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Talks about the value of Indian millets in our daily lives.

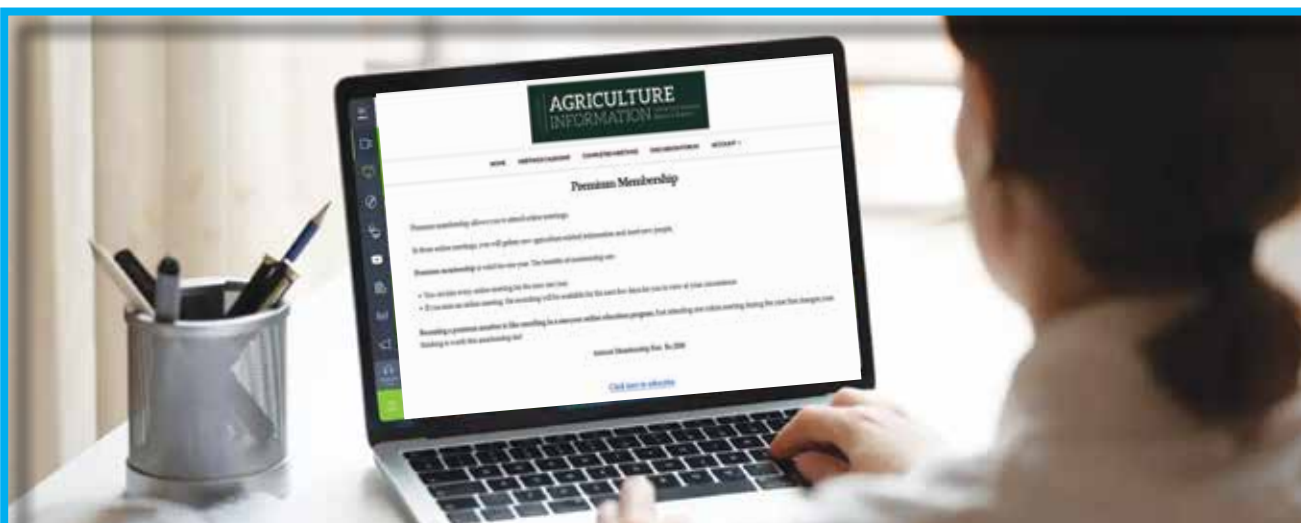


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CONTENTS

| | | | |
|----|---|----|---|
| 04 | News | 35 | Technology <ul style="list-style-type: none">* 5 ways CRISPR gene editing is shaping the future of food & health* Titanic robots make farming more sustainable |
| 11 | Online Meetings <ul style="list-style-type: none">* Upcoming events* Recently Completed Meetings | 38 | AgTech <ul style="list-style-type: none">* Praakritik Launches delivery of organic Fruits & Vegetables in Bangalore* TartanSense rebrands as Niqo Robotics* Aquaconnect raises \$15m to digitize India's aquaculture supply chain for smallholder farmers* Indian farmtech startups close 185% more funding in 2022 than 2021 |
| 14 | Opinion <ul style="list-style-type: none">* For second year in succession, Indian agriculture battles climate change* Drone technology in agriculture | 40 | Foreign Agriculture <p>How Africa's new free trade area will turbocharge the continent's agri industry</p> |
| 16 | Talking To <ul style="list-style-type: none">* Dr. Hema Yadav Vaikunth Mehta National Institute of Cooperative Management* Amanpreet Singh, GrainAnalyser | 42 | Ideas <p>Investing in trees</p> |
| 21 | FPO <p>Yogesh Rajkumar, Farm Exim</p> | 44 | Guest Column <p>Natural Farming : Bharatiya Prakritik Kheti Bio-Input Resource Centre</p> |
| 24 | Organic Farming <p>Dr. Manoharan Krishna An international organic agriculture scientist, agripreneur</p> | 46 | Research <p>Potato farming in Odisha Interview with Samarendu Mohanty, Asia Regional Director at the International Potato Center</p> |
| 27 | Horticulture <ul style="list-style-type: none">* Dr. Satyen Yadav, Horticulture Produce Management Institute* Kodali Naga Pradeep Kumar | 49 | Q & A |
| 32 | Value Chain <p>Madhawendra Kumar Thakur Chairman - Mithila Vegetable Processing and Marketing Cooperative Union Ltd</p> | | |

Agriculture budget rose 5 times in 9 years to over ₹1.25 lakh crore

Prime Minister Narendra Modi said the Union Budget 2023-24, like in the previous 8-9 years, focuses on the agriculture sector, and steps are being taken in mission mode to become completely self-sufficient in terms of edible oil.

Addressing a post-budget webinar with stakeholders of agriculture and cooperative sectors, the prime minister informed that the agricultural budget which was less than ₹25,000 crore in 2014 has been increased to more than ₹1.25 lakh crore today.

"Every Budget in recent years has been called a budget for Gaon, Gareeb and Kisan," Modi added.

Noting that India's agricultural sector remained distressed for a long time since Independence, the prime minister pointed out the country's dependence on the outside world for our food security.

He highlighted how India's farmers transformed the situation by not only making the nation 'atmanirbhar' (self-sufficient) but also capable of exporting food grains. "Today India is exporting many types of agricultural products," PM Modi said.

He also stated that India's goal should not be limited to rice or wheat when it comes to self-sufficiency or export. Highlighting the imports in the agricultural sector, the prime minister gave examples of expenditures of ₹17,000 crores in 2021-22 for the import of pulses, 25,000 crores for the import of Value Added Food Products, and ₹1.5 lakh crore spent on the import of edible oils in 2021-22.

He said the sum of all agricultural imports was about ₹2 lakh crores. The Prime Minister emphasized that various decisions are being continuously taken in the budget to promote the agricultural sector so that the nation becomes 'atmanirbhar' and the money used for imports can reach our farmers.

He gave examples of increase in MSP, promotion of pulse production, increase in the number of food processing parks, and work in mission mode to become completely self-sufficient in terms of edible oil.

The prime minister informed about the introduction of accelerator funds for agri-tech startups and said that the government is not only creating digital infrastructure but also preparing funding avenues.

He urged the youth and young entrepreneurs to move forward and achieve their goals. PM Modi pointed out that India is home to more than 3000 agri-startups today compared to next to nothing 9 years ago. This was the second webinar addressed by the Prime Minister. On Thursday, he had elaborately spoken on the topic of green growth. In all, he is scheduled to address 12 post-budget webinars till 11 March, 2023.

The webinars are being organised by various ministries/departments to build on the "Saptarishi" priorities outlined in the Union Budget 2023-24. The idea of post-budget webinars was conceptualized by PM Modi to bring together all stakeholders for bringing synergy in the implementation of Budget announcements.

Source : www.livemint.com

Founder Chairman
V. Isvarmurti

Managing Editor
Kartik Isvarmurti

Magazine Coordination
A. Kavitha

Website Coordination
Rajani Jain
rajani@agricultureinformation.com
Dhanalakshmi S
dhanalakshmi@agricultureinformation.com

Contact Number and Email
9620-320-320
support@agricultureinformation.com

To subscribe visit the website
www.agricultureinformation.com

Regd Office:
Pichanur, Coimbatore
Tamil Nadu - 641 105
Tel: 0422-2636248

Admin Office:
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Ragi to riches

India's new millet campaign is about how the grain is good for people and planet

India has globally relaunched an old and failed brand — the millet. Called mota anaj (big grain), millet has been looked down upon as a coarse grain while wheat and rice have occupied pride of place as fine grains.

New Delhi's campaign to make millet a global brand has got a push with the United Nations accepting India's proposal to declare 2023 as the International Year of Millets. The cereal has been gaining traction among the health-conscious in India and abroad who go for millet pancakes and cookies.

The rebranding begins with the name. Millet is no longer promoted as mota anaj; instead, it will be called shree anna or nutri cereal, a superfood high in iron and calcium. The resilient grain also fits in well with the current global climatic concerns — it consumes little water, has low carbon footprint and grows in arid conditions.

India's millet campaign revolves around a simple but powerful theme — it's good for you and the planet. New Delhi's first goal is to achieve \$100 million worth of millet exports by FY25, up from \$64 million in 2021-22. "Millet-based dishes are being popularised and adapted to the cuisines of various countries through the Ministry of External Affairs. Millet festivals are also being organised in hotels of select countries," says M Angamuthu, chairman of Agricultural and Processed Food Products Export Development Authority (APEDA), an arm of the Union ministry of commerce and industry. "The government is also supporting startups by women and new entrepreneurs who are exporting millet and millet-based products. We are facilitating them by organising food-sampling and tasting campaigns at departmental stores, supermarkets and hypermarket chains," he says, adding that millets are primarily being promoted in the US, Europe and the Gulf countries.

India has been producing and consuming millets since the time of the Indus

Valley Civilisation some 5,000 years ago. Even today, the nation is the largest producer of millets in the world. Some of the major-millet producing states are Rajasthan, Maharashtra, Karnataka, Uttar Pradesh and Gujarat.

Agricultural economist and NITI Aayog member Professor Ramesh Chand estimates that about 40% of millets, other than sorghum (jowar), is produced in India. (Jowar, which is cultivated in large quantities in the US for feed and energy is excluded from Chand's calculation.) The other hub is Africa, which accounts for 44% of global millet production (again, excluding jowar).

According to the second advance estimates of production of major crops for 2022-23, released earlier this week, India's millet production is about 16 MMT (million metric tonnes), almost the same as in 2021-22 but a drop from the high of 18 MMT in 2020-21. While 16 major varieties of millets are cultivated in India, three dominate — sorghum (jowar), pearl millet (bajra) and finger millet (ragi). Others include minor millets (kangani), proso millet (cheena), kodo millet, barnyard millet (sawa/sanwa/jhangora) and little millet (kutki).

The 2022-23 Economic Survey put India's millet production at 50.9 million tonnes (chapter 8, page 252) — but it is an error. "It's a mistake. In all probability, maize production numbers got clubbed with millet," says Chand of NITI Aayog, adding that productivity breakthrough in millet is indispensable at this juncture. "Millet production in India has been more or less the same since the early 1970s. Total production will increase only under two conditions — either the area under millet cultivation grows or the yield increases. For a rise in yield, we must have a productivity breakthrough. Better R&D in millet is an imperative," he says.

Millet was ignored by India's green revolution of the 1960s and the 70s. The cereal received some attention only in 2012 when the then government crafted a policy called Initiative for Nutritional



Security through Intensive Millet Production (INSIMP). In 2018 millet was declared a "nutri cereal" and added to the national food security mission. `300 crore was earmarked for its development. It was also in 2018 that India proposed to the UN to declare 2023 as the international year of millets — the proposal was accepted in 2021.

Millet received a shot in the arm when the government earmarked an outlay of `800 crore for millet-based products under its Production-Linked Incentive (PLI) scheme; 33 applicants have been selected for this. Then came the Union budget which said the government would support the Indian Institute of Millets Research in Hyderabad in sharing best practices, research and technologies at the international level. GoI has also provided a \$500,000 grant to the Food and Agricultural Organisation (FAO) to support activities related to the International Year of Millets, according to a reply to a question in Lok Sabha earlier this month.

HEALTHY SIGN

Private entrepreneurs and hotel chains are stepping in to meet the demand for millets. ITC Hotels has included millet-based dishes in their buffets — from risotto, jowar kebab and jowar tur dal tadka to kutki khao suey and kodo halwa. Taj Mahal Palace in Mumbai sources various kinds of millets for risotto, tehri and khichdi. "We have developed a buffet concept for millets for our banquet events. We have also introduced millet stations where various dishes are displayed," says the hotel's executive chef Amit Chowdhury.

Read full @ <http://bit.ly/3JsrnKV>

Source : economictimes.indiatimes.com

e-NAM gathers pace

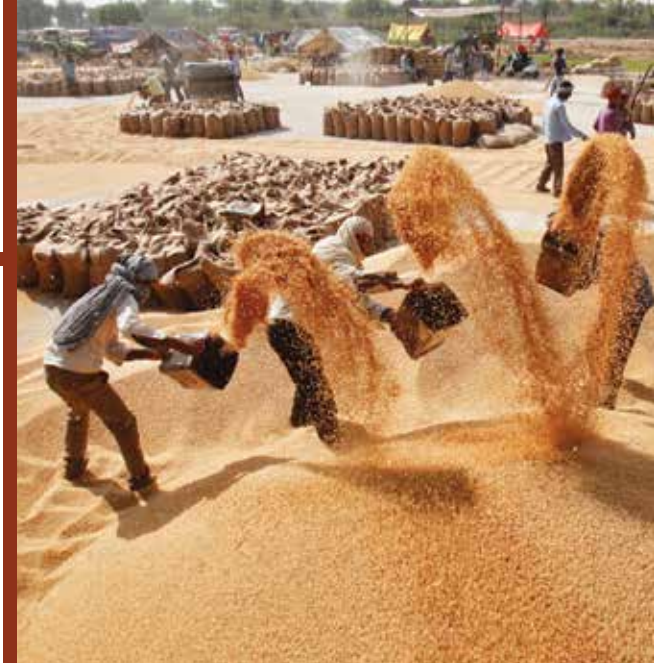
With private entities also roped in, farmers may be expected to get a better deal

The government's farm reforms may be on the backburner but there is no rolling back its larger Digital India initiative that uses technology to deliver services to farmers. A case in point is the progress of the electronic National Agriculture Market (e-NAM), which was launched in April 2016 to catalyse the digital transformation of mandi or marketplace operations for the trading of agricultural commodities. The objective was to create a transparent online competitive bidding system to enable farmers to secure remunerative prices for their produce. Since then, trade volumes on the e-NAM platform have steadily gathered pace, improving market access of farmers and creating a unified national market for agricultural produce, as reported by FE.

e-NAM trade now covers a growing list of commodities like apples, saffron, ragi (finger millets), jeera (cumin seeds), chana (gram), soyabean, copra, and silk cocoons. Private entities providing services such as transportation, logistics, assaying, weather forecast and fintech are also being integrated into the platform to enable more farmers to

sell their produce to buyers of their choice. At present, 1,260 mandis in 22 states and Union territories are integrated with e-NAM. Around 17.5 million farmers, 2,433 farmer producer organisations, 0.24 million traders, 0.1 million commission agents and other stakeholders are currently registered with e-NAM. The platform thus has reached critical mass or scale to significantly improve farmer incomes.

The progress towards "One Nation One Market"—which enables efficient price discovery—has been facilitated by inter-state trade which has recently commenced with farmers from Kashmir, Maharashtra and Rajasthan selling their produce to buyers in Kerala, Odisha, Jharkhand and Madhya Pradesh. Maninder Kaur Dwivedi, MD of Small Farmers' Agri-business Consortium, which is administering this platform, told this newspaper that the start of inter-state trade with same-day digital payments to farmers' bank accounts is showing a way forward. To be sure, trade in farm produce within individual states like copra (Tamil Nadu),



dry fish and betel leaf (Odisha), etc has grown at a faster clip this fiscal as markets still remain highly fragmented.

Overall turnover of e-NAM in this fiscal till February stood at ₹67,000 crore, up by 40% from a year earlier. For a sense of perspective, this represents 13% of the annual trade in farm goods, excluding milk and marine products, that is in excess of ₹5 trillion. Clearly, e-NAM has some distance to cover which is predicated on the faster growth of inter-state trade in agricultural produce.

The fact that farmers are increasingly accessing this platform for getting real-time information on prices prevailing in various mandis is the best augury for securing the best prices for their produce to improve their incomes. While e-NAM has no doubt made progress, there is a need to strengthen the platform further. Various suggestions in the past made by apex chambers like FICCI in a 2017 report and agricultural economists like Ashok Gulati deserve consideration.

More agri-market reforms are needed starting with basics of assaying, sorting, and grading facilities for primary produce as per nationally recognised and accepted standards. Suitable infrastructure at the mandi-level (like godowns, cold storages, and driers) needs to be created to maintain those standards. A national integrated dispute resolution mechanism needs to be evolved to tackle cases where the quality of goods delivered varies from what is shown and bid for on the electronic platform.

Source : www.financialexpress.com

Over two dozen sugar mills close early in Maharashtra

More than two dozen mills in Maharashtra, India's top sugar producing state, had stopped cane crushing by the end of February, nearly two months earlier than last year, due to adverse weather, a senior state government official said. The early closures suggest Maharashtra will produce far less sugar than the initial estimate of 13.8 million tonnes and bring down the country's total production.

Lower sugar output could prevent the world's second-biggest exporter from allowing additional exports, potentially supporting global prices and allowing rivals Brazil and Thailand to increase their exports. Maharashtra, which accounts for more than a third of India's sugar output, has produced 9.51 million tonnes sugar in the 2022/23 marketing year that began on Oct. 1, down from 9.73 million tonnes at the same point last season, a senior government official told Reuters recently.

Source : economictimes.indiatimes.com

Farm reforms pending in India since 1991?

China implemented long back: EAC-PM chief

The reforms undertaken in India in 1991 were pertaining to external factors and industrial liberalisation, and were not related to agriculture.

Farm reforms in India are pending even today since 1991, while neighbouring China implemented them way back in 1978, Economic Advisory Council to the Prime Minister (EAC-PM) Chairman Bibek Debroy said. The reforms undertaken in India in 1991 were pertaining to external factors and industrial liberalisation, and were not related to agriculture, he said.

Currently, agriculture has become unviable and even its share of the country's GDP is declining by 1 per cent per year even as a large percentage of the population is still dependent on this sector for their livelihood, he added.

"Quite often in India, we compare with China. In 1978-79, China reformed agriculture. We are told that reforms in India were implemented in 1991 and pertain to the external sector and industrial liberalisation. Have the reforms in agriculture been introduced? Has agriculture been subjected to "delicensing"? The answer is no," Debroy said in an agri-summit event.

By and large, the input-output, marketing and distribution side of the agriculture sector is controlled by the government, he said, adding "that reform agenda for agriculture is not only been pending since 1991, it is pending even today as we speak at this point".

"In technology, seeds, marketing channels, investments and links in terms of distribution channels -- in each of these you will tend to find controls. Those controls have not gone away...Fundamentally, there is a political economy of resistance," he said.

Debroy opined that the political econo-

my of resistance comes because of the mindset that Indian farmers do not know what is good for him or her and therefore must be protected.

"I don't think farmers need to be protected in that sense. Yes, farming is unviable because input prices are more than other prices. There are issues about insurance. We still do not have satisfactory insurance. Indian farmer does not need to be protected," he said.

What Indian farmers need to be protected is from unwarranted state intervention, he said, adding "If we free Indian farmers from that, I am sure Indian agriculture can be transformed," he noted.

Debroy also mentioned that the consumers have benefited from industrial liberalisation but object to agricultural liberalisation when export-import controls are imposed to check price rises.

He suggested that there is a need to create farm employment opportunities and move towards commercialisation and diversification. He also stressed having modern land records to undertake farm reforms.

"...there are states in India where the last cadastral maps were done in 1910 or 1920s. If this is the state of affairs, I am not even talking about land reforms that come subsequently. I am just fo-

cusing on the tracking. ...Until we have modern land records, how can we possibly reform agriculture," he said. Also, land and the bulk of agriculture are under the purview of states as per the seventh schedule of the Constitution, he added.

On minimum support price (MSP), Debroy said MSP today is tantamount to a procurement price. The moment there is a procurement policy, it distorts choice.

Speaking on the occasion, agri-export promotion body APEDA Chairman M Angamuthu said India targeting to



reach 7th position in the global agri-export market by 2025, encashing on its wide product range and price competitiveness.

"Our farm exports touched USD 50 billion in 2021-22. We were holding 12th position in the global market four years back and have inched up to 8th position now. We will reach 7th position in 2025," he said. Several steps have been taken to boost exports, including promoting GI (geographical indications) tagged products, and vegan and organic produce, he added.

Source : <https://economictimes.india-times.com/>

Why 2023 may be an annus horribilis for India's farmers

The hope of the Rabi crop harvest reaching even last year's level is waning. The more India's farmers hope for the better, the deeper they get into distress. In the last two years specifically, there was not a single season that was "normal" and didn't affect farms and thus farmers. The south-west monsoon of 2021 was statistically normal, rescued from a deficit state to a near normal one by excess rainfall in September.

August 2021 was the sixth-driest month since 1901. While some farmers had normal crops, others lost them. But they were hopeful as the late withdrawal of monsoon and heavy rain in September and October meant good soil moisture and reservoir levels for a bumper harvest during the Rabi season.

In the beginning of 2022, extreme rainfall and coldwaves dashed that hope by damaging standing crops. While the world was entering into a severe food crisis as the Russia-Ukraine war started, Indian farmers had their own battles to fight.

