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Agriculture & Industry Survey

India's Leading Business Magazine for Agriculture

Dr. Vandana Sharma

Mr Benjamin Raja

Mr Biju Purayil

Mr Pradeep Palelli

Senthamil Selvan

Arivuthottam was a barren piece of land when Mr Senthamil purchased it. Today it is the realistic example depicting organic farming is possible and profitable.

Azlan Mohammed Shakib

With an eye for design and a heart for agriculture, Mr Azlan has been hands-on with Aquaponics and Permaculture for the last 6-7 years now.

Benjamin Raja

Low agricultural productivity in a land blessed with the best of climate, soil and sunshine seems like a puzzle to figure out. Mr Benjamin Raja, through his research, concluded that the missing piece of the puzzle is lack of precision agriculture.

Biju Purayil

An IT trio decides to leave the corporate world to make a difference in the world. Discussions and debates finally zero down to agriculture.

Pradeep Palelli

"At Thanos Technologies we work in the agricultural domain; that is, designing, building and operating agricultural spraying drones.

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CONTENTS

Print media and the digital media in a Covid dictated world

Learning the online work culture!

It is a totally new experience! It seems a long way indeed!

One new learning is that sometimes big changes, be it high tech or even simple things come not by inventions and innovations they seem to come in a very sudden, brutal physical changes or happenings.

The coming of the Covid pandemic is one such event that has thrown the entire word into a spin. We don't know for certain how long. The pandemic lasting and how we, our lives will all change and what new world, we are going to confront and how the future is going to unfold.

One big unexplored world is the world of work. We have worked so far in a settled, office environment. From now onwards we have to work in a remote online, digital ways. So, it looks everyone of us seems to be learning.

Even in the Western societies there is confusion and contradictory voices. There have been so many U turns!

In the USA, it is hellcat the White House and the coming General Elections would be a landmark. The migration problem is going to create new tensions in all the Western countries. Indian migration to the USA and UK is not going to be easy. Inside India, we have to sort out issues, as the government is going to see new challenges from the way the Centre-State relations are building up.

New elections inside India is going to throw up many pressures on our well-regulated Constitutional norms, each regional party is doing things, not in high Constitutional manners. Corruption is going to be a new challenge.

You can't run the elections under the very opaque manners. The major national parties, the Congress and the BJP are now strictly respecting the electoral laws and norms. So, what role the media once well-respected, today everyone joining and changing parties. So, media, both print and online with the new tech tools like Social Media have to do their legitimate jobs and we have to analyse the issues and ponder over the role of media, print, TV, online and also such issues like fake media, media monopolies etc.

Today we live in a very different world indeed.

The IT revolution has ushered in an instant information age and the Internet has made us to what we today in the instant email age.

The covid pandemic had enforced a new code of conduct, that is, the digital revolution in all spheres. Our education and office systems all have been forced to adopt and online work culture in all our activities.

Among all the industry reviving talk and many new initiatives, the agri sector is perhaps the most unattended one. For us, it is our high priority sector, in which we are there for a long term, almost for over a quarter century!

Yes, there are giants in the media meaning print media and they are also facing much more challenging problems.

That is the age-old issue of freedom of the press. Compared to other countries, even big Democracies the freedom of the media is still a sticky question.

There is a visible shift in the mainstream newspapers, many have changed their idea of a free press, they have all turned themselves into captive press and their newspaper criticism and opinion pages have all been almost abandoned and they have all gone soft with the incumbent power holders.

Inside India, this is true while one can guess what is the state of press freedom. As far India is concerned there is this satisfaction of the absence of any ill-treatment of journalists. In other countries, there are more gruesome stories of journalists arrested and even jailed.

We should raise India's image as a moderate political culture-based country and our brand image in comparison with other countries a superior nation of culture and civilisation.

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INDIA'S PLACE IN THE WORLD !

Why the world is so complicated?
We seem to be living in a civilised and yet a contradictory world! Everywhere, from USA to China. Rulers are doing things that don't seem to make s sense!
Why China is antagonising large parts of the world? In Hong Kong, Taiwan and South China sea?

As these lines are being typed there is tension and flare-up on the India-China border in the Ladakh area. And the minds of Indians and, even in the outside world must be disturbed.

Are we living in a civilised world?

Are we living in the 21st century or in some primitive times?

Only we have read in the histories of the Greek and Roman world we have read about the invasions of "Barbarians", the term applied by the Greeks for all foreigners and only these later barbarians finally succeeded and the Roman Empire got weakened. And fell apart in the 7th century and the world went through a dark age.

In this time and historic point it is really galling to see some dictators are still indulging in territorial aggression!

Territorial aggression today's world is perhaps the most uncivilised conduct. Yet you see what is happening in Ukraine and Belarus and in the middle eastern countries.

