have resulted in shift in consumer preferences towards organic food. Such trends are projected to complement the organic seed market in the near future.

Indian seed industry is ranked fifth in the world. Indian seed market has shown robust CAGR of 19 percent over last four years growing from USD 1 billion in 2010 to USD 2.2 billion in 2014. In value terms, the major growth has come from the increased adoption of Bt Cotton hybrids, single cross Corn hybrids and hybrid vegetables. The volume growth has mainly come through increased Seed Replacement Rate observed in crops like Paddy and Wheat. Indian seed industry is estimated to grow at 12-13 per cent crossing USD 3 billion mark by 2020.

The overall Indian seed market is expected to grow at 11 percent annually, while Indian vegetable seed market is expected grow at 14.6 percent. In 2020, Indian field crop market would cross USD Indian seed industry is ranked fifth in the world. Indian seed market has shown robust CAGR of 19 percent over last four years growing from USD 1 billion in 2010 to USD 2.2 billion in 2014





**Domestic** vegetable seeds industry is expected to double from the current size to around Rs. 8.000 crore in the next five years. Over the last two & half decades. vegetable crops produced in India has nearly trebled. increasing to estimated 181 million tonnes in FY2018 from 59 million tonnes in FY1992.

3 billion mark, while vegetable seeds market would reach USD 700 million. The contribution of varietal seeds to the overall commercial seeds in India has witnessed a steep decline from 72 percent in FY'2007 to 36.8 percent in FY'2013. The Indian seed market is majorly contributed by nonvegetable seeds such as Corn, Cotton, Paddy, Wheat, Sorghum, Sunflower and Millets. In FY'2013, non-vegetable seeds accounted for 82.2 percent with Cotton alone accounting for 36 percent.

Domestic vegetable seeds industry is expected to double from the current size to around Rs. 8,000 crore in the next five years. This growth will be necessitated by the estimated growth in vegetable production required to meet future demand, and driven by greater use of hybrid seeds, which as of now have low penetration. Over the last two & half decades, vegetable crops produced in India has nearly trebled, increasing to estimated 181 million tonnes in FY2018 from 59 million tonnes in FY1992.

At present with the private sector dominating the market (with around 76 percent market share), there has been intense competition and a proliferation of companies. Today the private sector plays a dominant role both in R&D and marketing with the underlying infrastructure, technical skills, and production capacity. The New Policy on Seed Development of 1988 played a big role in opening up Indian agriculture to world seed market. The Policy greatly liberalized import of vegetable

and flower seeds in general, and

seeds of other commodities

to some extent and also encouraged the multinational seed companies to enter the Indian Seed Market. However, export of seed from India reached new heights with the implementation of Export Import Policy, 2002-2007.

Today India ranks 26th on the global list with annual seed export of USD 138 million and 1.38 per cent share in overall global seed export. If the exports are segregated into field and vegetable crops seed, India exports field crop seeds to the tune of USD 71.4 million and vegetable crop seeds to USD 67 million. However, India's position is comparatively better in vegetable seed export having ranked in top 15 countries with share of 1.94 percent. Field crop seeds export includes, Corn seed which has largest share, with the annual export value of USD 29 Million, followed by Sorghum (USD 17.1 Million), Rice (USD 8.2 Million), Soybean (USD 8.2 Million), Sunflower (USD 4.3 Million) and Cotton (USD 0.27 Million).

#### **The Policy Bolsters**

Indian policies have played a key role in developing India's seed potential. The foundation of today's seed sector was laid in 1966. The parliament passed the Seeds Act 1966 to provide legal framework around seed certification and make good quality seeds available to the cultivators. Under this act, Seed rules were framed and notified in1968 and systematic Seed Certification started in India in 1969. This act provided for establishment of a Central Seed Committee to advise the states in seed related matters. It also provided for establishment of Seed Certification Agencies in the states; Seed

certification Boards and State Seed Testing Laboratories.

Later constituting of Seed Review Team-SRT in 1968 and National Commission on Agriculture's Seed Group in 1972 further paved the way for development of Indian seed sector. With the launching of the World Bank aided National Seeds Programme (1975-85), a transformation change was brought about. The three phased programme led to the creation of State Seeds Corporations, State Seed Certification Agencies, State Seed Testing Laboratories, Breeder Seed Programmes etc.Later on, many programmes and schemes such as Seed Control Order (1983), Creation of the Technology Mission on Oilseeds & Pulses (TMOP) in 1986 (now called the Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize (ISOPOM)), Production and Distribution Subsidy, Distribution of Seed Mini-kits and Seed Transport Subsidv Scheme (1987) further

expanded the scope of the seed segment. The New Policy on Seed Development (1988) was a game changer. The policy encouraged the private sector and import of vegetable and flower seeds. Foreign Direct Investment was also permitted in seed sector.

National Seeds Policy (2002) introduced another facet into the seed sector. With the New Policy in Development of Seed, the seed scene in India observed a spurt in improved varieties. This failed to protect the rights of the farmers over their seeds. To address this issue, the National Seed Policy was introduced. The policy was launched to - provide intellectual property protection to new varieties; usher this sector into planned development; protect the interest of farmers and encourage conservation of agro-biodiversity. It focused on Varietal Development and Plant Varieties Protection, Seed Quality Production, Assurance, Seed Distribution and Marketing, Infrastructure facilities, Transgenic Plant Varieties, Import of seeds and planting material, Export of seeds, Promotion of Domestic Seed and Strengthening of monitoring system. The policy advocated the establishment of a National Gene Fund and a Plant Varieties & Farmers' Rights Protection (PVP) Authority.

The Seeds Bill (2004), still pending, seeks to regulate the production, distribution and sale of seeds. The Standing Committee has recommended that farmers selling or exchanging seeds from other farmers be exempt from this requirement. The Bill has been pending since December 2004. The government has proposed new amendments to the Bill in April 2010 and November 2010, accepting most of the recommendations given by the Standing Committee. The Seeds Bill, 2004 aims to regulate the quality of seeds sold, and replaces the Seeds Act, 1966. All varieties of seeds for sale have to





The Seeds Bill, 2004 aims to regulate the quality of seeds sold, and replaces the Seeds Act, 1966. All varieties of seeds for sale have to be registered. The seeds are required to meet certain prescribed minimum standards

be registered. The seeds are required to meet certain prescribed minimum standards. Transgenic varieties of seeds can be registered only after the applicant has obtained clearance under the Environment (Protection) Act, 1986. In addition, the label of a seed container has to indicate specified information. The Bill exempts farmers from the requirement of compulsory registration. Farmers are allowed to sow, exchange or sell their farm seeds and planting material without having to conform to the prescribed minimum limits of germination, physical purity and genetic purity (as required by registered seeds). However, farmers cannot sell any seed under a brand



name. If a registered variety of seed fails to perform to expected standards, the farmer can claim compensation from the producer or dealer. The Bill provides for setting up a compensation committee that shall hear and decide these cases. It also provides for an appellate mechanism to be set up by notification.

#### **From Breeder to Farmer**

Seeds are a critical input in the agriculture system. Pure seeds are the foundation of today's agriculture. Hence any dilution in its quality can be a sufficient reason to erode the credibility of improved seeds. The production of improved seeds therefore is highly regulated and monitored in India.

The Indian seed programme largely adheres to the limited generations' system for seed multiplication in a phased manner. The system recognizes three generations namely breeder, foundation and certified seeds and provides adequate safeguards for quality assurance in the seed multiplication chain to maintain the purity of the variety as it flows from the breeder to the farmer.

Breeder seed forms the foundation of the seed production programme and is the progeny of nucleus seed of a variety produced by the originating breeder or by a sponsored breeder. Breeder seed production is the mandate of ICAR and is being undertaken with the help

ICAR Research Institutions, of National Research Centres and All India Coordinated Research different crops;State Project of Agricultural Universities (SAUs) with 14 centres established in different States; Sponsored breeders recognized by selected State Seed Corporations, and Non-Governmental Organizations. ICAR also promotes sponsored breeder seed production programme through the National Seeds Corporation (NSC) / State Farms Corporation of India (SFCI), State Seeds Corporation (SSCs), Krishi Vigyan Kendras (KVKs) etc.

Foundation seed is the progeny of breeder seed and is required to be produced from breeder seed or from foundation seed which can be clearly traced to breeder seed. The responsibility for production of foundation seed has been entrusted to the NSC, SFCI, State Seeds Corporation, State Departments of Agriculture and private seed producers, who have the necessary infrastructure facilities. Foundation seed is required to meet the standards of seed certification prescribed in the Indian Minimum Seeds Certification Standards, both at the field and laboratory testing.

Certified seed, which is the next link in the seed production chain is the progeny of foundation seed and must meet the standards of seed certification prescribed in the

# Mr. K. K. Narayanan

#### Managing Director, Dhannya Seeds Limited

"Indian Agriculture is poised for continuous growth in the years ahead. In the upcoming decade 2018-2028, the overall growth in agriculture is expected to increase in comparison with the last few years GVA growth rate of 2-5%. Seed Industry is expected to be an important contributor to this growth. To achieve this potential, all the stake holders, and particularly the Industry participants and the Government, will be required to work hand in hand. The Industry may enhance its investment in new product development. It may create high yielding seeds or seeds which are more tolerant to biotic or abiotics tresses. In the face of flattish or declining land under cultivation, increase in yield becomes critical. Equally ecological changes brought about by climate change creates a need for stress resistant / tolerant seeds. Industry may take forward such products to the farmers through wide extension services. To motivate the Industry to spend on R&D and extension services, the government may adopt very constructive policies. Creating a predictable policy which is stable across different states will allow Industry to both plan ahead and invest in new product development & extension services with an expectation of catering to the growing and large all India Market. Schemes such as the PDPS which have been successfully introduced in some parts of the country will help farmers deal with market volatility better.Additionally creating a constructive climate for biotechnology will motivate both scientists and Industry. It is hoped that some of these initiatives will come to pass so that the potential opportunity is well captured".