The late withdrawal and excess rain events spurred the Rabi acreage. But the severe heatwave during harvest time in April-May 2022 led to widespread crop loss, particularly of wheat. This led to a downward revision of overall grain production. The wait for the monsoon started and the dire situation of 2021 repeated. Another "nor-

A dry winter, arrival of El Nino and two years without earnings make this year terrible for Indian farmers

mal" monsoon with an uneven temporal and spatial distribution — long dry spells and heavy rains towards the end of the season, or in September — led to widespread crop loss.

Excess rain in September has been an unmissable trend, at least in the last three years. The monsoon extended to the end of October, 2022; 52 per cent of the 36 meteorological subdivisions received above normal rainfall.

This brought down the paddy harvest and delayed the Rabi crop for nearly two months. The sudden rise in temperature led to the stunting of the wheat crop and the government stopped export of wheat in May, anticipating a shortfall. So, for three consecutive crop seasons, there has been no occasion a farmer could even recover cost; accruing loss instead.

Expectedly, all hopes were mortgaged to the Rabi crop of 2023. Farmers took up Rabi crops in 15 per cent more farms than last year. This year, the blow is severe — the winter has effectively vanished by January end and the country is experiencing mid-March temperatures.

And this unusual high temperature is not just felt in the wheat-growing northern parts of India but also in the eastern part of the country. This will severely stunt the wheat crop, as in last year but on a wider scale. So, the losses are going to be more. This means for two years, a farmer has not experienced a normal crop season; has not earned anything effectively; but has to continue doing so.

Will the next Kharif crop season be normal? Weather forecast has pressed the alarm bell — the three-year La Nina is

on the wane and the dreaded El Nino will make an entry in 2023 by July. El Nino usually means a subdued monsoon for India and also extreme heat.

It means, after losing a Rabi crop, farmers can't even trade with hope for the Kharif now. As they say, hope is not a strategy or plan. But what if it is the only commodity that farmers own?

For the country's overall foodgrain situation is also going to be hit, adding food inflation as well as making the poor more vulnerable to food insecurity. The hope of the Rabi crop harvest reaching even last year's level is waning.

On the other hand, the government's food stock has been depleting, first for meeting the food security scheme's commitment and second due to releasing some three million tonnes of grain into the market to keep the inflation under control.

Without a bumper harvest in the next two months means we are hitting a scarcity situation. This will lead to higher food inflation. Notwithstanding the free foodgrains under the food security scheme, people have to fork out more for food. This adversely impacts the overall income levels, particularly for farmers who have not earned a profit for the last four consecutive seasons.

Source : www.downtoearth.org.in



AGRI exports in first 3 quarters hit record \$20bn in 12.6% jump

Exports of agricultural produce through the Agricultural and Processed Food Products Export Development Authority in first the three quarters of the ongoing financial year touched a record \$20 billion, registering a 12.6% rise on-year, latest figures show, with their growth propelled by higher global commodity prices and resilience of the farm sector.

India has also emerged as a net exporter of farm products, whose exports touched an all-time high of US\$ 50.2 billion in 2021-22, according to official data. Trade analysts say India change of focus from domestic food security to exports had driven overseas sales. Farm exports crossed 11% as a share of total merchandise exports for the first time in 2021-22.

The war in Ukraine, shipping disruptions and rising oil and fertilizer prices bumped up grain prices, which seemed to have raised rates of premium basmati rice, despite India banning wheat exports in May last year followed by restrictions on rice exports, said Rahul Chauhan of IGrain Pvt Ltd.

Exports are a key reason for steady farm growth. The annual Economic Survey, presented on January 31, said the agriculture sector, the country's largest employer, has grown at an average annual growth rate of 4.6% in the last six years. The sector grew by 3% in 2021-22 compared to 3.3% in 2020-21.

Overseas shipments were boosted by basmati rice, which registered a 16% increase in value terms, a surprising 92% jump in exports of pulses and 25% in fresh vegetables, mainly to demand from the US, UAE and China, latest data from the Agricultural and Processed Food Products Export Development Authority show.

It however warned of a slowdown in global growth in 2023-24, which could lead to slower export growth. "A slowdown in Indian exports is inevitable in a slowing global economy," it stated. The growth of exports may have moderated in the second half of FY23, after a surge in FY22 and the first half of FY23, it added.

To facilitate exports, the Union government had launched Krishi Udan Scheme in August 2020 on international and national routes to help farmers transport agricultural products, especially perishable food products from the hilly areas and north-eastern states. To boost shipments of agricultural produce by air, the Airports Authority



of India now provides a full waiver of landing, parking charges and terminal navigational landing charges for freighters and passenger-to-cargo aircraft in 25 airports.

Source : www.hindustantimes.com

Axis Bank partners with ITC to offer rural lending products to farmers in remote region

Axis Bank announced its partnership with ITC Limited to offer the bank's lending products and services to farmers who are a part of ITC's agriculture eco-system. The deal will enable Axis Bank to cater to the financial requirements of the unserved and under-served farmers based in the remote regions of the country. "The Bank will offer a wide range of assets and liability products such as farmer loans, gold loans etc," the company stated in a press release. Axis Bank will leverage ITCMAARS (Meta Market for Advanced Agricultural Rural Services), a full-stack Agri-tech application for reaching out to the farmers and addressing their financial requirements. In addition, the bank will also provide the farmers with an extensive range of products and services through its rural-urban and semi-urban (RUSU) branches located across 656 districts of India.

The bank also aims to further scale up its Bharat Banking strategy by increasing the new-to-bank accounts in FY22-23. As on December 31st, 2022, its rural advances grew by 27% YOY, disbursement increased by 12% YOY and deposit grew by 16% YOY. "This partnership is in alignment with our Bank's Bharat Banking mission of extending our reach in the remote regions and providing them with seamless customer experience. With the help of ITCMAARS strong and enduring relationship with over millions of farmers, we believe that we can make a significant contribution in uplifting financial situation of the community thereby unlocking the true potential of Bharat," said Munish Sharda, Group Executive & Head - Bharat Banking, Axis Bank.

Source : <https://economictimes.indiatimes.com/>

India needs to find foreign market for large amount of milk it is producing, says NITI Aayog member Ramesh Chand



NITI Aayog member Ramesh Chand said India will have to find market for milk in foreign countries as its production is growing by six per cent every year. Speaking at the 49th Dairy Industry Conference and Expo here organised by Indian Dairy Association (IDA), Chand said there is a need to make supply chains to foreign nations, in a way that has been done in the country.

"At one time we were producing less milk than the US. Today, we produce double the milk than what the US produces. Earlier in 1960s our milk production growth rate was around 1 per cent, but it is six per cent now," he said.

In 1950-51, per capita consumption of milk in the country was only 124 gram per day and by 1970 this figure dropped to 107 gram per day, he said.

"The daily milk consumption in the country rose from a low of 107 gram per person in 1970 to 427 gram per person in 2020-21 as against the world average of 322 gram per day during 2021," he said.

India is producing over 220 million tonne of milk every year and consumption of milk per person has saturated in the country, he said. "So it is very important to find markets for milk that we are producing in the country," he said, adding that India should create supply chains to foreign countries.

Chand said the Indian dairy and animal husbandry is contributing al-

"We have a blueprint ready for vision 2047 and it is time we all effectively collaborate synergies to achieve it. By 2047, we plan to increase bovine productivity by four times, increase Indian dairy exports to 15 per cent of total global dairy export, and build sustainable green practices to achieve COP26 targets. I invite you all to actively participate in this transformative expedition," Shah said.

most half of the total per year agriculture growth. "The agri sector growth is 3.2 per cent, out of which half of the contribution is of the dairy and animal husbandry industry," he said.

Listing the challenges faced by the dairy industry, Chand said milk productivity per animal, breed improvement and use of chemicals in the dairy industry are the challenges faced by the milk industry.

Union minister of animal husbandry and dairying Parshottam Rupala said India must focus on breed improvement and enhancing cattle productivity to emerge as the dairy of the world. "The aim of our government is the emergence of India as a leading dairy nation of the world," he said.

IDA President R S Sodhi said that from 1996 till date milk production has increased by nine times in Gujarat.

"The last time Gujarat hosted the Dairy Industry Conference was at Anand in 1996. The progress made by the dairy industry since then is unmatched. At the time, India's milk production was only 71 million tonne, which has gone up to 222 million tonne

now. India's milk production has gone up by three times, but in Gujarat, it has grown by nine times from 30 lakh litres per day to 270 lakh litres," he said.

National Dairy Development Board (NDDB) Chairman Meenesh Shah said they have prepared a plan for development of dairy industry till 2047.

"We have a blueprint ready for vision 2047 and it is time we all effectively collaborate synergies to achieve it. By 2047, we plan to increase bovine productivity by four times, increase Indian dairy exports to 15 per cent of total global dairy export, and build sustainable green practices to achieve COP26 targets. I invite you all to actively participate in this transformative expedition," Shah said.

Taking place in Gujarat after a gap of 27 years, the three-day conference has brought together dairy experts and professionals from India and overseas, dairy cooperatives, milk producers, government officials, scientists, policymakers and planners, academicians and other stakeholders.

Source : <https://economictimes.indiatimes.com>



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CONTACT

Dr Prasshant P. Yoogi

Telegram : 8624070972 ; Whatsapp : 9822194289

Web : www.indiancow.co.in ; Email : smartbhartiycow@gmail.com

Online Meetings



www.agricultureinformation.com

Upcoming events

APRIL 3, 2023

5:00 pm

Mr. Samiuddin S.Kazi on "Grapes – complete crop management from flowering to harvest"

Mr. Samiuddin S.Kazi is the General Manager & Head Agronomy at Nagarjuna Fertilizers and Chemicals Limited in Hyderabad, Telangana.

APRIL 4, 2023

5:00 pm

Dr. Vijay Kumar Arora on "New techniques of fertilizer application in agriculture". Dr. Vijay Kumar Arora is a Consultant Faculty at Maharana Pratap Horticultural University in Karnal, Haryana.

APRIL 5, 2023

5:00 pm

Dr. Digvijay Singh Rathore on "Chia the super food and the super income crop for the farmers"

APRIL 6, 2023

5:00 pm

Dr. Ratnesh Kumar Singh on "Tissue culture plantation of sandalwood and teak wood"

Dr. Ratnesh Kumar Singh is the Managing Director of Sidharth Sai AgroBiotech in New Delhi.

APRIL 7, 2023

5:00 pm

Mr. Divakaran K on "Biomass for combined heat and power"

Mr. Divakaran K is VP-Marketing of Acclaim Technology Services India Pvt.Ltd. in Chennai, Tamil Nadu.

APRIL 10, 2023

5:00 pm

Mr. Madhawendra Kumar Thakur on "Vegetable value chain in the region of Mithila"

APRIL 11, 2023

5:00 pm

Er. Simran Taneja on "Hydroponics – Lettuce and cabbage"

Er. Simran Taneja has done B.Tech.(Agriculture Engineering) from CCSHAU, Hisar, Haryana

APRIL 12, 2023

5:00 pm

Mr. Maneesh Chandra Pandey on "Role of Modern Technology in agriculture"

Mr. Maneesh Chandra Pandey is the Farm Manager at G4 Agri Farms in Karnal, Haryana

APRIL 13, 2023

3:00 pm

Ms. Jissy George on "Value addition in coconut"

Ms. Jissy George is a Subject Matter Specialist, Home Science at ICAR KVK -ALAPPUZHA in Kerala.

APRIL 17, 2023

5:00 pm

Ms. Prachi Yadav on "How to export mangoes from India ? "

APRIL 18, 2023

5:00 pm

Dr. Jaykishan Dhangdhariya on "Set-up of laboratory and production unit in agricultural inputs"

Dr. Jaykishan Dhangdhariya has worked as Research Associate at CSMCRI – CSIR and s Assistant Factory Manager and Head Biocontrol Laboratory at Ahmedabad, Gujarat.

APRIL 19, 2023

5:00 pm

Mr. Shyam Bhadane on " Green house management "

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Recently Completed Meetings

Mr. Sanjay Bhattacharji on "Dairy processing and dairy products manufacturing"

Mr. Sanjay Bhattacharji is the Founder & Director of Teplu Learning Pvt. Ltd., in Mumbai, Maharashtra. Mr. Sanjay Bhattacharji has been a dairy farmer in his first stint as an entrepreneur. To know more view <https://bit.ly/3q6R1h9>

Mr. K.S.Gopal on "Mistakes farmers make while irrigating the lands"

Mr. K S Gopal is the Director of Centre for Environment Concerns in Hyderabad, Telangana. His interest is rural development and environment with focus on water, soil for horticulture and agroforestry crops in water scarce drought prone areas. To know more view <https://bit.ly/390hsm8>

Mr. Ramakrishnan R on "Grafting techniques of Agriculture, Horticulture and Silviculture"

Mr. Ramakrishnan R. is the Proprietor of RK Nursery and Seeds in Coimbatore, Tamilnadu.

Mr. Shinde Sachin Pandurang on "Application of drones in agriculture"

Mr. Shinde Sachin Pandurang is a Ph.D. Research Scholar from Department of Soil and Water Conservation Engineering in Dr. A. S. College of Agricultural Engineering & Technology, MPKV, Rahuri, Maharashtra. His interest is soil and water conservation technology.

Ms. Jyotsna Kaur Habibullah on "Online marketplace and its benefits"

Ms. Jyotsna Kaur Habibullah is the Founder, CEO of Lucknow Farmers Market in Lucknow. Her interests are connecting farmers & start-up entrepreneurs to customers; brand building & marketing support to farmers & entrepreneurs; helping to create a conscious community for lowering carbon footprint and encouraging Rethink, Reuse, Reduce, Recycle. To know more view <https://bit.ly/2KE7HNW>

Mr. Raja Samanth on "What are the challenges faced by farmers in shrimp farming and how to overcome it?"

Mr. Raja Samanth from Nandyal, Andhra Pradesh has done Master of Fisheries Science (M.F.Sc.) and is a self employed Research & Development Engineer in Aquatic Environment Management. His interests are Aquaculture – Shrimp culture & Fish culture; Innovations in Aquaculture and Technical support to aqua farmers.

Mr. Touseef Hussain on "Importance of soil borne pathogens in potato tubers crop"

Mr. Touseef Hussain is a Chief Scientist (Plant Pathologist) at Mati Mate Agromart Pvt. Ltd. in Bhavnagar, Gujarat

Ms. Richa Thapliyal on "Solanaceous crops and its value addition"

Ms. Richa Thapliyal is a Masters student at GB Pant University, Pantnagar. She says, "the solanaceae family is also known as the night shade family. Their land preparation, irrigation, intercultural operation, temperature requirement are almost similar.

They are attacked by several insect pests so it's necessary to protect them. Under value addition, these vegetables are used to make many products".

Dr. A. Amarendra Reddy on "Union budget 2023 for rural and agriculture"

Dr. A. Amarendra Reddy is the Principal Scientist (Agricultural Economics) at ICAR-Central Research Institute for Dryland Agriculture in Hyderabad, Telangana. He got trained in agricultural economics, but worked in wide range of areas like poverty, public policy, microfinance.

Dr. Rohan Chhabra on "Climate Smart Agriculture"

Dr. Rohan Chhabra is the CTO at Prakriti AgTech in Delhi. To know more view <https://bit.ly/3f2YWvK>

Dr. Pravin Kumar Dwivedi on "Green manuring"

Dr. Pravin Kumar Dwivedi is the Senior Scientist and Head at Krishi Vigyan Kendra, in Bhojpur, Bihar. His interests are on crop soil water management, crop diversification, weed management, micro nutrient management, cropping system, pulses, cereals production, organic farm management, medicinal plants, green manuring and quality seed production.

Dr. PK Shrivastava on "Budget 2023 allocations for dairy and allied"

Dr. PK Shrivastava is a Dairy Business Consultant at M/s. Dairy Consultancy India in Bengaluru, Karnataka. To know more view <https://bit.ly/2Sj19bn>

Mr. Aman Agrawal on "Agriculture education the need of an hour both for students and farmers"

Mr. Aman Agrawal is the Founder of Future Agronomists in Harda Madhya Pradesh. Future Agronomists a social startup via Agriculture graduates to create a bridge between Agri students farmers and scientists where they learn earn and grow together.

Mr. Siva Rama Krishna Gorla on 'The game of "carving out & cashing in" the opportunities in hydroponic farming'

Mr. Siva Rama Krishna Gorla is the Product Engineer in Fambo Innovations Pvt Ltd. in Visakhapatnam, Andhra Pradesh. To know more view <https://bit.ly/3XBEJxZ>

Dr. Vijay Mahajan on "Processing of onion and garlic"

Dr. Vijay Mahajan is the Principal Scientist at ICAR – Directorate of Onion and Garlic Research in Pune, Maharashtra. His interest is on onion and garlic. To know more view <https://bit.ly/3hBAGzO>

Er. Khose Suyog Balasaheb on "Alternate wetting and drying: A water saving technology for rice cultivation"

Er. Suyog Khose is a Research Scholar, Agriculture and Food Engineering Department, Indian Institute of Technology Kharagpur and Co-Founder & Director of Agricultural Training Institute in Ahmednagar, Maharashtra. To know more view <https://bit.ly/3JoY9SD>

Mr. Nesibur Rahman Barbhuyan on "How to grow bamboo plants and their benefits"

Mr. Nesibur Rahman Barbhuyan is the Proprietor of Neria Live Enterprise in Lanka, Assam. To know more view <https://bit.ly/3gofBHU>

Mr. Abhishek Kumar on "Vegetable nursery growing, management and grafting techniques"

Mr. Abhishek Kumar is a Production Head at Karjee Farms in Ambikapur, Chhattisgarh. To know more view <https://bit.ly/3GGkWGA>

Mr. Venkataswami Reddy Surasani on "Agri Input one platform solution – Seed to harvest"

Mr. Venkataswami Reddy Surasani is Co Founder & Director of Kissan Agri Mall Pvt Ltd, Kurnool, Andhra Pradesh. His interests are on Agriculture, Agri Input Market, Agri Retail, Agri Produce Post Harvest and Agri Supply Chain

Mr. Muthu Raj S on "Turnkey project for millets-soil to food"

Mr. Muthu Raj S is the Proprietor of SVM Exports in Tuticorin, Tamil Nadu. To know more view <https://bit.ly/2TDJ8oL>

Dr. C. Subesh Ranjith Kumar on "Indoor plants – Plethora and parenting"

Dr. C. Subesh Ranjith Kumar is a Professor (Horticulture) at Tamil Nadu Agriculture University in Periyakulam, Theni District, Tamil Nadu. To know more view <https://bit.ly/3f2hB8B>

Dr. Satyen Yadav on "Indian millets"

Dr. Satyen Yadav is the President of Horticulture Produce Management Institute in Noida, UP. To know more view <https://bit.ly/2PNdGeS>

Ms. Roshni Agnihotri on "Indoor plants and their significance in indoorscaping in 21st century"

Ms. Roshni Agnihotri is an enthusiastic floriculturist and landscape designer at Dr. Rajendra Prasad Central Agricultural University, Pusa, Bihar.

Dr. H C Gena on "Rural livelihood development by IFFDC through watershed management"

Dr. H.C. Gena is the Chief Project Manager at Indian Farm Forestry Development Co-operative Limited (IFFDC) in Gurgaon, Haryana. It is a Multi-state Cooperative working in the field of Natural resources management particularly developing wastelands & marginalized lands through afforestation by promoting Primary Farm Forestry Cooperative Societies in Uttar Pradesh, Madhya Pradesh, Rajasthan and Uttarakhand States. To know more view <https://bit.ly/3jcPxDe>

Dr. Lachhman Das Singla on "How to run a successful dairy farm by managing parasitic infections"

Dr. Lachhman Das Singla is the Director, Human Resource Management cum Professor and Head Veterinary Parasitology in Guru Angad Dev Veterinary and Animal Sciences University in Ludhiana, Punjab. To know more view <https://bit.ly/3z91tdD>

Mr. Kodali Naga Pradeep Kumar on "Challenges faced in dragon fruit farming"

Mr. Kodali Naga Pradeep Kumar is a Farmer from Mulakalacheruvu Village in Chittoor District, Andhra Pradesh. His interest is on pink to pink dragon fruit farming, teaching and commercial business about dragon fruit crop.