India, next to China, ironically or otherwise carry the world's largest populations, China with 1.44 billions and India 1.36 billions and yet the Chinese regime known for its finicky sensitivities don't care for dialogue and exchange of views and learn to resolve disputes in a civilised manner.

To come to underhand deals is not diplomacy and it is this underhand deals seem to have led to the latest flare-up.

Now, turning to the domestic scene there are issues and issues arising out of our day to day events.

One the economy seems to be caught in a bind. The finances are in shambles and the Finance Minister is not seen in public and the banks are also in a difficult position. The industrial scenario is mixed. Auto sales seem to be picking up somewhat.

But it seems a long journey.

As for agriculture, there is good news. The agri scene is upbeat, the extent of the Kharif sowing is picking up, thanks to improved rains. There is the very positive sales of tractors, the three major tractor making firms have reported almost doubling of units sold compared to last year and this must boost the spirits of the policy makers. However, that we like to draw attention is that the spirits at the grassroots are still confused, jobs are not coming along too soon and we need definite policy articulations that must enthuse the general public.

Yes, there has been good rains and much farming activity. But what about the generation of employment beyond the one scheme, the 100 days employment guarantee scheme?

The future of the cities in terms of governance and expansion are still vague. The Covid has proven that the urban density in the absence of real estate moving towards the suburbs is going to create more problems that solve future urban issues.

May be the need to get the mayors of the bigger cities must be elected directly by the city dwellers instead of the present day councillors methods so that the mayors might have more powers to spend the resources and also become more accountable to the urban citizens.

Also the future cities must be more widely disbursed with the current expansion of urban transport, with more and longer metro services so that there is enough space for people in the cities and the inevitable growth of slums are not going to disfigure our future cities.

Much more important is the sort of society, we visualise in the future growth of cities.

Also the quality of governance is very much tied to the larger question of civil society participation in urban governance.

We have seen recently many videos of European cities, the urban scene there is very different, very opitimistic and very open and we see a happy urban population going through their daily routines. There are so vast pedestrian spaces, all urban lines, both trains and trams seem to have been taken underground so that there is lot of space over ground and the parks are vast and green.

May be our planners must have toured the Western cities and have seen the very fantastic new architecture that makes some of these cities a delight and so much fulfilling !

The contrast between these cities and ours here is so striking. Where are our enlightened, public spirited citizens? Where is our new generation educated enlightened public spirited elite?

Here the sort of people who enter politics is anything but enlightened. You have to see some of the more well-governed States that have fallen into a rut.

How to expect the villages, the small communities, the minorities to fell secure and self-reliant.Self reliance country would emerge only where there is an air of freedom and democratic governing institutions.

So, what we are advocating is a honest self-introspection and not feeling complacent and defending blindly all our mistakes in governance.

Let us do many new radical changes in our rural governance.

Our plea is that the Indian elite must learn to live in this contradictory world!

We, the people, must become more committed and learn to live more courageously and Independent mindedly!

Agritech cos receive $532 million investment till March this year!

Agritech companies have received an investment of USD 532 million till April this year for growth and tap the market that has the potential to reach USD 24 billion by 2025, according to an EY report. "India's burgeoning start-up ecosystem has been actively playing its part in disrupting the agriculture sector. Agritech start-ups are operating in an attractive market with an estimated potential of USD 24 billion by 2025," EY said in its report 'Agritech - towards transforming Indian agriculture'.

The agritech is helping in solving many challenges across the spectrum of the traditional agriculture value chain. The potential of agritech market can be segmented into supply chain tech and output market linkages (USD 12 billion), financial services (USD 4.1 billion), precision agriculture and farm management (USD 3.4 billion), quality management and traceability (USD 3 billion), and market linkages -farm inputs (USD 1.7 billion), the report said.

However, despite witnessing strong investment activity in the last few years, market penetration in the sector is still very low at around one per cent, it added.

"Agritech players operating in the addressable segments in India have received a cumulative investment funding of USD 532 million as of April 2020," said Ankur Pahwa, Partner and National Leader – E-Commerce and Consumer Internet, EY India.

The global investors can harness their learnings from their success stories in the agritech segments to help them realise their full potential in India, he added. Pahwa said there would be consolidation in the industry as larger players begin to acquire regional players to achieve scale in market linkages as also extend into other service domains.

Source : economictimes.indiatimes.com

PM Modi pitches for taking farm education to middle school level

Prime Minister Narendra Modi pitched for taking farm education to middle school level, saying necessary reforms have been made in this regard in the National Education Policy (NEP) 2020. "There is a need to take knowledge related to agriculture and its practical application to school level. Efforts are (on) to introduce the Agriculture subject at middle school level in villages," Modi said. This will develop agriculture related understanding in students and enable them to give information about agriculture, its modern farming techniques and marketing, to their family members, he said, adding this will promote agro-entrepreneurship in the country.