Indian Minimum Seeds Certification Standards, 1988. In case of self pollinated crops, certified seeds can also be produced from certified seeds provided it does not go beyond three generations from foundation seed

YEAR	Production/Availability of Seed (Metric Tonnes)		
	Breeder Seed (Production)	Foundation Seed	Certified / Quality seed
2005-06	6823	74800	1405000
2006-07	7382	79654	1481800
2007-08	9196	85254	1943100
2008-09	9441	96274	2503500
2009-10	10683	114638	2797200
2010-11	11921	180640	3213592
2011-12	12338	222681	3536200
2012-13	11020	161700	3285800
2013-14	8229	174307	3473130*
2014-15	8621	157616	3517664
2015-16	9036	149542	3435248
2016-17	11221.8 (Target)	220907	3802904

stage-I.

The production and distribution of quality/certified seeds is primarily the responsibility of the State Governments. seed Certified production is organized through State Seed Corporation, Departmental Agricultural Farms, Cooperatives etc. The distribution of seeds is undertaken through a number of channels i.e. departmental outlets at block and village level, cooperatives, outlets of seed corporations, private dealers etc. The efforts of the State Governments are being supplemented by NSC and SFCI which produce varieties of national importance. NSC markets its seeds through its own marketing network and also through its dealer network. SFCI markets its seeds mainly through the State Departments of Agriculture and the State Seed Corporations. The production of certified seed by NSC and State Seed Corporations

The contribution of private sector seed companies in total seed production of the country is depicted in the following table:

Year of Production	Total Seed Production (Lakh qtls.)	Share of private sector
2003-04	132.27	47.48%
2004-05	140.51	45.02%
2005-06	148.18	46.80%
2006-07	194.31	41.00%

is mainly organized through contract growing arrangements with progressive farmers. SFCI undertakes seed production on its own farms.

The requirement of certified/quality seeds is assessed by State Governments on the basis of the area sown under different crop varieties, area covered by hybrid and self-pollinated varieties as well as the seed replacement rate achieved. The availability of seed is ascertained by the State Departments of Agriculture on the basis of the production of seed in government farms and production of seeds by State Seeds Corporations and other agencies. The Government of India periodically assesses the requirement and availability of seeds through detailed interaction with State Governments and seed producing agencies in the bi-annual Zonal Seed Review Meetings and the National Kharif and Rabi Conferences. The Department of Agriculture and Cooperation facilitates tieup arrangements with seed producing agencies to ensure that the requirement of seeds is met to the maximum extent possible.

Seed production in India has also seen active participation form the private segment. However, they seemed to be more concentrated on high value low volume seeds. At present, around 400-500 companies are engaged in Indian seed segment. Private sector companies have earned a significant place in the case of maize, sunflower and cotton. The advent of Bt cotton was primarily a fete achieved by private sector participation. In 2002, a joint venture between Monsanto and Mahyco introduced Bt cotton to India. Private sector has an irreplaceable position in the case of vegetable seeds and planting materials of horticultural crops.

#### **Protecting Rights**

With the obligation of catering to the agricultural community there came the immense responsibility of protecting the rights of the stakeholders involved. The entry of private segments and with the entry and exit



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of the planting materials to and from India, it has become all the more pertinent to protect the biodiversity and breeders' rights.

India, signatory to World Trade Organization (WTO) was required to introduce an "effective system" for the protection of plant varieties. In compliance to the TRIPS Agreement, India established Protection of Plant Varieties and Farmers Rights (PPV&FR) Authority, under the Protection of Plant Varieties and Farmers Rights Act, 2001. PPV & FR Authority became operational from 11th November, 2005. The Authority favours establishment of an effective system for protection of plant varieties, the rights of farmers and plant breeders and to encourage development of new varieties of plants. The authority strives to accord recognition and protection of the rights of farmers in respect to their contribution in conserving, improving and making the available plant genetic resources for the development of new plant varieties. It also has the potential to accelerated agricultural development in the country by stimulation of investment for research and development both in public and private sector, and facilitate growth of seed industry to ensure the availability of quality

**SEED SPECIAL** 

**COVER FEATURE** 

seeds and planting material to the farmers.

Under this act, farmers who have developed or bred a new variety shall be entitled for registration as a breeder of a variety. They are also permitted to save, use, sow, re-sow, exchange, share or sell his farm produce including seed of a variety protected under this Act in the same manner as he was entitled before coming into force of this Act.

Farmer who is engaged in the conservation of genetic resources of land races and wild relatives of economic importance working on their improvement and preservation shall be entitled to recognition and reward from the Gene Fund provided the material so selected and preserved has been used as a donor of genes in varieties register able under the PPV & FR Act. Any person or group of persons (whether actively engaged in farming or not) or any other Governmental or Non-governmental organization may stake a claim on behalf of the village or local community.

#### **Quality Matters**

Good quality seeds are the cornerstone of any farming system's success. The seeds sold should hence be of optimum genetic and physical purity, high germination percentage and optimum moisture content. It should also be free from noxious weed seeds, other crop seeds and should be free from seed borne diseases. Seed certification programmes are ways to ascertain and verify the authenticity of these claims. Seeds, being the primary input, such safeguards are necessary.

Seed certification is a process designed to maintain and make available to the general public continuous supply of high quality seeds and propagating materials of notified kinds and varieties of crops, so grown and distributed to ensure the physical identity and genetic purity. Seed certification is a legally sanctioned system for quality control of seed multiplication and production.

In India, the seed certification programme was initiated with the establishment of field evaluation



of the National Seeds Corporation in 1963. A legal status was given to seed certification with the enactment of first Indian Seed Act in the year 1966 and formulation of Seed Rules in 1968. The Seed Act of 1966 provided the required impetus for the establishment of official Seed Certification Agencies by the States. Maharashtra was the first State to establish an official Seed Certifications Agency during 1970 as a part of the Department of Agriculture, whereas Karnataka was the first State to establish the Seed Certification Agency as an autonomous body during 1974. At present 22 States in the country have their own Seed Certification Agencies established under the Seed Act, 1966. In great majority of the countries in the World, including India, seed certification is voluntary and labelling is compulsory.

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Seed certification assumes more





significance when it comes to export of seeds. To further consolidate India's presence in world seed trade, the Organization for Economic Cooperation and Development (OECD) granted eligibility to India to participate in the OECD Seed Schemes program in 2008. The program provides an international framework for the certification of agricultural seed movement in international trade. The Schemes were established in 1958 with a view to support fast-growing seed trade, regulatory harmonization in Europe, the development of offseason production, the seed breeding and production potential of large exporting countries in America (North and South) and Europe, and to support standardization in international seed trade. Most countries and seed importing companies now require OECD approved seed testing and quality certificates. The obiective of the OECD Seed Schemes is to encourage use of seeds of consistently high quality in participating countries. The Scheme authorizes use of labels and certificates for seed produced and processed for international trade according to agreed principles. Presently, India participates in five schemes namely, cereal, maize



and sorghum, vegetable, grass and legume and crucifer and other oil or fiber species. In India, 10 State Seed Certification Agencies covering all the regions of the country were nominated as Designated Authorities to carry out the varietal certification of the OECD Seed Schemes.

#### India – A Potential Seed Player

India 's agricultural exports are in demand in many countries. Beyond being an exporter of agricultural commodities and processed food products, India holds immense potential as a seed exporter. Currently commanding a small share in world trade, India however, has immense potential to capitalize on this trade.

India's varied agro climatic

conditions has rich and fertile soils with versatile agro climatic conditions suitable to a variety of crops. The presence of national and international research institutes is also a favourable factor for India in seed production segment. Presence of international research institutes in India can help India to collaborate to develop products targeted for geographies outside of India. Also the increasing research capability of private sector in India can catalyze the export oriented seed development programs of India. Availability of highly qualified techno commercial talent pool for both public and private organizations proves to be one of the greatest strengths of Indian seed industry. India's well established seed production systems and regulations, large number of trained seed growers, large number of seed producing companies are the enabling factors to make India a hub for seed export. For, post harvest handling, the Indian seed processing/ conditioning industry has perfected the techniques of quality upgradation and maintenance to ensure high standards of physical condition and quality. By virtue of the diverse agro-climatic conditions several geographical zones in the country

have emerged as ideal seed storage locations under ambient conditions. In terms of seed marketing and distribution, more than 20000 seed dealers and distributors are in the business.

However, the country is yet to bridge some of its gaps in the seed segment. The increasing production cost due to increasing labour charges and processing fees are disturbing many seed producers in the private sector. Another problem vexing the seed sector is the slow pace with which new seeds enter the commercial market. With the fate of GM technology hanging in the balance, research on many new varieties with improved traits are stalled. The recent stalemate on Bt pricing has also rattled the seed industry. India has cut royalties that local seed companies pay to Monsanto for the second time in two years triggering unrest in the seed segment. Non-uniform Price



regulation in Bt cotton is leading to market uncertainty. Delayed rollout of OECD testing and international quality standard testing schemes leading to competitiveness of Indian Seed exports delays and lack of synergy between seed testing, SPS and regulatory processes for exports are some of the other challenges facing this sector.

India seed sector carries the responsibility of feeding the nation. With more emerging threats, the industry must be geared up to facilitate research and development of new varieties. This requires well aligned policies, personnel and extension services.



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# SEED SYSTEMS TO DOUBLE FARMERS' INCOME

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vailabilitv. accessibility and affordability of improved seed varieties at right time in sufficient quantitiesis is crucial to increase farmers' incomes. Many research studies clearly revealed that the use of recommended seed variety and quality seeds will increase profits. However, availability of quality seed (certified or truthfully labeled seed) of recommended variety in sufficient quantity during sowing time is always a problem to the farmers. Still farm saved seeds of nondescript varieties contribute to about 50% of cropped area in most of the crops like pulses. millets and oilseeds. Replacing the farm saved seeds with either certified or truthfully labeled seeds will have the potential to increase farmers' yields and profits by 30 to 40% with very little investment.