Mr. Sikandar Meeranaik on "Climate change through resilient agriculture – Tree based farming"

Mr. Sikandar Meeranaik is the CEO of Sankalpa Rural Development Society in Hubballi – Gadag, Karnataka

Mr. Kulkarni HB on "All about vertical farming"

Mr. Kulkarni HB is the President of Federation for Re-farming Societies in Bengaluru, Karnataka. To know more view <https://bit.ly/3ByAKrA>

Dr. Mam Singh on "Open field cultivation of chrysanthemum for cut flowers"

Dr. Mam Singh is the Principal Scientist at ICAR- Indian Agricultural Research Institute in New Delhi. To know more view <https://bit.ly/3HTvfq9>

Dr. Rajeshnallaiah on "Value addition in moringa"

Dr. Rajeshnallaiah is the Director & CEO at RNR Agri Developers in Madurai, Tamilnadu. He is into providing terrace garden training. To know more view <https://bit.ly/3vvPKCc>

Mr. Ronak Mangroliya on "Sansevieria : Oxygen rich plant"

Mr. Ronak Mangroliya is a Ph.D. Research Scholar (Floriculture and Landscaping) at ASPEE College of Horticulture, NAU, Navsari, Gujarat.

Mr. Altaf Aijaz Andrabi on "Key honey processing units under Indian context"

Mr. Altaf Aijaz Andrabi is the Former Director at Department of Agriculture Kashmir in Srinagar, Jammu & Kashmir. He is presently working as Advisor at Laxman Roa Inamdar National Academy with NCDC ministry of Agriculture and Farmers Welfare Govt of India

Dr. V. Vani on "Post harvest technology and value addition in lime"

Dr. V. Vani is the Assistant Professor at Horticultural College and Research Institute in Periyakulam, Tamilnadu. Her interests are Food processing and preservation; Nutrition; Post harvest technology of fruit & vegetables and Quality control of processed products.

Dr. Chandrakiran Sant on "Sustainable dairy production to combat antimicrobial resistance"

Dr. Chandra Kiran Sant is the Dairy Advisor at Livestock Management Centre in Mumbai, Maharashtra. Dr. Chandra Kiran Sant is experienced in backward integration of dairies and livestock management : To know more view <https://bit.ly/3dAJWqg>

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For Second Year in Succession, Indian Agriculture Battles Climate Change

Large sections of the urban middle and upper classes take food security as a given. The weather events of 2022 and the possibility of similar experiences in 2023 pose a challenge to India's food security.

The wheat crop was smaller due to higher than normal temperatures in March 2022. Then there was a short-fall in monsoon rains in Uttar Pradesh, Bihar, Jharkhand and West Bengal, affecting paddy production. This year has also started with higher temperatures, right from February. If the effect of El Nino turns out to be severe, there may be drought-like conditions in some parts of India, affecting kharif crops and bringing enormous hardship to farmers doing rain-fed cultivation.

Last year, despite reports of a lower wheat crop, senior government functionaries were talking of feeding the world. This year, the prime minister has himself reviewed preparedness for sustaining agricultural production.

In February 2022, the Intergovernmental Panel on Climate Change (IPCC) Working Group II released its report, *Climate Change 2022: Impacts, Adaptation and Vulnerability*, by 900 authors who reviewed 34,000 scientific papers. It pointed out that India is one of the most vulnerable nations for crop production. Droughts and heatwaves will affect crop productivity and farmers' incomes. It pointed out that maize production in India could fall 25% if the temperature rises 1°C above the pre-industrial level. At 4°C higher, maize production could be 70% lower. IPCC modelling predicts higher rice and wheat prices that will severely impact economic growth.

The impact of climate change was visible in our neighbourhood last year, when unprecedented floods submerged one-third of Pakistan, causing death or injury to about 15,000 people and displacing 8 million. About 1.6 million hectares of agricultural land was destroyed or damaged. This climatic event has already caused food insecurity in Pakistan.

India must worry about the impact of hot February and March weather on the wheat crop, which give optimum yield in cool and moist weather. The optimum temperature for germination is 20-25°C. During the heading and flowering stages, elevated temperature can harm yield. During ripening, the optimum temperature is 14-15°C. If temperatures run above 25°C during this period, the grain has lower weight, because the plant wastes too much energy in transpiration. This is what happened to the wheat crop in 2021-22, and experts fear a repeat this year.

ICAR's Indian Institute of Wheat and Barley Research, Karnal, is the leading scientific institution for wheat. It has been issuing weekly advisories to farmers to mitigate the impact of hot weather. They have been advised to irrigate wheat crops lightly, and to spray 0.2% muriate of potash. In Punjab, Haryana and western UP, farmers are progressive and follow scientific advice, so yield loss will not be very high in the region.

Unlike last year, there is much higher media coverage and awareness about the adverse impact of hot weather on the wheat crop. Last year, wheat exports were banned only on May 17. By that time, many export contracts were

signed and traders and corporates had bought wheat to export. Global prices were touching \$500 a tonne due to the Russian invasion of Ukraine and stoppage of exports from Black Sea ports. This year, the export of wheat is already banned. The private trade would also be expecting promulgation of stock limits under the Essential Commodities Act. So, they may not be buying large quantities of wheat.

In this situation, the government may not find it difficult to procure 25 million tonnes of wheat it requires for Pradhan Mantri Garib Kalyan Yojana, under which wheat and rice have been distributed free since January 2023 to 2.38 crore AAY families and 71.06 crore priority household beneficiaries.

India is already impacted by climate change. In February 2011, the government had set up National Innovations on Climate Resilient Agriculture (NICRA) in the Indian Council of Agricultural Research, but it is under-funded. There is a need to provide adequate resources to face the challenge posed by climate change.

Siraj Hussain is former Union Agriculture Secretary and a Trustee of the World Food Programme Trust for India.

Source : <https://thewire.in>



DRONE TECHNOLOGY IN AGRICULTURE

Benefits and challenges for rural India

In recent years, drone technology has become increasingly popular in the agriculture sector. Drones offer farmers a range of benefits, including increased efficiency, improved yields, and reduced costs. However, there are concerns that farmers may be reluctant to adopt drone technology due to fears of job loss or a lack of knowledge and training. We can explore the benefits of drone technology in the agriculture sector and the challenges that may be holding farmers back from adopting this technology.

Benefits of drones in the agriculture sector

Drones can be used for a wide range of tasks in the agriculture sector, including crop mapping, soil analysis, irrigation, and pest management. Here are some of the key benefits of using drones in agriculture:

1. **Improved efficiency:** Drones can cover large areas of land quickly and efficiently, allowing farmers to gather data and monitor crops more effectively. This can help to identify issues early, leading to faster and more effective interventions.
2. **Enhanced crop yields:** Drones can be used to gather data on crop health, allowing farmers to identify areas that require attention. By addressing these issues, farmers can improve their crop yields and increase their profits.
3. **Reduced costs:** Drones can help to reduce costs by identifying areas of the farm that require attention, reducing the need for manual labour and reducing the use of pesticides and other chemicals.
4. **Improved accuracy:** Drones can capture high-resolution images and data, providing farmers with a detailed view of their crops. This can help to identify areas that require attention and ensure that interventions are targeted and effective.

Challenges of adopting drone technology in the agriculture

sector

While drones offer many benefits to farmers, there are also some challenges that may be holding farmers back from adopting this technology. Here are some of the key challenges:

1. **Fear of job loss:** Many farmers are concerned that the adoption of drone technology will lead to job loss, as fewer workers will be needed to perform manual labour on the farm.
2. **Lack of knowledge and training:** Farmers may not have the

knowledge or training necessary to operate drones effectively. This can make it difficult for them to adopt this technology, as they may not be confident in their ability to use it.

3. **Cost:** Drones can be expensive, and many farmers may not have the financial resources to invest in this technology.

4. **Regulatory barriers:** There may be regulatory barriers to the use of drones in agriculture, which could make it difficult for farmers to adopt this technology.

Is rural India afraid of losing jobs with the sole usage of drones or lack of training and proper knowledge holding the farmers back?

The adoption of drone technology in the agriculture sector in rural India is still in its early stages. While there is interest in this technology, there are also concerns about job loss and a lack

of knowledge and training. However, there are efforts underway to address these challenges and encourage the adoption of drone technology. One of the key initiatives is the Digital India campaign, which aims to provide digital infrastructure and connectivity to rural areas. This initiative includes a focus on training and education, which could help to address the lack of knowledge and training among farmers. In addition, there are a number of organizations and initiatives that are focused on promoting the use of drone technology in agriculture. For example, the Indian Council of Agricultural Research (ICAR) has established a Centre for Precision and Farming Technologies, which is focused on promoting precision agriculture technologies, including drones.

Read full @ <http://bit.ly/42oL3vG>

Source : timesofindia.indiatimes.com



Tissue Culture Products

- TC Banana (G9, Williams, Elakki)
- TC Pomegranate
- TC Teak (IFGTB Licenced Clones)
- TC Lemon
- TC Bamboo
- Floriculture and Ornamental Plants (Gerbera, Carnations, Gypsophila, Orchids)

Contact : 9980645151 / 9448009717 Email : hugugleblr@gmail.com

Dr. Hema Yadav

**Director
Vaikunth Mehta National
Institute of Cooperative
Management
Pune, Maharashtra**



Excerpts from the recent interview.

What is the distinct contribution that VAMNICOM is making in education today?

VAMNICOM has been fulfilling its vision of providing cooperative education & training and upholding the mandate of the Ministry of Cooperation which is to create awareness about the concept of co-operation, to attract people towards cooperative movement and develop a competent leadership for the cooperative sector.

The institute is engaged in the development of business leaders who acquire in-depth and updated management knowledge with managerial skills, values, ethics through various academic & co-curricular activities.

What have been some success stories of VAMNICOM alumni in recent years?

The institute has a very large and vast network with the 3000 alumni of Post Graduate Diploma in Agri Business Management (PGDM ABM), PGDCBM (Post Graduate Diploma in Cooperative Business Management), and DMCO (Diploma in Management of Computer Operations). The alumni of PGDM ABM are holding well established management positions in renowned organizations such as GCMMF, HDFC Bank, ADM, Syngenta and many more.

What kind of career and placement assistance does VAMNICOM offer?

VAMNICOM has been advancing the unique area of cooperation and agribusiness management, through a systematic academic and administrative environment. VAMNICOM has been adjudged as one of the top sectoral B-school in India and students have achieved a great leap in the summer internships and final placements.

The Live Projects in our curriculum allows the student to gain

corporate exposure and companies like Yes bank, NCDEX, NABARD have previously offered such opportunities to our students.

Top most National & Multi National organizations from sectors such as Agri-Input, Commodities, Banking & Microfinance, FMCG, Development, E-commerce, Agritech, Research & Consultancy & cooperatives have visited our campus.

Who are the prominent companies that come to your campus for the placement interviews?

The PGDM programme consistently has the record of 100 percent placement from its inception. The major recruiters are Agri.-Input, Agri.-Tech, Banking and Financial Services and Insurance, Commodity, Development, E - Commerce, FMCG, Retail and Research and Consultancy companies.

The 28th Batch of PGDM ABM have been placed successfully in companies like ADM, Adani Wilmar, Amul, Federal Bank, Bayer, UPL, NAFED, Reliance, HDFC Bank, DCM Shriram, Rallis India, NBHC, Biostadt, IIFL Samasta and more.

What is the profile of students joining your courses? What percentage of them enters the cooperative sector after their education at VAMNICOM?

The batch profile of students has diversity in the education backgrounds majority being agricultural graduates, 26 universities & 14 states. There is geographic diversity/Pan India presence in the students of VAMNICOM as they come from states like Andhra Pradesh, Karnataka, Kerala, Madhya Pradesh, Uttararkhand though majorly from Maharashtra.

Do VAMNICOM courses enable students to become entrepreneurs?

The PGDM ABM programme of VAMNICOM attracts students of various academic backgrounds from different

parts of the country. As a part of the course curriculum, students get an opportunity to understand the industry requirements through guest faculty sessions arranged regularly from industry. The preparation of project reports on an agribusiness area of their choice in the second year of the programme helps students to be confident in starting a new venture & lead a business team.

What percentage of your student are women? Is VAMNICOM taking any new initiatives to encourage more women to enter the cooperative sector?

For empowerment of Women, SC/ST and other Weaker Sections, VAMNICOM has conducted training programmes for Women, SC/ST and Weaker section on various facets of cooperatives such as Workshop on Prevention, Prohibition and Redressal of Harassment (PoSH) of Women at Work Place, Mahila Kissan Diwas Celebration, training programmes for the Women Members of Self Help Group on subjects like - Entrepreneurship Awareness, Book-keeping and Auditing, Financial & Digital Literacy, Value Chain Development & Business Model were organized.

VAMNICOM plans to conduct Training programs in collaboration with Ministry of Women & Child Development and National Level Workshop on Gender Budgeting, Women in Agriculture and Allied Sectors.

The establishment of Ministry of Cooperation has led VAMNICOM to boost the cooperative sector and produce more able managers through its courses and capacity building training programmes.

Have you introduced any new courses for the year 2023?

VAMNICOM is planning to conduct collaborative programme on Innovations and Agri business Management for the Junior Commissioned officers of Army, Navy and Air force. A course on Intellectual Property Rights was introduced for the PGDM ABM students.

Do you provide scholarships for children from lesser income groups joining your courses?

The Institute offers 25% concession on Tuition fee to the First Rank holders of Agricultural Universities in Agriculture and allied subject area. VAMNICOM forwards the application and facilitates release of Government of India scholarships

in favour of eligible students belonging to various social categories viz. SC/ST through their respective state Social Welfare Department.

Can you please shed light on recent research insights and publications produced by VAMNICOM teaching and research faculty?

VAMNICOM has full-fledged separate Research wing known as "Centre for Research and Publications (CRP)" and this Centre has undertaken Research Projects, Case studies / Success Stories, Publications of Research Articles / Paper publication/ Paper presentation, Book/Book Chapters and working papers.

What have been the main milestones in the growth of VAMNICOM in recent years?

The institute offers fully residential programmes, which calls for the finest educational infrastructure in the campus. Few recent developments such as the construction of a new hostel with 50 fully furnished rooms accommodating 100 students, renovation of the library, setting up of the lift facility in the CME building and preserving the serene and green environment, has led VAMNICOM upon on a fast-track expansion of the picturesque campus.

How do you visualize VAMNICOM evolving in the years ahead?

VAMNICOM visualizes to devise inclusive and cooperative incubation centre that builds social impact focused startups in Agriculture. We also look forward to Skilling-Mentoring-Handholding and Incubation of the startups/ enterprises rolled out by the startup founders/ entrepreneurs/ farmers/ students/ grass root innovators.

The scaling up of Cooperative Education & Skill building for the youth & women will also be a priority. Through this designing more training programs on Social cooperatives and business ideation to enhance managerial capability for Cooperatives. VAMNICOM also plans to focus on proposals, certificate courses on business planning & agri exports.

CONTACT : Dr. Hema Yadav, Director,
Vaikunth Mehta National Institute of Cooperative
Management, Pune, Maharashtra
Email : cme@vamnicom.gov.in



Talking To

Amanpreet Singh

**Co-founder of GrainAnalyser
An Agtech Start-up
Bathinda, Punjab.**

He discusses about the changing agriculture ecosystem and the use of AI in the grain value chain.

Grain Procurement is largely driven by the government institutions such as FCI, Nafed and State Civil Supplies besides this Private players in Manufacturing too have created a sizable chunk.

Government institutions are largely using AI driven technology, geographical information system or crop advisory solutions, AI or IoT on farmland and value chain. There are many startups which are competing with each other and entering the market under the pretext of offering solutions to digitise the procurement of grains, focusing on lowering food wastage in the value chain. There are two more not much noticed segments, FPOs and FPCs which are untouched by large markets and supply chains firms. There are more than about 3000 FPO's registered, 1200 FPOs doing active business, and the government is planning to create a 10,000 strong FPOs network and activate them through various SOP's. The FPO is a farmer group created to an ease of work for farmers by creating channels for forward and backward integration which in turn assists in generating higher incomes.

Now we see a lot of FPO integration happening through Institutions like NAFED and few Startups like DeHaat, Cropin as they are offering a variety of services and integrating a few hundred of them. The concentration is high in states like UP, Bihar, Rajasthan, Maharashtra, MP, and AP. The FPOs lack financial support which is the basic problem for the farmers. Government is creating structures called CBBO/Consortiums with formal arrangements to handhold the FPOs. Warehousing companies like Go Green Warehousing in Ahmedabad have been appointed as a CBBO for FPOs based in the Northeast. Buying from them is easier due to plenty of eMarketing portals and apps which have made the process smooth. The farmers tech adoption is slow due to the cost involved and information dissemination of low cost solutions. GrainAnalyser offers a low cost solution with free access to be given to FPOs for a few months. FPOs are not very oriented as of now, but the government is pushing for grants and programs for startups to introduce farmgate/warehouse gate technologies to reach the farmers and promote ease of use.

Lot of orientation is happening in green segments and spices



such as cardamom. Creating traction for technology becomes easy as FPOs look at technology adoption which is a high value. Maize is a value chain segment where a lot of traction is coming. Institutions like corporate and startup business have become slightly sluggish. Startups are in competition with us, many offering technology in the pre-harvest advisory, IoT use on the farm land, various forms of farming, and hydroponics is also using technology. We have post-harvest also where technology is used for selling commodities and produce. We have startups like Arya.eg which are bridging the gap between the corporate like ITC, Britannia, and others which are buying agricultural produce from the mandis and markets. So there is a need for technology there. Buying from markets or farmers is made easy for the corporations. Corporates have trading teams, managers, and branches across the country from where they can buy the grains, use the network to buy and store in warehouses managed by Warehouse Service Providers (WSP).

Many warehousing companies use technology to create digital records of quality, to reduce any dispute in procurement, commercial settlement, and try to create technology which could assist food grains storage for a longer period till rightful realisation is available without any damage to the grains. A lot of traction is coming in the large commodity players. ITC was the traditional market of buying, and we have shifted from it to the new way of buying, we are also into the crop input and output advisory with their app. It is a step forward to enroute farmers and FPOs into their platform, have direct interaction, and find out what is available or where we can buy.

eNAM is the initiative of the government of India wherein they are trying to create digital connections to all the mandis, APMC. We have a new pact, eNAM, and like eNAM, business houses like ITC and Britannia are making changes in their process of buying. They are gradually coming down to create a shift which will increase gradually. When our firms



like NAFED are buyers of the pulses and seeds from Government of India adopted digital technology 2 years back, and the government of India started using digital technology by 2020. There are intricacies as the technology is not very easy to adopt and concerns about accuracy, use of electronics etc which firms like ours are trying to remove. FCI is the largest buyer of food grain in the country and is adopting technology which is new. They are buying intelligent moisture metre, spectroscopy to analyse molecule moisture. We are looking for IoT adoption as FCI and other warehouses faced issues in storing, logistics, maintenance of produce, and wastage. So FCI and the government of India are adopting new technology which can remove the manual misappropriations and other issues. Technology is going to automate and digitise the records.

eNAM has about 300 to 500 mandis which have the supplies of new technologies while about 1200 mandis have been electronically connected. These Mandi's were governed by the APMC earlier, and now eNAM is a platform where a farmer or an agripreneur or a producer can login as a buyer or seller from anywhere. The eNAM rollout which enable Agtech Startups to sell their technologies to Mandis is painstakingly slow due to allocation of budgets for adherences.

We are trying to explain on how to go about in these markets, how we can create a change to reduce food wastage in the value chain by creating traceability and digital records of the ecosystem. Use of technology can give the right estimate of harvesting. We are trying to offer technology to seed breeding firms so that they can estimate the time of harvest of the particular variety. We have already enrolled a few clients like Bayer, Limagrains, Corteva to use their Seed Breeding technology.

We are also into the grain and horticulture segment where we are trying to offer physical and chemical assessment of grains. The physical parameters are moisture, physical attributes in the grain which are important. When we go for the value chain, interacting with the flour millers, we have a lot of other parameters which are vital as for them extraction of other sub products are important. So using physical parameters will not help them. So they have to use spectroscopy and wet chemistry to understand the internal parameters.

Animal nutrition is another segment which is growing very well. There is a shortage of green fodder, and so alternatives are being looked for across the globe to address the need of the animal feed, especially when we talk about organic animal feed in the non complex category. Complex feed category has been a huge market since the last two decades, and many companies are making the feed using the plant directly after a small process. Forage is the solution out of the fodder, maize, wheat, and sugarcane, and we can make feed out of it to sell. Soil testing is another thing we are coming up with, and we will be offering portable soil testing technology soon. Some startups have come up with portable and affordable solutions. We are testing a kit which will be priced suitable in the market. Spectroscopy, mobile imagery, and IoT are some technology initiatives we try to use to address food wastage. We try to understand the geometric structure of the grain, colour, and many other things apart from the variety of the grains. Chemical capabilities of technology test moisture, chemical attributes in mustard, moisture, oil and protein content. We have 4 people in our team, and some more to help in the technology based in South India and a major part of our IT team is outsourced for certain projects.

What is the use of artificial intelligence you see in agriculture in the near future?

