

11TH GLOBAL AGRICULTURE LEADERSHIP SUMMIT & AWARDS 2018

Connecting Farmers with Markets and Technologies



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From the Editor's Desk GLOBAL COOPERATION FOR FOOD SECURITY

griculture has remained human civilization's foremost engagement with nature and it continues more forcefully years later. As an act of survival, agriculture has drawn more than its share of resources from earth and to its woes, has been battling the pressures of climate change, population explosion and shrinking resources. India today is a leader in world agriculture and has come a long way from ship to mouth existence to food security. The green revolution and the years beyond has



accorded India the wisdom to continue its battle against hunger and malnutrition and also help the developing world with its experiences and diversity of learning.

While continuing to be the leading producer of many agricultural commodities, food and nutritional security for the rising population is a challenge. The overflowing granaries has not been able to eradicate hunger and malnutrition from the country. Climate change has manifested in different forms in terms of continuously rising temperatures and errant climatic phenomenon and disturbed cycles of monsoon. Stagnation in crop yields, outbreak of epidemics, emergence of new pests and diseases, and post harvest losses have reduced profitability in agriculture. This has necessitated a transformation from our current form of agriculture to sustainable means of farming with little harm to environment.

The agriculture of the future must rely on environmentally sound practices to negate the effects of climate change. Agriculture, also a contributor to global warming must increasingly reach out to technologies that depend on ecologically sound and responsible principles. A global cooperation is needed at this juncture and constant engagements at the international level is required. The recently concluded 11th Global Agriculture Leadership Summit 2018 has been an effort from Indian Council of Food and Agriculture to reinforce these issues at a global platform.

The summit facilitated the farmers to connect with the technologies, markets, industry, institutions and the Governmental programs, at the same time discussing opportunities for a global momentum towards making agriculture high-tech, market linked and value added for best returns to farmers and to all stake-holders across the food value chain.Important individuals and institutions, who played pivotal role in building new faiths and ambitions in agriculture were also acknowledged by the Global Leadership Awards 2018. With this vision to recognize the individuals, who have served the humanity through agriculture, Indian Council of Food and Agriculture has created World Agriculture Prize, to be presented annually to an individual or institution, who played seminal role in transforming agriculture globally and saving the humanity from the curse of hunger. Dr. MS Swaminathan was awarded the 1st World Agriculture Prize, who transformed India's destiny and propelled us towards agricultural prosperity.

Aniana Nair

C O N T E N T S

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11[™] GLOBAL AGRICULTURE LEADERSHIP SUMMIT 2018



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• वासावात्वाक • कीतवाक • क्यूंतवाक • उपलब्ध रहिमन पानी राखिये, बिन पानी सब सून । पानी गये न ऊबरे, मोती, मानुष, चून ।।

> वर्षी पहले से हमारे पूर्वज पानी के पहला का वर्णन कर गए हैं।

पुराने समय में पानी का स्रोत नदी, कुंऐ, झरने इत्यादी हुआ करते थे और पानी का उपयोग आवश्यकता अनुरूष होता था।

आज आधुनिकता के दौर में हम ज़मीन से ज़रूरत से ज्यादा पानी निकाल रहे हैं, जो उपयोग कम और बर्बाद ज्यादा होता है। जिससे मू-जल दिन प्रतिदिन कम हो रहा है और कुछ सालों बाद शायद पूरा ही खल्म हो जाये!

अब सबात उटता है कि हम हमारी आने वाती पीढ़ी के लिए कितना पानी छोड़ना बाहेंगें ?

इस परिस्थिती को भांपते हुए धानुका ने 2005 में नारा दिया था,

"खेत का पानी खेत में – गांव का पानी गांव में" बचावें पानी की हर बूंद ।

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Feminizing Agriculture

India celebrates October 15 as Women Farmer's Day

ndia took its first step in recognizing the role played by women in agriculture when the country celebrated its first Mahila Kisan Diwas on October 15.

Although agriculture has largely been perceived as a man oriented profession, the role played by women is more apparent. Their association with agriculture is evident in the entire value chain from the decision making process to value addition. A research by the Indian Council of Agricultural Research has pointed out that the participation of women is 75 per cent in the production of major crops, 79 per cent in horticulture, 51 per cent in post-harvest work and 95 per cent in animal husbandry and fisheries.As per Census 2011, 65 percent of the total female workers in India is engaged in agriculture. Of the total cultivators (118.7 million), 30.3 percent are women. Out of 144.3 million agricultural labourers 42.6 per cent are Women. In 2001, female agricultural labourers were 21 per cent which increased to 23 per cent in 2011.

But despite their formidable presence, women are often relegated as second class workers with considerable wage difference. By government estimates itself, this wage gap is nearly as wide as 25 per cent. Women also do not have the title to the land they cultivate and hence their accessibility to credit and subsidies are quite limited. Notwithstanding these challenges, participation of women has increased considerably. Unfortunately their potential as possible change makers has seldom been tapped to its fullest extent. A 2010-11 FAO report pointed out that if women in rural areas had the same access to land, technology, financial services, education, and markets as men, we could see a 20-30 per cent increase in yields on women's farms, which could raise agricultural output in developing countries by 2.5-4 per cent.

As far as India is concerned, women farmers is an opportunity that has went unnoticed for an absurdly longer time. When there is a considerable drain of male farmers and farm workers from rural to urban centers, women who stay back in the villages are probable candidates to take up farming or carry forward the tradition of family farming. But to do so, there should be alluring prospects that could attract and retain them in the profession of farming. The most important thing is to bring equality in terms of wages and also other benefits. Farmers should mean both male and female farmers.

Gender sensitive agriculture must be a norm that need to be followed strictly in principle and practice. Agriculture extension workers who form the first point of contact between the farmers and the agriculture department must be made aware of the relevance and importance of gender inclusivity. The policy planners should include the prospect of women centric policies. Researchers can develop technologies that are gender neutral and women sensitive. Farm mechanization is a prospect that was until a few years ago under explored. However, the quest for increasing productivity and shortage of farm labour has necessitated farm mechanization. This would therefore be the right time to develop machines and equipment that can be used by women as well.

It goes without saying that years to come will be that of women farmers. If India intends to maintain its self sufficiency status in food production, women should be well represented in the policies and programmes developed for agriculture. For which we need more than Mahila Kisan Diwas.

Stubble burning – Still Strong

Despite government subsisdies, farmers continue to burn stubbles

here will be no smoke without fire. The fire is very much real and it still continues to feed on the stubbles in the vast farm lands of Punjab and Haryana when the authorities in Delhi are struggling to douse the fire and trying hard to prevent the repeat of last year or may be every year.

Late last year, Delhi and a large part of northern India were covered in a dangerous toxic smog that forced authorities to shut schools, ban dieselrun generators, construction, burning of garbage and non-essential truck deliveries. Pollution levels climbed to 12 times the recommended limit and the Indian Medical Association declared a public health emergency. Delhi Chief Minister Arvind Kejriwal even likened the city to a "gas chamber." The concerned authorities were shaken up from their deep slumber and it was hoped that the coming years would be cleaner and greener. However, ground reports indicate that the farms have started to burn and in the first two weeks of November it will intensify and take the pollution levels to new heights!

In November, farmers typically harvest rice to sow wheat. After the harvest, the leftover plant debris (50-60 cm) are burned to clear fields for the next crop. Particles from stubble burning combine with industrial pollution, vehicle exhaust and dust to cover the region every year as winter approaches and wind speeds drop. This is also the time of Diwali, celebrated with firecrackers. Although many other factors also contribute to the dangerous levels of pollution of the region, stubble burning continues to be a major reason.

This year the government adopted a slew of measures to stop this practice. The Centre has provided Rs 575.18 crore to farmers of Punjab, Haryana, Uttar Pradesh this year to ensure that they buy state-of-the-art machines, such as happy seeder, paddy straw chopper/cutter, mulcher, RMB plough, shrub cutter, zero till drill, super straw management system on combine harvesters, rotary slasher and rotavator to manage crop residue at their farms at subsidised rate. The Narendra Modi Government had approved of Rs 1,151 crore Central funds to control stubble burning causing pollution in four States. Of these, Rs 591 crore will be spent in next fiscal while the remaining Rs 560 crore will be meant for assisting stakeholders in 2019-20.

The straw management system (SMS) that attaches to a harvester shreds the residue and the residue will be mulched using another machine and irrigated at least twice to get it to decompose. The practise was expected to take care of the stubble burning and converting the residue to a valuable compost meant to add nutrients to the soil. However, this posse of machines cost a fortune for the farmers. So despite the subsidy offered, the farmers cannot afford this. According to farmers, despite availing the 80 per cent subsidy provided, they still need to shell out Rs 20,000 per set of agro machinery for farm waste management. The subsidies being offered is 50 per cent for individual farmers and 80 per cent for cooperative societies for the machinery. These are not enough for the farmers who cannot afford to go for machinery purchase for want of surplus cash even if they want to avail the subsidy. Stubble burning becomes still the cheaper option then.

The government must realize that, among the alternate methods of stubble management, farmers will choose only the ones that are easy on them financially. The machines, however, can be utilized if the government can get directly involved in it. If machines are to be used, the government must take it upon themselves to carry on the process for a nominal fees from the farmers. This can be continued till another viable method is evolved. After all the government is looking for doubling incomes and not halving them!

India's Organic Farm Products go Global

Indian organic farm products export surges

hemical inputs based agriculture continues to draw flak from the world as its effects on environment and health are becoming apparent with every passing day. The alternative to this king of cultivation, in the form of organic farming, is fast catching the fancy of the world population. This is also an excellent opportunity for the farmers, especially Indian farmers.

The demand for Indian organic food products is on constant rise around the world and the country exported organic products worth \$515 million in 2017-18. It was up 39 per cent compared to the export worth \$370 million in 2016-17. The total volume of export during 2017-18 was 4.58 lakh Metric Tonnes. This is a good sign as far as the Indian agriculture and doubling the farm income initiative are concerned. The organic products on the long run are less capital intensive and moreover fetch a premium price in the market. Besides this, the chemical load on environment and food chain can be brought down considerably.

Organic products from India are currently exported to countries such as USA, European Union, Canada, Switzerland, Australia, Israel, South Korea, Vietnam, New Zealand, Japan etc. This spurt in demand has originated from the equivalency granted by European Commission and Switzerland for unprocessed plant products from India and the conformity assessment granted by USDA. India is also negotiating with Canada, South Korea, Taiwan and Japan for equivalency with NPOP. In addition, the traceability system, Tracenet established by APEDA for certification and export of organic products also helps India to maintain the credibility and traceability of certified products. The major demands under the organic product category are for Oil seeds, Cereals & Millets, Sugar, Fruit juice concentrates, Tea, Spices, Pulses, Dry fruits, Medicinal plant products etc. Many new countries like Israel, Vietnam, Mexico have also taken interest recently.

Under National Programme for Organic

Production, area under organic certification during 2017-18 was 3.56 million Hectares. This includes 1.78 million hectare cultivable area and another 1.78 million Hectare for wild harvest collection. With 835,000 certified organic producers, India is home to more than 30 per cent of total number of organic producers (2.7 million) in the world. However, when it comes to area under certified organic cultivation, India contributes only 2.59 per cent. The global demand for organic products is growing at 20-25 per cent per annum. India's market itself is growing at 40-50 per cent. India therefore stands an excellent opportunity in organic farming.

To further expand the area under organic farming in India, the challenges existing in the current system must be addressed. For the success of organic farming, availability of organic manures need to be increased. Instead of the conventional organic manures, concentrated organic manures must be developed and promoted. Subsides on organic fertilizers and pesticides is also another way to lure the farmers into organic farming.

Another important aspect that is disturbing, yet reasonably real is the decline in productivity in the initial years of organic farming. The situation is far worse in scenarios where we are looking at a transition from conventional farming to organic cultivation. So for those famers who are transitioning into organic cultivation, plans must be afoot to brace them by engaging in a subsidiary farming activity or a financial support from the government. But most importantly, farmers must be made aware of this situation. A reasonable cost is also involved in being 'Organic'. Cultivating organically is not enough to sell as Organic. The products need to be certified by an authorized certifying agency. It is also a costly affair.

In short Organic cultivation is a costly and cumbersome affair, although the benefits are rewarding. However, the period between initiating into organic cultivation and emerging as organic cultivators is crucial. If they can survive that, then organic system is more rewarding.

A Helping of Indian Soyabeans

China's strained trade relations with US has created a conducive environment for Indian trade in Soyabeans

golden opportunity beckons the Indian oilseed farmers from far East. With the trade conflict escalating between China and the United States, India sees

the prospect of trade with China particularly in the export of soyabean meal.

China imports soyabean mainly from the United States and Brazil and primarily uses them to extract vegetable oil and to fulfil the demand of vegetable oil and protein meals for the feed industry. India was also one of the suppliers of soyameal to China until 2012, when a ban was imposed on the exports on phytosanitary grounds. Business of China with the US suffered due to growing trade imbalance between the two nations. The imbalance is a result of the Trump administration upping the ante against China and hiking the import duty on a number of products from the Asian nation. In a retaliatory move, the latter too hiked the duty on several American products. The tension between US and China is expected to open a door of opportunity to Indian growers and it is widely anticipated that the ban on soyameal exports would be lifted as China is also looking for an alternative.

A point to be noted is that for the last six years, Chinese authorities have banned the import of soybean meal from India on the basis of non-compliance with food safety norms. Chinese authorities had found some of the cargoes contaminated with malachite green, a dye widely used in India for marking jute bags/ sacks. Non-tariff barriers like plant inspection and quarantine protocol are yet to be fulfilled for a possible resumption of trade. The import tariffs on soybean are at three per cent and soyabean meal at five per cent. By imposing tariffs on import of soyabean meal and import ban, China created a positive environment for local crushing which has increased steadily.

With Inspection form Chinese authorities still pending, India stands a big chance to emerge as a big source for soyabean meal supplies to China, which is aggressively looking for a reliable supplier to fulfil its domestic demand in the absence of US exports, which accounted for almost half the Chinese demand. China is the largest importer and consumer of soyabean.

The prospects of soyabean farmers were bleak as the export of soyabean meal from India decreased significantly from 5.25 million tonnes in 2010-11 to 0.41 million tonnes in 2015-16, owing to lower production, price competitiveness, quality and other issues. This has resulted in decline in domestic prices of soybean and farmers were not able to even get the minimum support price for their produce. So it is the government's priority to increase the export of soybean meal to improve the market sentiments for soybean. This year particularly, soyabean production is expected to increase on account of good monsoon and higher area under soybean. This is an opportune time for the export to take place. The robust and demanding animal feed industry of China is looking aggressively to fulfil the high demand of protein meals for animal feed industry.For, China India presents a logistic advantage as the meals can reach China within a week's time.

Right now India should seize this opportunity and take forward the proposal. Once the phytosanitary requirements of China is made known to the Indian counterparts, the countries can go ahead with their trade plans.

Indigo Launches Grow Indigo™, a Joint Venture with Mahyco Grow™

● Indigo Ag, Inc., a company dedicated to harnessing nature to help farmers sustainably feed the planet, and Mahyco Grow[™], a leading agri innovation major headquartered in India's Maharashtra state, have announced the launch of a joint venture to provide growers across South Asia access to cutting-edge seed treatments. The venture, proposed to be called Grow Indigo[™], marks Indigo's first expansion into smallholder markets, where average farm sizes are typically one to three acres. Commenting on the goals of the joint venture and the complementary approaches of the two companies, Karsten Neuffer, Indigo's Chief Operating Officer, International, said, "We're proud of this partnership with Mahyco Grow, which combines the technological innovation of two market leaders to maximize benefits for growers. Amid challenging environmental



conditions, Indigo products can enable smallholders in India to improve their yields, generate more revenue, and implement sustainable farming practices." The joint venture leverages Indigo's industry-leading microbial portfolio and MahycoGrow's robust developmental platform, strong grower relationships, and well-established path to market.

Mahindra Agri forms JV with Sumitomo Corp

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• Mahindra Agri Solutions Ltd (MASL), a subsidiary of Mahindra & Mahindra (M&M), has announced getting into a joint venture with Japan's Sumitomo Corporation for its crop protection business. MASL, which is eyeing a turnover of Rs 3,000 crore by 2020, has 60% equity in the new company named Mahindra Summit Agriscience Ltd and the rest is held by Sumitomo. The company executives said the partnership will offer a pipeline of specialty, new-generation products with unique and latest molecules to effectively manage pest and insect-related challenges faced by farmers. According to an industry estimate made in 2016, India's crop care consumption at less than 0.6 kilogram per hectare is one of the lowest among the major countries, even below that of neighbour Pakistan. In comparison, Taiwan has 17 kg, while China (13), Japan (12), US (7), Korea (7), France (5), UK (5) and Pakistan (1). The experts are of the view that India loses nearly 40% of its total production in terms of value to pest attacks and diseases. Since per capita land availability in India will only go down, farmers will have to raise their agriculture production by improving productivity, analysts say. The current estimated consumption of crop protection products in terms of value is around \$2.5 billion in India. It is expected to grow at 7% annually for the next few years.

Indian, Russian cos ink \$1 bn fertiliser import pact

• Indian Potash Ltd has agreed to import up to 2 million tonnes of fertilisers worth \$1 billion (over Rs 7,300 crore) from Russia's PhosAgro, the world's leading producer of phosphate-based nutrients, over the next three years. PhosAgro Friday announced the signing of an agreement with the Russian Direct Investment Fund (RDIF) and the IPL that covers cooperation in the sphere of mineral fertilisers. The signed agreements were exchanged in the presence of Russian President Vladimir Putin and Prime Minister Narendra Modi here Friday, PhosAgro said in a statement. "As part of a framework for mutually beneficial cooperation, IPL intends to purchase for the Indian market up to 2 million tonnes of high-quality mineral fertilisers produced by PhosAgro -- DAP and NPK with various nutrient content -- in 2019-2021. The total value of deliveries is estimated at \$1 billion," the statement said. Under the agreement, RDIF, PhosAgro and IPL also plan to consider the possibility of jointly implementing promising investment projects in the mineral fertiliser



sector. In addition, the parties intends to cooperate in a number of areas, including exchange of advanced know-how and the sharing of best practices related to the agri-environmental use of fertilisers. India meets around 20 per cent of its urea requirements through imports. The dependence on imported Phosphatic & Potassium (P&K) fertilisers is as high as 90 per cent. "This cooperation agreement is a significant contribution to the development of Russian non-resource-based high-tech exports and an additional incentive for further investment in the domestic mineral fertiliser industry, which will strengthen food security in Russia and India and increase trade between our countries," PhosAgro CEO Andrey Guryev said.