The existing formal seed production agencies including public sector agencies like National Corporation (NSC), seeds State Seed Corporations (SSCs), private companies are meeting just about 30 to 40% of the seed needs of the farmers. That too they mostly concentrate on major commercial crops like cotton and vegetables, where they get huge profits. The seed availability for rainfed crops like pulses, oilseeds and millets are not sufficient, especially in remote villages and backward states. Most of the farmers are still using farm saved seeds of the old varieties released 20 years back, even though new varieties with 20 to 30% higher yield potential are available. As a result, the farmers' yields from these crops would be lower by 50 to 60% compared to their potential yields observed in the research stations.

As a part of national objective

of doubling farmers' incomes, governments should focus on picking this low-hanging fruit first for immediate impact on farmers' incomes in low productive, backward and remote villages.

# Creation of platform for open sourcing seed material

Large scale seed production requires availability of seed materials (breeder and parental seed lines) from which the seed companies (either public or private) can produce certified or truthfully labeled seed to sale to farmers for wider adoption by the farmers. Most of these parental lines and breeder seeds are in the control of a few public research institutions and private companies. These government agencies and private companies are independently working in silos without free movement of breeder seed and parental lines. If a small private company or Farmers' Producer Organizations (FPOs) wants to use parental line of a particular variety for multiplication and seed production

to distribute to a large number of farmers, there are many procedural hurdles. Experience shows that, it is almost impossible to get parental seed lines by a third party even from public funded institutions.

But the free movement of parental seed material is essential for innovations in seed systems to increase development and availability of locally suitable varieties and seeds for different agro-climatic conditions. Hence, there is a need to develop an open source platform for sourcing parental seed materials, in which all stakeholders, both public and private seed companies, and FPOs should be members with nominal membership fee. Under this, an online list of all the parental seed materials available with all organisations should be provided and can be shared with whomever putting an indent for a particular seed material in a time bound manner with nominal fee.

**Promoting innovation systems** 

With the easy availability of all types



of parental seed material in open source, there is a lot of scope for development of new varieties suitable for local agro-climatic conditions, even by small seed companies and farmers' organizations. This will create local market for improved seed, in which everyone can participate and break the monopoly of a few private companies in the seed marketing channels. This will ultimately increase number of seed companies which supply seed in the remote villages and increase number of seed varieties available in the local seed market, which increase choice of seed varieties available to farmers to pick and choose according to their suitability at cheaper rate compared to existing monopoly prices.

#### Apex committee for rolling plan for seed availability

Timely availability of right variety of seed in local seed markets should be the objective of the seed planning. The existing seed planning is confined to only formal sector which consider demand and supply conditions of varieties released and supplied through public seed agencies like NSC with utter neglect of informal seed producers who meets about 50% of total seed demand. In the estimation of demand and supply of each seed variety for each agro-climatic condition in local seed markets, there is a need for inclusion of seed production plans of informal sector by estimating how much seed is required and how much is supplied through formal and informal sources. There is a need for adoption of three year rolling plan for this purpose, as to meet seed demand for this year, planning should start at least three years before. The rolling plan should take in to account year after year climatic variability and contingency plans to meet the changing varietal preferences and consequent seed requirements.

#### Timely availability of identified varieties

The identified varieties under rolling plans should be available in each village, either through public, private seed companies or by arranging local production by farmer producer companies (FPOs) or through institutions like Farmers Coordination Committees (FCCs) of Telangana. There should be a penalty clause if companies are not able to provide seed in time before sowing especially in remote villages.

#### Distribution subsidy in notified remote villages

To make available the identified varieties in remote, rainfed, backward districts for crops



like pulses, millets, oilseeds where the quantity demanded is scattered, thin, low volume is important. Although production subsidy is already available, there is a need for distribution subsidy to distribute the seed to these remote and difficult to reach villages. To ensure equal opportunity to local FPCs and small seed companies to produce seed locally, they should also get distribution subsidy equal to the large private companies from other areas.

#### **Regulation and monitoring for quality** seed

Quality of the seed in terms of germination percentage and genetic purity is of paramount importance for profitability of the farmers. Although formal sector is controlled by state seed certification agencies, quality is still a big problem. Almost every day there is news about spurious seed. Wide spread use of Bt3 cotton seed varieties before official release is one of the best examples of the lapse of the regulatory framework which needs to be strengthened. Informal seed sector should encourage formation of clusters of 25 to 50 acre clusters and clusters should get Participatory Guarantee Certification. Provisions for the same can be provided in Seed Village Scheme of Government of India.

With above measures, there will be sufficient competition in the seed market to break monopoly and encourage companies to serve remote and backward villages to supply quality seed to increase farmers' profitability.

growth of organic he agriculture in India has three dimensions and is being adopted by farmers for different reasons. First category of organic farmers are those which are situated in no-input or lowinput use zones. For them organic is a way of life and they are doing it as a tradition (may be under compulsion in the absence of resources needed for conventional high input intensive agriculture). Second category of farmers are those who have recently adopted organic agriculture in the wake of ill effects of conventional



AGRICULTURE

agriculture, may be in the form of reduced soil fertility, food toxicity or increasing cost and diminishing returns. The third category comprises of farmers and enterprises who have systematically adopted the commercial organic agriculture to capture emerging market opportunities and premium prices. While majority of farmers in first category are traditional (or by default) organic, they are not certified; second category farmers comprises of both certified and un-certified, but majority of third category farmers are certified. The third category commercial farmers are attracting most attention. The entire data available on organic agriculture today, relates to these commercial organic farmers.

Organic farming is one of the several approaches found to meet the objectives of sustainable agriculture. Many techniques used in organic farming like inter-cropping, mulching and integration of crops and livestock are not alien to various agriculture systems including the traditional agriculture practiced in old countries like India. However, organic farming is based on various laws and certification programmes, which prohibit the use of almost all synthetic inputs, and health of the soil is recognised as the central theme of the method.

Adverse effects of modern agricultural practices not only on the farm but also on the health of all living things and thus on the environment have been well documented all over the world. Application of technology, particularly in terms of the use of chemical fertilizers and pesticides all around us have persuaded people to think aloud. Their negative effects on the environment are manifested through soil erosion, water shortages, salination, soil contamination, genetic erosion, etc.

# Nutrient management in organic farming

Organic farming is often understood as a form of agriculture with use of only organic inputs for the supply of nutrients and management of pests and diseases. In fact, it is a specialized form of diversified agriculture, wherein problems of farming are managed using local resources alone. The term organic does not explicitly mean the type of inputs used; rather it refers to the concept of farm as an organism. Often, organic agriculture has been criticized on the grounds that with organic inputs alone, farm productivity and profitability might not be improved because the availability of organic sources is highly restricted. True, organic resources availability is limited; but under conditions of soil constraints and climate vagaries, organic inputs use has proved to be more profitable compared to agrochemicals.

Organic farming systems rely on the management of soil organic matter to enhance the chemical, biological and physical properties of the soil. One of the basic principles of soil fertility management in organic systems is that plant nutrition depends on 'biologically-derived nutrients' instead of using readily soluble forms of nutrients; less available forms of nutrients such as those in bulky organic materials are used. This

requires release of nutrients to the plant through the activity of soil microbes and soil animals. Improved soil biologicalactivity is also known to play a key role in suppressing weeds, pests and diseases. Animal dung, crop residues, green manure, biofertilizers and bio-solids from agroindustries and food processing wastes are some of the potential sources of nutrients of organic farming. While animal dung has competitive uses as fuel, it is extensively used in the form of farmyard manure. Development of several compost production technologies like vermi composting, phosphour composting, N-enriched phosphour composting, etc. improves the quality of composts through enrichment with nutrientbearing minerals and other additives. These manures have the capacity to fulfil nutrient demand of crops adequately and promote the activity of beneficial macro- and micro-flora in the soil. There are several doubts in the minds of not only farmers, but also scientists about whether it is possible to supply the minimum required nutrients to crops through organic sources alone. Even if it is possible, how are we going to mobilize the organic matter? At this juncture, it is neither advisable nor feasible to recommend the switch over from fertilizer use to organic manure under all agro-ecosystems. Presently, only 30% of our total cultivable areas has irrigation facilities where agrochemicals use is higher compared to rain-fed zones. It is here



that ingenuity and efforts are required to increase crop productivity and farm production despite recurrence of environmental constraints of drought and water scarcity.

The basic requirement in organic farming is to increase input use efficiency at each step of the farm operations.

This is achieved partly through reducing losses and adoption of new technologies for enrichment of nutrient content in manures. Technologies to enrich the nutrient supply potential from manure, including farmvard manure three to four times are being widely used in organic farms. According to a conservative estimate, around 600 to 700 million tonnes (mt) of agricultural waste is available in the country every year. But most of it is not used properly. We must convert our filth into wealth by mobilizing all the biomass in the rural and urban areas into bioenergy to supply required nutrients to our starved soil and fuel to farmers. India produces about 1800 mt of animal dung per annum. Even if two-thirds of the dung is used for biogas generation, it is expected to yield biogas not less than 120 m m3 per day. In addition, the manure produced would be about 440 mt per year, which is equivalent to 2.90 mt N, 2.75 mt P2O5 and 1.89 mt K2O.