We have a lot of traction in pre and post-harvest. In the pre-harvest, use of GIS data has been refined over the last couple of years. There is a huge dependency by government of India with restrictions which are trying to project on the crops. Crop advisory is covered by the GIS. This and the usage of IoT have taken initiatives to get census and interact to the dashboard to get valuable input. So you are deploying IoT devices. The startups try to assess use of water, fertiliser, temperature of the soil which are vital ones and target optimum utilisation of resources in the farming. Drones and robotics are another segment coming up very well where lot of seed breeding companies are using drones to capture images for delivering, spraying fertiliser and pesticide. In the post-harvest segment, use of farm equipment is also done using a platform. Using a tractor may not be feasible for a farmer, but it can be made so if the tractor is available on rent and digitally. He does not need a smartphone for this but can use his numerical phone and request for it. There are a few firms doing this. Technol-



Talking To

ogy is also used for extraction of grain, farm equipment, trading of the grain, and selling of produce. Startups are coming up with dashboard and offering procurement markets so that you do not have to carry the produce to the specific mandi and decide what kind of realisation the farmer wants to have. Many firms buy the produce from the

and we have many technologies entering into the pre and post-harvest segment of agriculture.

What are some technology solutions you can think of to solve the labour shortage faced by farmers?

Mechanisation can do it, but it is not economical. We have to come up with a solution which can sow, till, and help in understanding what is happening on the canopy of the plants. The government can make it possible with rental models already in place with startups like EM3 and others. It will be easy for small farmers to use the technology where labour is a problem.

Can you give us some examples of successful farming operations in India that serve as a role model for other farmers?

Farming has grown in states like Rajasthan, MP, Maharashtra, AP, Telangana, Karnataka to some extent, and in Bihar too. There are many schemes to make farmers and farming sustainable. Each geography has different problems or perspectives to solve. There is no one solution to the problems. When we look at things keenly, we would say farmers who have done multiple crops, adhered to crop rotation have seen phenomenal results, but again you cannot guarantee that as there are lots of changes in farming. So there are lots of concerns.

When you go for one crop and stop crop rotation, it leads to glut and does not get you the price. Now slowly all the farmlands and farmers joining and aggregating and FPO will deliver the desired results in the near future. It is going to be a successful model. It is already happening, but India being a large country, and many of our farmers are small and marginal farmers, it is a typical Asian model where the farm holding is small and marginal. It is therefore going to take time, But I am sure there are going to be a lot of examples to talk about, but it will happen gradually only.

If given an opportunity to meet with the Prime Minister, what suggestions would you make to improve agriculture in India?

I would suggest crop rotation and adhering to multiple crops will help us solve the problems. We can pull Northern states out of wheat and paddy cultivation and make them grow other crops like soyabean or rapeseed. Understanding the global perspective and crop rotation should be discussed, and we need to bring these crops and millets on the roll. It will help the country. We are taking steps with a few inputs which I think will do wonders. The promotion of crops like Millets too is a great step towards crop rotation.

Please tell us about yourself and what made you start GrainAnalyser.

I have a wide work experience in FMCG, Agri and Rural Banking, Agri Warehousing and Agriculture Technology wherein I've worked with brands like Coca Cola, Unilever and Marico, ICICI bank's core rural & micro banking, NBHC, AgNext. While in the Bank, I have worked to serve farmers, aggregators, processors, and corporations and others with multiple products such as tractor loans, Working Capital Loans, Warehouse Receipt Finance and a host of other Farmer, Processor and Value chain loans. My tryst with Agri business started with ICICI Bank in 2005. Post Banking I've worked in warehousing collateral management, trade facilitation etc. With this rich and varied experience, I hope to create technologies for the agriculture value chain and in this pursuit GrainAnalyser was launched in Oct 2020 to make technology available at Farm and Warehouse gate.

CONTACT :

Mr Amanpreet Singh
Founder of GrainAnalyser
Bathinda, Punjab
E-Mail: amanpreetsingh@grainanalyser.com
Telephone: 9100089099



farmer, act as aggregators, get the right price for the farmer so that he does not lose and get some profits. The firms are trying to create digital records of the produce which can be assessed, valued, and sold at profit. The technology can be mounted to the mobile phone, click the image of the produce, and create a digital record. eNAM has large scanners which are expensive, so we are coming up with a scanner which is easy to use, create 90% accuracy of grains for getting better price. The call has to be taken on the commercial perspective,



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Yogesh Rajkumar

Founding Member - Farm Exim

Mr Yogesh Rajkumar, founding member at Farm Exim, with a plethora of business capabilities, talks extensively on how FPOs can be the future of Indian Agriculture system. FPO is a group of farmers working as an organisation. FPC is registered under Companies' Act and FPO under Cooperative Societies' Act. FPOs can benefit small and marginal farmers who make up about 86.2% of the total Indian farmers. They have only 2 hectares of less of land.

For the small farmers, farming and extension services and technology adoption are very low because they are small farmers and do not have sufficient capital and lack business skills. They are unable to trade and build infrastructure to have market efficiency where the produce can be sold for a better price. This was the scenario till a few years before. But now many innovative institutional models are working as FPOs. NABARD has done a wonderful work to encourage FPOs to help the small scale farmers. Other government institutions like SFAC and NGOs are helping FPOs to fare better.

About 10 thousand FPOs have been started in the last decade, and NABARD is promoting 50% of the same in the last 8 to 10 years. The rest have been developed by NCD, SFAC, and other agencies. There are a few successful FPCs like Amul. Sahyadri Farm is a group of almost 8 thousand farmers, and they are doing wonderful exports to other countries. This is the power of FPO, and we need to get maximum benefits from the FPOs.

My vision was to start a company called Farm Exim to facilitate exports and other aggregation in the farm level. But I could not do much because there are many challenges in the ground level that only FPOs can solve. I am currently handling about 6 FPOs in Karnataka.

Earlier it was very hard for the farmers to get seeds, fertilisers, pesticides, related trainings, and other things. After FPOs started forming, I can see the difference and benefits now. From FPOs we order seeds in bulk, the traders supply to FPOs, and we get better rates. So we are able to reduce the cost of production. Earlier, individual farmer had to take the produce, go to APMCs, and sell. Now any farmer or FPO can sell anywhere which is a boon for all.

For example, to get a complete load of coconut, we had to visit the farm, and the marketing cost was increasing. We had to wait for the farmers to bring the coconut from different farms, collect in warehouses, and then send to different places. But with aggregation of produce made possible, we are sending to the FPO directly which drastically reduces the transport cost for the farmers. This extra cost is taken by the farmer as his profit. Thus we can increase the farmers' income through FPOs.

Earlier, technology was not being used properly. Now small and marginal farmers also have adapted technology. Also there was post-harvest losses. Out of 2 tons of coconut, after grading, quality checking, and other issues, he was getting only 200 kgs which could not be delivered. But now we are giving 25 tons to FPO and after segregation, they get 2 tons minimum. We are able to sell the products to processing industries at a price of Rs. 35 per kg, and the extra amount is given to the farmer. Thus we are able to help farmers get additional income.

There are many innovative companies like Green pod labs which are working on increasing the shelf life. Apps like FASAL & CROPIN to tell the farmers about the weather report; the spray to



use, how to control insects, how much percentage is affected, and the moisture of the soil are being used. We have to use the technology to improve the quality of products for export because in the international market, right now we have only pomegranate, Banana, Grapes and onions as leading but we have to include other products too. Agriculture depends on factors like weather, soil, and other things, and we need to understand the data. Individual farmers may find it difficult. When we use the technology, we can increase the quantity of products being exported and get higher price which will benefit the farmers. It was difficult for a trader or exporter to communicate with the farmers, but now FPOs will take the data on everything. Traders and companies have now understood the concept of FPOs, and they are approaching FPOs to work with. Communication has become easy, and companies can trust FPOs better and contact them.

There are a number of sources for finances coming forth to FPOs. With good turnover, banks are open to in-



vest and give necessary capital, and NABARD is coming up with good schemes. We are able to bargain with the agencies, seed companies, and traders. In our Nanjangud FPO, we are mobilising 300 farmers, taking inputs in bulk, and bargain with the traders who do not have to worry as they are supplying in bulk to a single place. Thus the farmers are able to get more benefit when they get good price.

Indian FPOs are still in the nascent stage, and we are working hard in the last two decades to improve the scenario. Many good FPOs are coming up, but out of the 10 thousand FPOs only a few are working well. Sahyadri Farms is a good model for all FPOs and FPCs in the country. There are currently 8 thousand members. Technical holding support is needed as we have to distribute the funds to many farmers. That kind of support and using the data in the right way are lacking, but there are many companies working on it. We are unable to increase the turnover and have enough capital to build infrastructure, get machinery for sorting and grading, and to have buildings. If we have to use human power to check the produce for grading, we will be paying heavily for that, and quantity will be less, and quality of work may not be there. The government is working on this problem along with many other companies to provide good sorting and grading machines. We are also looking forward to get cold chain storage.



NABARD says that if we can get a sustainable FPO system, we can get credit guarantee, capacity and HRD building in a better way, and get the farmers trained in a better manner. Marketing becomes easy then. We can give to B2B, exporters, and to processing industries, which can be achieved by marketing people in FPOs. Government has initiated many infrastructure schemes, up to 35 to 50% for the warehouse, cold chain and other things. We need to use them and work in the eco system, then FPO can work in

a better way. We also have to train the farmers on direct selling and sell in retail chain also. We lack technical services, but in the last few years, people are adapting inputs on business planning, advisory, agro services, warehouse receipts. Banks, NBFC, and NABARD are also giving better credit guarantees.

NABARD is working as a nodal agency who have two major parts. Producers Organisation Development Fund where we are getting most of the funds allotted to make use of and Producer Organisation Development and Upliftment Corpus and other government schemes are developed for the FPOs. NGOs like Isha Foundation are also helping to develop FPOs.

They have developed 25 FPOs in Tamil Nadu and are volunteering for the same. Since the farmers are not educated, marketing is done by FPOs. Isha Foundation is connecting NABARD and farmers to bring in a sustainable FPO model, and there are about 100 volunteers helping in marketing and mobilisation, talking to directors, connecting the B2B segment, processing industry, resolve with packaging and many other things. So in the future, we hope FPOs can work in market linkage, better quality, benefits for farmers, and good role in international market.

There are many companies that help us in technical services and invested in logistics. With improvement in infrastructure, we can reduce the time for transport very much. We can deliver fresh goods to different parts of the country. Floriculture and spice industry are coming up well. We have to work collectively, and the government is making changes to its policies to the benefit of farmers. The formation of FPOs can be done easily with 5 directors and not much of initial investment.

Can you share some details on how many FPOs are there in India now, and what percentage is running successfully now?

There are about 10 thousand FPOs, and 50% of them are promoted by NABARD. But only 5% FPOs are working well. NABARD is helping the rest with training facilities. We hope all the FPOs will start working well shortly.



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What is the difference between FPO and FPC?

FPO is a model. It is a trust run with donations. The benefits from both FPO and FPC are the same. For the FPOs banks will not fund. It is a kind of trust run with donations. You can see the difference between the two as in the case of Companies' Act and Cooperatives' Act. Based on that they work. But the schemes from the government for both are the same.

How can FPO guarantee for quality to export to USA and UK?

FPO is the first stage. For UK and USA markets, we need to have Global Gap Certified Farms. Many countries have banned some of the pesticides that we continue to use. Indian government is also banning many such molecules in the coming days which were not good for picking up international trade. USA and UK have different quality parameters. It depends on the soil, irrigation system, aspects on how we do, and these are the parameters for the Global Gap. If you read the details, you will know where we lack and where we are heading to.

How can FPO help contract farming?

Processing industries depend on the lowest rate. FPO can guarantee the contract farmers, but with farmers not being so adaptive to go for contract farming due to price fluctuation, we have to work on it. I, having done contract farming, have faced many problems as there is overlapping of supply of produce. Only a few FPOs work well with contract farming.

Please tell us about yourself and what made you to start Farm Exim.

I was working in an institute called International Institute of Import and Export Management. I am good at product selection and market selection and finding buyers in the international market. But I wanted to solve the challenges in the unorganised sector. I took up the initiative with the government to stop marketing of artificial flowers from China, and many states have followed it. I want to give my time and energy to agriculture which is unorganised in India.

What are the achievements of the FPO you have started?

I have connected with a few FPOs with Isha Foundation, and I am a volunteer in that. I have done projects like Cauvery Calling, Safe Soil Conscious Planet. I am able to see farmers selling at a higher price, getting collected, and becoming more confident about FPOs. They are joining hands now.



Is starting the FPO easy? What are the main hurdles you faced to make your FPO a profitable venture?

I had a few volunteers in the beginning to take up the challenges. Farmers would not believe FPOs would work, their practices, and I had to make them understand the model and how it can benefit them to get more income. Only then they started accepting FPOs. We have many problems right from mobilisation to selling the produce. Farmers do not

know about packaging or segregating and making them understand was a challenge. Now pepper production is there where they are unable to use grading machines. We are talking to the directors and FPOs. Once it is done, we can sell them to retailers, b2b segment, and processing industry. We are facing challenges to make them accept the use of machinery.


Any investment is needed in FPOs?

Farmers invest about Rs. 1000 initially, and NABARD is investing the same amount for marketing and other activities to run the FPO. If we can make good turnover, we can approach banks. NABARD is also giving up to Rs. 1 crore for building infrastructure. So not much investment is needed.

CONTACT : Mr Yogesh Rajkumar


Email: nithu.yogi@gmail.com, Phone-8884111995



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Organic Farming



Dr. Manoharan Krishna

An international organic agriculture scientist, agripreneur, Vellore, Tamil Nadu

Dr. Manoharan Krishna, an international organic agriculture scientist, agripreneur from Vellore, Tamil Nadu, is the Founder and Chairman of Naturaa Agrorganica. He explains how a scientific approach to agriculture can bring huge benefits to the farmers.

How can a person become organic agripreneur? Agriculture, as we all know, is the oldest technology made by man ever since several millions of years ago. It has today taken such a marvellous shape and reached a level where we can control each and every development of anatomic part of our body by consuming Agri produce with specific nutritional values and cure various diseases evolving every day now.

Coming from a family background of farming, I have seen since childhood how to practise orthodox and well developed organic farming. When we compare organic agriculture and chemical agriculture, there are different types of challenges the world, the living beings, and environment face. The chemical agriculture is the type of agriculture made by man using synthetic materials like fertiliser, soil conditioner, crop protecting agents like insecticide, pesticide, plant growth regulator, and preservatives using chemical routes for the purpose of cultivation. Indian ancestral Agri system has been practising only the naturally available ingredients

like soil, cow dung, plant material, compost materials, and scientifically made bio compost with the help of natural ingredients like cow dung, goat dung, plant materials collected from various sources, and the slimy mud which gets carried over by running water from rivers and canals. So these are dumped in one place, either by anaerobic or aerobic system, decomposed where various microbes are converting the materials into enriched ingredients to enable plants assimilate them.

Now when we want to compare the organic Agri produces with chemical products, by consuming continuously the chemical route Agri produces contain toxins. These toxins are derived from synthetic materials for the purpose of cultivation whereby some intermediates through biodegradation, or photodegradation, or aerial oxidation get accumulated or saturated in the plant tissues and materials which we consume, it can be flowers, fruits, or leaves or grains. These intermediates when we consume go inside our body and create different type of problems such as nonacceptance, breathing, digesting, and ulcer problems, cancer, reproductive, and blood related and cardiac problems.

That is why the entire global agriculture fraternity is moving towards organic agriculture. Any organic agriculture farmer or trader or marketer or consumer have to be orthodox, genu-

ine, and religious in practising only naturally available materials. So you all know that the organic agriculture cultivation is more difficult these days as it is difficult to get natural ingredients. A farmer having 10 acres of land can use of 2 to 3 acres for producing green manure or green bio-decompost which is called bio-enriched farmyard manure. Various types of naturally available plant materials and the slimy mud or floating mud or silt can be composed altogether by dumping in an open yard and allowed to decompose naturally.

Then it can be mixed in an appropriate way using pungan cake, ground cake, and coconut cake along with the plant material. Whatever bio compost, cow dung, animal waste is available nearby can be converted in the ratio of 20:20:20. To this we add some nutrients for the microbes to grow, especially azospirillum, Trichoderma viride, phosphobacteria, thiobacillus are things that mobilise nutrients primary and secondary which are available in the soil and make the nutrients available for the plants, and the plants will assimilate the nutrients as and when required.

Plants have 4 important hormones – auxin, cytokinin, gibberellins, and ripening agents. The inputs that we give should be according to the requirement at that time for the plants. If plants are newly growing, they may take auxin hormones more. For that you need nitrogenous rich manure. And when it

grows more, it will need phosphatic and other mineral rich components which are available from the decomposed plant materials. When we use crop phosphate and nitrogenous rich soil available in the earth, it gives all the essential nutrients like calcium, magnesium, zinc, and potash. These are very critical parameters for the plant growth. If we do not provide these, the growth of the plant will not be as per the yield requirement.

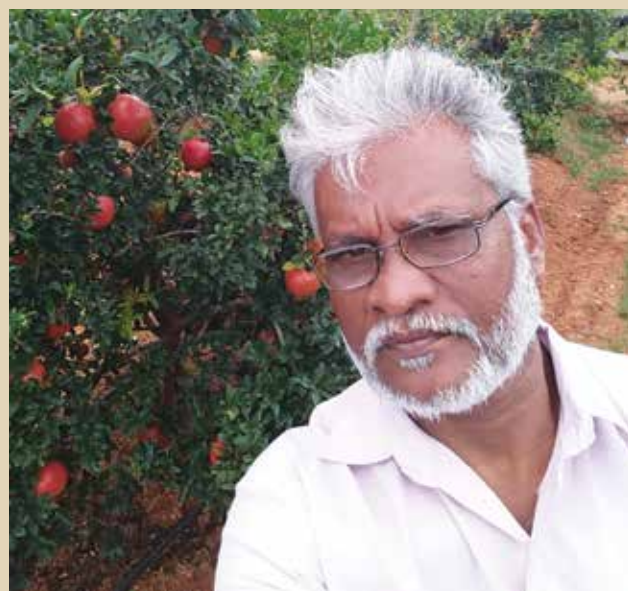
So this is the real crux of the organic agriculture across the world today. As many as 157 countries such as Indonesia, Thailand, Cambodia, Malaysia, and even Sri Lanka are practising organic cultivation now. We at Naturaa Agrorganica International Farms in Vellore

culture which we also call as exportable organic cultivation.

A person who practises right from soil pH, agro science, agro tech, and techno-commercial aspects and sustainable agriculture, we call the process agripreneurship. If he wants to be a domestic organic player, he has to produce as per the requirement of the country where about 10% of the 130 crores people need organic agriculture products. If he wants to be an exportable person, he has to fill the requirements of the importing countries where there are specifications such as use or ingredients, residue level which should be acceptable level should be followed. By utilising National Listing 101 as per USDA, they have stipulated

mangoes, grapes, and we go for important nutro-organic components like spirulina and ginseng components like black turmeric, blue and black ginger, green ginger, and lakadong turmeric which help in sustainable agriculture.

An organic farmer when he cultivates single crop in an acre, he may not get the success as per expectation due to various natural calamities. Instead if he goes for multilayer multi-crop system, such as coconut trees in between them he can go for pineapple and vanilla depending on the temperature range blue ginger, green ginger, black turmeric, lakadong turmeric etc. He can go for 5 to 6 crops by giving adequate water. When he goes for 5 or 6 crops multi-layer multi-crop system, the sunlight



have 260 acres of land where we are cultivating and developing technology suitable for tropical countries and medium range tropical countries such as Vietnam, Cambodia, Philippines, Laos, Malaysia, and Indonesia. These crops are suitable for Sri Lanka, India, African Countries, and also South American countries.

The farmers of today have to become techno-commercially successful. Any agricultural activity should get maximum realisation as per today's global market. This gives you success and revenue and the sustainable organic agri-

the list they require for importing, and if these are followed it is easy to export.