Shree Renuka to double ethanol capacity

• As the ethanol blending programme is gaining more attention from the Centre, market major, Shree Renuka Sugars (SRS) is planning to double its ethanol capacity to about 24 crore litres in about 18 months. Chairman Atul Chaturvedi said that the company has an existing capacity of 12 crore litres per annum and in about 18 months this will reach 23-24 crorelitres. The capex cycle has already started and will complete by the FY 2020 fiscal with an investment about Rs 350 to 400 crore, he said. SRS was recently taken over from the founder Narendra



Murkumbi by Wilmar Sugar Holdings Pte. Ltd The company has a subsidiary called KBK Chem Engineering Pvt Ltd, which is helping with the manufacture of equipment for ethanol production. Chaturvedi said that the current level of ethanol blending in the country is about 3 to 3.5 per cent and next year this number could increase by another 2 per cent. However, in about three years, adequate ethanol capacity will get created and it help achieve the 10 per cent blending target, he said. A number of sugar mills are adding new capacities and equipment such as incineration boilers are being added, which will also help in running the sugar mills in the rainy season.

Select Group to diversify into hydroponic, organic farming



Delhi-based Select Group, which has a presence in retail and hospitality businesses, plans to enter hydroponic and organic farming. It has joined hands with Symbiotic Sciences to form a company, VardanAgrotech. VardanAgrotech recently inked anMoU with the Rajasthan government to invest Rs. 50 crore to set up greenhouse farms in the Tijara region of Alwar. Arjun Sharma, Chairman, Select Group, said: " Currently the venture is in its trial stage. We have put together a team of scientists for perfecting the farming techniques. We think it will take us about two years for a commercial launch." The company is currently experimenting with growing vegetables and herbs at a pilot farm, which will be scaled up for commercial launch, gradually. "We think there is a massive potential for fresh, affordable and chemical-free vegetables and fruits. We will look at B2B and B2C distribution, besides exports. What's most exciting is the potential to directly sell to customers through a subscription model or e-commerce," Sharma added. Select Group is the co-promoter of Select CityWalk, an upscale South Delhi mall.

Agri-tech co FarmersFZ gets angel funding

• Farmers Fresh Zone (FarmersFZ), a Kochi-based agri-tech start-up, has raised an undisclosed amount of seed funding from the Indian Angel Network (IAN) and its maiden venture capital fund IAN Fund, Malabar Angels and Native Lead. The investment from IAN was led by its two members NagarajaPrakasam and PK Gopalakrishnan. The company will use the funds to strengthen its leadership position, increase geographical reach and strengthening customer acquisition. Prakasam will join the company's board, FarmersFZ said in a statement. Founded in 2015 by software-engineer-turned-entrepreneur Pradeep PS, FarmersFZ is a multichannel marketplace. "One of the main reasons agriculture is not viable to farmers is the inefficient supply chain — merely 30 per cent of what consumers pay goes to farmers. FarmersFZ's model encourages farmers to use technology to track and use best practices," Prakasam said.

Corteva records 20% growth in India in first six months here

• Corteva, agricultural division of US behemoth DowDuPont, grew by 20 per cent in the first half of 2018 in India, the firm's South Asia Chief K V Subbarao has said. "As against 7 to 8 per cent growth experienced by the industry, we have registered a growth of 20 per cent in the first half of the current year," he said, in an interaction with the media. However, he desisted from revealing the actual numbers as the company is in the process of getting listed on security exchanges, a process, Subbarao said, that would be completed by next June. Corteva, created by the amalgamation of the agricultural businesses of Dow Chemicals, DuPont and Pioneer Hi-Bred, began operations in India in January. It mainly sells hybrid seeds and crop protection products. Its seed business is confined mainly to hybrid seeds of rice, corn, mustard and bajra crops. "While we have 20 to 30 per cent market share in seed business (limited



to those crops Corteva dabbles in), we are among top 10 in crop protection," Subbarao said. Corteva currently has a total of 35 seed products (legacy products from the merged entities), he said.

Govt fixes residue level in pulses to control glyphosate

● In a move that may prove to be a step to protect pulse-eaters from the ill-effects of herbicides present in the imported pulses, the government has decided to fix the maximum residue level (MRL) in different lentils, which was not in the practice in the country. The presence of glyphosate in pulses more than the permissible limits causes life taking diseases such as cancer. As per a recent order of Food Safety and Standards Authority of India (FSSAI), it has been said that the quantity of glyphosate residues in imported pulses is expected to be high, which could be detrimental to the health of consumers. Since India does not have any set standards for MRLs for glyphosate, the FSSAI has decided to use the standards set by Codex Alimentarius, a joint committee set by the World Health Organization (WHO) and Food and Agriculture Organization (FAO). These standards allow MRL of 2 mg/kg in beans and 5 mg/ kg for lentils and peas.



PDPS for oilseed farmers to compensate up to 25% of MSP

• The Centre has sent the guidelines for Price Deficiency Payment Scheme in oilseeds under PM-AASHA scheme to the States. The Centre's note, says that the scheme will cover all oilseeds where MSP has been announced by the Centre. This includes - groundnut, soyabean, sunflower, sesamum, niger seed, rapeseed (mustard seed), safflower and toria. The Price Deficiency Payment Scheme (PDPS) is where the Centre ensures remunerative price to farmers without physical procurement. The difference between the MSP and market price (modal price) is paid directly in to the farmers' bank account. The note explains that the PDPS has been chosen for oilseeds, as it has been practically impossible to procure oilseeds at MSP by the government all these years as the requirement for warehouse space and working capital is huge. Oilseeds, particularly groundnut, require large warehouse space and tend to rot due to moisture, before the stock is liquidated. Also, given that the oilseeds stock can't be distributed through the PDS, as they have to be processed before consumption, procuring them is not actually advantageous. It has to be noted that the Centre will support the States and take the financial burden of the scheme for up to 25 per cent of production and only up to 25 per cent of MSP. The cost of any benefit beyond this limit has to be borne by the States offering it. Also, only crops of the FAQ (fair average quality) variety will be eligible for the benefits. The payment of compensation to the farmer will be done within one month from the date of sale of the commodity. The scheme's benefit will be given to farmers who register for the scheme. Further, the sale should be within the fixed 90-day period and in a notified mandi. States which implement the scheme have to develop a portal specifically for PDPS, register farmers with details including Aadhaar number, bank account number, mobile number and crops sown. This data should be verified by the Revenue Authorities of the States before the notified sale period finishes.

Draft mariculture policy proposes special zones, offshore technology parks

• A draft national policy on mariculture has mooted mariculture zones by demarcating special areas in the sea for activities such as cage farming, bivalve farming, pen culture, seaweed culture, hatcheries and nurseries based on scientific criteria. The draft policy was formulated by an expert committee formed by the National Fisheries Development Board (NFDB) with A Gopalakrishnan, Director of Central Marine Fisheries Research Institute (CMFRI), as Chairman. The policy has also suggested farming of genetically modified (GM) species in closed mariculture systems. "...the policy allows farming exotic and genetically modified species in closed mariculture systems after stringent risk assessment and monitoring," the CMFRI said. The policy aims to enhance mariculture production in the country and increase income and employment opportunities in a sustainable way, in addition to promoting entrepreneurship by facilitating technical and financial inputs. According to the policy, satellite remote sensing data and GIS will be used to identify potential zones for mariculture on the basis of scientific evaluation of environmental parameters suitable for various types of farming avoiding conflict with other users and protecting the livelihoods of local fishing communities. Sea areas identified in this manner will be designated as mariculture technology parks by the respective States.

Govt to Push for Adding Woman Farmers' Names in Land Records

• The government will take up the issue of recording women farmers and cultivators in land records with the departments of revenue and land resources, agriculture minister Radha Mohan Singh said on Monday. The minister said women farmers have a very important role to play in the agriculture sector and that 18% of the agricultural households in India were led by women. Speaking on the side-lines of a two day conference on MahilaKisanDiwas in New Delhi, the minister said he had asked state government officials to address concerns of women farmers in land issues, marketing, extension service and knowledge on government policies. In the absence of land ownership, women are deprived from accessing institutional credit, extension services and other government entitlements including relief measures, said Ashok Dalwai, additional secretary, agriculture ministry. As men from villages increasingly migrate to cities, women are left behind to manage farms and if they don't have credit, the farming suffers, said Dalwai. "With land revenue being a state subject, the states will have to amend the Revenue Act and make it compulsory to ensure women in the household also be made owners of the agriculture land," he said, adding that out of 13.7 crore farm land holdings only 2.02 crore is under women. Further, the agriculture minister said the government has allocated more than 30% funds for women under various major schemes, programs and development-related activities in order to bring women into agricultural mainstream, he said. In addition to agriculture, women have been making exceptional contribution in horticulture, fisheries, animal husbandry, beekeeping etc.

New agri export policy to focus on setting up agro specific zones: Prabhu

• The government will soon come out with a new agri export policy which would have provisions for setting up agro specific zones to boost outbound shipments, Commerce Minister Suresh Prabhu said. The minister said India produces nearly 600 metric tonne (MT) of agri products including horticultural produce and its strategy is to increase farmers' income and reduce wastage of food products. He added that India is bestowed with the potential to produce all varieties of organic commodities due to the country's varied agro-climatic regions.

Centre to study K'taka's agri-dash board model

• The Centre will study Karnataka's latest agri-dashboard model that indicates if mandi prices of crops are ruling below the minimum support price (MSP), so that the government can make timely intervention to protect interest of farmers, a senior state government claimed on Thursday. "During a meeting with the Union Agriculture Ministry officials Wednesday, our dashboard was discussed in detail. "The Centre has in principle agreed to study it and see whether it can pursue the other states to implement the model," said T N Prakash Kammaradi, the chairperson of Karnataka Agricultural Prices Commission. The agri-price analysis dashboard - KRIPA - launched by Karnataka in July, provides analysis of whether spot prices are ruling below MSP and also forecasts rates for next three months. The dashboard provides prices prevailing in 176 Agricultural Produce Market Committee (APMC) yards in Karnataka, the arrival and sale of crops as per varieties among other details on a daily basis, Kammaradi said.

Cabinet approves closure of BieccoLawrie, National Jute Manufactures Corporation

• The Cabinet, gave its nod for the closure of switch gear making public sector unit BieccoLawrie, National Jute Manufactures Corporation Ltd and its subsidiary Birds Jute and Exports Ltd (BJEL), and revival of newsprint maker NEPA. According to a statement, the Cabinet Committee of Economic Affairs (CCEA) gave its nod to close BieccoLawrie including giving Voluntary Retirement Scheme (VRS) and Voluntary Separation Scheme (VSS) to the employees of the company. The idling assets of BLL will be subsequently put into productive use after meeting all the liabilities in accordance with the guidelines of the Government. The Ministry of Petroleum and Natural Gas had taken various steps for revival of the company from time to time. However, the competitive environment and huge capital requirement, left no possibility for its revival. BLL is a Kolkata -headquartered Central Public Sector Enterprise with 67.33 per cent ownership by the Oil Industry Development Board and 32.33 per cent equity share held by Government of India. Others hold the remaining 0.44 per cent. The company operates in four business segments — switchgear manufacturing, electrical repair, projects division and lube blending and filling facility. BLL's accumulated losses were more than the equity and the net worth had become negative. The Cabinet approved the closure of National Jute Manufactures Corporation Ltd (NJMC), which made jute bags for foodgrains, and its subsidiary Birds Jute & Exports Ltd (BJEL). Attempts to revive these units did not succeed due to various reasons, including disagreement between Centre and State authorities in case of BJEL.



Loan waivers derail Fasal Bima Yojana

• The Centre launched the Pradhan Mantri Fasal Bima Yojana (PMFBY) in January 2016. While crop insurance programmes in Indiahave been in place for more than four decades, interest among farmers about insuring their crops has been low, which is reflected in the modest coverage level. According to latest data from NSSO, less than 10 per cent farmers insured their crops in the 2012-13 cropping year. With the launch of PMFBY, the government has bringing in 50 per cent of the cropping area under crop insurance. Budget allocation towards this scheme has increased substantially, and now covers as much as a third of the total budget of the department of agriculture. There was a noticeably sharp increase in crop insurance penetration immediately after the introduction of PMBY. The Chart shows coverage of crop insurance by percentage of farmers insured over the years, from 2000-01 to 2017-18. While around 30 million farmers in the country insured their crops in 2015-16, this number jumped to around 57 million in 2015-16, a 90 per cent increase in coverage. This is the highest year-to-year increase in the history of the crop insurance schemes in India. However, there was a sharp decline in take-up in the very next year, 2017-18. Coverage came down to 49 million farmers, a 14 per cent drop from the previous year. Favourable weather could be one reason for this drop. Crop production in India is still dependent upon rainfall. While 2014-15 and 2015-16 saw widespread drought, for 2016-17 and 2017-18, the rainfall was within the normal range. But farm loan waivers by large States in the last year may have played a more important role in this decline.

No deadline for submitting details for farm loan waiver, says Kumaraswamy

Skarnataka Chief Minister H D Kumaraswamy has said that deadline was not fixed for farmers to submit requisite details to avail the benefits of farm loan waiver. The chief minister, who was here to meet Union Ministers to discuss the state-related projects, said misinformation was being spread in the state that there is a deadline to avail of the benefit, causing panic among farmers. "It would be easy for a smooth implementation of loan waiver scheme if farmers provide all details properly. There is no deadline for this. No need to fear. Don't pay heed to misinformation," Kumaraswamy told reporters. Under the Rs 45,000-crore loan waiver scheme, farmers are required to submit certain details so that the government can transfer funds directly into their bank accounts, he said. Urging the distressed farmers not to take any drastic step, the chief minister said, The state Cabinet has approved the Debt Relief Act that aims to curb harassment of farmers by private moneylenders. The state is awaiting approval from the Centre to roll out the legislation. I have requested the Union Home Minister Rajnath Singh to give nod to the Act at the earliest.

RBI to provide 2% interest subvention on crop loans

• To provide relief to farmers availing short-term crop loans and those affected by natural calamities, the Reserve Bank of India said an interest subvention of 2 per cent per annum will be made available to banks for the first year on the restructured loan amount. Such restructured loans will attract normal rate of interest from the second year onwards, the RBI said in its updated 'Master Directions on Relief Measures by Banks in Areas affected by Natural Calamities'. While the rate of interest will be in accordance with the Master Directions on Interest Rate on Loans and Advances, the RBI said within the area of their discretion, banks shall take a sympathetic view of the difficulties of the borrowers, and extend a concessional treatment to calamity-affected people. In respect of default in current dues, no penal interest will be charged. Banks will also suitably defer the compounding of interest charges. Banks will not levy penal interest and consider waiving penal interest, if any, already charged in regard to the loans converted/rescheduled. Depending on the nature and severity of the natural calamity, the State Level Bankers' Committee (SLBC)/ District Credit Committee (DCC) will take a view on the interest rate concession that could be extended to borrowers so that there is uniformity in approach among banks in providing relief. The RBI said that under the Prime Minister's FasalBimaYojana (PMFBY), all Seasonal Agricultural Operations (SAO) loans for notified crops in notified areas are to be compulsorily provided insurance cover for all stages of the crop cycle, including post-harvest risks in specified instances. Farmers' details are required to be entered by banks in the unified portal for crop insurance to facilitate assessment of coverage of crops insured, and premiums deducted, among others.

Ahead of Telangana elections, loan waivers set to hit banks, agri sector

• With Telangana set for early polls in December, banks and the agricultural ecosystem are facing the perilous prospect of impending farm-loan waiver. The ruling Telangana RastraSamithi (TRS) has promised a loan waiver of up to RS 1 lakh for farmers in its partial manifesto, which was released on Tuesday. The grand alliance of Opposition parties has gone a step further, with a more ambitious promise of waiving loans of up to RS 2 lakh if it comes to power. As per preliminary estimates by officials, the expected burden on the State exchequer will be in the range of RS 22,000-40,000 crore, as approximately 40 lakh farmers would be eligible for the waiver. Even though the waiver amount is to be provided by the State government to banks, it is expected to hit the banks in many ways. Going by the experience of previous loan waivers (after the 2014 elections), the funds were released to banks in instalments stretched over a long period of time. In Telangana, banks had to wait for three years to get the money from the government, which provided RS 16,374 crore in five tranches up to September 2017. In AP, too, banks had to wait for more than four years for the waiver amount of RS 24,000 crore. Up to December 2017, the government had released only RS 16,000 crore to banks. The lack of Central funds was cited as a reason for the delay in reimbursement to banks. This made the already beleaguered banking system more vulnerable to a liquidity crunch. Expecting the loan waiver, many farmers had stopped repaying loans. This will make the disbursal of rabi loans sluggish and, thereby, impact agriculture in the current season. The overdues in agriculture for banks in Telagnana increased by RS 18,194.49 crore in the quarter ended June 2018, as per data released by the State Level Bankers' Committee.

Only 50% farmers benefit from loan waiver

• The Maharashtra government's claims about the ChhatrapatiShivaji Maharaj ShetkariSanmanYojana (CSMSSY), a farmers' loan waiver scheme, have fallen flat as only around half the money – Rs 16,498 crore – has been disbursed to 39.78 lakh farmers out of the state's 80 lakh farmers. In June 2017, the DevendraFadnavis government had announced Rs 34,000 crore for 80 lakh farmers. However, the latest data released by the Direct Benefit Transfer portal shows that the government's projections were exaggerated, and Opposition parties have now demanded a clarification from the government on the issue. More than a year after the loan waiver was announced, the government released the 11th list of beneficiaries. "The final disbursement is of Rs 16,498 crore, and 39.78 lakh farmers have benefited from the loan waiver," a senior official from the Maharashtra government's agriculture and cooperatives department told. As per official records of the disbursement, the government had received over one crore applications from farmers. Under the One Time Settlement (OTS), 22.50 lakh farmers' accounts became eligible, and Rs 12,386 crore was disbursed. After incentives were announced (they are given to farmers who repaid old loans within a stipulated time), more than 15.78 lakh farmers became beneficiaries and Rs 1,568 crore was disbursed. SVR Srinivas, principal secretary, Information Technology Department, whose division facilitated the direct benefit transfer (DBT) technology, confirmed the figures. "The loan waiver will not go beyond this. The money was transferred directly to the bank accounts with complete transparency," Srinivas said.