"For this, many reforms have been made in the National Education Policy," Modi said in an address after the virtual inauguration of college and administration buildings of Jhansi-based Rani Lakshmi Bai Central Agricultural University.

The NEP approved by the Union Cabinet last month replaces the 34-year-old National Policy on Education and is aimed at paving the way for transformational reforms in school and higher education systems to make India a global knowledge superpower.

Asserting that steady efforts are being made to connect farming with modern technology, the Prime Minister noted that research institutions and agricultural universities have a vital role to play.

Currently, there are three central agricultural universities in the country, compared to just one university six years ago. Besides this, three more national institutions -- IARI Jharkhand, IARI Assam and Mahatma Gandhi Institute for Integrated Farming in Motihari, Bihar -- are being established.

He remarked that these institutions will not only give new opportunities to students, but will also help in increasing their capacity, in providing technology benefits to the local farmers. Modi further said in the last six years, the government has endeavoured to establish a link between research and farming, and to provide scientific advice to farmers, at the ground level in villages.

He sought the cooperation of the universities in developing the ecosystem to streamline the flow of knowledge and expertise from campus to agriculture fields.

On use of modern technology in tackling farm sector challenges, Modi cited the recent locust attack and said the government worked on war footing to control the spread of the attack and to reduce the damage.

He mentioned that dozens of control rooms were set up in several cities, arrangements were made to alert farmers in advance, and drones were supplied for spraying pesticides. Besides, dozens of modern spray machines used to kill locusts, were procured and provided to farmers.

Asserting that the farm sector has a major role to play in making India 'Aatmanirbhar' (self-reliant), Modi said, "When I talk about aatmanirbhar in agriculture, it is not limited to foodgrains but the self-reliance of a village/rural economy." Self reliance in agriculture aims at making farmers both producer as well as entrepreneur. The growth of farmers and overall farm sector will lead to creation of jobs at village level, he said.

Read full @ https://bit.ly/3jMevVk
Source : timesofindia.indiatimes.com

Escorts surges 5% as tractor sales grow 80% YoY in August

The company's management remains optimistic for the coming festive months

Shares of Escorts gained 5 per cent to Rs 1,143 on the BSE after the company reported a strong 80.1 per cent year-on-year (YoY) jump in tractor sales in the month of August, 2020. The company's Agri Machinery Segment (EAM) sold 7,268 tractors, its highest-ever August sales. It had sold 4,035 tractors in August 2019. On month-on-month (MoM) basis, the volume was up 36.6 per cent, Escorts said in a statement. The market sentiment continues to be highly positive with good monsoons, better Kharif sowing, crop prices holding up well and good supply of retail finance, it said.

The management remains optimistic for the coming festive months. The supply side situation improved significantly as compared to last month.

"We are currently operating close to peak capacity now. In August 2020 we could build some inventory both at dealer and depots, which since last few months was at very low levels," the company said. Escorts reported 79.4 per cent YoY growth in domestic tractor sales in August 2020 at 6,750 tractors against 3,763 tractors in August 2019. The export tractor sales in August 2020 were up 90.4 per cent YoY at 518 tractors against 272 tractors sold in August 2019.

Analysts at ICICI Securities believe the demand trajectory would continue to remain healthy in coming quarters, courtesy positive farm sentiment, backed by a good Rabi harvest, remunerative crop prices, adequate water table levels, ongoing normal monsoon progress and expectations of a strong Kharif output. Lower incidence of Covid-19 in semi-urban, rural geographies is a further positive, while continued government focus on rural incomes and infrastructure along with underpenetrated nature of overall farm mechanisation products remain structural tailwinds in the medium to long term, it said.

www.business-standard.com

How has Covid-19 helped reduce farmer suicides in Punjab

As per Punjab Revenue Department record, over the last four years, on an average 40-42 farmers/farm labourers took their own lives every month in the state. The Indian Express explains the decline in cases of farm suicides during the pandemic outbreak in the state.

Over the past three months, which included the lockdown period and the unlocking that started unfolding since June 1, around three dozen farmers and/farm labourers have committed suicides as per the reports collected by the farmers' organisation across the state.

According to this figure, on an average around 12-13 farmers took their lives per month over the past three months. This number though is very high, still it is about 70 per cent lesser than suicides per month that the state was recording prior to the lockdown.

As per Punjab Revenue Department record, over the last four years, on an average 40-42 farmers/farm labourers took their own lives every month in the state. The Indian Express explains the decline in cases of farm suicides during the pandemic outbreak in the state.