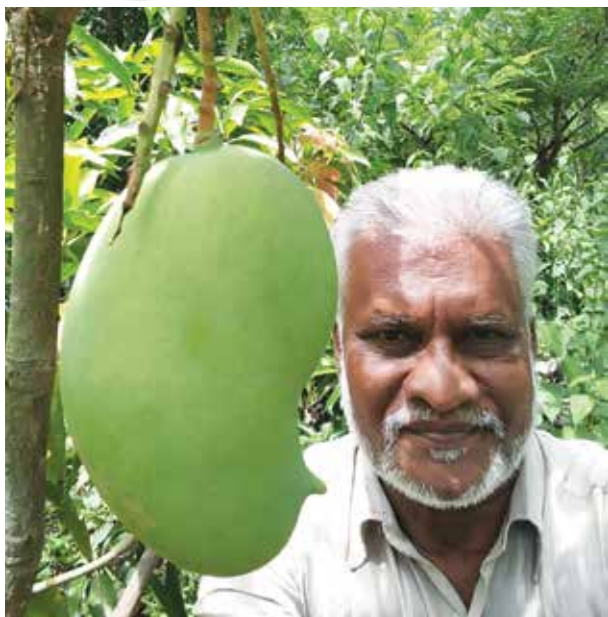
The farmer who is making agriculture as per the local agro climatic conditions, parameters of soil, water, rainfall, ventilation, sunlight availability and intensity of sunlight temperature, should select the crops according to these conditions. In Vellore, in our Naturaa Agrorganica, we have exotic fruits like pomegranate, dragon fruits, vanilla, gooseberries, red banana, and about 40 to 50 varieties of fruits, red banana, avocado, different types of pineapple, 18 varieties of international

absorption is more when compared to sunlight falling on earth. As a result, water evaporation is minimised. So he can go for watering once in 10 days using drip irrigation or sprinkle system. In organic farming we found that growing trees in the border minimises the insects attacking the crops because they like the natural food from the forest than coming inside and attacking the crops.

So we are adopting this technology in 47 countries now. It gives us more than 3 to 4 times income. If a farmer grows coconut tree, pineapple, green ginger,



Organic Farming



reach agripreneurship or global agripreneurship status. The challenge in this field is the type of crop one chooses to grow and the value addition to be done with the existing crop. In our farm, we have about 50 acres of Indian gooseberries. We can sell them at Rs. 15 to 20 per kg in India. But 100% organic gooseberries can be exported to Taiwan in tonnes.

We are sending about 200 to 250 MT of gooseberries every year. Now we have come out with an innovative idea. Why should we send gooseberries in cold storage with a travel involving 18 to 19 days or even 1 month. So we semi dry them here under solar drying system, aseptic system or dust free system.

One tonne of fresh gooseberry is equivalent to almost 400 kg of dried gooseberries. If the fresh one tonne gooseberry occupies 1500 kilo litres, when it is dried, it becomes half of the volume, and transport and logistics expenses will come down drastically. Once it reaches Taiwan, they subject to super critical, or solvent, or aqueous extraction, taking the concentrate and using it for energy drinks. Scientific techno-

commercial approach of agriculture gives a person chance to become global agripreneur with a successful venture. We have established 260 acres of land with 450 types of crops, various types of fruits like banana, mango, custard apples, pomegranate, different types of pineapples and mangoes. We do not use the conventional variety of mangoes for cultivation. We select premium varieties like Imam pasand, kesar, Amrapali, malgoa, malda and other enriched flavour containing varieties like Hapus. This fetches very good realisation in foreign markets when compared to sending ordinary mangoes.

In a nutshell, a person who scientifically practices organic agriculture can become global agripreneur. He can make Rs. 3 lakhs net profit per annum. We are touching even Rs. 10 lakhs per acre sometimes per annum, especially in the case of pomegranate and dragon fruits we are fetching very high realisation and net profit.

CONTACT :

Dr. Manoharan Krishna
International Organic Agriculture
Scientist Agripreneur and
Businessman
Vellore Tamil Nadu.
Email : krishmanoh99@gmail.com
Tel : 917826013934

langdok turmeric, and black turmeric, he can get additional income. This is because of not only agroclimatic conditions, but also we have manmade an agroforestry and canopy type of multilayer multi-crop system that gives a successful entrepreneurship oriented agriculture. A person who takes up this techno-commercial activity of agriculture is called agripreneur.

If someone wants to become agripreneur, he has to reorient and re-optimize the entire culture of cultivating process by which he should be able to produce as required for global market. We are producing 100% organic dragon fruit from our farm which we are not selling in India. We sell in Mongolia, Russia, and Serbia where they have not seen the plant or the fruit. This is a typical example of how agripreneur should use his agriculture scientific knowledge, agro technology knowledge, and techno-commercial aspect of total agriculture which is important. Followed by international marketing, in Indian market also we can have our role and make sustainable agriculture.

This type of multilayer multi-crop should be followed by everyone to





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President of Horticulture Produce Management Institute, Noida, Uttar Pradesh

Talks about the value of Indian millets in our daily lives.



India Millet Initiative (IMI) was promoted in early 2022 by HPMI to celebrate International Year of Millet Year 2023. It was promoted with the technical support of Agriculture University, Jaipur, India. India Millet Initiative joined hands with SKN Agriculture University, Jobner, Jaipur through two Memorandum of Understanding to promote the Nutri Cereal Crops in India as well as in potential countries for market access to support the farmers, producers and to promote biofortified Pearl Millet variety RHB 234 which has 100% morae iron and zinc.

The breeder seeds will be produced from pure parental lines which will be further multiplied for foundation seeds and certified seeds to be given to farmers for producing bio-fortified crop for further value addition.

Everyone knows how good millet is to lower cholesterol level, hypertension, and diabetes because of the low glycaemic index. It is easy to digest too as it maintains alkaline pH even after consumption. The Government of India has announced 10 nutritious cereal

crops, out of which 3 are major millets - sorghum, pearl millet, and finger millet. The 5 minor millets are foxtail, Proso, Kodo, Barnyard, and Little millets which are known in different names in different states. The 2 pseudo millets are Buckwheat and Amaranthus. The buckwheat is consumed during fasting time in India.

Millets have most of the macronutrients such as protein, carbohydrate, Vit B6, dietary fibre, omega 3, omega 6, Vitamin E, trans fat, saturated and unsaturated fats. Micronutrients such as Vit D, calcium, zinc, potassium, iodine, thiamine, cobalt, Vit E, Vit B 6, magnesium, manganese, iron, selenium, folate, B 13, niacin, Vit A, K, C, phosphorous, cobalamin, and chromium which are very critical micronutrients not found in most of the other crops and cereals. Hence we call millets as power house of nutrition.

The crop cycle for wheat and rice is long, while the millets are short crop rotation of 60 days and need 1/4th of water only. They can sustain temperature up to 65 degrees. So they are climate resilient crop. But there is a huge

gap between demand and supply. The crop was suppressed to promote wheat and rice all over the country. Lots of subsidies, incentives and promotion were done to push wheat and rice and therefore farmers ultimately stopped growing coarse grains in spite of the facts that they used to eat millets as a routine food in rural areas.

Now it has become rich man's meal as it is expensive due to the values and virtues of millets known to all. It has to be promoted properly now to create more awareness and to consume more millets. Then the demand will increase, and the farmers can be pushed to grow it.

Millet farmers get good price for their grains as well as for the biomass for fodder and hence they get almost double income. The farmers have to understand the market matrix and about the high quality seeds, fortified seeds, and high yielding seeds. The government of India is now promoting different kinds of millets, creating awareness, generic promotion, and many other things. The UN is also pushing it, and that is why 2023 is announced as International



with the help of the support system from banks, government, Department of Extensions, ICAR, and other agencies. The value addition centre can be promoted with the help of corporates as it is an investment-oriented project which needs investment. There can be a SPV between the corporate and FPOs. Millets can be procured through FPO and through value addition centre, high value added products can be processed, and they can be sold through direct marketing which will give employment as well as self-employment opportunity to the youths. We also have a model "Millet on Wheels", in addition to kiosks and e-Rickshaws to market the value added product which will offer job opportunity to people in need of livelihood, and people can get good quality and highly nutritious food easily.

Another model is for the government sponsored schemes. The government can decide

Year of Millets. The three sustainable goals supported are No Poverty, Zero Hunger, and Good Health and Wellbeing. These are directly related to millet crops. We know India is running world's largest government sponsored schemes such as Mid-day meal, Integrated Child Development through Anganwadis, Malnutrition and Poverty Alleviation and government has issued notifications that millets should be introduced in the schools children's meal program, but it is not happening as people are not planning how to make it happen. The government should implement millet scheme in schools through various programs. Thus eradication of malnutrition can be addressed with the help of high value nutrition in millets. The farmers should be motivated to produce more millets.

The small model, I propose to integrate from seed to plants

the protocol and recipes for school because millet is not easily consumed. People do not know the various options available. Various institutions have written recipe books to suit the palate of children and others. It will take millets a long way. Another model is where the government agencies can join with the startup processing units, self-help groups or farmer interest groups to promote SPV and implement the program. The fund can come from Government of India and states. The products can be delivered to beneficiaries through SHGs or different small farmer interest groups or women empowerment groups. South-western African countries like Niger, Nigeria, Mali and India produce 98% of the millets of the world. It is expected to offer food security options by 2030 or beyond. In India, Rajasthan is the largest grower of pearl millet, South India minor millet, and UP, Karnataka, and Maharashtra grow sorghum. Tamil Nadu and Karnataka are growing finger millets and minor millets.

Post Harvest management is very important as it reduces the losses due to aflatoxins. If post-harvest is not handled properly, the moisture content will reduce the shelf life. Post harvest technology is not available at the moment in India. We have requested for technology from International Institute of Tropical Agriculture, Ibadan, Nigeria and trying to bring the same to India. It is called Aflasafe which ensures aflatoxin free grains. So this leads to rejection of exports of grains.

The main challenges in post-harvest are proper storage, inadequate storage, inefficient technology, lack of knowledge, economic constraints, and value addition. In Africa, people are using the old storage method which was being done in India 40 years ago. People are eating millets almost everywhere, but in a crude method.

Their health condition is strong compared to India. Post-harvest management and operations include cleaning, grading, sorting, dehulling, polishing, pest or fungus management, milling, loading, stacking, value adding, trans-



port etc. We can make ready to eat products such as noodles or Kurkure. Premier institutes like Millet Research Post-Harvest Management Institute in Ludhiana, Raipur, NIFTEM, and CFTRI are working on technologies and developed more than 500 products that suit the needs and palatability. When you take noodles, vermicelli made of Maida, it is harmful. But if they are made of millets, they are highly beneficial to health without any side effects of gluten. You can have bakery products out of millets, and different kinds of namkeens which are palatable, tasty, and healthy. There are various options available to consume millets.

India Millet Initiative has taken many initiatives in the country like promoting millets, creating awareness, and developing recipes. We have written 10 recipe books, each with 60 recipes of major, minor, and pseudo millets. We have also written books on packages and practices. We want to integrate with Nigeria as we need a major market. The West African countries are consumer markets, so it can be exported to other countries like Europe and America from these countries and India. The developed countries are aware of good quality food and have paying capacity. There is a huge future if the millets are grown organically with properly processed with high quality technology. We should not miss this opportunity. Already many states are giving subsidies and different schemes. So the entrepreneurs should come forward to promote millet cultivation. We have an agreement with SKN University to develop seedbank to be supplied to farmers.

How many kinds of millets are there?

There are 3 major millets, 5 minor millets, and 2 pseudo millets. Some varieties are not found in India but grown in Japan and other countries.

In which states of India are millets grown largely?

The pearl millet is grown in Rajasthan, UP, and a few more states. Finger millet is grown in Karnataka, Sorghum in Maharashtra. Minor millets are confined to Karnataka and Tamil Nadu. It is a mixed cropping system as the farmers grow it as per their convenience and marketability. Millets can be grown anywhere in the country.

How do we select good quality millets?

Each millet has different kinds of nature, processing protocols, and nutritional benefits. In Rajasthan, bajra is eaten in winter as people think it gives more heat to the body. Similarly in Karnataka they eat finger millet with various recipes. It depends on eating habits and availability of grains and cultural heritage.



Does India export millets?

Yes, the quantity is increasing with lot of awareness being created.

Which is the best season for growing millets?

It depends on the climate of each state and the irrigation facility. It is grown across the country even in temperate areas such as Uttaranchal, Himachal, North-eastern states. It can be grown easily as it is a strong crop.

Which is the best millet health wise?

All the millets are good with different balancing nutritional values. Some have more protein, some more iron, and different kinds of amino acids. Millets are being introduced in various forms like snacks, cereals, and rotis. People add other grains to make rotis out of bajra. There are many bakery products also made of millets. People claim that diabetes can be cured by consuming millets. There are no medical studies or data available to support the statements. People are trying to introduce millet in various forms. It is a gluten free food.

Please let us know about your career background and how you got interested in this subject.

I am a scientist and passionate about helping the people to empower them through agribusiness. With thin mission, I had left academics in 1990 and since then I am trying to promote commercial agriculture and allied areas. I am glad that our Hon'ble Prime Minister is giving a big boost to this industry with various schemes. I am sure that this is going to be adopted by whole world and India will be the largest exporter of Nutri Cereal Crops from India.

CONTACT : Dr. Satyen Yadav
Email: president@hpmi.org.in
Telephone: 9711136325

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Kodali Naga Pradeep Kumar

A farmer in Mulakalacheruvu village in Chittoor district, Andhra Pradesh, is interested in growing pink to pink dragon fruit farming, teaching commercial business about dragon fruit crop, and exposes the challenges faced in dragon fruit farming.

History of dragon fruit: The dragon fruit is related to the cactus family and is native to Central America. Vietnam is cultivating the dragon fruit for more than 100 years. The fruit is mainly grown in Vietnam, and out of Rs. 100 G.D.P of their income, Rs. 39 is coming from dragon fruits business. It is also grown in many countries such as India, USA, Bangladesh, and China.

There are 3 varieties in this crop - pink to pink, pink to white, yellow to white. There are several other varieties, almost 72 varieties in dragon fruits. I selected pink to pink because it is very sweet and delicious. We can grow it for commercial business also. The fruit comes with value added products like pulp, wine, and fruit chips. The advantage of dragon fruit is that it needs less water. 90% of virus is not found in this crop, and no pesticide is required. The yearly maintenance is only Rs. 50 thousand per acre. 600 poles are needed per acre at 8 x 8 ft distance. Initial investment is Rs. 5 to 6 lakhs per acre. Currently we are selling at Rs. 1.50 lakhs per ton in the fruit markets.

The flowering will start in the month of May end to November. We can get fruits from 6 months. The life span of the plant

is 25 years. Minimum 45 days are needed to cut the fruit. The fruiting time is June to November without LED lights, and with LED lights, we can get the fruits throughout the year. The cement poles and wheel support are needed for dragon fruit plant. After plantation after 1 year we can get half ton per acre, from second year onwards 1 to 2 tons per acre. By 3 years we get 3 to 4 tons, and 4th year 5 to 6 tons. After completion of 5 years, we can get 10 to 15 tons per acre. So currently the market rate is Rs. 1.5 lakhs per ton. The main investment only is a one-time investment on cement poles and cement wheels and nursery plants.

Health benefits are many. It is rich in antioxidants and fat free and high fibre. It may help in lowering blood sugar, cures cancer, dengue, and full of Vitamin C. It can be given to sugar patients also and are used in beauty products like facial creams skin care products, and it is also used in medical products.

We need to use less water for the plant. In summer we can give water once in 3 or 5 days. In winter season we can give water once in week and rainy season, there is no need to give water. We can do lot of commercial business with the by prod-

ucts like pulp, wine, fruit chips, and dried fruit powder. The main product is wine which is very tasty and delicious. The pulp can be sold at Rs. 250 per kg. The wine in foreign countries is sold at Rs. 2000 and the fruit chips in Vietnam are selling throughout the world per kg at Rs. 2500. Dried fruit powder is also sold at Rs. 1000. The farmers are facing the problems to select the proper seed selection. It is very imp for any particular nursery plant. We can select only from an agent dealing in nursery those plants that have completed 3 years of age. The government is not supporting to give the subsidies for dragon fruit crop.



We can supply the cement pole, wheel and dragon fruit nursery plants for a better price. Nearly, 10 lacks nursery plants sold to the farmers in different states like Andhara pradesh, karantaka, telagana, chennai. fifty to seventy acres. full set up (one pole and wheel, four plants) will be given to the so many farmers.

How did you get interested in dragon fruits?

In 2015 I started a small company. I wanted to go to business side like electronics. But it required a very huge investment in any business like solar or electronic goods. Nearly Rs. 50 lakhs was needed. Dragon fruit needs only a one time investment, and we can get products for nearly 25 to 30 years. This crop is free from pesticide and virus.

So it is easy to maintain, less labour required to maintain the agricultural yield. It can be sold at a high cost in local market. Rs. 1.50 lakhs per ton is the selling price. That is the reason I selected this crop. Compared to pomegranate or mango tree, where people have to struggle to maintain these two because of more virus attack to mango and pomegranate and grapes, dragon fruit crop is easy to handle. That is the reason I went for this.

How long are you doing dragon fruit cultivation?

Since 2016 I am doing dragon fruit cultivation.

How big is your farm?

I have 11 acres in Chittoor and 11 acre in 20 acres nearly.

Any other crop you are growing or only dragon fruit?

I do dragon fruit and also grow dates farming.

Can we do any intercropping with dragon fruit?

You can do intercropping. Small crops like flowers, small crops, and groundnut can be grown between the poles. You can do any small, short term crops, 3 months crops. You can grow tomato also.

Is dragon fruit cultivation profitable?

Yes. Definitely per acre we can get Rs. 7 to 8 lakhs easily as income.

In one acre land how many plants can

be grown?

Per hectare 600 poles needed. 8 x 8 distance one pole is needed. 2400 plants can be grown per acre.

How many years does it take to grow before we can harvest?

One year is enough. We can get a yearly production.

Where can we buy good quality dragon fruit planning materials in India?

I collect from Bangladesh. 3 to 4 varieties are available in India. Before 2014, it was not available in India. I get from Bangladesh. For any farmer who wants to come into cultivation of crop, the main thing is seed selection. You can select seeds from above 3 years plants. Nowadays so many people are selecting seeds from less than 3 years plants.

Where is the main market for dragon fruits in Karnataka?

Throughout India we have market. In Karnataka it is available. Compared to Kerala, Andhra, and Telangana, it is consumed less. I am selling since 6 years at Rs. 100 150 per kg. Last year I supplied to Kerala nearly 25 to 30 tons.

Which is the main region in India where dragon fruits are grown?

In India, in any area we can grow it. It depends on the soil. Sandy soil is not suitable. In India, Gujarat, Maharashtra, Kerala, and Hyderabad. We can spray and use shadenet for the plants in summer.

What about the water requirement?

Water requirement 3 to 5 litres per day in summer season. We can give water through drip irrigation every 5 or 7 days. In other seasons, we can give weekly once. With 2 inches water we can cultivate nearly 10 to 15 ACRES.

According to you what are the major problems in dragon fruit cultivation?

The major problem is we have to find the fruit vendor (only new farmers). Second thing is we can do many products with dragon fruit. We can do pulp, we can do wine, powder, and with the outer skin we can make powder. Nearly it covers Rs. 1000 to 1200 cost per all



these products. But the government is not so keen to make the commercial products, such as wine. The new comers also face lot of problem in seed selection and fruit bearing plants.

We do not see much dragon fruits sold in the market. What is this reason. Is the fruit exported or processed?

Export is also on, but for exporting you can take so many precautions to get virus free and fungus free fruits. They want only big fruits, though the fruit looks big, they look for specific species. In the future the cost may vary from Rs. 1.50 lakhs which may not be a surprise. After 5 years, you can get 50 tons per acre. On average 50 thousand per ton is ensured. Average 50 thousand per ton is the profit for us. You will be spending for pesticide and planting materials. You can get Rs. 10 lakhs income per year.

Would you like to share other points on this?

No agricultural background is needed to maintain the crop. It is free from diseases and no pesticide required. That is the main benefit of this crop. Pesticide is not required, only low cost medicines you can spray during fruiting time every one week and after November to April. You can spray every 15 days organic spraying, neem oil, and cow dung, and cow urine and cow related things.

Do you provide guidance for cultivation?

Yes, I can.

If anyone wants to visit your farm, do you allow?

Definitely I can help them and guide them.

CONTACT:

Mr. Kodali Naga Pradeep Kumar,
E: pradeepkumarkodali@gmail.com
Telephone: 7893474688



Madhawendra Kumar Thakur

**Chairman - Mithila Vegetable Processing and Marketing Cooperative Union Ltd
Darbhanga, Bihar**



He expresses his view on vegetable value chain and how his company performs in this sector.

In 2017, the government and department of cooperatives started planning that every individual vegetable grower in Bihar to come under one umbrella as in 2006, the APMC was repealed. So the farmers had to go to mandi and sell the produce through mandi network. The new government came up with the proposal to have vegetable processing and marketing scheme which was approved by the cabinet. So we have primary vegetable cooperative society at tehsil/block level with vegetable growers as their members. Every individual block or tehsil has one primary vegetable cooperative society which has spread to 20 districts out of 38. We do not have much infrastructure for food chain or vegetable value chain and logistic support which are now being taken care by this project. Heavy budget is allocated for this.