Organic farms and food production systems are quite distinct from conventional farms in terms of nutrient management strategies. Organic systems adopt management options with the primary aim to develop whole farms, like a living organism with balanced growth, in both crops and livestock holding. Thus nutrient cycle is closed as far as possible. Only nutrients in the form of food are exported out of the farm. Crop residues burning is prohibited; so also the unscientific storage of animal wastes and its application in the fields. It is, therefore, considered more environment friendly and sustainable than the conventional system. Farm conversion from highinput, chemical-based system to organic system is designed after undertaking a constraint analysis for the farm with the primary aim to take advantage of local conditions and



their interactions with farm activities, climate, soil and environment, so as to achieve (as far as possible) closed nutrient cycles with less dependence on off-farm inputs. This implies that the only nutrients leaving the farm unit are those for human consumption. Crop rotations and varieties are selected to suit local conditions having the potential to sufficiently balance the nitrogen demand of crops. Requirements for phosphorus, sulphur and micronutrients are met with local, preferably renewable resources. Organic agriculture is, therefore, often termed as knowledge-based rather than input-based agriculture. Furthermore, organic farms aim to optimize the crop productivity under a given set of farm conditions. This is in contrast to concept of vield maximization through the intensive use of agrochemicals, irrigation water and other off-farm inputs. There are ample evidences to show that agrochemical-based, highinput agriculture is not sustainable for long periods due to gradual decline in factor productivity, with adverse impact on soil health and quality.

# Environmental benefits of Organic Agriculture

The impact of organic agriculture on natural resources favours interactions within the agro-ecosystem that are vital for both agricultural production and nature conservation. Ecological services derived include soil forming and conditioning, soil stabilization, waste recycling, carbon sequestration, nutrient cycling, predation, pollination and habitats. The environmental costs of conventional agriculture are substantial, and the evidence for significant environmental amelioration via conversion to organic agriculture is overwhelming. A review of over 300 published reports showed that out of 18 environmental impact indicators (floral diversity, faunal diversity, habitat diversity, landscape, soil organic matter, soil biological activity, soil structure, soil erosion, nitrate leaching, pesticide residues, CO2, N2O, CH4, NH3, nutrient use, water use and energy use), organic farming systems performed significantly better in12 and performed worse in none. There are also high consumer human health costs to conventional agriculture. particularly in the use of pesticides. It is estimated that 25 million agricultural workers in developing countries are poisoned each year by pesticides.

#### **Future prospects**

Although, commercial organic agriculture with its rigorous quality assurance system is a new market controlled, consumer-centric agriculture system world over, but it has grown almost 25-30% per year during last 10 years. In spite of recession fears the growth of organic agriculture is unaffected. The movement started with developed world and it is gradually picking up in developing countries. But demand is still concentrated in developed and most affluent countries. Local demand for organic food is growing. India is poised for faster growth with growing domestic market. Success of organic movement in India depends upon the growth of its own domestic markets.

India has traditionally been a country of organic agriculture, but the growth of modern scientific, input intensive agriculture has pushed it to wall. But with the increasing awareness about the safety and quality of foods, long term sustainability of the system and accumulating evidences of being equally productive, the organic farming has emerged as an alternative system of farming which not only address the quality and sustainability concerns, but also ensures a debt free, profitable livelihood option.

Dr. Rakesh Sahu and Roshni Sahu, JNKVV Jabalpur



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# **ALLEY CROPPING - A DYNAMIC AND VERSATILE AGRISILVICULTURAL SYSTEM**

llev cropping, an agroforestry exercise relating to the production of agricultural or horticultural crops in alleys between trees or shrubs 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 land owner can utilize vacant space, time and resources more successfully. Alley Cropping can be utilized for other reasons as well such as a short-rotation of 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. It helps in conversion from one farming system to another. Such conversions improve shade and changes micro climate that occur as trees and shrubs grow. The annual crops grown in alleys can supply short-term annual income until the trees mature.The trees 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 prunings are used as green manure or mulch 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 increase crop yields by development of the soil and micro climate and weed control. Farmers may also obtain tree products from the hedge rows 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



Alley cropping is a significant system to enhance wholefarm yield in the long term. It helps in conversion from one farming system to another. Such conversions improves shade and changes micro climate that occur as trees and shrubs grow





wish or are forced to enhance production on a plot of limited size.

#### **Design of alley cropping**

Woody plants are introduced as hedge rows 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 create a net increase in yields from croplands. Trees may also give new products like fuel wood, fodder or food. The situation and spacing of hedge row and crop plants in an alley cropping system depend on plant species, climate, slope, soil situation and the space essential for the movement of people and tillage equipment. Preferably hedge rows 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 the 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 eastwest orientation then they may need regular thinning to prevent shading the adjoining crops.

#### **Alley Crop Options**

There are a number of factors to consider when selecting alley crops, including light requirements throughout the year, nutrient needs of companion crops and the possibility of undesirable wildlife populations. 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 golden seal 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.
- An improvement 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 barriers 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 hedge row 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.

#### **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.
- 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 hedge row 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.

#### **General Considerations**

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 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.

#### **Economic Considerations**

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.

Tree Arrangement: 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.

#### **Management Considerations**

While the alley cropping system is getting established, there are a number of management needs 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, form of trees and shrubs will change, potentially affecting alley width and shade. Changes occur below ground as well with the potential for root competition between the rows and the alleys. Root pruning which involves subsoil ripping at the outer edge of the tree canopy during tree development mav 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.

Laxmi Priya Sahoo, Ankita Sahu, Jatinder Kishtwaria, Manoranjan Prusty, Tapaswini Sahoo & Sanjay Kumar Behera ICAR-Central Institute for Women in Agriculture, Bhubaneswar

# AMRITA SERVE - (AMRITA SELF RELIANT VILLAGE): ADARSHGRAM



8.9% of our population lives in villages (Census 2011) and it is expected that half of our population would be rural even in 2050. After seventy years of independence, still there is a significant gap between rural and urban India. Despite there being several past initiatives by governments at all levels - Central, State and local, many of the policies have failed, schemes haven't reached rural people, and level of improvement has not kept pace with the expenditure of the government.Redtapism, corruption, interstate -politics, casteism and lack of a holistic focus on the village as a unit can be enumerated as some of the causes.

#### Where is the Alternative Model?

Amrita Self-Reliant Villages (Amrita SeRVe) is an alternative model of

village development that started in the year 2013 September on the 60th birthday of Mata Amritanandamayi( Popularly known as Amma) .The Mata Amritanandamayi Math (MAM) selected 101 villages throughout India with the goal of holistic development and helping them to become selfreliant role-model villages for the country. By 2017, Amrita SeRVe had started its work in twenty one states.

Village Coordinators from Amrita SeRVe looks after the activities in each village. Separate flagship programs targeting different cross sections of village population were introduced such as AMMACHI Labs that provides skill training program to rural women and arrange internship program for students from various streams to know India better by staying and learning from villagers ; Amrita CREATE which educates rural and tribal people through tablet technology and appoints tuition teachers; The Amrita Center for International Programs (ACIP)-which is the central point for international academic relations at Amrita University and that sends foreign students to village for research projects.

# The role of village coordinators in Amrita SeRVe

"First learn from villagers their tradition, culture, beliefs and way of life and don't try to impose anything on them". -Sri Mata Amritanandamayi Devi (Amma).

India is a land of "Unity in diversity" and villages represent true India. When village coordinators work in villages they have to work with responsibility and sensitivity towards social, cultural, economic and environmental issues. Amrita SeRVe mainly focuses on seven areas: Health, Water and Sanitation, Education, Agriculture, Income Generation, Eco-Friendly Infrastructure and Self-Empowerment. They are the interface to the villagers and works in

- Assisting village/hamlets in constitution of the committee and their functioning.
- Organizing and nurturing user groups and self-help groups.
- Mobilizing women to ensure that their participation and that the interests of women are adequately reflected in every program.
- Conducting the participatory base-line surveys, training and capacity building programs.
- Preparing detailed resource development plans including water and soil conservation etc., to promote sustainable livelihoods at the household level.
- Undertaking engineering surveys,preparing engineering drawings and cost estimates for any structure to be built.
- Facilitating the development of livelihood opportunities for the landless.
- Maintaining project accounts
- Spreading Amma's messages among the villagers.

Village coordinators make sure that all institutional arrangements are made at the village level and to ensure people's participation by creating Village Development Committees (VDCs), Self help groups (SHG) and Farmers groups. All the groups are able to solve various problems at village level and administrative level. The committee also acts as a watchdog for program implementation and oversees all the matters pertaining to the development of the villages.

#### Amrita SeRVe's Major Steps in

#### AGRICULTURE

Organic agriculture was practised at 35 acres of land at Sadivayal Village, Thondamuthur Block, and Coimbatore Districts where the population mostly constituted the tribal Irulas community in 44 households. In the absence of irrigation facilities, villagers primarily practised rainfed agriculture, and once in a year they cultivated rice. However, as agriculture production was not sufficient for most of the families to sustain them throughout a year, they resorted to daily wage labour activities in the nearby forest area.

The main objective of the Amrita Farmers Groups is to improve the livelihood of poor and marginal farmers by organizing them into groups and helping them adopt innovative Agricultural activities and to improve the overall security of farmers- food, social , health and safety.. After various discussions with the farmers groups, Amrita SeRVe(Amrita Self Reliance Village) team came to the conclusion that to enhance the income of farmers, group farming is the best method. The increase in their income could only be possible by group farming and the all- round support from various line departments using convergence method and the project investment which can lead to sustainable livelihood enhancement. Training the farmers on fertilizers, seeds will lead to agriculture activities that are economically independent and socially empowering. The convergence method is the need of the hour. On 09 May 2016, a resolution was passed at the village, where twenty most deprived families of the village were selected to start group farming and a bank account in Canara Bank was opened under the name of Amrita Vyavasayam Kulu . Together they defined the formulated responsibilities and guidelines for internal management. The Amrita SeRVe team too focused approach to address various needs of farmers. Starting with the activities like selection of seed, soil testing, seed testing, crop planning, water budgeting & water conservation. Upon completion of discussion, farmers began their activities on June 20th 2016.