Robots to help farmers to water agricultural fields in Telangana

They can also collect the data and use it for future planning, which is the second part of this hi-tech plan.

If all goes well, you may soon find robots watering agricultural fields in Telangana. Though in its initial stages, this is one of the aspects of the State government's proposed plan to include emerging technologies in farming and allied activities.

The government, in collaboration with Professor Jayashankar Telangana State Agricultural University (PJTSAU) and the World Economic Forum (WEF), has been working to explore the various use cases of data-driven agriculture in Telangana.

Though it had announced the program as Artificial Intelligence for Agricultural Innovation (AI4AI), the features go beyond the ambit of AI and includes components such as remote-sensing satellites, robotics and the Internet of Things (IoT), among others.

According to experts, data-driven agriculture would help farmers monitor their land and crops — the first key component of the project. "Farmers can monitor the soil, weather, input demand, seed demand and so on — the entire value chain of agriculture — through big data," V Praveen Rao, Vice-Chancellor of PJTSAU, said.

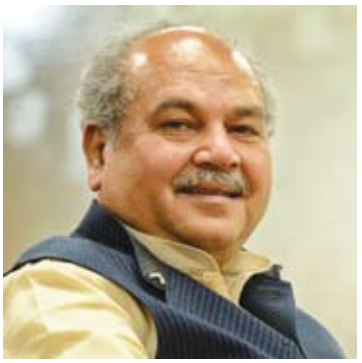
They can also collect the data and use it for future planning, which is the second part of this hi-tech plan. "Farmers can analyse the data and find out what is good for the farm. For instance, if they put a sensor in the field, they will get inputs that may help reduce costs and improve quality," Praveen Rao said.

The data gathered from the sensor in their farms can help predict the yield, based on which farmers can gauge how many harvesters they would need, Praveen Rao said. The third component of the project is 'precise delivery', which involves technologies such as drones or robotics.

Source : newindianexpress.com

SBI links YONO Krishi with govt portal

For delivery of horticulture seeds at farmers' doorsteps



The integration was launched by Agriculture Minister Narendra Singh Tomar in presence of SBI Chairman Rajnish Kumar on August 26, the lender said.

The country's largest lender SBI said it has integrated YONO Krishi platform with government's first online horticulture seed portal to facilitate delivery of high quality seeds at farmers' doorsteps. YONO Krishi integrates with ICAR IIHR seed portal to reach out to 2.7 crore customers registered on YONO, SBI said in a release.

The Indian Council of Agriculture Research (ICAR) has been bringing new innovations in agriculture through research and development since last 91 years. Indian Institute of Horticulture Research (IIHR) team has brought out a digital portal for farmers to purchase seeds of high yielding and disease resistant varieties, it said.

Farmers across the country can shop for IIHR variety of seeds suitable for different climatic zones and geographical areas, SBI said. It will empower farmer customers to purchase the high yield, high quality seeds being sold by the research institute.

"Wherever technology has been used, it has helped the rural areas significantly, in which banks have made significant contribution over the years. State Bank of India, being the largest bank, has played a pivotal role all along," Tomar said.

With this integration of ICAR-IIHR with YONO Krishi, farmers will be able to purchase seeds certified by the research institute, the minister said.

He said the entire amount of government schemes is reaching directly to beneficiaries due to transparency and SBI has contributed in implementation of government initiatives like PM-Kisan, Prime Minister Jan Dhan Yojana as well as transparent payments to the identified beneficiaries of the subsidies.

"This is another step towards fulfilling the dream of Prime Minister Narendra Modi of doubling farmer's income by 2022. With a digital-first approach, it is part of our continuous endeavour to provide innovative digital banking solutions to all our customers across the country," the SBI chairman said.

SBI's one-stop YONO (you only need one) digital platform which was launched about two-and-a-half years ago has seen more than 56 million downloads with over 27 million registered users.

YONO has partnered with over 80 e-commerce players in more than 20 categories and has also forayed into global markets such as the UK and Mauritius.

Source : www.financialexpress.com

Dubai sets up trading platform to connect Indian farmers to UAE food companies

The UAE and most other Gulf states import the bulk of their food, largely because their arid climates make crop and livestock cultivation difficult.

A freezone in Dubai has established an agricultural trading platform to connect Indian farmers with food companies in the United Arab Emirates, as the Gulf Arab country seeks to enhance its food security amid disruption of supply chains caused by the coronavirus.

The Dubai Multi Commodities Centre's platform, named Agriota and developed with India's CropData Technology, will enable trading in cereals, pulses, oil seeds, fruits, vegetables, spices and condiments.