There are 3 layers to this: the first layer is the primary vegetable cooperative society, the next one is making cluster of districts to form a cooperative union and State representation through vegetable federation. In Patna the first cooperative union was formed. In 2019 another cooperative union was formed with more farmers and increased business volume. It was in 2021 the third cooperative union, The Mithila Vegetable Processing and Marketing Cooperative Union, Darbhanga was formed which included 5 districts. We have now 60 vegetable cooperative societies, and we are targeting membership of Rs 200 initially. We are taking care of the market for the complete value chain of vegetables.

We aim at working on post-harvest management, storage, and marketing facility for the produce with specific emphasis on processing and adding value. Processing is a good prospect in completing the value chain of vegetable. We are planning to have a professionally managed institute for post-harvest management, storage, and marketing services, provision of permanent marketing centre at block level through our society. We also want to create an efficient marketing linkage and provide an alternative marketing platform. We are trying to connect to Nepal for developing the complete supply chain of vegetable. We are working on connecting to Bangladesh through the international export and get an appropriate institutional and organisational linkage.

We are reaching out to all individuals across the country. We are working on having our products in Gramin mandi in every block. We have created it in 9 places, and 5 of them are functional. The structure helps in cleaning, sorting, and grading the produce, buying and selling platform, and a training centre for the farmers with two offices and 10 MT cold storage. In many locations we are completing the process so that every individual vegetable grower of the block can come to this facility, clean, sort, and grade the product to reach to the selling platform. Traders will come to the facility and buy directly. The primary vegetable cooperative society handholds the farmers so that buying and selling process can be communicated easily.

We are working in rural, urban, and semi urban mandis to have logistic support from the primary vegetable cooperative society or cooperative union so that the volume of the vegetables can be increased in the society centre, procure that volume, and send to mandi and other parts of the country. We are connecting to retail point outlets like Reliance, and Big basket. Reliance is fully convinced about our process, and we are entering into an agreement to supply vegetable from the cooperative society.

We are spreading to 20 districts, especially the northern part of the state. All these districts have primary vegetable cooperative society with members of 100 now in



every individual block. We are creating an end to end solution which is not easy, and so we have our own solution tarkaari.in which is a brand for our vegetable setup. On ERP we have a few apps. We have dedicated one to member farmers so that they can register at their own KYC adding their plot and crop details, seasonal crop details, and they can change it in season every now and then by themselves. They can update the order history, payment details, and weather information. They will get messages if they can install the app on their smart phone and use it as per their requirement. Crop Pop is a weather based app which helps with information system.

We cannot mix the farming practices to every farmer. So we have segregated the details so that the farmers get the details they want only. For primary vegetable cooperative union, we have an app to cater to their demand, supply, MIS, ERP enabled, and financial transactions. We are also in eCommerce since a couple of years, and we are serving Patna, Muzaffarpur, Motahari, and Darbhanga. Our tarkaarimart app has customer profile, order vegetable, online payment, track orders, and we are ensuring service within 12 hours to achieve our goal of maintaining freshness and quality of the product. We are taking care of the mandi traders also, we are hopeful to have the track on this for bulk order and supply so that the bulk volume business can be entertained on the app.

We try for different stakeholders, PVCS can sell in rural and semi urban mandis, and PVCS and union help us in communicating with a few traders in Gorakhpur, Banaras, Lucknow, and other places. We send out vegetables to Himachal Pradesh, Delhi, and Lucknow. We have been supplying green vegetable to the jail in Saharsa on a daily basis by 4 to 5 quintals which is demanded by the jail. We get the order by 4 pm the previous day, and we supply them in the morning by 9 am. We are also convincing education department in Bihar by supplying green vegetables to schools for their midday meal schemes. A few hospitals in Patna also get our

vegetables. We are trying to get new clients in HoReCa. We have eRickshaws and eCommerce in this challenging business, and we are maintaining 10 eRickshaws in Patna to improve retail business, minimise wastage, and get better price for the farmers. We supply 15 to 16 trucks loads of tomatoes to Safal for their Ranchi plant. We also provide online delivery.

We are within the first 5 to 6 ranks in vegetable production. Even if we do not have the APMC and mandi facilities, we are doing well. Farmers are going to mandi where traders charge 5 to 6% which could have been reduced to 2%. We are trying to adopt demand based production system for which we have conducted a workshop. We are also working on getting quality vegetables with symmetry in shape & size.

From primary vegetable cooperative society, we get quality produce from prime members. In this region we operation we are exploring to have 20 cold storages shortly. For this we first need land, and I am in communication with the multiple stakeholders. We are also in correspondence with National Cooperative Development Corporation who have certain conditions, and we are ready to fulfil the conditions. We are working with the technology partners and technology support companies so that the machinery can be received on time. We are in touch



with a few companies in Delhi also so that they can plan and prepare our proposals for cold storage of 2500 MT and the proposal be sent to NCDC for their further approval. Department of Horticulture, Bihar is ready to serve with 75% subsidy under the schemes. We expect Rs. 1.86 crores (approx) as subsidy on a project of Rs. 4.5 crores for cold storage of 2500 MT. I am working on making it functional before 31st March 2024.

We are creating rural mandi with rural infrastructure for buying and selling of vegetable for primary vegetable cooperative society members, and another is regular reviews on business development and possible market linkages. We are trying PVCS having 3 to 4 collection points, and we can distribute our green vegetables with onion and potato to every nook and corner of that block. With regard to adoption of commercial varieties of potato, in the first season we tried, but this season we started the production of commercial variety of potato by the name LR1 and around 7 acres of land have been dedicated for this variety. We are also





exploring investment support from NCDC, state cooperative banks, and other funding sources.

The complete ecosystem has 22% of women representation. We have their assistance in cleaning, sorting, and grading, and they can do it in their own field. We have retail outlet in one of the PVCS in Patna who have created some 7 or 8 common types of structure made from them and started selling their vegetable through this channel. They have got an excellent foothold right after initiating. Patna is also

doing very well in eRickshaw. We are having support from Directorate of Horticulture of about 75% subsidy, we are also getting plastic crates and bags through them. We are trying to get GI tag for parwal.

During covid, we delivered 1200 orders in a single day and never stopped ourselves. We are inclined to help the small and marginal farmers to sell their produce in the market to get better price to sustain and grow as much as they can.

Can you please tell us about yourself and how you got interest in this field?

I was born and brought up in Darbhanga. After degree, I went to National Dairy Research Institute Karnal for Master's and worked in Delhi for 3 years. I also started a company but had to shut it down due to many problems. By 2020, we got a chance to interact with the people of department of cooperatives. They wanted to start the 3rd union, and I undertook the responsibility. During the 8 months of crop season, we grow 3 times of vegetables.

Are there any membership fee for farmers to register in the tarkaari app?

If you are order for vegetables online, it is free. For farmers we are charging Rs. 200 for registering, but they are not willing to pay the amount. We are giving him one share also for Rs. 100, and Rs. 100 for their membership fee. This amount is decided by the government. But farmers are not ready to pay the amount.

What do you mean by giving a share?

There maybe one lakh share for every individual primary vegetable cooperative society. It is an FPO type structure. So one member can get one share. The number of shares could be more, but each member will have a share. It means that one part of the profit at the end of year, every individual will share.

Are you into contract farming of vegetables?

No, we have not yet started. I am motivating the members to grow as much as they can and sell it out. But if a company approaches us demanding 20 MT vegetables in a specific period of the year, we can give them. That can be arranged and agreed on paper too.

What are the major problems in vegetable supply chain?

Wastage is the main concern. Vegetables have the property of perishing soon. Suppose a farmer goes to mandi with the crop and gets a price lower than the cultivation cost, he incurs loss.

So we are telling them not to sell that way. If we can have a 10 MT cold storage in individual primary vegetable cooperative society, we want them to stock the vegetables and sell them after 3-4 days. We can manage the temperature, regulate it, and keep the produce fresh for 4 days also.

CONTACT :

Mr Madhawendra Kumar Thakur
Email: ktmadhaw@gmail.com
Phone: 09304183829



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5 ways CRISPR gene editing is shaping the future of food and health

For some people, the idea of genetically modified (GM) foods is alarming. Opponents call them “Frankenstein foods”. But the need to produce more to feed the planet’s growing population means the techniques are gaining greater acceptance. Kenya announced in 2022 that it was lifting its ban on GM crops to help tackle mounting food shortages caused by four years of below-average rainfall which have led to crop failures and left 3.5 million people facing acute food insecurity.

The United Nations estimates that food production will need to increase by 60% by 2050 if we are to feed a predicted world population of 9.3 billion. The challenge, as the World Resources Institute points out, is to do it without increasing emissions, fueling deforestation or exacerbating poverty. A gene editing technique known as CRISPR, which has been described as “a pair of molecular scissors that can edit or alter a target DNA sequence precisely”, not only offers the prospect of more and healthier food – it is already being used to improve human and animal health.

Concerns about CRISPR

Although CRISPR has been hailed as a breakthrough, it has also heightened concerns around genetic modification. In 2015, a group of scientists, including Nobel Laureate Professor Jennifer Doudna, one of the pioneers of CRISPR, called for a temporary moratorium on its use in humans.

The use of gene editing in crops is already regulated in many countries, with the European Union imposing restrictions on almost all genetic plant modification. The United States and most other countries only regulate crops where new genetic material has been added. Opponents criticize the power of GM seed producers who require farmers to buy new seed from them every year, according to the American Farm Bureau. US critics also call for foods which contain GM crops to be clearly labelled, something that is not currently required.

Yet the World Economic Forum’s 2022 whitepaper Accelerating Global Access to Gene Therapies said gene therapy has the potential to reduce the global burden of disease.

How CRISPR is positively impacting our food and health

While the debate around gene editing continues, here are five ways that CRISPR is already having an impact - from the food we eat to the state of our health.

1. Making healthy foods tastier

Any parent will tell you how hard it can be to persuade children to eat green vegetables and salads. But CRISPR is coming to the rescue, making healthy foods taste better by dialling down the bitterness in many vegetables and enhancing the flavour of fruit. US biotech company Pairwise pledges “healthy shouldn’t be a choice - it should be a craving.” The

firm is currently working on new variants of leafy greens, cherries and berries.

2. Diagnosing and treating COVID-19

In January 2022, the US Food and Drug Administration authorized a new high-throughput rapid test for COVID-19 developed using CRISPR which can process thousands of samples in a single day. Trials have also been conducted of CRISPR-developed treatments which prevent the COVID-19 virus from attacking lung cells. Scientists at Duke University in the US found that the CRISPR treatment also inhibited the immune reaction which causes COVID deaths.

3. Improving animal health

Researchers at the Pasteur Institute in Montevideo, Uruguay, have used CRISPR techniques to modify the genes of farm animals to make them more disease-resistant. In one experiment, pigs were rendered immune to respiratory diseases like swine flu. They also focused on avoiding painful procedures such as the removal of cows’ horns which is done to avoid them harming one another. The scientists introduced a gene mutation found in horn-free Angus cattle to create a hornless breed of Holstein cows.

4. Helping crops tackle the climate crisis

Scientists have already used CRISPR to produce virus-, bacterial- and fungal-resistant crops that can cope with extremes of heat and cold. They’ve also increased the size of rice, wheat and maize grains and produced bigger and better soybeans and brassicas. Professor David Savage of the University of California believes his team are close to developing varieties of rice and sorghum that will not just survive the climate crisis but actively help tackle it by capturing more carbon from the atmosphere and storing it in their roots.

Read full @ <https://rb.gy/ovogn8>

Source : World Economic Forum





Titanic robots make farming more sustainable

MIT alumnus-founded FarmWise uses hulking, autonomous robots that resemble tractors to preserve crops while snipping weeds, eliminating the need for herbicides. There's a lot riding on farmers' ability to fight weeds, which can strangle crops and destroy yields. To protect crops, farmers have two options: They can spray herbicides that pollute the environment and harm human health, or they can hire more workers.

Unfortunately, both choices are becoming less tenable. Herbicide resistance is a growing problem in crops around the world, while widespread labor shortages have hit the agricultural sector particularly hard. Now the startup FarmWise, co-founded by Sebastien Boyer SM '16, is giving farmers a third option. The company has developed autonomous weeding robots that use artificial intelligence to cut out weeds while leaving crops untouched.

The company's first robot, fittingly called the Titan — picture a large tractor that makes use of a trailer in lieu of a driver's seat — uses machine vision to distinguish weeds from crops including leafy greens, cauliflower, artichokes,

and tomatoes while snipping weeds with sub-inch precision. About 15 Titans have been roaming the fields of 30 large farms in California and Arizona for the last few years, providing weeding as a service while being directed by an iPad. Last month, the company unveiled its newest robot, Vulcan, which is more lightweight and pulled by a tractor.

"We have growing population, and we can't expand the land or water we have, so we need to drastically increase the efficiency of the farming industry," Boyer says. "I think AI and data are going to be major players in that journey."

Finding a road to impact

Boyer came to MIT in 2014 and earned masters' degrees in technology and policy as well as electrical engineering and computer science over the next two years. "What stood out is the passion that my classmates had for what they did — the drive and passion people had to change the world," Boyer says.

As part of his graduate work, Boyer researched machine learning and machine vision techniques, and he soon began exploring ways to apply those technologies to environmental problems. He received a small amount of

funding from MIT Sandbox to further develop the idea. "That helped me make the decision to not take a real job," Boyer recalls.

Following graduation, he and FarmWise co-founder Thomas Palomares, a graduate of Stanford University whom Boyer met in his home country of France, began going to farmers' markets, introducing themselves to small farmers and asking for tours of their farms. About one in three farmers were happy to show them around. From there they'd ask for referrals to larger farmers and service providers in the industry.

"We realized agriculture is a large contributor of both emissions and, more broadly, to the negative impact of human activities on the environment," Boyer says. "It also hasn't been as disrupted by software, cloud computing, AI, and robotics as other industries. That combination really excites us."

Through their conversations, the founders learned herbicides are becoming less effective as weeds develop genetic resistance. The only alternative is to hire more workers, which itself was becoming more difficult for farmers.



“Labor is extremely tight,” says Boyer, adding that bending over and weeding for 10 hours a day is one of the hardest jobs out there. “The labor supply is shrinking if not collapsing in the U.S., and it’s a worldwide trend. That has real environmental implications because of the tradeoff [between labor and herbicides].”

The problem is especially acute for farmers of specialty crops, including many fruits, vegetables, and nuts, which grow on smaller farms than corn and soybean and each require slightly different growing practices, limiting the effectiveness of many technical and chemical solutions. “We don’t harvest corn by hand today, but we still harvest lettuces and nuts and apples by hand,” Boyer says.

The Titan was built to complement field workers’ efforts to grow and maintain crops. An operator directs it using an iPad, walking alongside the machine and inspecting progress. Both the Titan and Vulcan are powered by an AI that directs hundreds of tiny blades to snip out weeds around each crop. The Vulcan is controlled directly from the tractor cab, where the operator has a touchscreen interface Boyer compares to those found in a Tesla.

With more than 15,000 commercial hours under its belt, FarmWise hopes the data it collects can be used for more than just weeding in the near future.

“It’s all about precision,” Boyer says. “We’re going to better understand what the plant needs and make smarter decisions for each one. That will bring us to a point where we can use the same amount of land, much less water, almost no chemicals, much less fertilizer, and still produce more food than we’re producing today. That’s the mission. That’s what excites me.”

Weeding out farming challenges

A customer recently told Boyer that without the Titan, he would have to switch all of his organic crops back to

conventional because he couldn’t find enough workers. “That’s happening with a lot of customers,” Boyer says. “They have no choice but to rely on herbicides. Acres are staying organic because of our product, and conventional farms are reducing their use of herbicides.” Now FarmWise is expanding its database to support weeding for six to 12 new crops each year, and Boyer says adding new crops is getting easier and easier for its system.

As early partners have sought to expand their deployments, Boyer says the only thing limiting the company’s growth is how fast it can build new robots. FarmWise’s new machines will begin being deployed later this year.

Although the hulking Titan robots are the face of the company today, the

founders hope to leverage the data they’ve collected to further improve farming operations.

“The mission of the company is to turn AI into a tool that is as reliable and dependable as GPS is now in the farming industry,” Boyer says. “Twenty-five years ago, GPS was a very complicated technology. You had to connect to satellites and do some crazy computation to define your position. But a few companies brought GPS to a new level of reliability and simplicity. Today, every farmer in the world uses GPS. We think AI can have an even deeper impact than GPS has had on the farming industry, and we want to be the company that makes it available and easy to use for every farmer in the world.”

Source : <https://news.mit.edu>



Praakritik Launches Delivery of Organic Fruits and Vegetables in Bangalore

The new category launch is in line with the company's vision to focus on consumer health and wellness. The organic fruits and vegetables are sourced from Bhoomi Farms, where the produce is naturally grown, is chemical free, and focuses on nutrition per gram, and not the rate per kilo. These farms are NPOP Certified, which helps to trace back the product to its farm. Currently, Praakritik offers 45 varieties of regular and exotic fruits and vegetables like Bananas, Sapodilla, Parsley, and Spinach to name a few.

Dharmishtha Goenka, Founder of Praakritik said, "Post-pandemic, consumers have learned that there is no greater wealth than health. Therefore, most people are concerned about pesticides, additives, antibiotics, or other chemical residues, and believe organic food is healthier. After witnessing a successful response to our organic grocery products, we expanded our offerings to fresh organic fruits and vegetables in association with Bhoomi Farms."

She added, "With this relationship, we hope to bring farmers and consumers together by giving producers needed market access and supplying excellent products to our customers. To match our portfolio to the ever-changing demands of our customers, we launched operations in the city of Bangalore."

The brand ensures that systematic planning along with the farmers is done to cultivate all different kinds of vegetables and fruit around the year. Each farmer is trained to cultivate their soil and make it pesticide-free for organic farming. The soil is tested regularly to ensure that the quality of food is not compromised. Apart from these standard practices, Bhoomi Farms also offers greenhouse production of foods and its in-house R&D centre and Lab ensures quality produce. The multiple farms spread across Southern India are focussed on yield improvement by use of ground-level Agri knowledge combined with Technology from around the world.

With high-quality products, a wide variety, and a commitment to sustainable and eco-friendly farming practices, Praakritik is a brand that provides healthy and delicious organic food options.

Source : www.indianretailer.com



TartanSense rebrands as Niqo Robotics

The rebrand is ahead of the company's plan to launch green on green AI spot spray robots in India by June 2023

AgTech startup TartanSense has rebranded as Niqo Robotics. The rebranding comes on the heels of the company launching their proprietary green on green AI spot spray robots in India.

Niqo Robotics seeks to challenge the status quo of conventional farming methods by pioneering an AI powered robotics revolution in agriculture. This revolutionary spirit of the company is embodied in the new brand identity.

The name Niqo is derived from the word "Nikolaos", meaning Victory of the People. The victory flag in the logo is symbolic of the brand's ambition to liberate the entire farming ecosystem from unreliable availability of labour and unsustainable farming practices.

Jaisimha Rao, chief executive officer and founder, Niqo Robotics said, "It has taken us many years of innovation, frugal engineering, and rigorous testing to cover the distance from lab to land. The rebrand couldn't have come at a better time. As we get ready to launch the world's largest fleet of green on green AI spot spray robots to market, we need a strong identity that can boldly carry us into this exciting future. The name Niqo represents our hunger to win in this challenging ecosystem of robotics and agriculture. We are especially proud that India is leading the way for commercialising AI powered spot spraying at scale."

"Niqo unabashedly embodies our innovative thinking and revolutionary spirit. This is reflected in every aspect of the brand's identity from the name to the logo, typeface, colours, voice, and a strong customer centric narrative. For example, Niqo typeface is custom designed, inspired by postmodern style and data visualisation systems. The sharpness and slight curves create contrast and a strong image. It is an ode to the intricate engineering that goes into building our robots. This is the steadfast foundation we need as we take our first steps as a consumer brand" said Arha Padman, chief marketing officer, Niqo Robotics.

Source : brandequity.economictimes.indiatimes.com



Aquaconnect raises \$15m to digitize India's aquaculture supply chain for smallholder farmers

Why it matters: Though India is the world's third-largest seafood producer, its domestic industry is rife with inefficiencies. Outdated production methods and a lack of transparent practices and supply chains are just a couple of the major problems the industry faces. Other challenges include finding buyers and accessing formal capital. All of this eats into smallholder farmer incomes and makes it difficult for them to diversify their businesses and increase income.

Speaking in a statement, Lok Capital partner Hari Krishnan said, "the industry is hampered by inefficiencies in the value chain and poses a huge scope for tech disruption. Yet its true potential is untapped. Aquaconnect, with its deep-tech intervention, has the potential to disrupt the Indian aquaculture value chain and emerge as a key player in the growing blue food segment."