#### farming

In convergence, since the farmers themselves save seed for the next cultivation, there is no necessity for buying the seed from an external source. They also use cow dung and urine from their cattle which is free of cost to make bio-fertilizers and biopesticides. In addition to cow dung and urine, they need some fruits, jaggery, etc. to make biopesticides, which costs around Rs. 2000.00 for each of the farmers. Since the material costs for purchasing inputs are reduced, there is no need for external transportation. For labour intensive work, labour is sourced from the farmers themselves who are working on their own land, thus the amount spend on labour is also reduced. Even though work required is same in both convergence and outsourcing, the rate for the work per person is reduced by half, and the total amount also gets reduced almost half the outsourcing bv amount. The total amount spent on outsourcing amounts to Rs. 58,000.00, whereas convergence came in at Rs. 25,000.00, reflecting a saving of Rs. 33,000.00 by group farming.

The farmers, group gained confidence in November 2017 they started organic farming with a new vision to convert the whole cultivable land of the village of 40 acres to organic farm. The nearby hamlet also drew inspiration and started cultivating Bhavani rice, which was once the traditional rice of Tamil Nadu. The other adopted villages also started organic farming.Notable are five acres of land at Wayanad where they grew – Aathira Rice. The farming is collectively managed by Amrita Adivasi farmers Club consisting of 13 members.

In all other villages the Village Coordinators started lemon grass, vegetables, grows bags according to land size.

#### Health

Healthcare is major problem in rural

Convergence

and group



India and due to lack of qualified medical doctors, nurses and staff, basic medicines and medical facilities. quality infrastructure, low quality of care, poor accountability, and lack of awareness. Primary health care centers (PHCs) are limited, 8% of the centers do not have doctors or medical staff, 39% do not have lab technicians and 18% PHCs do not even have a pharmacist.. To address the grimfact, Amrita SeRVe chose community health workers from each village and gave them proper training how to inform PHC doctors and health staff, give awareness on various diseases to the villagers, monitor pregnant women and new born children, and to conduct regular medical camps.

#### Education

In Indian villages, over fifty percentage of students are unable to complete schooling through high school. This is due to poverty, irregular attendance, lack of individual teacher attention, lack of interest in academic subjects, lack of guidance from parents, lack of proper transportation and meager family incomes. The huge dropout rates among women indicates that girls are needed for other activities such as looking after other siblings, domestic work and help with farm work. To reduce drop outs and bringing changes Amrita SeRVe selected a teacher from the village who provide regular tuitions to students in the village. Amrita CREATE has developed a project aiming to educate rural and tribal people in India through tablet technology.

#### Water and Sanitation SANITATION

About 550 million Indians are forced to defecate in the open due to lack of toilets. Many studies found that those households who build toilets prefer to continue to defecate in the open, and that toilets provided by the government are especially unlikely to be used. To address the Sanitation issues, AMMACHI Labs an academic and research center at Amrita University that brings an interdisciplinary approach to addressing societal challenges, trained and empowered women to build toilets in villages and giving awareness to end open defection. As part of a student's exchange program, ten students from University of California, US, joined hands with the women of the village to construct the toilets. In 2017, Amrita SerRVe made 13 villages open defecation free.

#### WATER

The World Bank estimates that 21 percent of communicable diseases in India are linked to unsafe drinking water and lack of hygienic practices.

Further, more than 500 children under the age of five die each day from diarrhea in India alone. On the 64th birthday celebrations Amrita University Chancellor of Sri Mata Amritanandamavi Devi, Amma, on 8th September, 2017, Jivamaritam project was launched. The Honourable President of India, Shri, Ram Nath Kovind, who was the chief guest of the event, inaugurated the Jivamritam Filtration System, initiative to provide filtered clean drinking water to one crore villagers.

#### **Income Generation**

To empower women Amrita SeRVe engaged women in a variety of occupations and conducted many training programs such as toilet building, making artificial jewellery, Soap and detergent, papad and making reusable sanitary napkins.

#### **Eco-Friendly Infrastructure**

We are encouraging massive afforestation - planting trees and restoring wetlands, natural resource management enhancing existing water management system that protects, restores, or mimics the natural water cycle and eco friendly waste management system. Eco-Friendly infrastructure is effective, economical, and enhances community safety and quality of life.

#### **Self-Empowerment**

Amrita SeRVe through its program wants to address all the major problems in our seven focus areas. In addition, cultural awareness classes teach how to live in harmony with nature, conduct cleanliness drives called the Amala Bharatam Campaign (ABC). Strengthening AYUDH - Amrita Yuva Dharma Dhara, organizing village -level sports, yoga and meditation. Amrita SeRVe through its program aims to make every village self -reliant, safe and a better place to live.

#### Sreeni K.R, Program Manager, Amrita SeRVe

# PLUG TRAY NURSERY PRODUCTION A MODERN TECHNIQUE OF PRODUCING HEALTHY NURSERY



ealthy seeds and seedlings are foremost and essential requirement for achieving full yield potential of any crop. In recent years, vegetable and flower growers have become highly conscious and aware about the importance of quality seeds or seedlings. A



major portion of the area under vegetable and flowers in India is now sown with hybrid seeds, which are costly but give higher yields and quality produce. Raising of seedlings in plug trays is the modern nursery technique that achieves the maximum possible improvement. Plug tray technology was developed for the efficient pro-

Nursery grown in open field	Nursery grown in plug trays
More seeds required for raising seedlings	Less seeds required for raising seedlings
Disinfect the nursery area by solarization.	Use clean trays
• Prepare seed beds about 3mX1m in size and 20 cm heights.	• Use the correct cell size according to the crop. For example, cucurbit crops require larger cell size than other vegetable crops
• Prepare the nursery bed soil loose and friable and sow seed in lines about 5 cm apart and 1- 2 cm deep. Adjust the planting depth according to the seed size.	• Prepare growing media: normally coco peat mixes with bio-fertilizer used. Sown one seed in each cell at a depth of 0.5 to 1.0 cm.
• Cover the nursery bed with paddy straw or dry leaves for germination.	• Cover the trays with black polyethylene sheet for germination.
More loss of expensive seeds	Less loss of expensive seeds.

## **PLUG TRAY TECHNIQUE**

- The seedling tray (pro-tray) is filled with the growing medium (coco peat, perlite and vermiculite).
- A small depression (0.5 cm) is made with fingertip in the center of the cell of the pro tray for sowing.
- One seed per cell is sown and covered with medium.
- Coco peat with 300 to 400 per cent moisture is used and hence no immediate irrigation is required until germination.
- After sowing 10 trays are kept one over other for 3 to 6 days, depending on the crops.
- The entire stack will be covered using polyethylene sheet to ensure conservation of moisture until germination. The stacked trays are spread once the germination commences to avoid etiolation.
- · The trays are shifted to net house on germination of seedlings and spread over the beds.
- The trays are irrigated lightly every day depending upon the prevailing weather conditions by using a fine sprinkling rose can or with hose pipe fitted with rose.
- Drenching the trays with fungicides as a precautionary measure against seedling mortality is also being done.
- Spraying of 0.3 per cent (3g/litre) water soluble fertilizer using poly feed (19 all with trace elements) twice (12 and 20 days after sowing) is practiced to enhance the growth of the seedlings.
- The trays are provided with protective cover from rain by covering with polyethylene sheets in the form of low tunnel whenever it rains.
- The seedlings at right stage of planting are hardened by withholding irrigation and reducing the shade before transplanting or selling to the growers.
- Systemic insecticides are sprayed 7-10 days after germination and before transplanting for managing the insect vectors.
- The seedlings would be ready in about 21-30 days for transplanting to the main field depending upon the crop.



Protray



Seed sowing in plug tray



Protray filled with soilless media



Healthy seedlings from plug tray



duction of high-quality seedlings for transplanting. The technology was introduced in Korea in 1992, and has now become an important industry. In this technique single seed is placed in each cell of the seedling tray and covered with media. This technology is fast emerging as an important agro enterprise in India for its obvious advantages to both the nursery grower and the farmer. This technology is also a women friendly technique of producing nursery as it can be sown and easily managed by the women farmers.

#### What are Plug Trays/ Protrays?

Protrays are shallow plugs in which germination media remains warm and provides better aeration. Seeds are sown directly into plugs. Weeding and thinning is easily carried out in such protrays. Trays are made of soft plastic to facilitate removal of seedling without damaging its roots.96 celled trays which are 54 cm x 27 cm and 4 cm deep are commonly used for tomato seedling. Life of the tray depends on the handling and quality of trays.

#### **Soilless Media for Plug Trays**

Mainly cocopeat, vermiculite and perlite are used as a rooting media for raising the nursery. These ingredients

#### The advantages of using seedling trays

- Provides adequate space for each seedling to grow
- Improved germination and saving of expensive seeds
- Reduces seedling mortality or damping off because of sterilized growing media
- Uniform, healthy growth and early readiness of seedlings
- Ease in handling and cheaper transportation
- Better root development and less damage while transplanting
- Good field establishment and improved uniform crop stand



are mixed in 3:1:1 ratio before filling in trays. Coco peat, a by-product of coir industry has high water holding capacity and is a common media used in protrays. Cocopeat has six times water holding capacity to its weight. However, it should be supplemented with nutrients. Sterilizing the growing media reduces diseases and pest introduction and attack. Perlite is a light rock material of volcanic origin. Vermiculite is heat expanded mica. It is very light in weight and has minerals for enriching the mixture as well as good water holding capacity. Other recommended media are Cocopeat + vermi-compost or vermi-compost + sand or soil loam + FYM in equal proportion.

#### Development of Automated Seeding System for the plug tray:

An automated seeding system recently developed in Korea can mix the medium, put it in trays of cells, sow seeds and cover them with medium, water the trays, and move them into a germination chamber. Only two persons are needed for this work, which can produce 150 trays of 200 cells per hour. Automated seeders of both drum and nozzle types have been designed. The nozzle seeder is slower (180 trays per hour) than the drum seeder (up to 300 trays per hour). However, the nozzleseeder has 98% sowing efficiency, compared to 90% for the drum seeder. The nozzle seeder is also more efficient at handling seeds of different shapes and sizes.