Gujarat bags 'Best Agriculture Award'

• For its innovation and technological advancement in farming, Gujarat has received the 'Best Agriculture Award' instituted by the Indian Council of Food and Agriculture (ICFA). Union Home Minister Rajnath Singh presented the award to Gujarat Agriculture Minister RC Faldu, Additional Chief Secretary (Agriculture) Sanjay Prasad and Director of Agriculture Bharat Modi at the 11th Global Agriculture Leadership Summit in New Delhi. M S Swaminathan was the Chairman of the jury for the awards. Gujarat has adopted several initiatives for better farming practices. Its efforts such as Krishi Mahotsav, Soil Health Card, water conservation, micro-irrigation, horticulture, post harvest management, dairy and animal husbandry were noteworthy. The State, according to a statement issued by the government, has been successful in containing the pink-bollworm menace in cotton crop, which is the State's largest kharif crop. Over the past couple of years, Gujarat has taken up initiatives in the areas of satellite imagery and GIM mapping besides drone survey for agriculture.

Punjab to ban sale of formulations with glyphosate

The Punjab Government has decided to ban the sale of all formulations containing weedicide glyphosate, as a court in San Francisco upheld the weed killer's role in causing cancer. "The use of glyphosate is regulated because of its harmful effects on human health," an official statement said. The State Agriculture Department had asked all pesticide manufacturers, marketers and dealers not to sell the formulations and concentrations of glyphosate and return the unused stock to the companies which have supplied them. It has also asked the licensing authorities to take necessary steps to remove the entries for glyphosate from the licences issued by them. According to the Government, the Central Insecticide Board and Registration Committee has recommended this herbicide only for use in tea gardens and non-cropped areas. Since the State has no tea plantation and too little of non-cropped areas, there is no need for allowing the sale of glyphosate. Punjab is the fourth State after Andhra Pradesh, Telangana and Maharashtra to regulate the sale of the herbicide.



Mustard cultivation off to a great start

• Mustard cultivation in the current rabi season has taken off as farmers in Rajasthan and Uttar Pradesh resorted to early sowing in order to capitalise on residual moisture levels in the soil. "There is a substantial increase in mustard/rapeseed sowing this season so far. While farmers in Rajasthan took to sowing early as they wanted to make use of the higher level of moisture present in the soil due to the delayed monsoon withdrawal," said Pramod Kumar Rai, Director (Acting) of the Directorate of Rapeseed-Mustard Research (DRMR), Bharatpur. Similarly, there is an increase in mustard cultivation in Uttar Pradesh

as the State government is actively promoting it as part of a strategy to wean farmers away from wheat, he said. The area under mustard/ rapeseed cultivation has touched 13.4 lakh hectares (lha) as against 7.06 lha during the corresponding period in the previous rabi season. In fact, mustard is the only crop that reported a substantial increase in acreage. The total area covered by all crops stood at 30.23 lha, about 35 per cent lower than 46.47 lha in the same period in the last year. The area under pulses, on the other hand, is down by almost 70 per cent to 7.30 lha as compared to the same period last year.



Tamil Nadu allots Rs 45.71 crore for 'Per Drop More Crop' scheme

● The Pradhan Mantri Krishi SinchayeeYojana -- Per Drop More Crop (PDMC) -implemented jointly by the Centre and the State governments to improve water use efficiency by adopting micro-irrigation technologies, has more components for farmers this year. Besides, significant subsidies are given for four key activities - sinking of shallow tubewells/ shallow/medium borewells in safe blocks, installation of diesel pump sets/ electric motor pumpsets, laying of conveyance pipes and construction of ground-level storage structure. The state government has allocated Rs 45.71 crore for this scheme for the current year (2018-19). Detailed guidelines have also been issued to help farmers in availing the subsidies under the scheme to be implemented in 30 districts. While the sinking of shallow tubewells and borewells would be allowed only in 437 safe firkas, the rest of the three works would be allowed in all firkas. Under this scheme, for the component of sinking of shallow tubewells/shallow/medium borewells, a back-ended subsidy of Rs 25,000 per unit would be given. For installation of diesel pumpsets/electric motor pumpsets, 50 per cent of the cost of installation limited to Rs 15,000 would be given as subsidy.

Maha proposes EPF, insurance benefits for sugarcane labourers

• The Maharashtra Government has proposed to extend benefits of Employees Provident Fund (EPF) as well as insurance schemes to those cutting, harvesting and transporting sugarcane, a State Labour department official said. He said that the State had around eight lakh labourers engaged in these works in 168 cooperative and private sugar factories. The official said that it has been proposed to extend benefits of EPF, insurance schemes such as Pradhan Mantri Jeevan Jyoti Bima Yojana and Pradhan MantriSurakshaBimaYojana, financial assistance for children's education and housing to these labourers. "These are proposed schemes and we will soon fix the criteria for them. For the implementation of the scheme, there will be an office in Parli in Beed district, as large number of cane labourers are from there. A drive would also be undertaken to register them," he informed. In 2014, the State Government had announced setting up of a Sugarcane Labourers Welfare Board to be named after late BJP leader GopinathMunde. However, instead of the Board, the State Government has now come out with a welfare scheme for sugarcane labourers, which was approved by the cabinet in December last year. The official said that a sub-committee of the state Legislative Assembly had suggested making sugar factories the principal employer and cane labourers its part. Besides, it was also proposed to collect levy from the sugar factories for welfare schemes for cane labourers, said an official said. "This would have established the relationship between the sugar factories and cane labourers as employer and worker. It meant these labourers should be given social security benefits such as employees provident fund etc. But the factories opposed it citing financial burden," the official said.

Pink bollworm attacks on the rise in Telangana as mercury dips

• With night temperatures coming down as the winter sets in, the incidence of pink bollworm attack has gone up in several Telangana districts. Scientists have asked the farmers to keep an eye on the crop and take immediate measures to arrest the growth and spread of the worms. A committee deputed by the Prof Jayashankar Telangana State Agriculture University has received reports of farmers losing their bolls to the pest. "Though it is still within the limits, the incidence might go up in late October and November which is considered a favourable period for the worms," a university official said. Cotton acreage in Telangana stands at 18 lakh hectares this kharif as against the normal acreage of 15 lakh hectares. The marketing yards and ginning mills have already started procuring the fibre from the first picking. Meanwhile, the scientists have advised the farmers to spray a mix of chemical pesticides and natural formulations such as neem oil between 6 and 11 am or 3 and 6 pm, besides asking them to go for alternative crops such as greengram, groundnut or maize after the second picking.

Sikkim receives FAO's Future Policy Gold Award

Sikkim Chief Minister Pawan Kumar Chamling received the UN Food and Agriculture Organisation's (FAO) Future Policy Gold Award from its Deputy Director Maria Helena Semedo, who commended the Himalayan State for setting an example to the world by becoming the first totally organic State. Accepting the award at the FAO headquarters in Rome on Monday, Chamling extended an invitation to the world, saying: "Let us build an organic world together." "An organic world is definitely achievable. I also appeal to the world community that we do not carry out any kind of development work and business at the cost of the environment." Nicknamed the Oscar for best policies', the award is co-organised with the FAO by the World Future Council (WFC) and IFOAM – Organics International and recognises "the world's best laws and policies promoting agroecology". Presenting the award, Semeda said: "Sikkim is an outstanding example on how to successfully transform the food system and ensure respect for people and planet" and the award recognises the State's leadership and political will. Sikkim's transition to organic farming "has benefited over 66,000 family farmers, reaching beyond just organic production to include socio-economic aspects such as consumption and market expansion, rural development and sustainable tourism with its comprehensive and inclusive approach", she said.

Farmers portal launched; Meghalaya agriculture policy & MSP on cards

• The Meghalaya Farmers' Portal (www.megfarmers. gov.in) was officially launched by the Meghalaya Agriculture Minister BanteidorLyngdoh at YojnaBhavan. The Farmers' Portal of the Department of Agriculture is a platform for farmers to seek any information related to agriculture. Detailed information on farmers' insurance, agricultural storage, crops, extension activities, seeds, pesticides, farm machineries amongst other information is provided. Details of fertilizers, market prices, package and practices, programmes, welfare schemes are also given. Block-level details related to soil fertility, storage, insurance, training, etc. are also available on the portal. Speaking on the occasion, Lyngdoh said that the portal will directly connect farmers to the Agriculture Department and hoped that the information provided in the portal will prove to be beneficial to the famers of the State. Reiterating that the Government is continuously working to improve the condition of framers, the State Agriculture Minister informed that the Department is seriously working towards an Agriculture Policy and also setting Minimum Support Prices for famers' produces so that they are not exploited.

Coffee exports may drop 8% as floods dent output

India's coffee exports could drop 8 per cent to 230,000 tonnes in 2019 as production is expected to fall to its lowest in five years after plantations were hit by floods in key producing southern states, the head of an industry body said. Lower exports from India could support global prices already trading near their highest in 8 and a half months. "Floods badly affected coffee plantations in Karnataka and Kerala. As production is going down, we will have limited surplus for exports," Ramesh Rajah, president of the Coffee Exporters' Association of India, told Reuters this week. Some of the worst flooding in India in a century killed hundreds of people in Kerala and Karnataka in August. The two southern states together account for more than 90 per cent of India's total coffee production. India is likely to produce 310,000



tonnes of coffee in the 2018-19 marketing year that started on October 1, the lowest in five years and significantly lower than a pre-flood estimate of around 400,000 tonnes, Rajah said.

China drops ban on rapeseed meal from India

Ochina has dropped a year-long ban on rapeseed meal imports from India as the government seeks to diversify sources of protein used in animal feed, the Customs Administration said on Monday. Rapeseed meal shipments from India can resume, if they meet certain inspection and quarantine requirements, the General Administration of Customs said on its website. The move



is China's latest effort to reduce its reliance on the US soyabeans, as Beijing and Washington remain locked in an outright trade war. China buys 60 per cent of the soyabeans traded worldwide, processing them into soyameal to feed its vast pig herds. Soyabeans are the top US agricultural export to China by value. China was the top buyer of Indian rapeseed meal before the ban was imposed in 2011 over quality concerns. As Sino-US trade tensions escalated, India stepped up its lobbying for the resumption of a trade worth \$161 million in 2011. Indian rapeseed meal exported to China must be from processing plants inspected and approved by the Export Inspection Council of India, and registered with China's General Administration of Customs, the Chinese body said on its website.

100% Import Duty Hits Walnut Shipments

Even as the nutritional benefits of walnuts are boosting consumer demand, the 100% import duty and currency weakness have affected the exports to India, said California Walnuts Commission (CWC). Walnut exports to India are likely to decline from California, which produces 99% of the crop, due to 100% import duty and weakness in the rupee, senior marketing director, International, Pamela Graviet said. "We expect the exports to India to go down further as the Indian government has imposed 100% import duty on walnuts in 2017-18 from the earlier 30.9%. This has increased the prices of the nuts and impacted demand," Graviet said. The walnut crop year is from September-August. India produces around 35,000 tonnes of walnuts in Jammu and Kashmir. Overall demand for walnuts in India is growing steadily and is 45,000 tonnes.



India likely to face hurdles in meeting 300-mn-kg tea export target

India's dream of hitting the tea export target of 300-million-kg in the next three years, which is expected to generate Rs 70 billion, may remain unfulfilled as tea companies continue to face subsidy and incentive challenges. According to the Indian Tea Association (ITA), the huge trade deficit with certain key partners is compelling the commerce ministry to push for an aggressive export strategy on favourable currency terms. Hence, while India's import bill in US dollar terms continues to remain high, the government is seeking to bill countries in rupee terms for primary commodities like tea. "It is imperative that tea exports will remain at the forefront in this endeavour," an official from the tea industry said. ITA has noted that currently Indian tea exports

stand at 252 million kg valued at Rs 50 billion and the Tea Board, after consultation with the industry, has targeted to take it up to 300 million kg. However, what may play spoilsport in this initiative is India's higher focus on crush, tear, curl (CTC) tea variety while global trends show a shift towards orthodox and green tea. During 1950s, orthodox teas accounted for nearly the entire production base of 231 million kg but went down considerably to 120 million kg today owing to increased focus of tea companies on producing the CTC variety. Today, CTC accounts for 90.1 per cent of the total production of 1,300 million kg while orthodox accounts for only 8.4 per cent and green tea the remaining 1.5 per cent. Globally also, until recently, CTC had been in demand particularly in the middle-low income countries. However, both demand as well as global prices of the CTC variety have been stagnating in the last 2-3 years and a clear indication points to the rising demand for orthodox teas.





Five more Indian rice mills to export non-basmati rice to China

• Five more Indian rice mills have been cleared by Chinese authorities for exporting non-basmati rice to the neighbouring country, the commerce ministry said. Now, a total of 24 rice mills have been authorised to export the commodity to China, it said. The first consignment of 100 tonnes non-basmati rice was shipped to China, from Nagpur, in September.

Global demand for Indian organic food products on constant rise

The demand for Indian organic food products is on constant rise around the world as Country exported organic products worth \$515 million in financial year 2017-18. It was up 39 per cent compared to the export worth \$370 million in Financial year 2016-17. The total volume of export during 2017-18 was 4.58 lakh Metric Tonne . The organic food export realization was around Rs. 3453 crore (\$515 million). Organic products are exported to countries such as USA, European Union, Canada, Switzerland, Australia, Israel, South Korea, Vietnam, New Zealand, Japan etc. "The major demands under the organic product category are for Oil seeds, Cereals & Millets, Sugar, Fruit juice concentrates, Tea, Spices, Pulses, Dry fruits, Medicinal plant products etc. Many new countries like Israel, Vietnam, Mexico are also taking interest recently. The equivalency granted by European Commission and Switzerland for unprocessed plant products and the conformity assessment granted by USDA has played pivotal role in increased export," said DrTarun Bajaj, General Manager. Agricultural and Processed Food Products Export Development Authority (APEDA). "India is also negotiating with Canada, South Korea, Taiwan and Japan for equivalency with NPOP. In addition the traceability system, Tracenet established by APEDA for certification and export of organic products also helps India to maintain the credibility and traceability of certified products." said DrTarun Bajaj, "Under National Programme for Organic Production, area under organic certification during 2017-18 was 3.56 million Hectare. This includes 1.78 million hectare cultivable area and another 1.78 million Hectare for wild harvest collection," said Dr Bajaj.

PAU re-launches popular wheat variety with added rust disease resistance

Every Punjab farmer knows PBW-343, a workhorse wheat variety released in 1995 that was once being grown in over 3 million hectares (mh) area in the state and about 10 mh across India. However, as it became susceptible to stripe (yellow) and leaf (brown) rust, this popular variety gave way to new blockbuster wheats, especially HD-2967 and HD-3086, which were more resistant to these fungal pathogens. But the Punjab Agricultural University (PAU) here has now reintroduced PBW-343 in a new avatar, by incorporating two pairs of leaf and yellow rust-resistance genes - Lr37/Yr17 and Lr76/Yr70 - that make it possible for farmers to cultivate their old favourite variety yet again. "We have named



the re-launched variety PBW-343 Unnat. The entire process of identification of the rust-resistance genes from donor wheat lines and introgression in PBW-343 background was done using a biotechnology-based plant breeding technique called marker-assisted selection. This is the first ever such developed wheat variety released at the national level," said Navtej Singh Bains, Director of Research at PAU. The preference for the new variety through past association can be gauged from the fact that around 3,700 quintals of its seeds got sold through KisanMelas (farmer fairs) in Punjab this time. Sale of HD-3086 seeds, on the other hand, was only 1,100 quintals. The PBW-343 Unnat seeds were sold at a rate of Rs 1,200 per 40-kg bag. Farmers usually sow 2.5 bags per hectare. The 3,700 quintals sold can, thus, technically cover 3,700 hectares in the current 2018-19 rabi season. "We released the variety last year, but as the seeds were available only in limited quantities, it was grown more like a trial by a few farmers. In the coming season, more farmers would be in a position to plant it," noted Tarsem Singh Dhillon, director of seeds, PAU.

Alphonso gets GI tag



• The government has eventually granted the Geographical Indication (GI) tag to the Alphonso Mango from Ratnagiri, Sindhudurg and other adjoining areas in Maharashtra. The move will help identify the authenticity of this variety of fruit. The king of mangoes, Alphonso, better known as 'Hapus' in Maharashtra, is in demand in domestic and international markets for its taste, pleasant and distinct flavour and vibrant colour. In addition this variety is a rich source of vitamin 'A', 'E' and selenium, which helps to protect heart diseases. Alphonso contains phenolic compounds, which are rich in antioxidants, and help in fighting cancer and skin benefits. It also makes the digestive system strong by relieving acidity and constipation. It has long been one of the world's most popular fruit and is exported to various countries including Japan, Korea and Europe. Even in India all for its taste, flavour and the health perspective. New markets such as in the US and Australia have recently opened up for this variety. Geographical Indications protection is granted through the Trade Related Aspects of Intellectual Property Rights (TRIPS) Agreement of the World Trade Organisation (WTO).

Gel to protect farmers from pesticides

Indian farmers usually do not wear any protective gear while spraying chemicals in fields. This exposes them to harmful toxics contained in pesticides, causing severe health impacts and even death in extreme cases. Indian scientists have now developed a protective gel to address this problem. The gel can be applied on skin and can break down toxic chemicals in pesticides, insecticides and fungicides including the most hazardous and widely used organo phosphorous compounds. The gel deactivates these chemicals, preventing them from going deep into the skin and organs like the brain and the lungs. It has been found to be effective in tests done in rats and researchers hope to soon test it in humans. Exposure to chemicals contained in pesticides interferes with an enzyme called acetylcholinesterase (AChE) which is present in the nervous system and is critical for neuromuscular functions. When its functioning is disrupted by chemical pesticides entering the body through the skin, it can cause neurotoxicity, cognitive dysfunction and even death in severe cases. When the gel was applied on rats and they were exposed to a lethal dose of pesticide MPT, it did not lead to any change in their AChE level, showing it could prevent penetration of the pesticide into the skin. The gel, named poly-Oxime, has been prepared by researchers at the Institute for Stem Cell Science and Regenerative Medicine (InStem), Bangalore from a nucleophilic polymer. In lab studies, rats treated with poly-Oxime gel survived pesticide treatment, whereas rats with no gel or sham gel showed symptoms of poisoning or died.