The UAE and most other Gulf states import the bulk of their food, largely because their arid climates make crop and livestock cultivation difficult. They also depend on overseas supplies of medical, consumer and industrial products. The UAE has "the ultimate goal of positioning our nation as a world leading hub in innovation-driven food security," Ahmed Bin Sulayem, DMCC's chief executive officer, said in a statement. The government has taken several steps to ensure uninterrupted access to supplies since the virus spread around the world. A food-security council coordinates official efforts, including the stockpiling of essential goods. The country is also looking to farm rice to reduce its reliance on purchases from abroad.- Bloomberg

Indian farmers face Rs 93,000 cr post-harvest loss

E-commerce can address such pressing challenges

Like with labour markets, India's agriculture sector too has been shackled by rigid and archaic regulations. Both these sectors also are state subjects and therefore we also have differing rules that come in the way of any scaling up that any firm would want. Again, like in the case of labour, the government has used the pandemic to issue some quick ordinances to replace existing statues.

Whether these should have been moved first in parliament or in state legislatures is a moot question and the debate will go on for quite a while. The COVID-19 pandemic has indeed changed everything in many ways. Besides impacting the way we live and work, it has also severely affected the economy. Countries have been compelled to take a relook at various sectors and salvage them from the impact of the crisis.

For India, agriculture is in many ways the backbone of economic activity. It still hires nearly 50 percent of the workforce and it is growth in agriculture that catalyzes growth in the manufacturing and the services sector too. Given the discussions that have been going on for decades now, on Agricultural Mandis and on Essential Commodities, it was just a matter of time before some big changes were effected.

Therefore, it was not surprising that some big amendments to the Essential Commodities Act, 1955, Agriculture Produce Marketing Committee (APMC) jurisdiction and laws on interstate trading were announced recently. Besides ensuring better prices for farmers and improving their livelihoods, these reforms have also paved the way for further streamlining of the otherwise unorganized farming sector of the country. For example, it would enable a harmonization of the various taxes that farmers pay to the Agricultural Committee, ranging from 1% in Rajasthan to 8.5% in Punjab.

Such a scenario could prove to be an opportune time for technology adoption. The reforms spearheaded by the government when clubbed with digitization led by e-commerce could benefit the sector at large. In fact, it could go a long way in making agriculture in India a globally competitive sector.

Just like how technology has helped identify gaps and find solutions in sectors such as manufacturing, healthcare and finance, the time is ripe for agriculture to make the most of it. Promising digital solutions such as e-commerce can address pressing challenges, posed mainly by the pandemic in the present time. Let's look at how it can prove to be a key enabler for enhancing the existing agri linkages.

Key benefits of e-commerce

Of the several issues faced by the agriculture sector, e-commerce can solve problems such as high levels of fragmentation in the supply chain, large volumes of produce traded, and quality and costs of products.

Given their access to adoption and assimilation of new technologies in the supply chain, these companies can go a long way in helping to reduce costs. An indirect advantage of this would be empowering farmers, especially those who are not in a position to negotiate better prices for their produce.

This will give them access to capital for adopting technology suitable for enhancing agricultural practices. Speed of the produce reaching from farm to table is also an immense challenge for several farmers in India. E-commerce can help fill in the bottlenecks along the way by setting up an entire channel of the supply chain. This way, they can procure easily from farmers leading to the agriculture market gaining immense speed. Farmers in India are often exploited by middlemen, which leads to excess inventory, leading to loss of their rightful earnings. The transparency and efficiency followed by e-commerce companies will help eliminate at least some of the unnecessary middlemen resulting in inventory reduction, which makes it easier for a farmer to sell their produce to consumers at competitive prices. Besides easing of processes, it can also ensure effective checks to ensure that quality is not compromised in any way.

A farmer puts in tremendous efforts in harvesting the crop and is entitled to reap the monetary outcomes of the hard work. Tech adoption can help with optimum utilization of produce. If deployed thoroughly, it can help in reducing post-harvest wastage by improving market efficiency; give a boost to agricultural content development and its upgradations. Moreover, it can significantly amplify the reach of agricultural products, thus leading to increased cross-boundary selling; produce can be delivered beyond boundaries. Even today, a lot of farmers face constraints when it comes to selling their produce to a larger customer base. E-commerce can solve this issue with their capacity to bring niche agricultural products to nationwide markets. A NASSCOM study of 2019 has suggested that Indian farmers face post-harvest losses amounting to a whopping Rs 93,000 crore.