Plug tray nursery production has opened up new vistas for growing vegetable and flower seedlings efficiently and effectively. Such innovative techniques need to be popularized among farmers for the production of healthy nursery of vegetables and flowers.

Rajesh Thakur and Seema Thakur Krishi Vigyan Kendra, Solan

# BREATHE POSSIBILITIES!

Hill Wild – A Chocolatier from the North East is an enterprising start up that intertwines Entrepreneurship with Sustainable Development

ill wild, a chocolatier nestled in the pristine Ukhrul district in Manipur, was founded by the enterprising duo, Zeinorin Stephen Angkang and LeiyolanVashum in 2017 with a vision of building healthier lifestyle and community through food in the North East region of India. A community based movement focusing on economic sustainability, Hill Wild has been able to organize a sizeable crop of enthusiastic entrepreneurs along their lines.

Hill Wild began with a whim, when Angkang was taught by a Pastry Chef friend to make chocolate. "I had other businesses running at that time, which weren't structured. But I had a lot of ideas. It was an overnight idea of adding something unique from the hills into chocolates. I come from a place with great cultural heritage, mystical stories and rooted with the Land itself. It had to be exotic. I started to gather some knowledge about edible nuts, produce of the land that were untouched and wild. Thus gave birth to a range of chocolates made from the infusion of Pumpkin seeds, Hodgsonia, Plum Wine and the famous Naga King chilly. Apart from this, we manufacture rum raisins and whiskey truffles too", beams Angkang.

Incorporated as a company in Nov 2017 along with a partner LeiyolanVashum, Hill Wild began its journey with the bigger picture of putting Ukhurul in the map of entrepreneurship and to transform it into a thriving place against all odds. Hence forth, they began a mini trade fair, #madeinukhrul, with the objective of promoting sustainable enterprises in Ukhrul district."Madeln Ukhrul depicts the positivity of Ukhrul. The vibe is full of possibilities. The collective strength gives hope to many. It truly has become the generation of collaboration. Madeinukhrul 2017 saw 26 entrepreneurs who gave their best and it has increased triple times this year.



We are witnessing 92 entrepreneurs on board for Madeln Ukhrul 2018 Event with many out of the box products." Themed 'Sustainable Ukhrul 2030', the event is scheduled for April 5-6 at an indoor stadium in Ukhrul.

'Breathe Possibilities' was the mantra that has been guiding Angkang throughout her life. Her Mother, her role model, stoked the entrepreneurship spirit in her ever since she was young. Angkang nurses deep admiration towards Otara Del Gunawardene, the woman who changed the retail face of Sri Lanka. "I can connect and relate to her so much. I learned about my ability. I saw the potential in our place at certain levels and I have immense passion to show my fellow dreamers some vision we can collectively work on. On that note, we started manufacturing chocolates as business and also initiating women, youths in our district to take up entrepreneurship with project like #MadeInUkhrul which is all about boosting local economy by encouraging production done locally. We have 92 entrepreneurs having the small and medium production".

Hill Wild has helped many in realizing economic security. Angkangreminisces how Hill Wild helped once helped one of its staff to realize his long cherished dream of owning a house. "One of our staff wanted to build a small house for his family but didn't have enough resources. So we helped him by teaching other food processing skills to start his own business, generate more money apart from our usual factory work and salary. He earned more money. We even paid for 6 months advance, helped build a house and business. Growing together as a family has been a memorable one."

Infused with the local products grown in the pristine environment, the artisanal chocolates from Hill Wild have already earned loyal customers. Hill Wild initially took the conventional route of stocking through retailers and later on targeted some events. Catering to weddings, 'Hill Wild' became a familiar brand locally. By collaborating with more retailers and partnering in summits, Hill Wild increased its customer base and market presence. Today they have a dedicated team of 4 in Hill Wild back end and 13 women for manufacturing various other products. However, logistics has been a huge challenge for the Hill Wild.

But that hasn't suppressed the entrepreneurial spirit of Angkang who has made distinct plans for the future. They plan to showcase more products along similar lines infusing local items into something palatable with a refined approach which aids local livelihood.

Angkang believes that there is immense potential in the entrepreneurs of North East and she has a piece of advice for the budding entrepreneurs of the region, " Breathe possibilities! This words has been passed down to me and I shall continue sharing that. Northeast is a blessed land. We have to stress upon sustainability, striking fine balance with exploring and exploitation. Keep your vision clear and work for what you really believe in."



# PLANT BREEDING A JOURNEY FROM ART, SCIENCE TO TECHNOLOGY

griculture has evolved with the evolution of human race. About 135,000 years ago modern human race was evolved. Initially, humans were hunters and food gatherers. Domestication of plants started around 10,000 years ago. Wheat and barley were initially cultivated. During that era, agriculture was completely an art but due to work of GregorJohn Mendel (father of genetics) in plant genetics, modern plant breeding came into existence.

World has witnessed the success of plant breeding in the form of green revolution, with the efforts of Dr. Borlaug (father of green revolution) the dwarf genes from 'Norin 10' wheat had been transferred to Mexican



varieties. Further, with the hard work of Dr. M.S. Swaminathan, Mexican wheat varieties were introduced to India and resulted in green revolution or wheat revolution in this region. Now, mankind has moved far ahead from the era of green revolution. Today new challenges are waiting i.e. increasing population, decreasing cultivable land and changing climate. The only solution is to develop the crop varieties according to need of particular regions and quick replacement of old varieties with new ones with changing climate. To achieve this solution plant breeding has to be equipped with new tools.

Plant breeding works on two principles viz., variation and selection. Variations among plants are created naturally by introduction (bringing varieties from one region to other) or artificially by hybridization (crossing of two species), mutation (using X-rays, gama rays, Ethyl methanesulfonate), polyploidy (by changing chromosome number) and genetic engineering (introducing new genes). Once the variation has been created, next step is the selection of desirable ones. Selection is always aided by markers. It may be a morphological marker (plant height, flower colour etc.) or biochemical marker (Protein or allozyme) or molecular markers (DNA markers). Due to the limited number, stage specificity and environmental influence on first two markers, the focus has diverted towards molecular markers. The era of molecular markers have been divided into three generations where first generation (1980-1990) are hybridization based markers (Restriction Fragment Length Polymorphism), second generation markers (1990-2000) are based on polymerase chain reaction (amplified fragment length polymorphism and simple sequence repeat) and third generation markers (2000 onwards) are DNA sequencing based markers (expressed sequence tags and sinale nucleotide polymorphism). These third generation markers are getting importance day by day due to availability of next generation



sequencing methods. These methods have capability to sequence billions of base pair in single operation. The robustness and cost effectiveness of next generation sequencing (NGS) methods can be understood by the fact that the first human genome took 13 years and 1 billion US dollars to sequence, whereas today with help of NGS it take one day and 3000 USD only.

The major NGS platforms for sequencing are developed by Roche, Applied Bio Systems and Illumina. These sequencers have significantly reduced the cost of sequencing from 3000 USD/Mbp with sanger method (initial method of sequencing) to 0.05 USD/Mbp. The success of these next generation sequencing is estimated by the fact that nearly 112 plant species have sequenced, till now since the sequencing of first



plant species Arabidopsis in 2000. The sequencing has opened new vistas for research and development of new and improved crop varieties. The marker assisted selection (MAS), assisted marker back-crossing (MABC), marker assisted recurrent selection (MARS) and pyramiding of genes are the possible applications of DNA makers in crop improvement. Further, sequencing enables to look out for genes of interest not only within the species to produce 'cisgenics' but also between kingdom to produce 'transgenic'. India has witnessed the success of such gene reshuffling where Bt gene cloned from soil born bacteria Bacillus thuringiensis and inserted into cotton resulted in protection of cotton crop from deadly insects like bollworms. Now, about 98% of cotton grown in India is Bt cotton. Another example is of 'golden rice' where vitamin А deficiency among population of developing world is tackled by introducing ß-carotene (precursor of vitamin A) synthesis pathway in rice. It was achieved by introducing two gene viz., psy gene (phytoene synthase) from daffodil and crtl gene (carotene desaturase) from the soil bacterium Erwiniauredovora. Similarly, many ambitious projects around the world has been formulated due to availability of sequencing information i.e. 'C4 rice project', where anatomy and bio-chemistry of rice will be changed to make it more efficient for photosynthesis and water use. If this will happen the yield of rice will increase by 50% and the water use efficiency will be doubled.

Agriculture is always moving so is plant breeding. New avenues have been added since its evolution. It was an art at that time and with the evolution of plant science it became art and science, now with the involvement of next generation sequencing, it is becoming an art, science and technology.

Dr. Navdeep Singh Jamwal

# **'PRIVATE SECTOR CAN PLAY A STRONG ROLE IN EXPANDING INDIA'S FOOD PROCESSING SEGMENT'**

Established in 2007, Dr. Oetker India Pvt. Ltd. acquired Fun Foods, a leading purveyor of western cuisine in India. Dr. Oetker in India functions as the parent brand and aims to have various sub-brands under its umbrella. A leader in value addition and processed food segment, Dr. Oetkar was established by Dr. August Oetker in 1891 in Bielefeld, Northern Germany and currently the family enterprise pursues its business activities in 40 + countries. In an interview with Agriculture Today, Mr. Oliver Mirza, Managing Director, Dr Oetker India Pvt. Ltd discusses food processing segment in India and how the sector has developed in recent times.