Arunachal Govt launches two agriculture programmes

Arunachal Pradesh Agriculture Minister Dr Mohesh Chai launched two schemes for farmers to increase production and their income. The two schemes are Chief Minister's Sashakt Kisan Yojana (CMSKY) and Chief Minister's Krishi Samuh Yojana (CMKSY). Finance Minister Chowna Mein in his 2018-19 budget speech had announced a number of initiatives to transform farm economy in the State,



Chai said. "The two new initiatives launched today is aimed at fulfilling the vision of Prime Minister Narendra Modi to double farmer's income by 2022," he said. Under these initiatives, all allied departments would be involved under District Agricultural Development Society which is responsible for planning and implementation of farmers oriented development schemes, he said. The Minister said the State Government is coming out with more policies for the enhancement of farmer's income. The government plans to link farmers with markets, and develop scientific and integrated ways of farming, he said. "Arunachal Pradesh produces around 4,500 mt of fish per year, whereas the requirement is about 15,000 mt. So, the State has a ready market for fishes," the Minister said. Chai also launched the web portal of the department. The CMSKY would subsume three programmes – CM's Employment Generation Scheme, CM's Agri-Mechanisation Programme and CM's Flagship Programme on Tea and Rubber, Agriculture Secretary MimumTayeng said.

Local farmers go online to reach dining tables

A group of farmers in Dakshina Kannada is aiming to bridge the gap between farmers and consumers in a local area with the help of an IT (information technology) platform. Developed by IT professionals-turned-farmers and supported by other like-minded farmers, the online platform -LocalFarmers.in - wants to help the farmer to get a better price for hisproduce. Yetheesh Shetty Bondala, one of the farmers involved in the development of this IT platform, told BusinessLine that this online marketplace, which was launched one-and-halfmonths ago, is an effort to provide a transparent marketing platform for farmers and consumers. For the consumer, this platform provides traceability of the produce he/she buys, helping the person to provide direct feedback to the farmer concerned. For farmers, the platform helps in getting a better price for their produce or value-added products. Bondala, who took to farming in Bantwaltaluk in Dakshina Kannada district three years ago after working for an IT company for several years, said this idea was lingering for almost one-and-a-halfyears in the minds of farmers in his circle.

India to export raw sugar for first time in three years

• Indian sugar mills have signed deals to export raw sugar for the first time in three years as a rally in New York prices to sevenmonth highs along with government subsidies made exports lucrative, five dealers and two industry officials told. Mills in the country were reluctant to sign new export contracts until recently as global prices were trading far below local prices. But a rally in international raw sugar prices along with a rupee hitting a record low has made exports viable. Mills have contracted to export 150,000 tonnes raw sugar at around \$280 per tonne on a free-on-board basis for shipment in November-December, the dealers said.

Karnataka aims to be nutri-cereal granary

• After having taken the lead in promoting the cultivation of millets, Karnataka is now positioning itself as the main sourcing destination of nutri-cereals and organic produce in the country. The State is hosting the second edition of the Organics and Millets International Trade Fair in January 2019 with a theme K-Source, celebrating the State of Karnataka as the source for next-gen Smart Foods. "Through this event, we want to emphasise our positioning of Karnataka as the Organics and Millets Capital of India," said Karnataka Agriculture Minister, Shivshankar Reddy. The organic agriculture sector in the State was gaining momentum with markets experiencing double-digit growth year-on-year, while millets have emerged on the scene as the nutri-cereals, Reddy said. Over 250 exhibitors including overseas buyers, sellers, exporters and farmer-producer organisations (FPOs) are expected to participate at the three-day event starting January 18. The Karnataka Agriculture department has roped in the International Competence Centre for Organic Agriculture (ICCOA) as the knowledge partner for the event. Maheshwar Rao, Principal Secretary Agriculture said the policy push provided by the Karnataka Government has helped promote organic farming in the State. The certified area under organic farming has registered a steady growth in the State from 2,500 hectares to one lakh hectares as on date, while millets are cultivated on around 20 lakh hectares.

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ven after decreased contribution to GDP, agriculture still continues as a major livelihood provider around the globe, especially in the developing world; and hence responsible for economic growth and social transformation. Tremendous progress has been achieved in agriculture in the recent years by the industry, NGOs. CGIAR bodies and institutions, supported by the Government and international organisations in transforming agriculture and allied sectors. The most significant development in the last one decade has been the emergence of large number of start-ups in food and agriculture, across the value chain spectrum, completing the chain from farm to fork. In India, the Government schemes like ACABC, Startup India, Standup India, Skilled India and launch of MUDRA Bank and such other initiatives have accelerated the value creation and entrepreneurship activities in the farm sector and connected the same to the markets and the consumers through innovative agribusiness models. Connecting farmers effectively with trade, markets and value added activity holds the key to their prosperity. In this context, Government of India has launched eNAM to help in marketing and also the program towards doubling farmers' incomes by 2022.

There is need for understanding and adopting successful global models and also fostering farmer-industry-institution partnerships towards helping farmers gradually transforming from farmer to farm entrepreneurs.

Given the prominent role of agriculture in Indian economy and changing global scenario, Indian Council of Food and Agriculture organized the 11th Global Agriculture Leadership Summit 2018 on the theme of "Connecting Farmers with Markets and Technologies". The 11th Global Agriculture Summit 2018 provided the much needed platform towards facilitating farmers connect with the technologies, markets, industry, institutions and the Government programs.

Prof. MS Swaminathan, Architect of India's Green Revolution; Sh. Parshottam Rupala, Hon'ble Union Minister of State for Agriculture; H.E Mr. Tran Thanh Nam, Deputy Minister of Agriculture, Government of Vietnam; H.E. Mr. Marten vanden Berg, Hon'ble Ambassador of Netherlands to India; Sh. Sanjay Agarwal, Secretary of Agriculture, Government of India; Dr. RenuSwarup, Secretary, Deparment of Biotechnology; Dr. KV Subbarao, South Asia Leader, Corteva Agriscience; Mr. Alok Sinha, DG, ICFA and Dr. MJ Khan, Chairman, ICFA attended the inaugural day. The two days





summit was held on 24-25 October 2018 at Hotel Hyatt Regency, New Delhi. Over 300 national and International delegates including corporate, officials, scientists, policy makers and diplomats, farmers, NGOs and development institutions participated in the event.

As on the previous Leadership Summits, the 11th edition of the Agriculture Year Book 2018 was launched on this occasion. The Year Book contained features and articles penned by some of the most eminent persons, representing different facets of Indian agriculture, introducing many new concepts and initiatives and also identifying several areas of concerns to Indian farming. The year book, a good addendum to the event, struck a right balance with combination of data, analysis and information along with the articles.

The summit was also a platform to appreciate the efforts of individuals and institutions, cutting across the sectors, who played seminal roles in furthering the interests of the farmers and agriculture. Their performances were honoured with Global Agriculture Leadership Awards 2018.

Prof. MS Swaminathan, Pioneer of India's Green Revolution at the verv outset of his remarks underlined the increasing natural calamities due to increased human intervention. "There are various environment changes and calamities taking place which are directly as well as indirectly affecting agriculture not only in our country but across the globe. Moreover, the problem of market is one big issue but largely remained unfelt by the farming community. Agriculture by its nature is a business operation but livelihood agriculture practised in the country is very different from the

commercial agriculture", observed Prof. Swaminathan. Another area of concern pointed out by Prof. Swaminathan is problem of market pricing. In our country the farm commodities are low priced and he believed that situation would get better after implementation of recommendations of farm committee on MSP. He pointed out that we should learn from countries like Netherlands on effective marketing of the products, as in our country we have more small farmers and therefore we need to organize them for effective marketing and increased profits. He stressed on the need



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to work towards empowerment of women especially those engaged in agriculture sector given the fact that they form a major part of the workforce engaged in the sector. Further, Prof. Swaminathan pointed out that we are entering into new age with various technological advancements, especially in the field of biotechnology. Gene editing is one such need to be put in to harness these opportunities to resolve various pressing problems while overcoming its negative impacts.Moving forwards, he also accentuated the importance of value addition especially in horticulture, as it will not only increase the shelf life rather will significantly increase the income to the farmers. He quoted the case of Holland and Israel which have high farm income and progressive agriculture in-spite of water scarcity. He believes that there are so many success stories in the world to learn from and to work in the right direction to overcome our challenges and convert them into our strengths for revolutionising agriculture. In the end, he added that advancements in science and technology will pave new way for agriculture.



Dr MJ Khan, Chairman, ICFA, welcomed all the dignitaries and expressed deep gratitude to Prof Swaminathan for his supportto Global Agriculture Leadership Summit since 2008. Dr. Khan emphasised the need to discuss the constraints and opportunities for a global momentum towards making agriculture hightech, market linked and value added for best returns to farmers and to

all stake-holders across the food value chain. He emphasised that this may require collective efforts, taking on board the Governments, inter-governmental organisations, trans-national corporations, industry, NGOs, FOs, financial and technology institutions for increased flow of knowledge, technologies, investments and market access. He also opined that the national aovernment need to create enabling policy environment for effectively translating the potential of agriculture through agribusiness, and thus empowering farmers. Dr Khan expressed his concern over three major challenges to the Indian agriculture. Firstly, the food security poses a big challenge to Indian agriculture. As the resources are limited and population is rising it is essential to ensure sufficient food for all in this face of changing climate pattern. He stressed that providing sufficient food is important but ensuring quality of the food is equally important. The second challenge discussed was malnutrition. Dr. Khan stated that one-fourth of our country's population is undernourished, which is an issue of deep concern. The third issue highlighted by Dr. Khan was of farmers' income, he felt that the income earned by the food producer in our country is the most meagre and he is trapped in a vicious cycle of poverty. Our Honourable PM has envisioned to double farmers' incomes by 2022 and Dr. Khan stressed that all the stakeholders should come together and work to translate this vision into reality.

He further briefed the house about various activities of ICFA and informed about various initiatives already launched or to be launched during the summit, viz. Agriculture Knowledge Transformation Platform, Healthy food initiative, CEO'scouncil, Uttarakhand state agriculture council, Uttar Pradesh state agriculture council and various District agriculture councils. He also underlined the changing pattern in agriculture sector and highlighted that people from non-agriculture are getting into the sector, which is changing the direction of future agriculture in the country. He also brought to notice that youth of the country is still not taking up agriculture actively and need to be inspired and motivated to take agriculture as an occupation.



Dr. Lyonpo Kinzang Dorji, Hon'ble former Prime Minister of Bhutan said that Bhutan is not only closest neighbour of India but Bhutan is the closest friend and ally of India. "As Prof. Swaminathan said the coastline is going to be the forefront of the impact of climate change, as we know we experience every year more of hurricane, typhoons, floods and uneven rainfall patterns but Bhutan being in the mountains is also bearing the brunt of climate change. Although our glaciers are melting faster but it has slight positive impact in reference to the Bhutan. We have places about 2500 m above sea level where our farmers could not grow rice. Being rice eater every Bhutanese farmer's aspiration is to grow rice on their small holdings. Since about 15 years, we have been growing rice in Bumthang which is 2500 m above sea levels. Growing wheat, barley and livestock are their mainstay but since about 15 years because of the wonder of new technology, agriculture development in Bumthang has been able to grow rice. Similarly, we could not grow chilies but now Bumthang is one of the best chilli grown regions in Bhutan. There is positive side to

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climate change but we know that negative impact far outweighs the positive impact. The climate change impact on the food security and food production is something entire world is challenged with. We need to work together to elevate the impact of climate change. Climate smart agriculture is something that we should all be working towards. Agriculture has to be sustainable and agriculture should take into account the landscape approach not just a farm, the surrounding environment is important, he said.



Sh. Rajnath Singh, Hon'ble Home Minister of India congratulated ICFA for organising Global Agriculture Leadership Summit and Awards bringing together function and various stakeholders of food and agriculture sector together on a single platform. He emphasised the role of youth in India's growth story. He believed that leadership award presented by ICFA is a very good initiative to encourage people in food and agriculture sector. He said the question is how to boost agriculture, increase the agriculture GDP share, and increase the growth rate. He mentioned that there were many commissions made when he was agriculture minister of India. "Even when received recommendation of the commission, we are not able to achieve the desired growth in agriculture," he noted. But still he believes that we will achieve the desired growth through continous hardwork and progress. He pointed out that techonology is becoming advanced day by day and there is a need to link technology with

agriculture. People are accepting technology and this is a good sign. He also opined that India's development is not complete without the development of rural areas and he believes that India will achieve this target soon. "If we look at the 50s, the contribution of agriculture sector in India's GDP was approximately 52% and now it is less that 4%. But this time in the first quarter of 2018, agriculture growth rate was 5.3% and we are hopeful that it will continue to grow like this. The Prime Minister knows the potential of agriculture sector and he is working towards realising the potential of this sector. His vision is to increase the farmers' income by 2022. The PM is working towards to achieve this vision. The government has committed to irrigate around 28 lakh ha of unirrigated land and many are already done in this regards. The government has increased the MSP but the procurement is also very important and we are working in this direction. The agriculture global leaders are working towards it and I believe that we will achieve the results soon", he said.



Ms. Kampamba Mulenga Chilumba Chewe, Hon'ble Minister of Livestock & Fisheries, Zambia in the special policy session highlighted the policies of Ministry of Livestock and Fisheries of Zambia. Ms. Chilumba said that the fisheries and livestock policies aimed at improving food and nutrition security, increasing income at household levels, reducing poverty in rural set ups and reducing unemployment for youths." For the development in agriculture, the national agricultural plan and the vision 2030 is in effect. The seventh national development plan is also in effect which has a broad spectrum. The key challenges in Zambia are the low production and productivity in the fisheries and livestock sector. Adequate agriculture extension officers in the country are doing as much as possible to ensure that we address some of these issues." the Minister said. Ms. Chilumba mentioned that fishery is one of the important areas of the Ministry. The government is doing everything to ensure market linkages for the people. "Limited access to finance and credit, high post harvest losses, low value addition, and low participation of private sector in agriculture are some of the challenges. Policy measures are taken to increase production and productivity in the sectors for example the general overview would be to improve efficiency and effectiveness for the existing extension staff.We are also trying to strengthen our research extension which is very vital and we are also calling public private partnership in this area. We are also trying to implement communication technoloav, ICT in agriculture which is a measure upcoming in our country," she said.

Chandramohan Sh. Reddy, Minister of Agriculture, Government Andhra Pradesh highlighted of various achievements of the state in the field of Agriculture, Horticulture and Fisheries. Andhra Pradesh has achieved 7.7% growth rate in the year 2015-16, 14.9% in the year 2016-17 and 17.9% growth rate in year 2017-18 in the primary sector. "This is indication of the inclusive development during the dynamic leadership of the Chief Minister. The AP government has taken initiative through AP drought mitigation project with an outlay of Rs. 1042 crores benefitting 1.3 Lakhs families in drought prone districts. The zero budget natural farming is another initiative of the government to cover 5.5 lakh farmers in 5 lakh





acres by the end of 2018-19," he informed. Dr. Reddy mentioned that International organisations namely UNEP and FAO have recognised the AP government efforts in using farm friendly chemicals and fertilizers to increase farmers' income. He said that the government has taken a bold step and issued order for clearing Rs. 24,000 crores towards debt redemption benefiting 40 lakh farm families. Dr. Reddy also pointed out that the state has distributed 40 lakh soil health cards in the year 2016-17 and 34 lakh soil health card distributed in the second phase so far. "The state has made agreement with the Bill and Mellinda Gates foundation for soil health technology using satellite mapping. Our government is providing micronutrient to farmers free of cost. The government

has taken the major initiative to establish mega seed parks in the state with the partnership of lowa State University to provide farmers with the quality seeds. The state is spending Rs. 450 crores every vear in seed research and Rs. 452 crore for farm mechanisation and allocated 12,200 tractors in 2018-19. The state has also initiated program for digitalisation of data for farmers", he informed.Dr. Reddy also mentioned that the state stood first in the productivity of Maize, Jowar and soya bean. "We are taking all measures to stand first in productivity of different crops in the country by the year 2020 and competing with world productivity level by the Year 2024. "In horticulture, our vision is to increase area under horticulture to 40 lakhs acres to one crore acres. During the current year it was targeted to provide microirrigation to two lakh acres with the budget of Rs.1380 crore. We have incorporated cold chain production in Andhra Pradesh to provide cold storage facility and cold storage van for perishable horticultural products. In fisheries, Andhra Pradesh ranks number one in total production of shrimps in the country. The seafood exports from the state in the year 2016-17 reached to Rs.17,000

crores against the total export of Rs. 37,000 crore of total of the country, which is about 45% share in India. The sector has achieved growth rate of 30%," he explained.



Dr. Renu Swarup, Secretary, Department of Biotechnology, Government of India stressed on the importance of the theme of the summit that emphasized on connecting farmers to markets which is the very important component for any growth we wish to have in agriculture sector. "Looking at the theme, there are two very important components which are the drivers of agriculture i.e., technology and policy", she elaborated. Dr. Swarup said that unless we have complete new technology development which is driving this and new policy makers which promote this, it is difficult for us to achieve what our vision is **COVER FEATURE**

i.e., connecting farmers to markets. "India is a country which has a long history of having its priorities correctly positioned which has both the components, technology and policy, and way back from green revolution which Prof. Swaminathan achieved was a great example of policy and technology. From the green revolution till now we have seen tremendous advancements in the sector that gives us the confidence that we are correctly positioned to take this forward. If you see where we stand today in terms of developments, DST along ministries, stake with holders. and scientists have worked with International and national collaborations and one can see technology can be a huge enabler driving agriculture growth," she said. Dr. Swarup talked about new technologies, cuttina edae technologies of crop improvement, increased enhanced productivity, new varieties, genome technology, editing technology; gene Prof Swaminathan has brought better technologies addressing challenges of biotic and abiotic stress and nutrition in crops. Our Scientists are working on it and we have got excellent results. She mentioned that they are looking at facilitating the skill development in terms of human resource but also in terms of capacity building. If we look at where we are positioned today we do have the best state of the art infrastructure within the country. She said that for various agriculture growth and new technology developments they are looking at different facilities across the country and she also emphasized on partnership between public and private sector. She emphasised on the importance of connecting all the stakeholders, researchers, scientist, entrepreneurs, academicians and industry. According to Dr. Swarup, to achieve the government's vision of doubling farmers' income it is important to connect farmers with markets which focuses majorly on these components ie, new

technology, bringing all stakeholders together, combination of technology and policy.In the agroclimatic zone models, the scientists are working closely with farmers and markets to understand the needs of famers and vice-versa making the linkage strong. Dr. Swarup also discussed that the startups have a tremendous scope in agriculture sector. "These startups are developing newer technologies which address the issues of farmers. It is time we bring in new polices for startups to increase the collaborations that are happening in the industry and drive the growth of sector," she said.