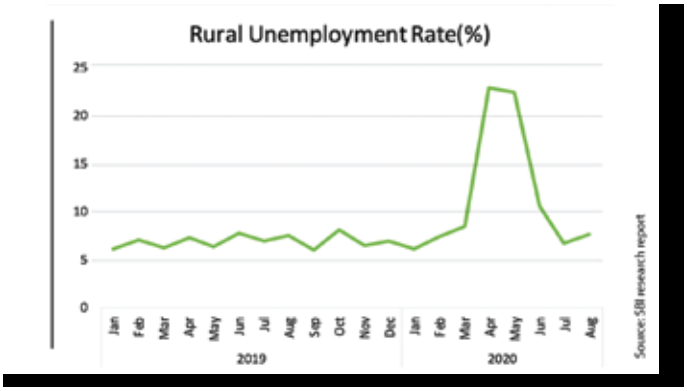
While a slew of agritech startups are trying their best to bridge the gap, adding e-commerce to the mix can further accelerate their work toward boosting farmer income. This will happen when grading of products is enabled, product tracing happens easily and labelling becomes a reality. Digital inclusion therefore would enable most farmers to access a new supply chain that reduces leakages and losses during transportation and allows for a far more efficient supply chain linking the procedure to the plate.

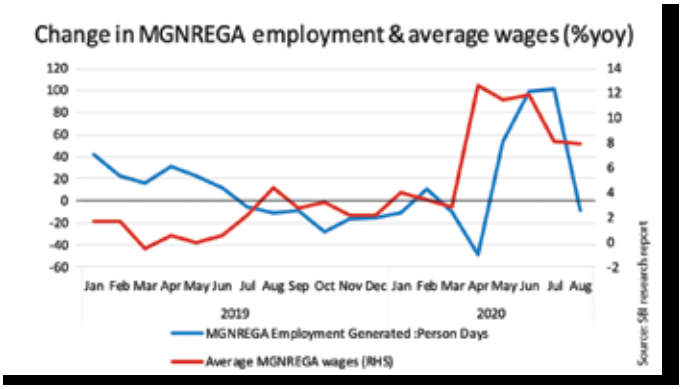
By Amir Ullah Khan

Source:economictimes.indiatimes.com

SBI report says rural economy is losing steam, flags rising unemployment and fall in wages

For 12 Indian states, the loss in state GDP in the current fiscal is mainly due to the rural areas, says the research report by State Bank of India.





India's rural economy may be losing steam after leading the economic recovery in the first few months of the pandemic, a research report released by the State Bank of India said.

Rural unemployment rate has started rising again in August, while employment and average wages under the national rural employment guarantee scheme have fallen, the report said.

The report also pointed out that for 12 Indian states, more than two-thirds of the loss in gross state domestic product (GSDP) in the current fiscal was contributed by rural areas.

Chhattisgarh, Assam, Himachal Pradesh, Bihar, Odisha, Andhra Pradesh, Telangana, Uttar Pradesh and Madhya Pradesh are among the states that are seeing a substantial loss in the GSDP contributed by rural areas.

According to the report, in states like Chhattisgarh, Assam and Himachal Pradesh, more than 90 per cent of the GSDP loss is from rural areas. Bihar at 86 per cent, Odisha at 84 per cent, Uttarakhand at 79 per cent, Rajasthan at 75 per cent, Andhra Pradesh, Telangana and Madhya Pradesh at 71 per cent and Uttar Pradesh at 65 per cent are among the other states with high output losses from the rural sector.

Source : theprint.in

Neglected Indian farmers drove agriculture to 3.4% growth while GDP shrunk by 24% during COVID

The Indian economy contracted by 23.9 per cent in the April to June quarter (Q1 FY 21), marking the first contraction in more than 40 years as COVID-19 pandemic compressed consumer demand and private investments, government data showed.

Trade, hotels, transport and communication saw a dip of 47 per cent while manufacturing shrank by 39.3 per cent. The construction sector took a hit of 50.3 per cent as mining output struggled at 23.3 per cent, and electricity and gas dipped by 7 per cent mostly due to the lockdown triggered by the COVID-19 pandemic.

However, agriculture was the lone bright spot which grew at 3.4 per cent. One reason for this is because the first quarter estimates are based on agricultural production during Rabi season of 2019-20.

Though the lockdown has had an adverse impact on the farmers' income as many failed to sell their produce, the easing of the restrictions came just around the Rabi harvest season, which witnessed a bumper crop this year, partly thanks to some good rains.

India's rabi production in the 2019-20 crop year (July to June) is estimated to be around 149.60 million tonnes, 4.10 per cent more than the previous year. Of that, wheat output is estimated at a record 106.21 million tonnes, which is 2.51 per cent more than last year.

In fact, this was the fifth consecutive quarter of agricultural growth surpassing the growth of the economy as a whole.

In July, Barclays had said that rural India will be key to economic recovery this year and had predicted the growth in agriculture is set to beat a five year average. "A strong start to the monsoon season, high levels of water availability, record sowing levels and rising rural spending indicate that the rural sector is doing well, which could continue for rest of the year," it had said.