# How has the Indian food preferences changed over the years?

Indian food preferences have been changing rapidly since the past few years owing to growing awareness, increasing disposable income. improving lifestyle, rapid increase in the number of working women and rise of nuclear families. There is an increased inclination towards western cuisine as consumers today are well travelled and have exposure to world cuisine. Frequent dining out and experimenting with food at home are the evolving trends. From an industry point of view, Indian Hospitality industry is bringing in newer and evolved concepts to offer world food experience to the food enthusiasts. In addition, the boom of the online food ordering business in India with food delivery players like FoodPanda, Zomato, TinyOwI and Swiggy gives a great opportunity to the food lovers to

try out newer cuisines at one's convenience.FunFoods bv Dr. Oetker caters to the evolving needs of Indian consumers through its extensive product range. The range appeals to consumers who want to enjoy scrumptious western cuisine at the convenience of their home. Our high quality products offer convenience in cooking with great taste, as we truly believe 'Quality is the best recipe'. To capture the growing market, our focus is on our core range of Western Sauces & Spreads. Our aim is to educate consumers on the versatility while exploring the untapped territories and other segments simultaneously.

#### Has India's food processing sector geared up to the changing food scenario?

Yes, the Indian food-processing sector is geared up to the changing food scenario. In fact, this sector is the one which has brought about the change. Indian consumers today are becoming increasingly selective and demanding for better and safer food products and are willing to pay a higher price for health and convenience. While this trend showcases opportunity for growth, there is also a need to focus on product quality keeping in mind the global standards along with factors like logistics, supply chain, quality of packaging, and delivery. Government of India has increased its attention towards the Food Processing Industry and has recognised it as a priority sector in the National Manufacturing Policy 2011. Ministry of Food Processing (MOFPI), Industries since its inception, has been instrumental towards the overarching objective of positioning India as the 'Food Basket' to the world.Several initiatives have been taken over the years for promoting investments, innovation, increasing employment opportunities and bringing in the best practices.

# What are the challenges ahead of India's food processing segment?

Red-tapism has always obstructed the ease of doing business in the food-processing sector. While the industry is bullish towards a bright future, other additional factors like poor supply chain linkages resulting to high wastage, high costs, especially due to seasonality, perishability, and variability of produce, halts the industries growth. More than 30 per cent of the

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produce from the fields spoil due to poor post-harvesting facilities and lack of adequate storage infrastructure. All this clubbed with inadequate skilled labor force, insufficient quality control and high taxes and duties is decelerating the growth of this sector. In the recent past, Government has taken several measures to increase transparency, elimination of redundant processes to bring better governance with the introduction of 100% FDI and GST regulations amongst others.

#### What role can private sector play in expanding India's food processing segment?

Private sector can play a strong role in expanding India's food processing segment by bringing in their knowledge

and expertise. They are a key contributor to employment generation, research, and innovation. Considering that 42% of the foodprocessing sector still falls under un-organised category, hence interest and investment by private players can help in making the segment more organised. There is encouragement to private sector as 100 per cent export-oriented units are allowed to sell up to 50 per cent of their produce in the domestic market. Export earnings are exempted from corporate taxes.

# How is the government support in this sector?

The Government of India understands the latent potential of the sector and 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. As recent as August 2017, the Cabinet Committee on Economic Affairs gave the green signal to the Pradhan Mantri Kisan Sampada Yojana (PMKSY). This umbrella scheme incorporates the various ongoing schemes like Mega Food Parks, Integrated Cold Chain, Value Addition Infrastructure, Food Safety and Quality Assurance Infrastructure, Infrastructure for

> Agro-processing Clusters, Creation of Backward and Forward Linkages and Creation and Expansion of Food Processing and Preservation Capacities.

> The Make in India campaign also recognizes the Indian food processing sector as a focal area. And as such, the budget allocation for the Ministry of Food Processing Industries in 2018-19 has doubled this year to INR 1400 crore and the government is moving towards bettering the life of farmers and increasing their incomes by 2022. Another fresh new initiative is the Operation Greens, and this is to ensure that TOP (Tomato, Onion and Potato) are available throughout the country without price instability. This initiative has been allocated another INR 500 crore in the budget 2018-19.

From the GST front, it has been a boon for the sector with significantly reduced tax rates. Given the deduction from the earlier 10 per cent to the current 6 per cent, it will not only enable growth but will also attract investment. Introduction of GST will not only drive supply chain efficiency but has also brought the entire nation under unified tax regime that will facilitate ease of doing business.Another commendable effort by the government is curbing the post-harvest losses from agriproduce. The government is trying to bring policies into practice aimed at boosting food processing and reducing agri-wastage by 50 per cent in the next 5-6 years.

# **TIME TO BE PRO-ACTIVE** EXPLORING RICH AGRI-RESOURCES

Is it not a fact that in economies like India the gains from green revolution has been slowly fading away? Judging by the ongoing facts and circumstances population growth is not going to retard especially in the developing block, while food grains output would not be able to register commensurate growth - such a situation needs immediate tackling.



t is clear that the developing nation's GDP growth has been mainly hinging upon the industrial sector [read corporate] backed by the services sector. It would have been more attractive and at the same time immensely useful, had there been equal growth in the farm sector. That was not there. Problems galore in spite of the fact that the plan allocations have been stepped up and a number of measures have been taken by both – at the Centre and at the state levels.

#### **Pepping Up Farm- Credit flow**

There is no doubt that lending is still skewed in favour of a few industrial houses. Naturally the Clarion call is there to increase the lending speed to the farm sector. Banks are to focus on the bottom of the pyramid by giving loans to tenant-farmers, small and medium enterprises and extending micro-credits in villages. It has rightly been observed that for the PSBs, private Banks, foreign Banks, RRBs and Co-operatives, farm lending would be the key area in the days to come.

Truly, institutional finance alone could not change the scenario in the very absence of other infrastructure and allied supports. Simply asking the banks to double credit flow/utilization in next three years is not enough. The roots must be taken into account.

In fact, agriculture sector does not require money flow alone – more important is to have the infrastructure development at the earliest. Dependence on rain god adds to the woes. And then floods and droughts are becoming an annual ritual. Productivity gets a blow in the absence of quality seeds and other inputs supplies, a slow modernization process.

# Coordination to Remain in Paper Only?

That is why the crucial requirement is there to beef up coordination among different sections involved in the process of farm sector's development. There is no short cut formula on this score and it is to be especially seen by all concerned that repayment culture is not distorted. Recycling of farm still poses the biggest menace. Huge provision for loan waiver cannot and should not be the escape route though politically attractive. Assets generation over space and time is badly required at this juncture. Practical support to the farmers stay at the top if ultimately a changed picture is aimed at, especially when potentiality galore.

Of course it is better to have a basket full of technologies. For that matter appropriate and effective delivery system to transfer technology to the rural artisans, potters, weavers, blacksmiths and so on could go a long way to help them keep heads above competitive environment. agricultural productivity Raising through technology transfer could likewise act as booster to the region suffering from low productivity. It also remains a fact that in countries like India 72 percent of population still stay in rural areas and even one percent shift in population would involve 10 million. Value addition through food processing, fisheries' improvement, quality break-through for arts and crafts and standardization in medicinal herbs etc. have the potentiality to create job. A network of rural industries backed by modern industry experts and networking of rural development agencies capable of such transfer of technology could yield better results even within the traditional scenario.

Recent studies also clearly indicate adverse impact of climate change on agriculture. Crop improvement and research to develop drought-floodsresistant high-yielding varieties of seeds assumes importance with a view to combating adverse impact of drought on food production and to ensure food security. Climate change factors would continue to play their role. Adaptation and mitigation process requires a time-bound plan otherwise situation will further deteriorate.

#### Time to Change the Strategy

The need is, thus, there to formulate a credit policy especially for the small and marginal farmers. It is a fact that credit flow to the farm sector has been witnessing steady rise over time. Banks have considerable exposure to Priority Sector lending and more particularly in various sectors of Agricultural lending. Banks, in particular, have to adopt a general strategy to accelerate agriculture advance covering the following five segments of agriculture advance:

- Short term production credit/ working capital loan for crop production.
- Medium term and long term investment credit for various activities like minor irrigation, farm mechanization, land development, horticulture & plantation, animal husbandry, agri-clinics, rural godown, land purchase, etc.
- Relatively large advances for commercial agriculture and allied activities, cold storages, agro processing, agri-exports, agri inputs supplies, companies and corporations in public and private sector on agriculture related activities, like irrigation corporation, milk plants, seed companies, etc.
- Increased loans to weaker sections and women by way of microfinance through SHG linkage and to selected MFIs, etc.

Banks are also to attach more importance to the following areas to augment agriculture lending:

- Besides credit cards, other cards for meeting various needs of all categories of farmers' under simplified lending procedure for faster growth in agriculture lending are being issued.
- 2. Farmers' indebted to informal sector is to be brought more into the fold of a specially designed product to be launched to redeem the dues of the farmers from informal source.

That is why the time is for actions so that the gaps are taken care of in a bigger and speedier way keeping in view the global trend. Especially for food grains a lot depends on this part of the world [India, China where half of the world population live in]. The global factor has to be essentially kept in view as many of the countries are speedily opening up and want to have a good niche in the market plus the responsibility is also there with the betters to see development taking place in Mali, or Ethiopia, Myanmar and the like!

We need to address the challenges of the agriculture sector through comprehensive and coordinated efforts. Renewed attention needs to be paid to improving farm production and productivity, better utilization of agricultural inputs, proper marketing infrastructure and support, stepping up investment in agriculture with due emphasis on environmental concerns efficient food management. and urgent problem that needs The solution is two dimensional income employment. and Risina of the general income would be dependent on several planks like: (i) better utilization of resources (ii) minimization of cost & maximization of output. While the employment criteria needs to be tackled through : (i) earning job through most of the year and (ii) creating jobs in allied activities like goat rearing, bullockmaintenance, home hold gardening, cottage industries etc. . Regarding job creation and income-generation, the thing which has to receive attention is the closeness towards traditional practices as it would be easier for the farming community to devote themselves spontaneously and continuously in activities, which they can adapt to easily. As a result of these, the interactions between agricultural, industrial and tertiary sectors would go up by leaps and bounds. Let there be realistic planning so that economies like India could be able to register a double digit GDP growth ensuring equitable justice.