Mr. Saniav Agarwal, Secretary of Agriculture, Government of India said that the PM's vision of doubling the farmers' income by 2022, requires good governance, good strategy, good programs. Mr. Agarwal pointed out that the ratio of farm income has changed from 60:40 to 70:30 and to increase the income of farmers, investment of private sector and public sector is required. Mr Agarwal mentioned that in eNAM there are 585 mandies. There is an increase of 42% in numbers from last time and the exchange of information and services, commodity arrivals and prices, and buy and sell trade offers, has helped farmers bid for the best prices across markets.

Dr. Purvi Mehta, Asia Head of Agriculture, Bill & Melinda Gates Foundation said that India is one of the fastest growing countries in terms of agriculture production. The government of India has been taking various steps towards boosting its trade, and facilitates both exports



and imports with the other countries of the world. India is showing positive growth in exports. The livestock sector has shown an impressive growth in past years.Dr. Mehta talked about the India's largest extension system KVKs, they have been working to collect all the information from farmers about their inputs and imparting vocational training to the practicing farmers, school dropouts and field level extension functionaries. These KVKs are producing quality technological products such as seeds, planting material, bio-agents, and livestocks and thus making it available to farmers, organizing frontline extension activities, identifying and documenting selected farm innovations and converging with ongoing schemes and programmes."Today, there is a people led revolution and technology has connected people all over. Farmers are using phones for exchanging information. Technology has got all connected to each other. The digitised land registration and uberised tractor services all are contributing to improved farm management. New technologies have enabled small farmers to shift from input-intensive to knowledge-intensive agriculture", mentioned Dr. Mehta.

Prof. Rudy Rabbinge, Special Envoy – Food Security, Government of Netherlands said that as Prof. M.S. Swaminathan brought green revolution to India, we are trying the same for Africa. The world's population is set to grow considerably over the coming years, albeit at a slower rate than in the past and with considerable differences across regions. Prof.

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Rabbinge pointed out that growing hunger is the major problem which the world is facing. "Global estimates of undernourishment rose from 777 million in 2015 to 821 million in 2017. Approximately, 27.4% of the population in Africa were classified as severely food insecure in 2016 and we are working to eradicate these problems from Africa," he informed.Prof. Rabbinge said that food security is not only an issue of sufficient production, but also about improving the quality of food. "We need to make sure the availability of food in terms of quantity and quality to satisfy the dietary needs of individuals; and the physical and economic accessibility for everyone, including vulnerable groups, to adequate food, free from unsafe substances," he said. Prof. Rabbinge emphasised that along with ensuring safe food to all, we must learn to produce

food that does not harm nature. "To feed the world sustainably we need to produce more food with fewer resources. There is a need to combine high production agriculture in such a way that it pose less threat to climate change.Our goal must be to identify high production systems and adopt practices that are both more sustainable and more profitable. The agriculture yields are being affected by climate change and there is a need to increase agricultural production by developing high yielding varieties of climate resilient crops to feed the increasing population, he recommended.



Dr. KV Subbarao, South Asia Lead, Corteva Agriscience mentioned that people living in rural areas are the most exposed to food insecurity, owing to limited access to food and financial resources."Poverty and climate change exacerbate the global challenge of food insecurity.In the last decades, it seemed there has been a shift from quality to quantity. We can see overall quality of food being consumed has decreased.It is not so important anymore how good the quality of something is, but how much you can produce and consume," he pointed out. According to Dr. Subbarao, Global climate change can be measured by 3 points ie., land deforestation, temperature increase and water depletion. He also pointed out that as the world's population grew, there will be greater demand for food, timber, fresh water, fuel and clothes. Agriculture and forestry will need to cater to these increasing demands but at the same time minimize it's environmental impact. He pointed out that large number of technologies can play a role in addressing concerns related to agriculture. "We need to develop hi tech farms that control risk. New and existing technologies to combat biotic and abiotic stresses, raise crop and livestock productivity, improve soil fertility and make water available can potentially increase the amount of food produced. Storage, refrigeration, transport and agroprocessing innovations can address the dimension of food accessibility.



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he suggested. Lastly, he emphasised the importance of Science to produce high-nutrient staple crops can combat malnutrition, improving food utilization and use. "Country is strongly positioning itself in global scenario; it is high time for India to recognize the efforts of doyens in agriculture and especially those who have contributed to the global food security. The institution of World Agriculture Prize and starting the series of Global Dialogue on Climate Change and Food Security will provide great avenues to India and the world to learn from experiences and success stories of developed nations and replicate them in Indian and developing world context to deal with the challenge of climate extremes and ensure sustainable global food security", he said.



Mr. Salil Singhal, CMD, PI Industries underlined the fact that worldwide agriculture is losing proposition for the farmers and it is primarily supported by governments to sustain them in the business. He mentioned that in America the cotton farmers get the subsidy of \$80 billion, whereas European farmers get the subsidy of billion dollars a day. "Farming is very complicated subject but on the other hand if we look at Indian agriculture it has done brilliantly well from ship to mouth to farm to fork. Now we are exporting \$33 billion worth of exports which is a very big support to the farmers if they get the benefit of that export," he said. He mentioned that the challenges remain very rightly pointed out and the challenge is connecting the farmers to the market. In the market connection between the farmers and market there are too many intermediaries. Mr. Singhal suggested the need for a comprehensive 10 year plan on how we want to handle agriculture. He pointed out some of the problems faced by Indian agriculture such as constitutional problem, what the state might be deciding may not work with the centre and vice a versa and social problems associated with the land. "We can not get the productivity in 1 ha farm by what we can do by creating FPO or cooperative. Tragically the cooperative movement in India has just collapsed," he said. Mr. Singhal emphasized on the financial consequences of MSP. He said that if we have to give MSP all other program of social and educational areas will have to come to stop. So this has to be thought in a holistic manner. Lastly, he emphasised that we should be very proud of what we have achieved in last 60 years.

Recommendations of Eleventh Global Agriculture Leadership Summit 2018



• Synergy of Technology and policy. Unless there is complete new technology development and new policies promoting it, it is difficult to connect farmers to markets.

• Developing and promoting technologies to increase agricultural productivity and farmers' income. New and existing technologies need to be promoted to combat biotic and abiotic stresses, raise crop and livestock productivity, improve soil fertility and make water availability. This can potentially increase the amount of food produced. Storage, refrigeration, transport and agroprocessing innovations can address the dimension of food accessibility

• Promoting biotechnology. Biotechnology is a suitable avenue for incorporating changes in the genetic make up of the plants and for introducing quality attributes faster. Gene editing is an important genetic tool that need to be put in to harness these opportunities to resolve various pressing problems while overcoming its negative impacts.

• Creating enabling policy environment. The national government needs to create enabling policy environment for effectively translating the potential of agriculture through agribusiness, and empowering farmers.

 Collective efforts, taking on board the Governments, intergovernmental organisations, transnational corporations, industry, NGOs, FOs, financial and technology institutions for increased flow of knowledge, technologies, investments and market access

• Organizing Global Summits for deliberations and policies.

Capacity building through

seminars, sessions, strategies and policy formulation with the financial assistance from the government and other institutional bodies.

• Skill development in terms of human resource and capacity building are very important for agriculture. The knowledge generated in agriculture needs to be translated at the field level. This requires professionals who are skilled and equipped to carry out this mammoth responsibility.

• Partnership of private and public sector is significant in the sectors of facility creation and infrastructure. Public private partnership will provide the right business environment to attract capital investment, and ensure that investments support national targets, such as upgrading research infrastructure; improving professional and technical competencies; and promoting entrepreneurship and innovation.



• Bring new policies for startups. The startups have a tremendous scope in agriculture sector. These startups are developing newer technologies which address the issues of farmers. New polices for startups will increase the collaborations that are happening in the industry and drive the growth of sector.

• Quality of the food also matters. Make sure the availability of food in terms of quantity and quality satisfy the dietary needs of individuals. The physical and economic accessibility for everyone, including vulnerable groups, to adequate food, free from unsafe substances should also be made a priority.

• Identifying high production systems and adopting practices that are both more sustainable and more profitable. Alongwith ensuring the safe food to all, the process of food production should not harm nature. To feed the world sustainably we need to produce more food with fewer resources. There is a need to combine high production agriculture in such a way that it pose less threat to climate change.

• Climate impacts on food security is a serious, concern and thus more research is required that directly informs the actions needed to tackle food security challenges. While food systems will need transformative options in the coming decades, challenges can be identified. In order to meet these challenges, science must work hand in hand with practitioners and policy-makers, to devise sensible options that meet current needs and capacities. Crops with high resilience and high growth potential under climate stress need to be identified and popularized.

• Crop Diversification can play a significant role in doubling farmers' income. Farmers should not solely depend on their main crops rather should practice other economic



activities as well, simultaneously, such as animal husbandry, fishery, piggery, goat rearing etc., so as to earn extra income. High value agriculture commodities fetch a premium price in the markets.

 India should invest in post harvest operations to stem the loss of agricultural produce. The country loses farm produce worth Rs. One Crore annually due to lack of postharvest infrastructure. Necessarv safeguards must be adopted to stem this loss which accounts to 20-25 per cent of the produce. Better logistics and cold storage structures should be evolved based on the geographical and agronomic needs. Cold chains should be promoted by state governments through appropriate programmes and subsidies.

• Attracting and retaining youth in agriculture. Youth of the country is still not taking up agriculture actively and need to be inspired and motivated to take agriculture as an occupation.

• Aggregating farmers for scale and homogeneity through Farmer Producer Organizations, Cooperative, Self-help groups or Cluster farming can help the farmers in better price realization. Formation of commodity boards and federating FPOs with commodity boards and incentives to farmers' organizations has also the potential to improve the profitability of agriculture.

 Incorporating ICTs for increased agricultural productivity and strengthening the agricultural sector which would entail timely and updated information on agriculture related issues such as new varieties release, emergence of new threats such as diseases, weather forecast, pricing control, warning alerts etc. With easy access to information, knowledge and experts support through ICT based information dissemination services, farmers would be able to improve their income and economic situation through better practice.

• Empowering womeninagricuture. Work towards empowerment of women especially engaged in agriculture sector, given the fact that they form a major part of the workforce engaged in the sector. Gender sensitivity in policy planning and technology development can raise the agriculture productivity and income derived from agriculture.

• Value addition especially in horticulture, as it will not only increase the shelf life rather will significantly increase the income to the farmers.





MS Swaminathan Global Dialogue on Climate Change and Food Security & 1st World Agriculture Prize





griculture has undermetamorphic gone changes globally in the last few decades. In this journey of transformation from famine to food sufficiency, certain individuals and institutions played critical roles. Still there is a long way to go in making the planet free from hunger and malnutrition. Considering the ever-increasing population, changing climatic pattern, shrinking resource base and increased disposable incomes resulting in higher demand for safe and quality food, agriculture is continuously evolving to support the humankind. Developing and underdeveloped nations, in order to boost agriculture, need cooperation, collaboration and learning by global experiences. Youth are moving away from farming and educated class sees farming as last option. They need role models and inspirations. India has now taken leadership position in the world agriculture and is in a position to benefit the developing world with its experiences and diversity of learning. It is high time for India to recognized the efforts of doyens in agriculture and especially those who have contributed in promoting agriculture in third world countries.

With this vision to recognize the individuals, who have served the humanity through agriculture, Indian Council of Food and Agriculture has instituted World Agriculture Prize.

of Pioneer India's Green Revolution, Prof. M.S. Swaminathan received the first World Agriculture Prize instituted by ICFA on 26th October, 2018 at Vigyan Bhawan, New Delhi. The prize was presented by Hon'ble Vice President of India, Sh. Venkajah Najdu at a special session organised by ICFA. Recognised worldwide for his basic and applied research in genetics, cytogenetics, radiation and chemical mutagenesis, food and biodiversity conservation, Prof. Swaminathan has been hailed by the United Nations Environment Programme as 'The Father of Economic Ecology' owing to his commitment towards the ever-green revolution movement in agriculture. His path breaking approach accelerated wheat yield in 1967-68 and transformed India's then image as 'begging bowl' to 'bread basket'.

The prize has been instituted by the ICFA with an aim to recognise individuals who have served humanity through agriculture. A high level international selection committee decided the World Agriculture Prize Laureate. The World Agriculture Prize is a single prize of \$100,000 and launched with a special session, named Global "Swaminathan Dialogue on Climate Change and Food Security", as part of the Global Agriculture Leadership Summit in New Delhi. The special session on climate change and food security has been incepted with a thought to invite the laureates of food and agriculture world to participate in the World Agriculture Prize event and deliberate on this burning issue to come out with a blue print for climate resilient agriculture in a sustainable manner to safeguard the interests of our future generations.

Shri M. Venkaiah Naidu, the Vice President of India, called the eminent Agricultural Scientist, Prof. M.S. Swaminathan a Vishwa Guru in Agriculture, a teacher and a scholar who continues to leave his inspirational, ideational thought prints on the world. The Vice President said that Prof. Swaminathan ushered in green revolution and laid a firm foundation for India's food security. His vision and lucidity of expression have captivated more than a whole generation of agricultural scientists, he said. The Vice President called up on the policy makers to accord highest priority to agriculture as it provides employment to more than 50% of the population. He urged them to have positive bias towards agriculture and rural areas while allocating resources. Stressing on the need to re-think the development paradigm and see how we can make agriculture more economically viable and attractive, Shri Naidu called for regular and effective coordination between scientists, policy makers and farmers to make it sustainable. Concerned over the decrease

11TH GLOBAL AGRICULTURE LEADERSHIP SUMMIT 2018

COVER FEATURE

in number of people engaged in agriculture, the Vice President called for concerted, coordinated action to address a number of issues that impact the growth of agriculture sector and the quality of life of people who depend primarily on this sector. Talking on the ill effects of climate Change, Shri Naidu said that it is impacting every aspect of life including agriculture and asked scientists and policy makers to evolve strategies to cope with the changing climate, depleting resource base and increasing food demand. "This calls for policy



changes in agriculture sector. We should focus on developing climate resilient crops. We need to develop crops that can withstand extreme weather conditions," he said. The Vice President said that hidden hunger and nutritional deficiencies are major challenges before the world. He said that nothing short of an agricultural renaissance and an evergreen revolution with nutrition as the main component can make us realize this ambitious goal.

H.E. Mr. P. Sathasivam, Hon'ble Governor of Kerala pointed out the stark reality of malnutrition existing



in the world. He observed how India has achieved certain level of food security through great effort's like the green revolution in food production led by stalwarts like Professor MS Swaminathan which strengthened India's capability to fight against hunger and malnutrition. He also pointed at the post harvest losses and the effect of climate change on agriculture. He emphasised on using new varieties of crops and seeds which requires lesser amount of water. Pointing at the ill effects of soil erosion, he suggested a change from our current form of agriculture to sustainable means of farming with a little harm to our environment. Lastly, he emphasised that the agriculture of future must realise on environmentally sound practises to negate the effect of climate change. "Agriculture must also use technologies that depend on ecologically sound and responsive principles. While talking about the adoption of technology we also cannot ignore the need to encourage entrepreneurship in agriculture through skill development. We could raise army of agripreneurs who would make agriculture profitable," he said

Sh. Suresh Prabhu, Hon'ble



Commerce Minister of India channeled his thoughts on the inevitability of climate change on today's world. "Today we have a serious challenge posed by climate change on agriculture of the world. Some parts of the world will benefit from climate change. But most part of the world is going to face serious challenges in agriculture and are under serious threat. Warming going beyond 2-3°C would put most of our staple crops, including wheat, under serious threat. Therefore, we have to now seriously think about how to deal with it. Water is also one of the serious casualties of the climate change. This is going to be major challenge for the world but also more for India because 17% of the world population is in India and we hardly have any water. Only 4% of the fresh water of the world is in India and most of the groundwater after Green Revolution, particularly in the Green Revolution belt, has been lost. And most importantly the Himalaya, which is providing water to 70% of the population to south Asia and on the other side to south-east Asia and China, and therefore we have a big problem we need to work on it seriously. Food security is a challenge which cannot be dealt with unless we deal with agriculture, and agriculture is a function of nature," he observed. Mr. Prabhu pointed out that we don't know the status of Paris agreement and we don't have a global framework to deal with climate change globally. "We have a real challenge on hand and we should take the leadership of Prof. Swaminathan to lead the battle and succeed as we succeeded in the Green Revolution," he concluded.

Sh. Suresh Prabhu, Hon'ble Minister of Commerce & Industry; H.E. Sh. P. Sathasivam, Hon'ble Governor of Kerala; Sh. OP Dhankar, Hon'ble Minister of Agriculture, Government of Haryana; Dr. Trilochan Mohapatra, DG, ICAR, Dr. MJ Khan, Chairman, ICFAand more than 200 farmers were present on this occasion.



ELEVENTH GLOBAL AGRICULTURE LEADERSHIP AWARDS 2018

he 11th Global Agriculture leadership Summit 2018 provided the much needed platform for global dialogue on the constraints and opportunities faced by today's agriculture. The event also recognized important individuals and institutions, who played pivotal role in building new faiths and ambitions in agriculture by bestowing them with the coveted Global Leadership Awards 2018. The awards across different categories went to



International Leadership Award

Prof. Dr. Ir. Rudy Rabbinge, Special Envoy - Food Security, Government of Netherlands

Prof. Dr. Ir. Rudy Rabbinge, the University Professor Emeritus in Sustainable Development and Food Security at Wageningen University in the Netherlands and a Special Envoy for Food Security in the Netherlands, Ministry of Economic Affairs and Foreign Affairs, has played a leadership role in sustainable development. A veteran specialist, the Professor recently led a 60 million Euro program on transition of agriculture land use and agribusiness.Rabbinge was also the Chair of the Inter-Academy Panel on Food Security and Agricultural Productivity in Africa and member of the Board of Directors of the Alliance for a Green Revolution in Africa (AGRA). With degrees in phytopathology, entomology, theoretical production ecology and philosophy of science from Wageningen University, he has served in different responsibilities. He was Chairman, Science Council of the CGIAR, member of boards of five centers, Chair of the



Board of Trustees of IRRI from 1996 until 2001 and leader of the change program of the CGIAR in 2008 as Chair of the independent Science Council. His works have also earned him many honours and distinctions such as Knight of the order of Oranje-Nassau, Honorary professor Chinese Academy of Agricultural Sciences, Knight of the order of the Dutch Lion, Honorary member Academy of Sciences Georgia and Distinguished scientist, State Victoria, Australia.