Source : www.indiatimes.com

ONLINE MEETINGS

@ www.agricultureinformation.com

Upcoming events

SEPTEMBER 11
11.00 AM
Talk with Mr. Mayank Singhvi on "Dragon fruit farming - A boon to the farmers"

03.00 PM
Talk with Dr Ambika D S on "Current trends in plant protection"

****

SEPTEMBER 14
11.00 AM
Talk with Dr. Mahadev B Chetti on " Agri Entrepreneurship"

03.00 PM
Talk with Dr. Narendra Kumar Gontia on "Enhancing crop production and farm profit with use of different technologies"

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SEPTEMBER 15
11.00 AM
Talk with Mr. Jagmohan Singh Nagi on "Agripreneur from Amritsar on innovative farming"

03.00 PM
Talk with Mr. Gowthaman S.K. on "Uses of organic coir pith"

****

SEPTEMBER 16
11.00 AM
Talk with Mr. Kishor Kumar Sutar on "Opportunity in flower cultivation and subsidy facility - Exotic flowers like orchid, gerbera and dutch rose"

03.00 PM
Talk with Mr. S Rao Chittajallu on "Vegetables & fruits perishability problem and solutions"

****

SEPTEMBER 17
03.00 PM
Talk with Mr. Nithin Alex on "Mangosteen cultivation and marketing"

****

SEPTEMBER 18
11.00 AM
Talk with Dr. Sudeep Tandon on "Distillation, purification& storage of essential oils from aromatic plants"

03.00 PM
Talk with Dr P. K. Agrawal on "My research experience with developing more than 25 crop varieties in maize, rice and other crops"

****

SEPTEMBER 21
11.00 AM
Talk with Mr. Rajpal Singh Gandhi on " Stevia farming, processing and marketing - my personal experience"

****

SEPTEMBER 22
11.00 AM
Talk with Mr. Sivarao Kshirasagara on "Growing wheat grass and other grass in a profitable way"

03.00 PM
Talk with Dr. Satyanarayan Dahyalal Solanki on "Business opportunity in producing quality seeds"

****

SEPTEMBER 23
11.00 AM
Talk with Mr. Rajshekhar Patil on "Bamboo farming changed my destiny"

03.00 PM
Talk with Dr. Zilleali Haider on "Small millets - cultivation, processing and industrial uses"

****

SEPTEMBER 24
11.00 AM
Talk with Mr. S A Gopalakrishna on "Mechanization in agriculture and horticulture"

****

SEPTEMBER 25
11.00 AM
Talk with Dr. T N Balamohan on "Ultra high density planting in guava"

03.00 PM
Talk with Dr. Pratap Singh Panwar on "Livestock Production & Management"

****

SEPTEMBER 28
11.00 AM
Mr. Kalidas Raj on "Chrysanthemum cultivation in open & protected areas"

03.00 PM
Talk with Mr.Anant, Poddar on "Poddar Farms is a hydroponics based farm-to-fork company that grows and delivers superior quality zero pesticide vegetables"

****

SEPTEMBER 29
11.00 AM
Talk with Talk with Mr. Naresh H. Chauhan on "Benefits of agro and food processing machines"

03.00 PM
Talk with Mr. Adarsh Kumar on "Cultivation of lemongrass and palmarosa for oil extraction"

****

SEPTEMBER 30
11.00 AM
Talk with Padmashri Shri.Hukamchand Patidar on "How an organic farmer became a businessman?"

03.00 PM
Mr. Raj M on "Moringa- Cultivation guide and market opportunities"

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Talk with Mr. Soundararaja Veerasamy on " Herbal processing and extraction technologies"

Mr. Soundararaja Veerasamy, Consultant - Herba Extract is a Post Graduate Chemical Engineer and has 30 years experience in herbal processing industries. He is associated with export oriented herbal processing unit manufacturing and project executions in senior management level. He has undertaken consultancy assignments with number of small and medium scale industries on both chemical processing and herbal processing filed and traveled abroad for technology transfer and project execution.

Talk with Mr. Rishi Ram Prashar on ' Apiculture - Opportunities and Challenges '

Mr. Rishi Ram Prashar, Founder of Parashar Bee Farm is a Bee keeper and an Agriculture graduate, from Barna District, Kurukshetra, Haryana. He has about 14 years practical working experience in beekeeping, honey production, bee pollen, propolis and marketing. He is also conducting training on Apiary and educating fellow farmers to start Bee keeping venture. Mr. Prashar says, "Bee keeping is mainly based on natural elements such as flowers, climate and Bees per unit area".