How it works: Aquaconnect is addressing the industry's inefficiencies with an aquaculture platform that organizes and digitizes supply chain logistics and builds more transparency into the overall value chain. The Aquaconnect mobile app provides smallholder producers with a variety of tools and services across the value chain. Fish and shrimp farmers can access advisory services to increase farm productivity, manage elements like water quality and aquatic health, and connect with formal banks for financing.

The platform also includes a marketplace, where producers can buy inputs, and the "Aquabazaar," which matches farmers with prospective buyers. All of these services aim to give smallholder shrimp and fish farmers greater yields ultimately bigger incomes.

Aquaconnect at a glance: Founded in 2017, Aquaconnect currently serves more than 90,000 fish and shrimp farmers; it also has a network of over 500 last-mile partners. Company founder and CEO Rajamanohar Somasundaram, said these numbers have helped Aquaconnect "scale phenomenally" throughout six major aquaculture production states in India, including Andhra Pradesh, Gujarat, Odisha, and Tamil Nadu. "In the next 12 months, we are set to triple our AquaPartners' network across India and optimize our service offerings," he added. Aquaconnect raised \$4 million in pre-Series A funding last year.

Source : <https://agfundernews.com>

Indian farmtech startups close 185% more funding in 2022 than 2021

Downstream food delivery startups have dominated funding levels across agrifoodtech globally and India is no exception; in the fiscal year to March 31, 2022, over 70% of the \$4.6 billion raised by startups went to those operating closer to the consumer, according to AgFunder's India AgriFoodTech Investment Report. However, funding for Indian farmtech startups — those used by farmers in their operations — accounted by 60% of total deal count, showing increasing activity, especially in the early stages. Farmtech startups raised \$1.5 billion during the 12-month period, a 185% year-on-year increase.

A look at India's agricultural supply chain reveals gaps that technology acceleration and adoption can fill to improve productivity. As with other regions like Africa, India is also facing drought, which is claimed to be affecting close to two-thirds of the country, but other weather events like monsoons can also have devastating impacts on the country's agriculture industry. In addition to that, most farmers are subsistence farmers with often low productivity and income cycles, and lacking access to markets and affordable credit due to the fragmented nature of land ownership in the country.

What could have led to increased funding for Indian farmtech startups?

Global investments into farmtech have generally been on the rise since 2013. AgFunder's 2021 Farmtech Investment Report, projected that farmtech investments would hit a record \$7.9 billion, with the US taking the lion's share of investments at 83%. It appears tech acceleration has buoyed this trend for Indian farmtech startups too; the report disclosed that India is one of the top five most funded farmtech ecosystems globally in 2022. It comes behind the US, France and China, but was ahead of Canada in investment volume.

AgFunder describes farmtech as solutions that are helping farmers realize better farming outcomes and ultimately higher incomes. This could be increased yields, reduced harvest losses, better access to consumers and buyers and overall better farming practices especially in times where farmers are the most disadvantaged group due to climate change effects.

Source : <https://agfundernews.com/>





HOW

Africa's new Free Trade Area will turbocharge the continent's agriculture industry

Under the African Continental Free Trade Area (AfCFTA) agreement, Africa's need to import so much will be reduced, and domestic processing capacity boosted massively.

Agriculture accounts for roughly one-third of the African continent's GDP, provides a livelihood for 50% of the population and feeds hundreds of millions of people on the continent and beyond every day. The key role that agriculture plays in the continent's economy is only set to grow in strength and size under the African Continental Free Trade Area (AfCFTA) agreement, struck in February 2021 and now in full swing.

A new era for African agriculture

According to the World Economic Forum's Insight Report on the deal — AfCFTA: A New Era for Global Business and Investment in Africa — the free trade area, one of the world's largest by number of people and economic size, is projected to host 1.7 billion people and oversee \$6.7 trillion in consumer and business spending by 2030.

The deal will be transformative for many of Africa's industries, but given agriculture's already central role in the continent's economy, and its huge potential for growth, agriculture will be a prime beneficiary. According to the Forum's report, agriculture has exceptional potential for increasing intra-African trade, meeting local demand, accelerating GDP growth, creating new jobs and improving inclusivity due to upstream and downstream linkages.

It will increase value addition, meet new local demand and bring smallholder farmers — who are responsible for 80% of Africa's food production — into wider supply chains. Opportunities abound in the AfCFTA for new investment in agro-processing, in particular.

Agro-processing and Africa's agricultural ascension

Agro-processing has important implications for African food security, job creation and poverty reduction. Boosting it adds value to an already competitive agriculture sector.

Countries across Africa have already increased their fo-



cus on agro-processing in response to the food insecurity and price spikes caused by trade disruptions from global shocks — not least the Russian invasion of Ukraine — and because of the potential to transition economies away from the long-established but suboptimal model of exportation of raw materials. With improved capacity to process their own agricultural goods — whether that's grain, fertiliser or anything else — African countries can exploit the huge advantage many of them have in their established and sizeable agricultural sectors to build wealth and create new jobs and opportunities at home.

Scaling agro-processing has positive inclusivity impacts, too. Women make up 70% of employment in the overall agricultural sector and most of the domestic agro-processing workforce is female. A boost to African agriculture is a boost for the continent's women.

New investment, new opportunities

This growth in agriculture and agro-processing will drive new investment from abroad, from within the continent and outside of it. The common market introduced under the AfCFTA can leverage regional differences in the strengths and competitiveness of intra-African diversity in their food value chains, specialisations and key outputs.

Increased intra-African trade through the AfCFTA will help reduce dependency on foreign agricultural inputs. Currently, the continent imports about \$50 billion worth of agricultural products per year. By 2030, intra-African agricultural trade is projected to increase by 574% if import tariffs are eliminated; a huge victory for a continent historically hobbled by unnecessary reliance on outside economies.

African-owned and run businesses will benefit from this intra-continental trade boost. The fertiliser industry, for example, is expected to boom. New agricultural activity is expected to require an 800% increase in fertiliser application for main nutrients. Irrigation is expected to benefit from \$65 million in new investment, while more than \$8 billion worth of investment in storage will also be required. All of this, under the AfCFTA, can be fulfilled tariff-free by African enterprises.



Foreign Agriculture

- *Agriculture makes up 35% of Africa's GDP and employs about half of its people, but the continent still imports billions of dollars of agri-product every year.*
- *Under the African Continental Free Trade Area (AfCFTA) agreement, Africa's need to import so much will be reduced, and domestic processing capacity boosted massively.*
- *The benefits of the AfCFTA are outlined in a new report by the World Economic Forum: AfCFTA: A New Era for Global Business and Investment in Africa.*

AfCFTA: good for growth

The AfCFTA is paving the way for stronger business partnerships across the continent, with many companies taking up the fresh opportunities. Here are just a few:

OCP: Leveraging local partnerships

OCP is a Moroccan company that has developed into an industry leader in customized fertiliser solutions. OCP Group has focused on Africa because it recognises the potential of the AfCFTA to bring unifying standards for fertiliser regulation and to increase intra-African trade for agricultural goods and supplies. With offices spanning 12 African countries, OCP represents a successful example of making use of local partnerships on the continent to expand reach and impact.

In three years, OCP established 80 farmer hubs in Nigeria and Côte d'Ivoire, which provide farmers with a range of inputs and agricultural services. The company's success in reaching farmers locally is due to its strong partnerships with governments, non-profit organizations, research centres and universities across Africa. For example, OCP partners with Mohammed VI Polytechnic University (UM6P) in Marrakesh, which houses 80% of the company's R&D capacity.

Coca Cola: Leveraging agro-processing and distribution

In the case of agro-processing, The Coca-Cola Company, a long-time partner that employs 50,000 people across Africa, has also found success by working with local suppliers and developing value chains as key components of its strategy on the continent. Together with bottling partners, Coca-Cola's Africa footprint is a thriving business, due to Africa's young population. It is also contributing to wider economic growth through job creation, sustainability and the economic empowerment of women and youth. According to the company, the AfCFTA will help Coca-Cola further develop sourcing and production as well as packaging within African markets, and will drive down costs, giving more countries an equal chance to be suppliers for Coca-Cola.

Yara International: Drawing on close relationships with countries and communities

Yara International ASA is a Norwegian company that provides environmental and industrial solutions for crop nutrition across 12 African countries. Yara has found success in continuing to move parts of its value chain onto the continent, including a blending facility, a chemical enterprise and a sales office — especially as AfCFTA tariff reductions reduce the cost of infrastructure, transport and production.

Yara has cultivated relationships with farming communities through Yara Crop Nutrition Centers. They help the company understand how to best provide specific agronomic advice and methodologies that can improve farmers' prosperity and make smallholder and commercial farmers more competitive and attractive to financial investors, including through digital farming technologies and online environments.

Yara has embedded a social impact strategy into its business in Africa to address the challenges specific to smallholder farmers within the communities in which they operate. Thus far, it has launched MBA-style leadership academies in Kenya to strengthen the skills of micro, small- and medium-sized entrepreneurs, with plans to expand further in 2023. Central to Yara's strategy is an "Africa for Africa" focus on building a comprehensive, continental, field-to-fork value chain by continuing to invest in current and aspiring farmers, retailers, distributors, technology developers and agro-entrepreneurs.

Looking to the future

These companies showcase the lucrative, and growing, opportunities that exist within agro-processing and agriculture across the newly connected African continent. Investment will play a critical role in helping to develop and strengthen these value chains for the benefit of global investors and African economies alike. The benefit, ultimately, will be felt by everyday African people.

Image: REUTERS/Esa Alexander

Source : <https://www.weforum.org>



Investing in trees

Global companies are protecting and restoring forests

Conserving and restoring degraded forest landscapes is essential to combating global climate change and preventing biodiversity loss. A number of companies have pledged to help grow 1 trillion trees in the next seven years, with more due to come on board.

The impact of restoring trees around the world.

Companies from across sectors are working together through the World Economic Forum's *it.org* initiative, which serves the global movement to conserve, restore and grow 1 trillion trees by 2030. More than 80 companies have pledged over 7 billion trees in over 65 countries. Since COP27 in November 2022, new pledges from nine companies have been welcomed, including the first four Indian companies -- Vedanta, Re-New Power, CSC Group and Mahindra.

Organizations work collaboratively through the *it.org* Corporate Alliance. Member companies commit to boosting their local communities and forests, and to implementing a Paris Agreement-aligned target to reduce emissions. The Corporate Alliance brings companies together under a shared goal of pro-

tecting the environment and working sustainably, and connects enterprises with *it.org*'s community of innovators, partners and regional chapters.

Companies from diverse sectors such as mining and automotive manufacturing are investing in forest conservation and restoration. Meta has partnered with the National Indian Carbon Coalition (NICC) to ensure that carbon-reducing plans include the leadership, traditional ecological knowledge, and vision of Indigenous peoples. Mahindra has also committed to planting over 1 million trees per year through its Project Hariyali initiative, and has already planted

- **\$44 trillion, the equivalent of about half global GDP, is at risk due to nature-loss.**
- **Over 80 companies have committed to investing in trees by conserving, restoring, and growing over 7 billion trees in over 65 countries.**
- **The global goal to conserve, restore and grow 1 trillion trees is ambitious but achievable.**

over 20 million trees. Its aim is to create functional forests for local communities to enhance the livelihoods of small-holders and marginal farmers while restoring forest ecosystems. This work is in line with the World Economic Forum's efforts to guide companies to use Indigenous knowledge in the conservation and restoration of landscapes.

What's the challenge facing global forests?

Forests are critical to the health of the planet. They sequester carbon, regulate global temperatures and freshwater flows, recharge groundwater, anchor fertile soil and act as flood barriers. They harbour 80% of the world's terrestrial biodiversity, provide habitats for many species, and are a source of subsistence for 350 million people.

Degradation and loss of forests are destabilizing the planet on a scale unseen in human history. We have lost nearly half of the 6 trillion trees that existed on Earth before the onset of agriculture 12,000 years ago. Each year we lose around 15 billion more.

The cost to business is increasingly evident. More than half of our annual global GDP, or \$44 trillion, is potentially threatened by nature loss. As trees disappear, the services they offer are undermined, reducing the productivity of soils and natural carbon sinks, diminishing our access to clean water and reducing our resilience to extreme

weather events.

Our approach to supporting forests, local communities, and global decarbonization goals.

Launched at the World Economic Forum Annual Meeting 2020 in support of the UN Decade on Ecosystem Restoration, it.org supports the growing momentum on nature-based solutions to address climate change and nature loss.

it.org brings private companies together under the Corporate Alliance, and the it.org Knowledge Exchange offers corporates curated knowledge and opportunities to share learnings and experiences. These learning materials help companies put ecologically and socially responsible approaches in place that contribute to the needs of forests, local communities, and global decarbonization goals. For instance, it.org profiles global standards like the IUCN Global Standard on Nature-based Solutions to help ensure planning is informed by local knowledge and scientific evidence.

With rapid advances in monitoring technology, it.org is collaborating with a group of partners to connect it.org's reporting process with geospatial platforms and ground-level data collection. Tentree's veritree, for instance, uses blockchain to validate successful planting efforts through collecting and sharing ground-level data. Restor informs and connects restoration initiatives, using geospatial data layers.

it.org is especially focused on driving impact in priority regions including:

The United States through our it.org US Chapter co-led by American Forests

it.org Mexico Chapter co-led by Re-forestamos and the AMERE coalition

African Union's Great Green Wall for the Sahara and the Sahel Initiative

it.org China Action co-led with China Green Foundation under the guidance of the National Forestry and Grassland Administration

Amazon Basin by focusing on the transition to a sustainable bioeconomy- India through the it.org India Platform

Through the it.org US Chapter, launched in August 2020, subnational governments and the US-based non-

profit community alone have pledged over 50 billion trees by 2030. With regional working groups on topics such as forest carbon, US policy and urban forestry, the US Chapter demonstrates the power of business, government and civil society working together to protect and restore forests.

In March 2022 the it.org India Platform was launched to support the country's commitments under the Paris Agreement to restore 26 million hectares of deforested and degraded land by 2030. And at the World Economic Forum Annual Meeting 2022, China's Special Envoy for Climate Change announced that, with the World Economic Forum and China Green Foundation, China will plant and conserve 70 billion trees by 2030.

it.org and the Global Landscapes Forum's Youth in Landscapes Initiative have co-convened the #GenerationRestoration Youth Hub, a diverse global network of over 80 youth ecopreneurs, practitioners and activists.

In partnership with UpLink, the Forum invites partners to launch and support innovation challenges to address issues relating to the natural world. Organ-

izations can then sign up to propose solutions to the challenges. There have been over 10 global challenges – including Trillion Trees, #GenerationRestoration, and Carbon Market Challenges – as well as regional challenges in India, the US, the Amazon and the Sahel. Combined, these have resulted in over 1,000 submitted solutions, and a cohort 137 recognized Top Innovators that is being supported through dedicated accelerator programmes.

How can you get involved?

Collaboration and partnerships are key to meet the trillion trees vision. We encourage companies that have committed to set a company-wide emissions reduction target, such as a 1.5C Science-Based Target or credible net-zero goal by or before 2050, to pledge their forest commitments.

Companies can also support it.org's vision to conserve, restore and grow 1 trillion trees by 2030 by pledging their forest commitments through the it.org Corporate Alliance.

The global goal to conserve, restore and grow 1 trillion trees is ambitious but it is achievable. Join the movement.

Source : www.weforum.org



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For detailed eligibility, selection criteria and application procedure, please visit website: www.iipmb.edu.in

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Date: 10.1.2022
Notification No. 01/22

DIRECTOR

NATURAL FARMING

Bharatiya Prakritik Kheti Bio-Input Resource Centre

In the Union Budget, it has been announced to launch Bharatiya Prakritik Kheti Bio-Input Resource Centres.

Around 10,000 centres will be set-up to create a national level distributed micro-fertiliser and pesticides manufacturing network.

The main objective of Bharatiya Prakritik Kheti Bio-Input Resource Centres will be to facilitate the adoption of NATURAL FARMING by making an impact over 1 crore farmers in the next three years.

HISTORY

No matter how much a man makes progress, Agriculture is an occupation that will be always undertaken since it suffices one of the most important basic needs of the human being i.e. Food. Various methods adopted using new technology to find ways to increase agricultural production in order to feed the ever growing demand for food. Indiscriminate use of chemical fertilizers & pesticides has not only reduced soil health but also harmful for healthy human diet. Therefore, many new ways and methods are being introduced in this field to harvest and cultivate the best quality crops.

Natural Farming, as the name suggests, is the art, practice and, increasingly, the science of working with nature to achieve much more with less.

Use of Chemical fertilisers was introduced fifty years ago. Subsequently, it was noticed that there are many risk factors due to usage of chemical fertilisers.

The ill effects of use of chemical fertilisers and pesticides are

- Pollute ground water, water ponds and rivers.
- lead to death of fish and aquatic life
- harm natural soil because of acidification which may result in decrease in productivity of land.
- create health problem to farming community and consumers

Natural farming is promoted by the Government of India with Bharatiya Prakritik Krishi Paddati Programme (BPKP) which falls under Paramparagat Krishi Vikas Yojana (PKYY). There are several states practicing

ing Natural Farming. Prominent among them are Andhra Pradesh, Chhattisgarh, Kerala, Gujarat, Himachal Pradesh, Jharkhand, Odisha, Madhya Pradesh, Rajasthan, Uttar Pradesh and Tamil Nadu.

Currently 4.43 million farmers have started practicing natural farming according to the Economic Survey 2022-23. As per the promulgation in Union Budget, the initiative may benefit around 10 million farmers to adopt natural farming in the next three years. Against the total allotment of Rs.1.15 crores to Ministry of Agriculture and Farmers Welfare in the budget for 2023-24, a sizeable portion should be provided to Bharatiya Prakritik Kheti Bio-Input Resource Centres

Imparting the knowledge to cultivate crops under natural farming among farming community

Making availability of quality organic and bio-inputs at reasonable rates.

Providing market support and fair price for sale of produce

WAYS AND MEANS OF NATURAL FARMING

1. Banning of chemicals: Soil scientists are against indiscriminate use of fertilisers. Use of organic compost is the right replacement to supplement micronutrients.

2. Multiple cropping & Crop rotation: Mix cropping is the outstanding feature of organic farming in which variety of crops are grown simultaneously or at different time on the same land. In every season care should be taken to maintain le-





Guest Column

BENEFITS OF NATURAL FARMING

Natural Farming offers a solution to various problems. It has the potentiality to address various existing problems in Indian farming.

- Farmers practicing Natural Farming reported similar yields to those following conventional farming. In some of the instances, higher yields were also reported.
- Natural Farming aims to make farming viable and aspirational by increasing net incomes of farmers on account of cost reduction, reduced risks, similar yields, incomes from intercropping
- Natural Farming aims to drastically cut down production costs by encouraging farmers to prepare essential biological inputs using on-farm, natural and home-grown resources
- Natural Farming does not use any synthetic chemicals. As such, health risks and hazards are eliminated. The food generated through Natural Farming has higher nutrition value.
- Natural farming may lead to create employment in input enterprises, value addition, marketing.
- Natural Farming encourages better soil biology, better agrobiodiversity and judicious usage of water with much smaller carbon and nitrogen footprints.
- Cultivation of different crops will help each other and cover the soil to prevent unnecessary water loss through evaporation
- The impact of Natural Farming is on the biology of soil microbes and other living organisms such as earthworms.
- The integration of livestock in the farming system plays an important role in Natural farming and helps in restoring the ecosystem.
- Several scientific studies have reported the effectiveness of natural farming. Some of the advantages of adopting natural farming are
- Good health to Farming community and consumers

gume cropping at least 40%. Farmers should select the crops combination according to their needs and season.

3. Crop rotation: Crop rotation is the back bone of organic farming practices. To maintain soil health and allow natural microbial systems working, crop rotation is necessary. Crop rotation may lead to improvement in soil structure, protect Pest build-up and acts against build-up of weeds.

4. Pest Management: Pest management is practiced in natural farming through 4 ways (i) Cultural / Agronomic (ii) Mechanical (iii) Biological and (iv) Organic

(i) Cultural / Agronomic: Use of disease free seed or stock and resistant varieties are best preventive practice in organic pest management. Maintenance of biodiversity, effective crop rotation, multiple cropping

(ii) Mechanical: Removal of affected plant parts and plants, Destruction of egg masses & Larvae, Installation of bird perches, Light traps.

(iii) Biological: Use of Pest predators & Pathogens, Neem and Neem extracts has been found to be effective in the management, Cow urine used as foliar spray is not only effective in the management of pathogens & insects, but also acts as effective

growth promoter for the crop. Fermented curd water (butter milk) is also being used for the management of White fly, Jassids, Aphids.