Research & Development Leadership Award

National Research Development Corporation (NRDC)



National Research Development Corporation (NRDC) has played a leadership role in promoting, developing and commercializing the technologies, know-how, inventions, patents and processes emanating from various national R&D institutions. During the six decades of its existence, NRDC has forged strong links with the scientific and industrial community in India and abroad and played a lead role in the commercialization of Intellectual Properties and know-hows developed in their laboratories. Recognized as a large repository of wide range of technologies, NRDC has licensed the indigenous technologies to about 5000 entrepreneurs, filed over 1800 Patents and helped to establish a large number of small and medium scale industries in India and abroad. Out of 5000 technologies licensed, about 42 % of the technologies licensed are in the area of food and agriculture sector. Besides being the torch bearer in the

field of technology transfer, NRDC also undertakes number of value addition activities. NRDC has also successfully exported technologies and services to 24 developed as well as the developing countries. During the last four years under the able leadership of Dr H Purushotham, Chairman& Managing Director, NRDC has registered an exponential growth of about 380% and has become a more vibrant, visible and sustainable organization and the organization has been put on the growth path.

Academic Leadership Award

Indian Institute of Management, Ahmedabad



Indian Institute of Management, Ahmedabad, a beacon in the field of management studies has been in the forefront of realizing the need for management support to the under-managed but socially important sector such as agriculture. The Centre for Management in Agriculture (CMA), established in 1971 addresses the process of modernization of the agri-food sector, by using concepts of management science. CMA has also performed significant amount of research in the areas of agri-food policy, procurement, marketing, and processing of agro-based commodities, farm input systems, irrigation and water management, agricultural and rural finance, investment and subsidies, livestock, fisheries, forestry, agricultural trade, food retailing, commodity trading, rural innovations, intellectual property rights, biodiversity conservation,

biotechnology, GMOs and food safety issues. The CMA faculty has been actively engaged in policy planning and implementation at national and State levels. CMA has provided help in institution building and played a key role in setting up national level institutes like Indian Institute of Forest Management, National Institute of Agricultural Marketing, and National Institute of Cooperative Management. CMA has undertaken research studies for the Ministry on various facets of agricultural and allied sectors and provides policy advice to the Union Government. The academic institution has played a crucial role in providing the agriculture sector with the able professionals to steer the sector ahead.

Livelihood Leadership Award

Mr. Shailendra Chaudhary, MD, NERCORMP, Shillong

Dr Shailendra Chaudhari, the Managing Director of a very important rural livelihood project in North East India popularly known as "NERCORMP", has been a dynamic leader influencing the lives of poor & marginalized rural communities throughout his career. With more than 26 years of long working experience in the North Eastern Region of India, Dr. Chaudhari has put in sincere efforts in bringing positive and fruitful results in augmenting the livelihood opportunities of the most sidelined sections of the community. The organization, under his leadership has played pivotal role in management of resource base in a way that has contributed to the preservation and restoration of the environment. His organization has reached out to 2532 villages benefitting more than one lakh and nineteen thousand households transforming the lives of more than six lakh fifty three thousand poor people till date. A total number of eight thousand two



hundred & sixty two Self Help Groups have been formed women empowerment. Their intervention of NRDC with the economic and social activities and infrastructure with predominant thrust on income generating activities has helped in achieving economic transformation of the target groups.

Farming Leadership Award

Satishbabu Gadde, Andhra Pradesh



Satishbabu Gadde, proponent and practitioner of organic farming, stands tall as an excellent example for the fact that sustainable agriculture can also be a financial success. This idealistic farmer has been following the traditional agricultural practices of his forefathers that shuns environmentally destructive methods. With 22 hectares of land under farming, Mr. Gadde maintains 47 cattle, the milk of which is largely used to nourish the calves which in turn develops into healthy and sturdy cattle and are put up for sale. His method of farming is economically remunerative as he has brought down the cost of cultivation by making his farms zero tolerant to chemicals and pesticides. Practising organic farming in eight hectares of land, his farm propagates the agenda of sustainable models. This progressive farmer uses seeds and manures derived from his own farm. His unique model of farming allows cattle to graze stress

free in the fields which increases the productivity of the crops and cattle. Dependent only on botanicals for pest management Mr. Gadde's farm has so far remained strong against any biotic or abiotic stress. A certified organic farmer, Mr. Gadde obtains premium prices for his farm products. Recipient of many recognition, this farmer continues to inspire the fellow farmers by regularly conducting discussions and seminars.

Global Agri Business Leadership Award

Shri Mukund Daga, Managing Director and Shri Shrikanth Rathi, Director, M/S Nagarjuna Agro Chemicals Pvt Ltd, Hyderabad, Dr A K Patra, Director, ICAR – IISS Bhopal and Shri Sanjeev Kumar Chadha, Managing Director, NAFED, New Delhi.

M/S Nagarjuna Agro Chemicals Pvt. Ltd is a leading player in developing and propagating soil testing minilab technologies for over one and half decades. The efforts of NACPL bore fruits in developing Mridaparikshak Minilab in joint collaboration with ICAR – Indian Institute of Soil Science, Bhopal. The Mridaparikshak minilab as developed under flagship programme of Make in India professed by Hon'ble Prime Minister of India. The MRIDAPARIKSHAK is a digital, mobile, quantitative rapid, affordable and easy to operate mini laboratory, first of its kind in the world, for the estimation of soil health parameters, fertilizer recommendations, and generation of soil health cards. It gives quantitative results of the soil health parameters that can be disseminated on real time basis



to the farmer's mobile through Short Message Service (SMS). The results include, in addition to soil test parameters, the advisory on nutrient recommendations, specific to crop and soil. The results can also be stored in memory and the output can be saved in some external storage device such as pen drive or compact disc (CD). The primary advantage of this Minilab is by getting Quantitative results and accordingly advocating fertilizers recommendations conveniently paves for doubling the income of farmers. This Minilab being portable in nature can be taken to the Farmers doorstep for establishing soil testing facility at village level as envisaged by Government of India for empowering all the farmers with Soil Health cards. This Minilab attend prominence to the Country and also globally. The prototype of the Minilab was demonstrated to Dr S. Ayappan, Hon'ble Director General, ICAR on February 14, 2015. The Mini Lab was formally released by Shri Radha Mohan Singh, Hon'ble Union Minister of Agriculture, Govt. of India during 86 th Annual General Meeting of ICAR on Feb 18, 2015. Hon'ble Prime Minister Shri Narendra Modi distributed Mridaparikshak Minilab to Farmer on July 25, 2015 during 87thFoundation Day of ICAR and ICAR Award Ceremony at Patna.

Industry Leadership Award

Sonalika International Tractors Ltd.



Sonalika International Tractors Ltd., a well known name in Domestic and International market, stands strong as the third largest tractor manufacturing company in the country with the bestselling tractors ranging from 20HP-120 HP. A formidable player, the company has over 8 lakh patrons in more than 100 countries across the globe. The World's No.1 largest integrated tractor manufacturing plant with a production capacity of 3 lakh tractors annually, Sonalika envisions to become the world's leading tractor manufacturing and farm mechanization company. The global recognition of ITL's growth is evident by the strategic investment into the group by leading international brands like Yanmar of Japan. With the World's No.1 largest integrated tractor manufacturing facility, a well-equipped research and development center, a robust dealership network, consistency in the quality of products and services, Sonalika ITL's has been serving the farming community with passion and commitment to quality. Through new products and innovations, Sonalika ITL has been committed to its core values of serving the farming community.

Global Business Leadership Award

The Weather Company

The Weather Company, a weather forecasting and information technology company that owns and operates weather.com, intellicast.com, and Weather Underground, has been on the forefront of delivering personalized, actionable insights to consumers and businesses across the globe by combining the world's most accurate weather data with industry-leading AI, Internet of Things (IoT), and analytics technologies. A subsidiary of the Watson & Cloud Platform business unit of IBM, their solutions provide newscasters, pilots, energy traders, insurance agents, state employees, retail managers, and more, with insight into weather's impact on their businesses, helping them make smarter decisions to improve safety, reduce costs, and drive revenue. With its varying climate regions, abundance of agriculture, and drastic seasonal weather shifts, creating a weather offering in India that is locally relevant and



backed by scientifically validated raw data is of critical importance. The Weather Company, has been the leader globally in the area of offering the most accurate, personalized and actionable weather data. Its products include a top weather app on all major mobile platforms globally, a network of 250,000 personal weather stations, a top-20 U.S. website, one of the world's largest IoT data platforms, and industry-leading business solutions.

Technology Leadership Award

Tirth Agro Technology Private Limited



Tirth Agro Technology Private Limited's Shaktiman, the market leader in India, has helped bring Farm Tech Prosperity to the Indian farmer with technologically superior affordable solutions. Shaktiman has been the pioneer in introducing many equipment in Indian agriculture. They introduced the first indigenously developed cane harvester with unique performance parameters like Reduced trash content, auto cleaning technology in cooling system, GPS & GPRS based tracking system, Air Conditioner & ergonomic cabin. In just 4 years, this world class product has gained market leadership in India, Fiji, Philippines, Vietnam and Sri Lanka. Another success story is the Protektor 600 - a self-propelled high clearance boom sprayer with technologically advanced features which has been the marquee for providing a kick start to technology revolution brewing up in crop protection methods in

India. With the ambition of becoming complete farming solution provider, Shaktiman has been on a fast track path of launching technologically advanced products which are not only solving the burning issues in agricultural practices but is also paving a path which will be leading Indian agriculture to better productivity, efficiency and making agriculture more economical.

Corporate Sustainability Award

PepsiCo India

PepsiCo India, one of the largest MNC food and beverage businesses in the country, is guided by the company's philosophy of Performance with Purpose. PepsiCo has pioneered and established a model of partnership with farmers, and now works with over 24,000 farmers across nine states providing 360-degree support to farmers through assured buy back of their produce at pre-agreed prices. The association with PepsiCo India has not only raised the incomes of small and marginal farmers, but also their social standing. Since 2009, PepsiCo India has achieved significant milestones, saving more water than is consumed through a multipronged approach focused on water replenishment & conservation, including rain water harvesting within the plants, driving sustainable water resource development & management programs for communities & promoting



sustainable initiatives in agriculture like Direct Seeding of Rice (DSR) & drip irrigation. In 2017, PepsiCo India's water saving was 17.6 billion liters, more than it consumed in its manufacturing operations. As a responsible leader, the company is also focused on reducing its carbon footprint, and in 2017, PepsiCo's India's Food as well as Beverage plants had a 79% and 55% share respectively, from renewable energy sources. PepsiCo has thus matched its corporate ambitions with sustainable and responsible business growth.

Life Time Achievement Award

Padmashree Dr. Keki Hormusji Gharda



Padmashree Dr. Keki Hormusii Gharda, Scientist, Entreprenuer, Philanthropist and "Father of the Indian Agro-Chemical Industry", believes in the philosophy of Karmayoga, using Knowledge converted to products to wealth for the benefit of Society. His contribution to India's Green Revolution is unmatched as he gave India its 1st Indigenous Technology for Wheat Herbicide and Pyrethroids and decided not to patent it to enable farmers benefit the Competition. His Industrial R&D doctrine practiced stands for generation & application of new knowledge, into new products and processes, creating new markets and providing support services for commercialization. He broke the monopoly by taking on International giants such as Sandoz, Dow, Rhone Poulenc, Bayer and produced Anilophos (Rice), Isoproturon (Wheat), Pyrethroids, Quinalphos and Deltamethrin with his own processes. Dr. Gharda who pioneered the Agro-Chem industry in India with Gharda Chemicals Ltd., heads Gujarat Insecticides Ltd.,

Gharda Foundation (Charitable Trust), Gharda Scientific Research Foundation & Gharda Medical & Advanced Technologies Foundation, not for profit companies dedicated to Scientific Research in Basic Technologies. At 89, Dr. Gharda continues as the Chairman & Managing Director of Gharda Chemicals Ltd., the turnover today of which is over \$ 400 million with an export of over \$ 220 million. Recipient of many awards and honours, Dr. Gharda, is an icon of home grown knowledge based entrepreneurship. A true icon of 'Maker In India' slogan

Policy Leadership Award

Shri Nara Chandrababu Naidu, the Hon'ble Chief Minister of Andhra Pradesh

Shri Nara Chandrababu Naidu, the Hon'ble Chief Minister of Andhra Pradesh, who made Hyderabad the IT hub of the country with strength in determination and commitment in decisions has introduced many market-based reforms, while at the same time formulating many populist schemes which none of his predecessors ever launched. He brought about revolutionary changes in solving people's problems and always relied on technologies to address the same. Agriculture has been kept high up in the agenda by the Chief Minister. The government under his strong leadership has been promoting technology services in agriculture using drones, robotic applications and digital classes. A strong proponent of Zero-Budget Natural Farming to reduce cost and risks in farming, produce safe food with nutritious values, reverse migration to villages and enhance soil health, Mr. Naidu is bringing



about sweeping changes in the agriculture sector of the state. The Vision 2020 propelled by him roots for the allround development of the state. Mr. Naidu has been instrumental in making significant contributions to agriculture and allied sectors through formulation and introduction of pathbreaking policies proactively which made substantial difference in the lives of the farmers and farming community.

Program Leadership Award

The Department of Horticulture, Government of Haryana



Fast emerging as one of the leading States in Horticulture sector, Haryana has made significant achievements in this sector with 6.79% area under horticultural crops and contributing about 9% of GSDP within crop husbandry. With the launching of National Horticulture Mission, Haryana had made some significant achievements in horticulture development. Poly houses, Centres of Excellence, water resources, area expansion of horticulture crops, mushroom projects, post-harvest management, pollination support through bee keeping, mechanization and human resource development are the major components covered under this. The total area under horticulture which was 2.77 lakh hectare during 2005-06, has been increased to 4.90 lakh hectare during 2017-18 recording an excellent 56.53% increase in 12 years. The state has 707.12 hectares under poly houses and 47 mushroom projects. Under postharvest management, 722 units of cold storage,

ripening chamber and pack houses have been set up by the state. Four Centres of Excellence are fully functional under Indo Israel bilateral agreement. Haryana stands first in the Country in subsidy disbursal through 'HORTNET' payment gateway system. A total of 21,065 farmers against a target of 20,000 beneficiaries have availed the benefit. Through perceptible policy changes and committed leadership, Haryana has achieved important milestones in the area of horticulture development and is well on the way to become a number one state in horticulture.

Best Animal Husbandry State

The State of Bihar

Bihar, a success story in Animal husbandry, has displayed remarkable progress in the last two years. The state has recorded 11.50%, 21.60%, 13.68% and 15.81% incremental growth in production of milk, meat, egg and fish respectively. The significant enhancement in production of these products became possible due to various initiatives taken by the Department of Animal and Fisheries Resources. Effective implementation of different schemes under dairy, animal husbandry and fisheries sectors where subsidies were provided to the eligible farmers, have helped Bihar in augmenting its livestock resources. The state has also performed superbly in Livestock Health and Disease Control. Mass vaccination against PPR and Brucellosis was conducted in the state of Bihar for the first time during 2017-18. Various measures were taken for Veterinary Hospital



Strengthening and Management. Besides this, the department is aggressively expanding the reach of the livestock health services to the farmers with the help of 50 well equipped Mobile Veterinary Clinics. The state has witnessed considerable growth in milk procurement, processing, and marketing by COMFED during the last two years. The Department, under the able leadership of Dr.N.VijayaLakshmi, IAS, has achieved splendid results. Bihar undoubtedly has created an incredible impression with its impressive programmes and commitment towards the same.

Best Horticulture State

The State of Nagaland



Nagaland, a global hotspot of biodiversity, is gaining grounds in horticulture segment and is carving a niche for itself. The Department of Horticulture had made strategic efforts and has enabled the State to achieve the GI Registration of "Naga Mircha" and "Naga Tree Tomato" and managed to achieve the Branding of "Naga Pineapple", the only crop to be given a brand status from the whole of North-East India. Besides mobilizing farmers into commodity specific groups, the department has also made rapid strides in Organic cultivation and has so far been able to certify 4750 Ha as organic. For improving the market linkages for the horticultural farmers, Nagaland has established the first Local Horticultural Products Daily Market. Vegetable Villages, another important contribution of state has at present 800 ha area in all the 11 districts. The Department has been instrumental in the introduction of Dragon fruit in

Nagaland, an exotic fruit which is gaining popularity across the country. Horticulture has become an attractive alternative to Jhum Cultivation and more than 5000 Jhum farmers have shifted to permanent horticulture cultivation over the last few years. Nagaland has identified horticulture as its important strength and is in the process of becoming to one of the most "Horticultural advanced States of the Country".

Best Agriculture State

The State of Gujarat

Gujarat, a vibrant state with a diversified agricultural economy has witnessed spectacular growth in agriculture sphere in recent years. With a significant share in the production of major crops in the country, Gujarat has fared well in the production of cereals, pulses, oilseeds and cotton. Horticulture economy, another success story, has been gaining momentum as the area under fruit crops, vegetables, spices and floriculture has increased. Gujarat is one of the largest processors of milk in India and AMUL is among 10 largest dairy brand in the world. Major expansion and interventions in agriculture sector has been one of the strengths of Gujarat. Intensive extension activities under Krishi Mahotsav programme, irrigation, water management, implementation of micro-irrigation, Kisan Credit Cards and Soil Health Cards for farmers, area expansion of high value crops, post-harvest



management, digital agriculture etc. led economy towards inclusive growth. Integrated approach in Pink Boll Worm management in Cotton and Use of Remote sensing are the notable initiatives in recent years. Satellite imageries and its use in agriculture sector for multiple factors which adopted by state is surely classic example of technological scalability and the state is well on its path towards a better and sustainable agriculture sector.