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# Farmer Fair Price and MRPs for Farm Produces New way forward?



here is a need for some new thinking at management of prices of agricultural produce beyond minimum support price and tweaking of import/export prices/permits, which is also limited to some commodities and also not entirely satisfactory in outcomes. Every manufacturer has a right to ask for a reasonable return, however, farmers are the lone category of producers being made to feel as if a favour is being done buying their produce. Similarly, there are no maximum retail prices (MRPs) for these items or made known in public domain, consumers never know if they are being charged fair in relation to what the farmer was paid for it.

**Perishability led Vulnerability** Perishability of farm produce makes the farmers highly vulnerable to market pressures. Absence of an institutional mechanism to assess supplies on a real time basis, the markets tend to be driven by rumours and sentiments which could be driven by vested interests, adds to the pressure and anxiety of the farmers. Farmers anxious to realise cash, end up selling at unremunerative prices, as was seen in onions recently. However, price crashes offer an



opportunity for speculators to garner stocks with the hope to profiteer a few weeks later when stability returns, as most items can store for a few weeks or longer. There is no reference minimum price for most items that can be expected by the farmers leaving them to fend for themselves, which allows the markets to work detrimental to the interest of the farmers.

#### **Unregulated Price Volatility**

Data from nhrdf.org shows modal wholesale prices of onion in Mumbai doubled in twelve days from Rs.2,525/ gtl on 1st August 2013 to Rs.5,150 on 12th August 2013 causing panic amongst the consumers. Steeper spike was observed in 2015, tripling in a month from Rs.2100/quintal on 22ndJuly 2015 to Rs.6100/qtl on 25th August 2015. In June-Oct 2013, inter day prices changes in excess of 10% noted on 8 occasions including 3 of which were in excess of 20%. Auction pricing is not regulated by norms to prevent such volatilities which result in unjustified price hikes, in the name of free market, benefits of which largely accrue to middlemen and far less to farmers. Even the stock exchanges have daily price circuit filters to avoid sudden market crashes and surges driven by not so very fundamental reasons. Rules and regulations of the Exchanges state the situations warranting any change in price filters. Financial markets are far better regulated than markets dealing in agri-commodities impacting the lives of millions of consumers and farmers.As much seriousness as given to a technical glitch in National Stock Exchange for one hour which warranted an inquiry by the Ministry, needs to be shown to check if the farmers gained proportionately, when farm produce prices surge.

#### **Farmer Fair Price**

Suggestion being put forth is to develop a mechanism that determines a Farmer Fair Price (FFP), for all essential non-MSP items to begin with, based on cost of production and reasonable return at the beginning of every harvest season based on various factors. All negotiations/auctions with farmers to begin at FFP as the base price for FAQ grade. Maharashtra Government is believed to be working on a bill to criminalise procurement at prices below MSP. Supported by such a law, efforts

**Farmer Fair Price.** mechanism of working could be designed by each of the state marketing boards in consultations with the farmer bodies, market thinkers, researchers on agricultural markets and trade organisations. This will obviate the need for state procurements for price stabilization.



of Farmer Producer Organisations (FPOs) serving to unite the farmers could help enforcement of farmer fair price. Mechanism of working could be designed by each of the state marketing boards in consultations with the farmer bodies, market thinkers, researchers on agricultural markets and trade organisations. This will obviate the need for state procurements for price stabilization.

#### **Auction Price Band**

At the consumer end, a similar model of FFP plus cost plus returns based formula for determining auction price bands in major markets in every consumption location can be formulated. By defining norms and regulations for determining auction price band (APB) within a certain range, market sentiments would not be permitted price drive disproportionate to distortions. Norms for determining APB among other aspects could include safeguards to check undue profiteering at any point in time. Drawing inspiration from ourfinancial markets, agricultural markets can also be better regulated to protect interests of consumers and farmers.

#### Implementation

Marketing boards of each state could form an empowered body, based on its recommendations, the Board can announce FFP for key vegetables to begin with on a pilot basis. Similarly, for all consuming markets in various cities/town, permissible auction price bands linked to the FFPs could be announced by the Board. Electronic National Agricultural Markets (e-NAM) managed by Small Farmer Agribusiness Consortium (SFAC) could provide thought leadership for bringing about the change on a national basis.

Initiatives to strengthen market intelligence techniques could be more rigorous, continuous and institutionalized as part of the



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state marketing boards, to provide planting advisory to avoid excess or short acreage. Creating a market surveillance cell under each marketing board would also be helpful.

As the farmer is assured of a fair price, they would be better placed to handle market pressures exerted on them. Fixing auction price bands in consumption markets would assure the consumer that the price being paid has a reference to what the farmer receives and is not being exploited by some unknown forces. By pegging both ends of the supply chain, the scope for abnormal profiteering is restricted which would help restrain speculative interests from engineering sharp spikes.

FFP can also relieve the financial burden associated with price intervention schemes of the Government, hence would be a sustainable way to protect interest of farmers and consumers. Share of consumer rupee to the farmer is only spoken in seminars to sensationalise the plight of farmers, and it is time a practical enforceable mechanism as suggested is operationalised.

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# A SMALL VOICE WITHIN

his is so very much a NON IDEA, in almost all spheres of discussions and debate, at present, but do view that possibly the matter is of significance to all and sundry in our roles as citizens and inhabitants of this vast Country. Byte of "JAI JAWAN JAI KISAN" coined so aptly, by our respected Prime Minister, Late Lal Bahadur Shastri has a chime for farmers too and which rings out truer and louder than ever before. Perhaps he got to the heart of the matter.

Quite likely the rural folk and farmers are only through a haze seeing, if at all, their contribution either way to a larger salient picture. Be it positive or negative. Be that as it may, Agriculture can shift it's role from being a contributor to climate change to becoming a part of the solution. Soil carbons lost through time by land clearing and poor farming practices can be captured to remain in soils for a long time.

All living beings do consume food and all farmers do grow crops. The association is so straightforward and cannot be missed. The dependency on each other is symbiotic. To understand and be of synergistic help to each other is most desirable.

The farmers across crops may alleviate situation by slow release of carbon from soils by ending land clearing and wetland drainage for agriculture, preventing erosion, reversing degradation of soils by low / conservation tillage. Also by reducing dependence on heavy machinery and chemicals, all of which are energy intensive in nature. This goes against the present grain of thought where development at all costs is the norm, but still very valid ideas to share and

spread.

Perhaps the way to see it is to try pointing differences between industrial agriculture (as is generally practiced) and an agro ecological form of agriculture. The gains from industrial form of agriculture have come at a huge social and ecological cost, and which may well lie as one of the causes of farmers' plight as on date and launching them into a vicious cycle of indebtedness. Agro ecological agriculture could possibly take time to yield sustainable crops but can lower costs and reduce debts. Pushing farmers to take loans, waiving the earlier loans, alongwith their own families' aspirations (as in consumerism) is a unhealthy spiral as in industrial sectors. Perceptions and beliefs that arise from these generally make all of us view the symptoms and enable knee jerk action/reactions and to make matters more complicated. Many jump into the scene to make it more chaotic by disguising their intent merely for self gain and ends.

Cohesive and congruent picture is undeniably not easy to put together (in the face of "growth delusion") but the disjointed concerns, views, activisms, programmes only serve to emerge hydra headed and more tenacious than ever.

Consumers of farm produce / crops/fruits/vegetables truly have a huge role to play especially when they demand clean products which are sustainably grown, (where traceability becomes essential) for all round health benefits to them and families, as also soil health (the relationship here to soil health and health of all who consume food is most essential). And for beneficial service it must cross public minds to let the farmers earn a little more as

that would save consumers a lot by way of expenses on health etc. in the medium to long run. To help and join farmers do that will result in reduced carbon release from soils.Could this partnership be fostered to achieve such all remain a daydream ?Cannot say.Would the market forces by themselves equate between farmers' and enlighten consumers of such a healthy outcome if the State chose to only facilitate and not unduly and in haste seek another agenda?Do not know !A long haul idea which ripples may see shores someday.....for what can under the present mode of doing a farm is clearly seen, and more of that is already come about.

It would be so heartwarming to hear, read and see public health be linked (as it truly is)to soil health !

The most favoured catastrophe is climate change. Land and water are as much endangered as the climate.... the two dangers are but one really. Our ways of degrading the climate are in no way distinguishable from our ways of abusing the land.

The Country is bestowed with Institutions, Academia, Experts etc. who have to try to come together on an issue as this, of huge magnitude and cascading effects. Small scale farming is contrary to agri business large scale mindsets. The single question is how to live on Earth without destroying it. Then pieces may fall into place slowly but surely as one may get to see the intersection between ecology and economy.

> Ashok Trivedi Tea Farmer





"Crop diversification and promoting allied farming activities such as backyard poultry are equally important to increase farmers' income"

M VENKAIAH NAIDU Vice-President

"Market regulation is the biggest obstacle (to farmers getting remunerative price for their produce). States are not reforming their APMC (Agricultural Produce Market Committee) Act and because of that organised private sector players are not participating in agriculture marketing. As a result, competition, development and evolution of market have become casualties. Since markets are not offering remunerative prices to farmers, they are turning more and more towards the government for getting minimum support price (MSP)"

#### **RAMESH CHAND**

Niti Aayog Member



"If the political class does not pay attention to farmers at this critical hour, then we will have to eat imported food"

SHARAD PAWAR President, Nationalist Congress Party (NCP)



"Potential for agricultural and food export will get a great boost due to digital initiatives"

SURESH PRABHU Commerce and Industry Minister

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