CHALLENGES

There are several problems existing in Indian Farming, such as food insecurity, farmers' distress, health problems arising due to pesticide and fertilizer residue in food and water, global warming, climate change and natural calamities

- The overuse of synthetic fertilizers, especially urea, pesticides, herbicides, weedicides etc. alters soil biology and soil structure, with subsequent loss of soil organic carbon and fertility.
- Despite the efforts of Government, a few states over the last few year adopted natural farming or chemical free farming. Natural farming is struggling to be a part of mainstream Agriculture.
- Allocation of meagre or negligible funds for practicing organic or natural farming
- Around 4% of the net sown area is under organic farming (5.91 million hectares of land in the country as per Economic Survey 2022-23)
- The funds allocated in budget for natural farming is not clear.

- Lack of knowledge to cultivate under natural farming among farming community

- Non-availability of quality organic and bio-inputs

- Lack of market support to get fair and remunerative prices

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1. Wikipedia
2. <https://naturalfarming.niti.gov.in/>

Article by

D.Surendranath,

Chief Manager

Union Bank of India

Staff College, Kalkere,

Bangalore 560083

Email: dsurendranath@

unionbankofindia.com





Potato farming in Odisha

Interview with Samarendu Mohanty, Asia Regional Director at the International Potato Center (CIP)

Mr. Samarendu Mohanty is a creative, dynamic, and effective agricultural research manager and administrator with an excellent educational background, a strong publication record, and extensive expertise in commodity marketing, trade and policy analysis, futures market and technology dissemination & large-scale impact for smallholders.

He is an excellent communicator at all levels. Mr. Samarendu Mohanty is a native of Bhubaneswar, Odisha. In the 1980s, engineering was at its peak, and everyone, including Samarendu and his friends, desired to attend engineering college.

With just two engineering colleges (Rourkela and Burla) in the state at that time, Mr. Mohanty attempted entrance exams for two years but was unsuccessful.

However, he never gave up and proceeded to Bangalore for his bachelor's degree in agricultural marketing and cooperation, where he completed his degree as a topper with nine gold medals.

After completing his bachelor's degree, he proceeded to the United States for his master's degree with full scholarship and later completed his doctorate in agricultural economics. He worked as a professor both at Iowa State Uni-

versity and Texas Tech University for 15 years. After spending 20 years in the United States, he decided to return to Asia. He joined as the head of the social sciences division and program leader at International Rice Research Institute (IRRI) in the Philippines.

After spending 9 years at IRRI, he joined International Potato Center (CIP) as the Asia Regional Director.

Soon after joining CIP, he realized that potato seed is the biggest constraint for millions of poor potato farmers in India, particularly in Odisha. Therefore, he brought a new low-cost seed production technology "apical rooted cutting (ARC)" from Vietnam.

Kindly inform us more about (CIP) and how (CIP) works globally.

"The International Potato Centre (CIP) is non-profit international agricultural research organization with a global mandate to conduct research on genetic resources of potatoes, sweet potatoes, and other Andean roots and tubers, crop genetic enhancement and improvement, integrated crop management and sustainable management of natural resources."

"Our genebank is one of the largest in vitro genebanks in the world and contains the global collection of potato, sweetpotatoes and Andean root and tuber." "In the last five decades, CIP has supplied over 14,00 accessions (ad-

vanced clones, parents and true seed families for clonal selection) of diversified potato groups to India to develop new varieties through breeding or release locally adapted varieties."

"Similarly, in case of sweetpotato, CIP has exchanged elite germplasm that were procured from CIP-Lima. In 2018, CIP provided 20,000 orange flesh sweet potato true seeds to Central Tuber Crops Research Institute (CTCRI)."

"We also work in several states in India including Odisha, Haryana, Karnataka, Bihar, Assam, Meghalaya, Tripura and others in improving livelihood of potato and sweetpotato farmers through new varieties, quality planting materials and market linkages."

Is there a factor or barrier preventing Odisha farmers from progressing, particularly in potato farming?

"At present, Odisha agriculture is mostly subsistence in nature, with a majority of the farmers growing crops for their own household consumption."

"Rice is the primary food crop grown in the state, occupying slightly less than half of the total gross cropped area, and 90 percent of the total rice is produced in the kharif season using monsoon water." "With the problems in traditional food baskets of India, the country will be looking more and more at Odisha and other eastern states to expand rice area in the rabi season using



groundwater to contribute to national food security." "But this will require the use of highly precious groundwater to produce water-guzzling rice crops in the rabi season (5,000 liters of water are used to produce one kilogram of rice). The expansion of irrigated rice in the rabi season is unlikely to provide the necessary boost in income to most of the farmers in the state."

"Odisha needs to be proactive in transforming rice-centric subsistence agriculture into a diversified farming business. This will improve the livelihood of small farmers and make it attractive for rural youth to take up agriculture as a business."

"The state should start developing agricultural infrastructure, including irrigation, cold storage, market linkages, and mechanization, among others, to enable farmers to take up high-value agriculture, including fruits and vegetables, highly nutritious and climate-resilient roots and tubers, floriculture, livestock, fisheries, and milk production."

"To allow progressive farmers to expand their operations beyond their own small holdings, formalization of land leasing agreements between landlords and tenants is needed."

"This will remove the fear on the part of landlords of losing the land to tenants and, at the same time, tenants will be recognized as the operators of land and they can apply for an institutional loan, insurance, and disaster relief."

"But at the same time, the state needs to be prudent in its use of ground water in transforming the agriculture sector. Not many states in India have more than 3 million hectares of fallow land in the rabi season and groundwater a few meters from the surface level."

"With land and water, Odisha holds the trump card for India's future food and nutrition security. If not prudent, the state can easily fall into the same trap as Punjab and Haryana with high environmental degradation and depleted groundwater 30 years from now." "These states are now facing increasing environmental degradation because of the excessive application of fertilizer and pesticide and rapid groundwater

depletion because of double monocropping of rice and wheat." "Couple of years ago, we (at the International Potato Center) facilitated the visit of a group of large potato farmers from Haryana to the state. This group visited several potato-growing districts, including Koraput, Puri, and Cuttack."

"At the end of the visit, many farmers wanted to purchase land in Koraput and start potato cultivation there. They were surprised to learn that the state produces only 20 percent of its requirement. It is high time for the state to develop a fool-proof strategy for transforming its subsistence agriculture into high-flying commercial agriculture."

"To make this happen, the state needs its young minds, both men and women, driving this transformation. Agriculture should be the pride of our state and our farmers should proudly send their sons and daughters into farming without worrying that their profession will be the reason for their being unmarried."

What developments and opportunities available in the agricultural field?

"At present, agriculture is not an attractive career choice for the majority of youth. Social stigma is attached to pursuing farming as a profession. Even a majority of our farmers do not want their children to follow in their footsteps and continue with farming."

"They would rather send them to the city to become a security guard or labor as a waiter in a restaurant or in any other odd job but not become involved in farming. Another angle to this story is that the farmers do not want their children to become farmers because it will be difficult to find a bride."

"The children also grow up with the impression from their school days that farming is not a good career choice. I still remember during my school days when teachers used to repeatedly tell us that, if we did not study, we would end up in farming. Eventually, this becomes engraved in children's minds."

"Despite all this social stigma, the fact is that farming is not attractive for rural youth because it does not provide a decent standard of living." "If one has one hectare of land (that is the average

size of landholding in the state), then this person barely makes INR 20,000 (USD 242) at the end of a rice crop. This means that you make INR 20,000 (USD 242) in five to six months, that is, less than INR 4,000 (USD 48) per month, after all this hard work in the field under hot and humid conditions."

"There is also no guarantee to make that amount because of drought and flood, which can wipe out the entire crop and any profit or even result in lost money."

"Youth will consider farming as a profession only if it is portrayed as a business with decent income potential. It is high time to stop depicting farmers as half-naked men and women toiling in the field like animals. The COVID-19 pandemic should be used to demonstrate that all other sectors can be shut down but not farming. Youth should be exposed to high-tech agriculture that involves robotics, information and communication technology, and nano technology."

"A vibrant and tech-savvy agricultural sector will not only attract youth to be part of it but will also take care of a lot of other problems, including poverty eradication and overall development of the state."

How are you helping the farmers in the state?

"Let me focus on potato because that is what our organization is focusing on in the state and potato is an important staple for majority of population in the state."

"Unfortunately, we are now only producing 20 percent of our requirement and the remaining 80 percent is coming from other states like West Bengal and Bihar. The demand for potato in the state will continue to grow in the future with rising per capita consumption and population growth."

"CIP has been working with the state government and other stakeholders to make Odisha self-sufficient in potato. But the biggest constraint in expanding potato production in the state is the unavailability of quality seeds at affordable price and in a timely manner."

Read full @ <http://bit.ly/3JD2Nfy>

Source : www.potatopro.com



Research

“Microbes have been here since life began, almost 4 billion years. They created the system that we live in, and they sustain it,” said Dan Buckley, professor of microbial ecology in the Section of Soil and Crop Sciences in the School of Integrative Plant Science. “We may not see them, but they’re running the show.” Buckley and five other Cornell researchers, along with colleagues from Lycoming College, described the new bacterium in a paper, “*Paraburkholderia madseniana* sp. nov., a phenolic acid-degrading bacterium isolated from acidic forest soil,” published Feb. 6 in the *International Journal of Systematic and Evolutionary Microbiology*.

The new bacteria, *madseniana*, is named to honor the late Gene Madsen, the microbiology professor who started the research. He died in 2017, before he could confirm the discovery.

All plants and animals, including humans, host a collection of friendly bacteria that help us digest food and fight infection. The bacteria living in soils not only help plants grow, cope with stress and fight off pests, they’re also essential to understanding climate change. The newly discovered bacteria belong to the genus *Paraburkholderia*, which are known for their ability to degrade aromatic compounds and, in some

Newly found bacteria fights climate change, soil pollutants

species, the capacity to form root nodules that fix atmospheric nitrogen. The species name, *madseniana*, reflects the legacy of Madsen’s work in the field of environmental microbiology.

Madsen’s research focused on biodegradation – the role microbes play in breaking down pollutants in contaminated soils – with a special focus on organic pollutants called polycyclic aromatic hydrocarbons (PAHs). His work was groundbreaking in providing natural tools to address hazardous waste in areas where contaminated soils can’t easily be dug up and removed. “Gene was a humble man and a great scientist. I am so happy to see his legacy live on in this way,” said Esther Angert, professor and chair of the Department of Microbiology. “It’s so apt that a bacterium with these traits would be named after this remarkable environmental microbiologist. I think Gene must be smiling.”

The work started in a Cornell experimental forest on Turkey Hill, a natural area stewarded by Cornell Botanic Gardens. Madsen isolated the new bacteria from the forest soil; Buckley’s team brought the project to completion.

Source : <https://cals.cornell.edu>

Bhupinder Jatana Addressing agricultural challenges from the soil up

Bhupinder Jatana grew up helping his father grow rice, wheat, cotton and vegetables on their family farm in Faridkot, India. His favorite job was helping flood the rice paddies, where he and his friends would later play in the muddy water. The work (and play) instilled in him a lifelong passion for agriculture.

In 2013, Jatana graduated with a Bachelor’s degree in Agriculture from Punjabi University. He went on to pursue a Master’s in Agronomy at Punjab Agricultural University where he focused on strategies to improve the growth and productivity of late-sown wheat. Upon graduation, Jatana moved to the United States to begin a Ph.D. at Clemson University. His research combined agronomy, soil science and plant physiology to determine how rendered animal products can efficiently provide nitrogen and phosphorus for crop growth. Jatana’s goal was to eventually have his own lab solving agricultural challenges.

Jatana first discovered NMSP on the hunt for a postdoctoral position. “I saw a postdoc position in Cornell’s Animal Science Department, and I’m a plant science person so I thought,

forget it. But one of my friends said, ‘No, this is a plant science position, you should apply!’”

Though Jatana applied and did not get the position, he was not discouraged. He contacted Quirine Ketterings, director of NMSP, to ask for feedback on his interview. Ketterings thought, “If he’s interested in feedback there is potential for a mentor-mentee relationship, which is critical for this type of position.” So she asked him if he would be interested in joining the team on a different project. Jatana jumped at the opportunity saying, “I was looking for an advisor who could actively mentor me and I saw that in Quirine.”

Source : <https://cals.cornell.edu/>



Question

Q&A

Answer

01

INTERCROP FOR COCONUT TREES

nprabhs : Hi, We have a coconut farm with 1 year old and our area is dry during summer situated in western ghats belt. We are looking for intercrop like trees which also shouldn't harm our coconut trees. We thought of papaya trees, but white insect will harm our small coconut trees as well. So dropped papaya trees. Any other suggestions on this? Also we do like to try exotic fruit trees if possible. Please guide.

Answer 1 : garao56 : Generally arecanut trees are planted in coconut. Cocoa can be planted. Other crops like pine apple, zinger, tapioka, banana, Yam etc can be planted in the coconut orchards. In AP Citrus plants (lime) also planted. G.Anandarao B.Sc(Ag)

Answer 2 : tomvia: You can plant banana for three years or any seasonal veggies or fruits as mentioned by Anandarao

Answer 3 : gounder28 : Hello **nprabhs**, Try Taiwan Pink Koya as udupayir between coconut trees. Yields in 6-8 months of plantation and produces through out the year. The buyer comes to your farm for harvest and pickup and they pay about Rs. 45-50/KG. The plant will yield to 6-7 years and NOT much maintenance require other than pruning often.

Answer 4 : shajathali: The first mistake you did was selection of crop. Coconut is a plant of high water area like delta, river banks. You need to give 50 ltrs of water per day now and upto 80 ltrs in future. If you give less water, you can't grow only coconut trees not coconut. Just remove it, it is only one year old. It's my personal experience.

When you don't have water to coconut itself, how you are planning for intercrop.

02

WHAT CAN WE GROW IN TEAK FARM UNDER SHADES

jeep143 : Hello, Recently we bought teak farm of 2 and 1/2 acre, tree age is about 10 years, these trees occupied entire land and full of shades. Can I grow pepper plants, will they grow without much sunlight and what other plants can we grow? please advise

Answer 1 : rcdixit: Dear Sir You have three options to utilise the farm with shade as follows: (i) grow colocassia(arabi; a moody crop may not grow well (ii) Grow ginger(difficult to grow crop) (iii) Turmeric(easiest to grow and will give good returns) You can get turmeric roots from us and grow organic turmeric products. Pepper can not be grown since it requires



min 70% sunlight. You can get pepper saplings from us if you need. You can also grow yam/sooran which becomes most demanded item during Diwali.



Answer 2 : vrikshaay: There are many highly priced herbs including many rare and high value tubers and fruits etc. that can be grown under and on Teak, as companion crops, if there is sufficient supply of water - On Teak means climbing vines that bear fruits / flowers / tubers on the vines - there are many such highly priced fruits / flowers / tubers used as remedy for many diseases as per recent research findings. We can provide complete consultancy for such cultivation, and supply all required seeds / saplings and also provide support for marketing of the products cultivated as per our advice.

Please contact us privately by clicking on our name on the left > start conversation (because it is a rule not to provide contact details in public posts in this site and do it by private conversation only).

Answer 3 : daram venkat reddy: Hai Sir, I have planted eucalyptus trees 9 feet x 4 feet...middle of 9 feet, can we plant ashwagandha seed...please suggest me... Las

Answer 4 : rcdixit : No. Ashwagandha requires full sun

Answer 5 : suhalsuta : Pepper plants typically require at least six hours of direct sunlight per day to thrive, so growing them in shaded areas may be challenging. However, there are some pepper varieties that can tolerate partial shade. For other crops, leafy greens, herbs, and certain fruit trees like mango and avocado can tolerate partial shade. It's important to consider the soil quality and pH levels on the teak farm and consult with local agricultural experts for more specific advice on suitable crops. S

03

NEED GUIDANCE FOR ORGANIC FARMING

poultry90: Hi, Kindly assist to share the soft copy for the study materials to my email address below, I own a 20-acre land in Bangalore and I'm currently working outside India. I'm keen to know more about organic farming to cultivate crops to serve our people in a healthy way.

Answer 1 : jkan8a5f: Hello Advertiser, I'm Mr. J. Kantharaj, resident of Bangalore. Have good knowledge about organic or natural farming practices to be adopted in our farms to get pure organic products. I don't have any research papers to give you, it's years of practice thru which I had gained some knowledge. If interested in converting your land to organic / natural farm, foremost is you must have pure natti / desi cow. Without there is no way, your wish can be solved. Send a mail with your contact details, location of your farm, & what's happening in farm as of date. Can send what all has to be done to convert the land suitable for giving organic products in return, it's not magic &

Question

Q&A

Answer

wont happen in few months, the day you stop applying dangerous fertilisers etc & proceed with farm made inputs (few materials have to be sourced from outside, for some time,) Respond to me if interested . Hope to hear from you. Bye

04

WHAT ARE THE NAMES OF A FEW ORGANIC FERTILISER THAT ARE SAFE?

tanvitri: Hello. I am looking for an organic fertiliser that is safe to use in my vegetable garden. What are some of the best organic fertilisers that are available on the market and what are their benefits? I am also looking for an organic fertiliser that is effective in promoting plant growth.

Answer 1 : cropexind: Dear Farmers, Our support and dedication is fully towards safe harvesting, as a manufacturer of fertilizers we supply plant fertilizers for the rapid growth of plants, you can explore our site to choose a variety of farming products for all climatic condition and better yielding of rice, wheat, fruits, vegetable plants.

Answer 2 : kingjing: There are many organic fertilizers that are safe and effective for use in gardening and agriculture. Here are a few examples:

Compost: Compost is a natural fertilizer made from organic matter, such as vegetable scraps, leaves, and grass clippings. It is a rich source of nutrients and helps to improve soil structure.

Manure: Manure from cows, horses, and chickens is a good source of organic fertilizer. However, it should be aged or composted before use to avoid the risk of pathogens.

Fish emulsion: Fish emulsion is a liquid fertilizer made from fish waste. It is a good source of nitrogen, phosphorus, and potassium, and is often used in organic gardening.

Blood meal: Blood meal is a dry, granular fertilizer made from the blood of animals. It is a good source of nitrogen and is often used to supplement soil lacking in this nutrient.

Bone meal: Bone meal is a dry, granular fertilizer made from ground bones. It is a good source of phosphorus and calcium, and is often used to promote root growth.

It is important to note that all fertilizers, whether organic or synthetic, should be used in moderation and according to package directions to avoid over-fertilization and potential harm to plants and the environment.

Answer 1 : jkan8a5f: Hi Guy's - There are umpteen organic or natural inputs from growth promoters to pesticides to fungicides, etc etc. All these can be made in the farm if you have a pure desi cow plus a few organic cultures that has to be bought. In one year your soil will revive into healthy soil & give you organic



food thru veggies / fruits / cereals etc etc.

You need a person to prepare these items at your farm on contract basis, you may contact us. Anywhere in Tamilnadu & Karnataka I can visit & prepare the needed products.



05

OYSTER AND MILKY MUSHROOM FARMING

ravi41977: I want to start oyster and Milky mushroom farming. But core issue is about marketing of that. My location is distt Ghazipur. It's 90 km far from holy City Varanasi on Patna route. I am looking for buyers of these mushrooms. Any suggestions/feedback/buying interest . Kindly contact me directly. Thanks

Answer 1 : garao56: Generally mushrooms have to be marketed locally ie., in near by cities and markets

Answer 2 : pra9626: Hi, We required huge quantity of milky mushroom in urgent. per day asking qty of 50kgs.

Answer 3 : rohitcj: Hi, We are cultivating Organic milky/oyster mushrooms in Chennai. Our mushrooms are made in extreme hygiene condition with no chemicals involved.

06

NEED RECOMMENDATIONS FOR FARMING NEAR PUNGANUR, AP

gopipc: We are planning to go for scientific farming in Punganur (Andhra Pradesh). Climate is similar to Bangalore's climate. The intention is to support our orphanage expenses with the expected profit from farming. Any recommendations?

Answer 1 : stevifarm: Hi we have buy-back arrangements for stevia and medicinal plants. Contact me .

Answer 2 : vasudh: Good Morning Gopipc Jee ! I am suggesting you to go for Passion Fruit which is an easiest mean and having Good Market. As suggest on Brother Taiwan Guava is also better but the Market is up and Down and need to wait for the yield.

gopipc: Thanks for the suggestion. Do you have details on passion fruit including economics and buy back arrangements?

Answer 3 : vasudh: Yes Sir Considering the Nutrition and Easy Farming , it will have very Good Market. One has to asses the Market based on the quality, usability, value for Money,

Health Benefits (Because the Future Market will be on Health Conscious in view of the Environment , attack of Bacteria, Virus etc... etc... We can provide seedlings during June-August.

















Kindly don't hesitate to contact us for any Further Details considering us as Farming Consultants

Answer 4 : garao56: Sri Gopic, First of all give particulars of land, location, irrigation facilities etc. In your opinion what crops are better for growing on the lands.

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