Special Life Time Achievement Awards

Prof. Panjab Singh

Prof. Panjab Singh, Chancellor, Rani LaxmiBai Central Agricultural University, Jhansi and President of the prestigious National Academy of Agricultural Sciences (NAAS), has made significant scientific contributions in the fields of water management, crop production and agro-forestry management systems. Providing illustrious leadership in shaping up of national and state level education and research institutions and Universities, Prof. Singh initiated the establishment of a new south campus of Banaras Hindu University at Barkachha in Mirzapur district. Starting his career as an Assistant Professor, the veteran academician rose to the position of Secretary, Department of Agriculture Research and Education (DARE), GOI and Director General, Indian Council of Agricultural Research (ICAR). Prof. Singh's academic and scientific excellence elected him as Fellows of Six Scientific Societies, President of Six and Vice President of five Scientific Academies/ Societies and the Chairman of various National and International Scientific Bodies. He is also decorated with D.Sc. (HonorisCausa) from seven universities, and life time achievement and distinguished Alumnus awards from four institutions and scientific societies. An alumnus of IIT, Kharagpur, Prof. had served in many responsible positions such as Assistant Director General of ICAR; Director, IGFRI; Director of IARI; Vice-Chancellor of Jawaharlal Nehru Agricultural University; founder Director, School of Agriculture in Indira Gandhi National Open University (IGNOU) and Vice-Chancellor of Banaras Hindu University. He also served in the F.A.O. as Regional Plant Production and Protection Officer for Asia and the Pacific. His unparalleled leadership and stellar research prowess spanning over several decades helped further the agricultural potential of the country.

Media Leadership Award

Mr. Ammar Zaidi, National Business Editor, PTI

Mr. Ammar Zaidi, the National Business Editor and Chief of Economic Bureau at The Press Trust of India, has over two decades of experience in journalism. Associated with PTI which is India's largest news agency subscribed by nearly 500 English language newspapers and publications, Zaidi has always encouraged healthy journalism. With a Masters degree in Business Management, Mr Zaidi has risen from within the ranks in PTI where he joined in 1999 and now heads a team of young and energetic journalists, covering policy, regulatory and corporate news. Leading the business section of PTI, Mr. Zaidi is well connected and makes it a point to personally interact with concerned authorities to file the stories of national and international interest. A well known personality in media fraternity, he is easily accessible and constantly motivates his team members by working day in and day out. He had taken special interest in giving adequate coverage to news related to agriculture. With extensive experience and knowledge of agriculture industry, Mr. Zaidi has brought reasonable and positive change in the field of journalism.

Development Leadership Award

Dr. Pramod K. Joshi, the Director for South Asia, International Food Policy Research Institute, New Delhi

Dr. Pramod K. Joshi, the Director for South Asia, International Food Policy Research Institute, New Delhi, is a prominent academician, researcher and administrator. With wide areas of research such as technology policy, market, and institutional economics, he has held many key positions in reputed organizations. He was the director of the National Academy of Agricultural Research Management and the director of the National Centre for Agricultural Economics and Policy Research. His expertise over the subject matter earned him important positions such as the South Asia Coordinator at the International Food Policy Research Institute and senior economist at the International Crops Research Institute for the Semi-Arid Tropics. Dr. Joshi has also been recognized by many awards and honours such as Dr. MS Randhawa Memorial Award of the National Academy of Agricultural Economics, and RT Doshi Foundation Award of the Agricultural Economics Research Association for outstanding contribution in social science and agricultural economics research. Being the head of many reputed organizations responsible for policy change, Dr. Joshi made noticeable contribution for the growth of agriculture economics.

LEVERAGING TECHNOLOGY TO EXPAND INCOME AND RETURN

ndia loses 15-25 per cent potential crop output due to pests, weeds, and diseases. Harvest and post-harvest loss of India's major agricultural produce are estimated at Rs 92,651 crore (\$13 billion), according to data published by the Ministry of Food Processing Industries on August 9, 2016. The numbers have gotten far worse this year. In February 2017, an ICAR scientist stated that pests eat away 35% of total crop yield. Such large-scale crop loss has an adverse effect on biosafety with the increasing demand due to population growth. The European Union has banned the import of Indian mangoes as they failed to pass its stringent biosecurity regulations.

P.K. Chakrabarty, Assistant Director General of the Indian Council of Agricultural Research stated that among all the pests, nematodes, the microscopic parasite had recently emerged as a major threat to crops in India, has caused an estimated loss of 60 million tonnes of crops every year.

Crop protection and crop enhancement solutions are readily available and it is a matter of creating awareness to farmers and village authorities and implementing these solutions in a systematic manner. Chairman Standing Committee of Parliament on Agriculture and Farmers Welfare Hukumdev Narayan Yadav stated that,"The situation should be tackled collectively by farmer associations, industry players, government, and pesticide regulatory bodies in a time bound manner."

With the advancement of Internet of Things(IoT) in agriculture, there are tools that can help farmers identify and prevent pests in their crops. My Farm info is one such tool.

In the Farm Management section of this tool, farmers can save their

farm details by drawing their farm on top of GIS interface. Once the information is fed into the system by the farmer, the tool will provide the farmer with optimum NPK application, nutrition information and optimal mandi for the crop.

In the Crop Feasibility section of this tool, farmers can find the feasibility of growing any crop on their farm. When this is done at the early stage, farmers can decide which crop is the best to grow that will produce maximum yield. He will also be able to avoid growing crops







that are not feasible for his area.

The tool also has a Crop section. Farmers Management can find the probability of disease infestation in their crop. This scientific tool uses sophisticated algorithms in concurrence with the last 10-year historical data to find disease probability for the farmer's crop. Forecast Advisory can be used by the farmer to get early warning of disease infestation so they can take proper measures to minimize loss. The tool also tells the farmer the right pesticide to use and in what quantity. Farmers can now protect their fields and seek the fruits of their yields without worrying about precision. Some of the farmers are not aware of the right quantity of pesticide their crop would require. In such cases, too much of pesticides are applied that leads to the produce being poisonous for human consumption.

My Farm Info provides pest and disease vulnerability across 34 crops.

By knowing this in advance, farmers are able to take preventive measure to protect their crops. It is also possible for farmers to get in touch with My Farm Info for contact spraying by sharing their contact details. Once this information is shared, My Farm Info gets in touch with the local dealers and provides the necessary pesticide.

Nutrient Management is one of the key factors in the quality and yield potential of a crop. The application of nutrients, timing, soil management, and water management are important factors in crop quality. Farmers can also use the 'crop scheduler' section in the My Farm Info tool to keep track of all stages of crop life cycle. They will receive messages (SMS) according to the schedule regarding upcoming crop stages. Forecast and disease alerts will also be sent through SMS. Other information that will be available is the best season, best crop suitable for the season

and soil factor, irrigation timings and schedules and more. With all these information, farmers are able to make informed decisions on managing their crop.

The tool also helps in weed management. While there are some weeds that do not affect crop growth, there are others which are distinctly destructive. It is difficult to know the destructive weed every time. The tool provides different weed information along with pictures for farmers to know what is growing on their farm. List of names and pictures of weeds for up to 18 crops can be found on My Farm Info. For farmers who are growing vegetables, this tool also provides nematode management and advisory.

Water is one of the key factors in crop health and with effective water management solution such as timely irrigation information from experts via SMS and WhatsApp, getting expert advice has been made easy. These experts from My Farm Info are also called as Health Doctors whose primary concern is the health of the farm.By setting up soil sensors, it is possible to understand the potential of soil, its water retention capacity and how much of irrigation is needed for the crops. This helps in decreasing water losses

The ultimate objective is to help farmers increase their yield and income and that can be achieved by using a tool like My Farm Info.

Mr. Sujay Ojha, Advisor to Weather Risk Management Services Pvt. Ltd.

'GREAT SCOPE FOR ORGANIC PRODUCTION OF HORTICULTURAL CROPS'

Agriculture is an integral part of Bihar, as it supports a majority of the population. Horticulture is also another sector which offers immense opportunity for the state. In an interview with Agriculture Today, Dr. AK Singh, Vice Chancellor, Bihar Agricultural University, Sabour discusses about the potential of horticulture in expanding farmers' income and the associated challenges.



What is Bihar's position in horticulture production?

Horticulture is an integral part of the state's agricultural economy and contributes 20 per cent to the gross value of agricultural output. Though, the share of horticulture sector in gross value of agricultural output has declined over the period the value of output from horticultural sector has increased from Rs.81.6 billion to Rs.172.4 billion during the period 2003 to 2014. Fruits and vegetables contribute to about 90% of total horticulture production in the state and its contributions to national fruit production is 4.6 per cent, while it is 8.1 per cent for vegetables. It also contributes about 1 per cent to the national plantation crops production. As per latest estimate (2016-17) by the National Horticulture Board, Bihar is now the eighth largest producer of fruits (4.27 million tonnes) and is the largest producer of litchi, 4th largest producer of mango and guava, 5th in pineapple and 7th largest producer in Banana. Mango and litchi together account for about 59.4 per cent of the area under fruits.

As far as vegetables are concerned, the state of Bihar is the fourth largest producer of

vegetables (14.22 million tonnes) in the country, after Uttar Pradesh (26.41 million tonnes), West Bengal (25.50 million tonnes) and Madhya Pradesh(16.66 million tonnes). The state is also second largest producer of cauliflower, 3rd largest in potato, cabbage and okra, 4th in onion, 5th in brinjal and 6th largest producer of tomato. If we look at district profile, Darbhanga is a leading producer of mango (9.54 %), Muzaffarpur in litchi (20.4% and banana (17.8%), Nalanda is leading producer of guava, potato and onions while Vaishali is leading producer of cauliflowers. As per study done by a team of ICRIER, Bihar's productivity in vegetables as a group is higher than the national average and also for okra, brinjal, onion and tomato as well. Few important crops such as cole crops (cauliflower and cabbage) and potatoes have lower productivity but slowly reaching towards national average productivity.

Of late, flower crops, spices, medicinal and aromatic plants have also picked up for cultivation in many district of Bihar and currently the state produces 79,600 MT of loose flowers, 1,06, 200MT of spices, 6, 000 MT of medicinal and aromatic plants. It is also 10th largest producer of plantation crops by producing 9.73 lakh tonnes of the produce.

In Bihar, two major produce, honey and mushrooms are also attracting attention. Bihar is now the fourth largest producer (9.09 lakh MT) of honey after UP(17.17 lakh MT), West Bengal (15.96 lakh MT) and Punjab (15.15 lakh MT). Mushroom data is not available but it has been taken up in most of the villages in the state as it contributes to nutritional and livelihoods security among the villagers, particularly the landless one.

What are Bihar's advantages in horticulture?

Bihar is contributing significant quantum of horticultural produce horticultural to the national produce basket. I see three distinct comparative advantage of horticulture in our state. Firstly, rich untapped natural resources such as fertile soils and abundant water distributed through three distinct zones for growing of horticultural crops, secondly the state has several specialty crops and varieties in which it takes pride in producing and marketing and thirdly, the strategic

geographical location connecting and creating an easy trade route with other south Asian countries within the government policy provisions. Besides, the state has strong policy for agriculture as well as horticulture development in the form of Agricultural Road Map –III.

In Bihar, what are the challenges associated with horticulture?

There are enormous challenges associated with development of horticulture sector in Bihar. I think major problems with agriculture and horticulture are common such as very small average land holding of 0.4 ha that hinder farm mechanisation and making cluster of production. Both flood and droughts are common in Bihar; about 73 per cent of North Bihar is affected by floods and 33 per cent of South Bihar receives less than 750 mm of rainfall, making the northern part flood prone and southern part of the state drought prone. Hence, with proper water management and choosing the right crop may help changing this challenge into opportunities. Low productivity of the most of the horticultural crops are another challenge, that ultimately affects profitability of the crop. Right technology and its adoption is therefore imperative. Lack of storage and cold chain facility for perishables persists in the state and that needs to be developed for better marketing of quality perishable produce as in the case of litchi, mango, banana and vegetables. Seed replacement ratio is another challenge in the vegetable crops. Modern nursery for vegetable including plug plant production and vegetables grafting, making profit out of protected structure/ cultivation are another challenged areas where farming community need skill development.

What is the relevance of value addition in horticulture?

The value addition to the horticultural produce and products are one of the important areas where both country and state are lagging behind. There is a huge potential in the sector. The processing of horticultural produce is still very low in the state which may be hovering around 2 per cent. There are huge losses of horticultural produce ranging from 10-30 per cent. So to cut down post-harvest losses, adding value to the produce, processing of produce for distant market, etc., have huge potential in the state. Some of the infrastructure facilities have already been put in place with central/ state government support. 12 Agri Export Zones, with focus on products like Litchi, Vegetables and Honey, have been identified by State Government in Muzaffarpur, Samastipur, Hajipur, Vaishali, East and West Champaran, Bhagalpur,

Begulsarai, Khagaria, Sitamarhi, Saran & Gopalganj. Three Mega Food Parks in the state of Bihar are in process of establishment/ functioning namely Mums Mega Food Park Pvt. Ltd. (in Buxar), Pristine Mega Food Park Pvt. Ltd. (in Khagaria) and JVL Mega Food Park Ltd (in Rohtas). A total of 40 industrial areas are present in the state that includes 20 in Patna, 10 in Darbangha, 8 in Muzaffarpur and 12 in Bhagalpur districts. Two cold chain facilities are now available in the state for providing integrated cold chain and preservation infrastructure facilities, without any break, from the farm gate to the consumer namely Mahua Cooperative Cold Storage Pvt. Ltd (Vaishali) and R.K. Agri Biz Pvt. Ltd. (Muzaffarpur) Fruits & Vegetables are fully dedicated to fruits and vegetables. Several investment projects for processing, value addition and storage have already been identified by the Ministry of Food Processing Industries for the state that includes storage unit for fresh onion, bottled drink manufacturing plant, small scale processing units for making jam jelly etc, medicinal herb extraction unit, freeze dried food processing unit and development of fruit and vegetable clusters etc. I feel that this is the area where both government and industry partners should venture into.

What is the scope of organic cultivation in horticulture?

Promotion of organic farming has been felt in view of adverse effect of chemical inputs on the soil, environment and human health. The Bihar state agricultural roadmap III encourages promotion of organic farming in the state. The road map is basically working on two pronged strategydeveloping an organic corridor alongside the Ganga river for cultivation of vegetables and to provide input subsidy to organic farmers such as preparation of vermicompost, insect pest management etc., that too in advance. Our University has been supporting organic growers through developing / refining organic package of practices for growing horticultural crops, while government is providing a boost through input subsidy twice a year to farmers before sowing a crop and also empowering Bihar State Seed and Organic Certification Agency(BSSOCA) for organic certification to facilitate market for organic produce. The organic corridor scheme aims to convert about 2,000 acres in 2017-18, 2,5000 acres in 2018-19, 3,5000 acres in 2019-20, 4,5000 acres in 2020-21 and 50,000 acres in 2021-22 located along the banks of river Ganga and state/ national highways. In these programmes mostly vegetables are being taken up for the organic production. Therfore, I see a great scope of organic production of horticultural crops in the state.

GPS (GLOBAL POSITIONING SYSTEM) FOR AGRICULTURE IN THE FORM OF GEO-FENCING

PS technology is not confined to the purpose of tracking vehicles or knowing vour coordinates. GPS has been used in Smart Farming techniques, for virtual fencing mechanism that guarantees tracking and monitoring of people, pets, tractors, smart phones and GPS enabled devices. GPS based tracking and monitoring can simplify agricultural activities like Cultivating, Fertilizing, Crop Disease Management, Insect & Pest Control, Harvesting etc. They can help in choosing appropriate routes for tractors to move in agricultural land which would directly impact the economical and financial aspect of farming by minimizing the fuel consumption and the need for additional manual labour.

GPS is free to use and is being applied multifariously and used in different domains of agriculture. One such example can be precision agriculture. Demarcating boundary of farms virtually based on the location comes under the domain of geofencing. This can be dynamically formed or can be counted within the fixed set of perimeter like boundary of farm. This service is capable of triggering any pre-specified action whenever a device enters the virtually geo-fenced area. It is a location oriented service which makes use of GPS (Global Positing System), RFID (Radio Frequency Identification), Wi-Fi (Wireless-Fidelity) or cellular data and geo-fence app to trigger an action. This action can involve raising an alarm, notification by SMS etc. and is triggered when a mobile device or RFID tag is encountered within the scope of geo-fence (i.e. moves in or moves out of a setup of virtual boundary established around a geographical location). The mechanism that makes use of geofence is called as geo-fencing.

When a farmer puts up an electric fence, the animals have to learn that the shock they get from touching it means that they should not try and cross the fence. The similar principle can be used with an animal by using a GPS collar. That can be programmed so that when the animal crosses a line on a digital map, it receives a signal persuading it to turn back. Virtual fencing has been used in that way to keep in farm animals in large extensive farms (e.g. sheep farms in Australia) and to keep animals such as wolves or elephants from getting in and damaging crops or farm animals.

States/ Events of Geo-fencing The system of geo-fencing involves interaction of GPS based devices with the device used for monitoring



Figure 1 Geo-Fenced Area

to develop a location-aware farm. It includes access to the present location of GPS device to know the proximity of devices to the monitored locations. This allows the marking of a location of interest specified and monitored using its latitude and longitude, additionally a proximity radius is added. These three parameters (i.e. latitude, longitude, and radius) define a geo-fence by forming a virtual area or fence around the farm boundaries.

There are major three events that make use of Location Services to intimate about the location coordinates of a device. These events include the:

a) Entrance Event: This intimates the user when any unidentified object enters the Geofenced area. This could be the intimation by sending a SMS to remote device or by raising an alarm. This is also called as Arriving as it is moving into the Geo-fence.

b) Exit Event: This is similar to an entrance event which acknowledges the state of any tagged or untagged animal moving out of fence. Both of these events send the current location and other related information of any entity within or at boundaries of the fence. This is also called as Leaving as it is moving out of Geo-fence.

c) Wait or Dwell Event: This event is used to specify time period for any identity within the geo-fence area. This is called as waiting, or dwelling state because it involves the time spent within the geo-fence boundaries. This is the triggering event which can be limited by the



Figure 2 Events of Geo-Fencing Process

mentioning the expiry period in milli seconds. Once it expires or accepted as family entity, this could remove the location service automatically.

Applications of Geo Fencing in Agriculture

Geo-fencing has been broadly used in various domains and discipline.

Land Monitoring:

Geo Fencing enables farm men, ranchers and proprietors to watch out for their lands. Agriculturists/ landlords can get information, if any mishap or unusual activities on the land like human burglary or animal attack can be instantly detected. Likewise, the up gradation in the production of grains can be accomplished by utilizing IoT in the agribusiness industry.

Livestock Tracking:

Agriculturists and farmers can monitor or track the movements of animals all over the area in the farm or land following livestock trackers. It can be reviewed by all recorded tracking data at a timely base which spares a considerable measure of time and facilitate the person just by sitting at home.

Behaviour Detection:

Behaviour detection involved a dynamic user profile demonstrative of a user behaviour context with a mobile device. The vibrant user profile may be indicative of one or more current inferable user behaviour contexts for a user co-located with the mobile device. The mobile device may transition a dynamic user profile from a one state to another state, in response to a purpose that the



Figure 3 Geo-fencing Process

dynamic user profile is to alter from the one state to the second state, and operatively affect one or more functions performed, at least in part, by the mobile device based, at least in part, on the transition of the dynamic user profile to the second state.

Ware house Management:

In warehouse operation geo-fencing contributes to a better and effective anti-theft measure. Warehouse Management System users can set geo-fencing regions and get indicators if system or assets marked with RFID tags leave or enter geofencing region.

Transport Monitoring:

Geo-fencing is a blessing for agriculturists or farmers or common men doing business of shipping. Tracking the vehicle in which the goods are being transported is easy for them. Safety measures need to be applied for vehicle and goods depending on need.

GPS Crop Dusting:

GPS Technology can be used to simplify Agriculture and Farming. A GPS tracking and monitoring system and agricultural centres can program use of tractors. This will help save time and money by reducing fuel consumption and manual labour. Specific areas need crop dusting for the success or failure of a farm crops. Farmers are looking for ways to minimize and treat the areas that are uninfected to overcome negative effects it can have on the environment and crops themselves.

With help of a GPS based solution, workers can record the geographic location of insect preventing the unnecessary treating of an entire farm area and protecting the health of uninfected plants.

Rahul Singh Chowhan, Senior Research Fellow, Computer Science Archna Karel, Senior Research Fellow, Food & Nutrition Agriculture University, Jodhpur

BANANA STEM VALUE ADDITION FOR AUGMENTING FARMERS' INCOME



nlike apple, pear and other varieties of hardwood fruitbearing trees, banana plants only fruit once in their lifetime and

then they naturally die and decay away.After farmers harvest the fruit, they chop down the parent stem to help facilitate this natural process and encourage growth. Two intuitive inventors Taylor and Cook noticed that several banana plantations were sitting on a gold mine of fibers, otherwise considered waste material from the banana fruit harvest. A world caught up in an industrial revolution was not ready for a slower source of handmade paper.Today banana

stem is used as a source of raw material for preparation of paper pulp. This pulp is used to prepare different types of papers such as tissue, bloating and pulp. After harvesting, the farmer cuts the banana trees and throws away enormous amount of these stems into the fields because after harvesting the fruit, there is no significant use. Making tissue paper from the banana stem will be remunerative for farmers. Several industries manufacture tissue paper using bamboo, hardwood, softwood and jute etc. as the raw material, because it contains very good percentage of cellulose. Banana stem, therefore is a good alternative as it contains very high percentage

of cellulose.

In India, several varieties of banana are cultivated, one of which is from the genus Musa. North Eastern region of India has a suitable weather for banana crops. Genus Musa is cultivated in large scale. Incidentally they contain very percentage of cellulose.All high varieties of banana trees abound in fibers. In fact almost each and every part of the banana plant gives fibers of various strength, colour and beauty and staple length which can be used for various purposes. Out of the 14-18 sheaths available in a stem, the outermost 4-6 sheaths yield coarse fiber, the outer 6-8 sheath soft lustrous fiber and the rest middle



sheath excludina the innermost 4-6 sheaths yield very soft fibers. In each sheath, there are 3 distinct layers, the outer layer including the epidermis, contain bundles of fiber dispersed in a soft tissue matrix. The middle layer consists of water transporting fiber vascular tissue and the inner layer consists of soft, cellular tissue. The quantity of fiber in each sheath depends upon its width and its location in the stem, as does its guality. In addition to fruit production, huge quantity of biomass (pseudostem, leaves, suckers etc.) is also produced.

Byproducts

In production of tissue paper from banana stem, Kraft pulp process is preferred. It is the oldest and very famous process to prepare a pulp. The Kraft process was



discovered in Germany in 1879 and was first applied in Swedish mill 1885. When initially in paper was manufactured through the Kraft process, the paper obtained was much stronger than any paper previously manufactured. A dark brown pulp is obtained through this process. After that through the bleaching process, a white pulp is obtained and this pulp gives a very good strength tissue paper. Among the latest developments in paper industry for production of tissue paper, banana stem acts as a superior raw material and it provides easily manufacturable good strength tissue paper. The different uses of banana stem consist of manufacturing grease proof paper, fiber, board, writing paper and tissue paper. From the point of economy, the banana stem raw material is





cheaper than wood.

Properties of banana fiber

There are many desirable characteristics of the banana fiber that make it preferable to other textiles beyond the potential supply from our love for the sweet fruit

- Highly strong fiber
- Mixes well with other fibers to form composites
- Lightweight
- Biodegradable
- Rapidly Renewable
- Water-resistant
- Flame-resistant
- Naturally beautiful

The uses for banana fiber have not so much changed over time, but the processing has evolved and improved enough to make it commercially desirable. The fibers can be made into cloth, mats, woven materials, and handmade papers.

With the improvements in extraction and turning the fiber into a pulp, handmade paper stands out as one of the biggest opportunities for banana fiber. The thickness of the paper can be adjusted to achieve the desired texture and to make it suitable for a finished product.

Thick papers can be made to achieve a card stock feeling that is suitable for business cards and greeting cards or thin enough for tissue paper. Papermaking artisans have also experimented with mixing various fibers including recycled



paper pulp, pineapple and sakau to achieve a wide variety of papers.

Banana Stem Uses

Two types of banana papers are generally available. One is to refer to a paper made from the bark of the banana tree, mainly used for artistic purposes. Another one is paper made from banana stem or the non-utilized fruits. However, you can process this type of paper either as handmade or with machines.

Banana is one of the most important crops in India. Our country produces banana in the large quantities. However, after harvest of fruit, it generates the huge quantity of waste. It is about 60 to 80 tonnes per hectare of waste biomass (pseudostem, leaves, suckers etc.).

Presently, this biomass is discarded as waste. Normally farmers employ labour to either cut or uproot the pseudostems and throw them by the roadside. For this, a farmer needs to invest Rs. 10,000 per acre as labour charge for cutting and removing the plant from the field. Instead of spending money, now they can earn from their banana wastes as an ecofriendly substitute in textile industry in place of the environmentally hazardous synthetic fibers.

can provide livelihood Thev opportunities to the rural poor through generation of employment in the fiber producing and processing industry. Being completely biodegradable and naturally occurring, the banana fiber products are expected to be in great demand in the international markets as they pose no toxic effects to man and environment. The value added products, would enhance the profitability of banana farming. It will help in minimizing deforestation due to various wood/cellulose processing industries, thus protecting our ecology and environment. Boxes made from these boards can be used for transport of fruits and other materials. Thicker varieties of banana paper can be used for making files, covers and packing materials.

Handicrafts ,



- Ropes & Mats,
- Bags ,
- Threads & Twines ,
- Footwear,
- Hand Made Paper, Candy
- About 280 300 kg fiber and 15 tonnes vermicompost obtained from banana stem.

Banana stem is a cheapest and easily available raw material as a source of making paper pulp for the production of various types of paper. Strength and guality (brightness, formation, softness, smoothness) of the Paper produced in this process is marketable. Process cost is very low.In the present scenario, a small plant for production of tissue paper could be materialized which will be very useful for the society and its environment. Banana is cultivated in about 2, 30,000 hectares of land and the fiber yield is around 8.7 lakh tonnes. Though banana fiber extraction is not done on any large scale at present, banana fibers are reported to have been spun on the jute spinning machinery and used for making hand bags and other fancy articles. Agro-based bio-fibers have composition, properties and the structure that make them suitable for uses such as composite, textile, pulp and paper manufacture. In addition, bio- fibers can also be used to produce fuel, chemicals, enzymes and food. Byproducts produced from the cultivation of corn, wheat, rice, sorghum, barley, sugarcane, pineapple, banana and coconut are the major sources of agro-based biofibers. Likewise banana fiber based production processes, structure, properties and suitability of these biofibers are to be identified for various industrial applications.

> Panda Arun Kumar, R.V.Sujatha, RVSK Reddy,T.Suseela, Dr.YSR Horticultural University, Andhra Pradesh and K.Vennela, Horticulture Officer, Dept of Horticulture, Andhra Pradesh.

A Prayer, please come along...

eaders, the theme of iterations made through these columns yet, lingers and persists in the fond hope of sometimes, somewhere, someplace making a little ripple and which unbeknownst may at some point of time touch shore.

2018, has been thus far the year when farmers across the Country have been in the print and digital media for many and varied reasons. Farming as a way of life has clearly not made the cut. Clearly those who espouse the cause must look at their gains from the games they play and " farming" per se' is by them untouched at the ground level. The farmers' much larger role in prevention of soil pollution that could reduce soil degradation.increase food security, contribute significantly to the adaption and mitigation of climate change as also contribute to the avoidance of conflict and migration, is not seen as important enough to be highlighted, debated and discussed. Would not enlightened farmers and some who held these priorities be economically better off.....food for thought ?

Soils are the most valuable ecosystem in their role in food production and food quality, in climate regulation, provision of raw materials and services, such as fibres and natural antibiotics are widely agreed to.

The custodians of soils are in a big way the farmers, small and big. Today with a feel of connectedness which is all pervasive why is it so that our farmers are unable to see their hugely significant role in the scheme and remain aligned to narratives that are politically built. Would be most unfair to suggest they do not care....perhaps their way of seeing themselves as they do is because of the misalignment with political rhetoric and one which easily promises a sense of entitlement and complacency thus playing to another's tune. A proclivity to such is harnessed by political narratives is a fact. The aim and focus of all the Institutions and State must be to have the farmer dedicatedly focus on his/her core competency to bring out best mettle possible.

Would be not totally off mark to believe that in case the farmers enjoin with their larger than life role, good



will accrue in more ways than one.

Amongst other things the farmers must, by State and its Institutions, be helped to become proactive in such matters that concern humanity at large, and which would certainly value the farmers for that.

The opportunity to be in the heart of the issue comes to us in a couple of months' time as the world gets set to highlight World Soil Day in the first week of December 2018.

In looking and caring for soils, the farmer's directly contribute to many of the Sustainable Development Goals (hitherto not highlighted) !

Not only farmers....Their being a crucial role Society as a whole must attempt to see the holistic picture which sadly is so fragmented when climate is a globally dominant force which an individual alone cannot mitigate.lt is strangely callous that societies, and States come together with a form of stickiness on matters other than the ones espoused herein.

Maybe we need to figure out a sticky glue for this.

The hinge moment necessarily entails ethical and moral choices. Eerily the Country is fixated on issues which in the 21st Century are heading towards redundancy but continue to make headlines and which spiral into misspent energies and loss of valuable time .Sadly all such divert minds and hearts of the farmers from their core competency and build up of which is first and foremost.

The sentiments, Dear Readers, are straight from the heart and it is hoped that for the few minutes that you took to read , we were "on the same page "? Were we aligned in few moments?

Ashok Trivedi Tea Farmer



MICRO FOOD FOR TROPICAL TUBER CROPS



Il crops need at least seventeen essential elements for their successful completion of life cycle and for giving maximum yield. They are classified into major, secondary and micronutrients. Since carbon, hydrogen and oxygen are plentily available in air and water, they need not be supplied externally. Nitrogen, phosphorus and potassium are the other three major nutrients. Plants require them in comparatively larger amounts and hence called major nutrients. The three secondary nutrients are calcium, magnesium and sulphur. In addition to the above major and secondary nutrients, which together are known as macronutrients, require crops another seven micronutrients which include iron, manganese, zinc,



copper, boron, molybdenum, chlorine and nickel. Nickel is the most recent addition to the list of micronutrients to higher plants. In addition to the above 17 essential elements, certain plants need some other elements also for their normal growth and production, which together are called beneficial elements. The important beneficial elements are

| Table below gives the nutrient con | nposition of the five micronutries | nt formulations that were |
|------------------------------------|------------------------------------|---------------------------|
| developed. | • | |

| SI. No. | Сгор | Zn % | Cu % | B % | Fe % | Mn % |
|------------|--|------|------|------|------|------|
| 1 | Cassava - 1 (Acid soils) | 2.5 | 0.4 | 0.2 | 0.5 | 0.25 |
| 2 | Cassava - 2 (Neu- tral & Alkaline soils) | 1.5 | 0.3 | 0.15 | 0.75 | 0.4 |
| 3 | Sweet potato | 2 | 0.6 | 0.2 | 0.5 | 0.25 |
| 4 | Elephant foot yam | 1.5 | 0.4 | 0.3 | 0.75 | 0.5 |
| 5 | Yams | 1 | 0.4 | 0.3 | 0.75 | 0.5 |



Five liquid foliar micronutrient formulations for tropical tuber crops brought out in the market by M/S Linga Chemicals, Madurai based on ICAR-CTCRI technology

cobalt, sodium, silicon, selenium and vanadium. Cobalt is required for forage plants, sodium is needed by C4 plants, silicon is required by cereals and grasses, selenium is beneficial for cabbage and mustard and vanadium is required by certain higher plants and green algae.

Tropical tuber crops which include cassava, sweet potato, elephant foot yam and yams are an important group of crops cultivated in our country in an area of about 4 lakh hectares with a total production of about 80 lakh tonnes of different tubers. In addition to major and secondary nutrients which are normally supplied through different fertilizers and soil amendments, they also need five micronutrients namely, iron, manganese, zinc, copper and boron for higher yield and better-



quality tubers. The Central Tuber Crops Research Institute located at Thiruvananthapuram, Kerala has been conducting research to develop crop specific, multi-micronutrient formulations for these tuber crops for the past five years and has come out with specific products in liquid form that can be used as foliar spray. The formulations were developed based on intensive laboratory studies to make the components compatible and with a long shelf life. The stability of the products was also tested for a year under ambient temperature. Studies showed that application of these micronutrient formulations will increase the yield of these crops by 5-9 per cent and produce better

quality tubers.

Currently, five different micronutrient formulations have been developed for Cassava in acid soils, Cassava in neutral and alkali soils, Elephant Foot Yam, Yams and Sweet Potato. The foliar liquid micronutrient formulations were developed based on crop specific requirements of different micronutrients considering average soil supply in major tropical tuber crop growing areas.

The institute has recently commercialized all the above five multi-micronutrient products to a company, M/S Linga Chemicals, Madurai and the company has brought out all formulations in the market for the benefit of tropical tuber crop farmers. The technology transfer has been effected through Agrinnovate, the company under Indian Council Agricultural of Research for commercialization of their technologies.

> G. Byju Principal Scientist, ICAR-CTCRI, Sreekariyam P.O., Thiruvananthapuram, Kerala

| Table below shows the concentration of spray solution, quantity of the formulation r | equired |
|--|---------|
| per hectare. | - |

| Sl. No. | Сгор | Concen- tration of spray solu- tion (ml/ litre) | Quantity required (Litre/ hectare) | Quantity of spray solution required (Litre/hectare) | No. of sprays | Time of ap- plication* |
|------------|--------------------------------------|---|---|--|------------------|---------------------------|
| | | | | | | Months |
| | Cassava-1 (Acid soils) | 5 | 2.50 | 500 | 3 | 2, 3 & 4 |
| 2 | Cassava-2 (Neutral & Alkaline soils) | 10 | 5.00 | 500 | 3 | 2, 3 & 4 |
| 3 | Elephant foot yam (Acid soils) | 5 | 2.5 | 500 | 3 | 2, 3 & 4 |
| 4 | Yam (Acid soils) | 5 | 2.5 | 500 | 3 | 2, 3 & 4 |
| 5 | Sweet Potato (Acid soils) | 5 | 2.5 | 500 | 3 | 15, 30 & 45 days |

* This is general recommendation. In case of severe deficiency symptoms in field on a large scale, apply 3 times at fortnightly intervals on appearance of symptom for all crops except sweet potato. For sweet potato, apply 3 times at 10 days' interval on appearance of severe deficiency symptoms.

"Agriculture is at crossroads and the sector is unviable as people are leaving farming. Boosting agriculture sector is one of the top priorities"

> M VENKAIAH NAIDU Vice-President





"Our government is committed to double the income of Indian farmers by 2022. Our plan would be kam lagat, adhik aay (less cost, more income) and are making unprecedented inclusion of scientific methods in farming"

NARENDRA MODI Prime Minister

"Since the World Trade Organisation came into being, farmers in developing countries, for whom agriculture is the primary livelihood, unlike their counterparts in the advanced parts of world who pursue industrial agriculture, have been facing new challenges.India's farmers must get access to global markets so that exchange of technology can take place"



PROF. MS SWAMINATHAN Renowned Agriculture Scientist



"Our aim is to bring all farmers and all cultivable land in the state to zero-budget natural farming (ZBNF) in the next five years. In five years, every village will become a bio-village. Our ultimate vision is to bring all 60 lakh farmers in the state into ZBNF. AP farmers should become role models to the world in natural farming. We should win Nobel prize in this and whoever wins that will be given Rs 100 crore"

N CHANDRABABU NAIDU Chief Minister, Andhra Pradesh

Telangana State Seed & Organic Certification Authority



Certified

Seed

- Does not cost, it pays
- Symbol of quality and purity
- Assures higher yields and premium income to farmers

Our Initiatives

- Catering to the needs of Telangana States as well as supplying seed to more than ten States
- Pioneers in implementing complete Online Seed Certification Process
- Designated Authority for OECD International Seed Schemes
- First in the Country to export seed under OECD Seed Certification
- International Co-operation with the ISTA & OECD Seed Schemes
- Steeped into Organic Certification to Promote Organic Farming
- Working with a motto of making Telangana as "Global Seed Hub"



- A Seed Grows with no Sound but its Quality Results in huge triumph Farmers reap bountiful Harvest"
- As we sow-so we reap
- Sow certified seeds-reap bumper fields

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