Talk with Mr. Siddaraju K.A. on 'Innovative Marketing - Directly connect Farmers and Consumers'

Mr. Siddaraju K.A. is the Chief Executive Officer Anekal Horticulture Producers Co.Ltd. says his organisation, comprising growers of a variety of vegetables including English cucumber is now selling its produce directly to consumers on streets of various localities in JP Nagar. Refer the article link https://bit.ly/2XBDQbg

Talk with Mr. Satyanarayana Choppavarapu on " All about Melia Dubia tree cultivation "

Mr. Satyanarayana Choppavarapu , Managing Director of SANF Greenmens Pvt.Ltd. has 7 years practical experience in Melia dubia cultivation and integrated farming system. They are into supplying plants and also provide consultancy for melia dubia, sandalwood and bamboo plantation. To know more view https://bit.ly/2ySBr3F

Talk with Mr. Parashuram Patil on " Advance Production Practices in Turmeric Cultivation "

Mr. Parashuram Patil, Scientist - Horticulture in ICAR-BIRDS KRISHI VIGYAN KENDRA, Belagavi has done M.Sc. Horticulture (Fruit Science) with NET qualified. His area of interest in agriculture is Horticulture (Fruit Science, Vegetable Science, Floriculture, Plantation, Spice, Medicinal, Aromatics and Post harvest handling of horticulture produce) organic farming issues.

Talk with Dr M. Vishwanath on "Cultivating flowers for domestic and export markets"

Dr M. Vishwanath is the Joint Director of Horticulture, Bangalore Division and Managing Director of International Flower Auction Ltd., Bangalore. This will be an online discussion about the potential of both export and domestic flower market. To know more view https://bit.ly/3creTV9

Talk with Mr. Parthasaradhi Nara on "Organic, natural farming & marketing organic produce"

Mr. Parthasaradhi Nara, Founder of Organic Anantha Products LLP is born and brought up in agriculture family. He has done M.Sc (Computer Science) and worked in IT sector for 11 years. He says because of his family background and issues in farming , he choose agriculture. To know more view https://bit.ly/3ccKpHo

Talk with Mr. Nitin Goudar on "Sandalwood cultivation"

Mr. Nitin Goudar , Sandalwood Plantation Consultant and Founder & CEO, Darvi Group has done B.Sc. (Forestry). They have been into developing agroforestry plots across South India, future agriculture scope and shift in conventional agriculture. His area of interest in agriculture is agroforestry and organic farming. To know more view https://bit.ly/379JMwt , https://bit.ly/2YaKmWP

Talk with Mr. Ramchandra Appari on "Tree Transplantation - How I have translocated more than 15,000 trees?"

Mr. Ramchandra Appari, Founder of Green Morning Horticulture Services Pvt. Ltd., has done Masters in both Entomology and Agri-Business Management. He has exemplified the unification of innovative ideas in the traditional method of landscaping with an objective to bring modern agriculture into the corporate sector and earning millions by paving the transformation in traditional landscaping. To know more view https://bit.ly/2zwzlGv

Talk with Dr Barathi Nambi on "Commercial production of bamboo in India"

Dr. Barathi Nambi an Agricultural Scientist , Growmore Biotech Ltd. has done his doctorate in agriculture and has hands on experience in plant tissue culture and cultivation of 85 different species. He has been specialising in bamboo for the past 15 years for large scale cultivation, conversion of bamboo into different type of energy products such as Electricity, Bio-CNG, Charcoal, Bio-Ethanol, Bio-Petrol/Diesel. He says his area of interest in agriculture is Bamboo cultivation, Production of Electricity from Bamboo,..... To know more view https://bit.ly/3druuFO

Talk with Mr. Sadananda K on "Mushroom Cultivation - Button, Oyster and Milky Mushroom"

Mr. Sadananda K, Founder of Disha E-Farm has been into mushroom cultivation for the past 7 years. He also conducts practicle training for mushroom cultivation. To know more view https://bit.ly/2WVh9OK

Talk with Mr. Veeresh Mahadeshwara Lingadal on "Red Sandalwood cultivation"

Mr. Veeresh Mahadeshwara Lingadal, Bhuvikas Farm and Nursery has 5 years work experience in agroforestry method in agriculture activities. His area of interest in agriculture is agroforestry mainly mahogany tree, white sandal, & red sandal and horticultural crops.

Talk with Mr. Nitin Goudar on "Sandalwood cultivation"

Mr. Nitin Goudar , Sandalwood Plantation Consultant and Founder & CEO, Darvi Group has done B.Sc. (Forestry). They have been into developing agroforestry plots across South India, future agriculture scope and shift in conventional agriculture. His area of interest in agriculture is agroforestry and organic farming. To know more view https://bit.ly/379JMwt , https://bit.ly/2YaKmWP

Talk with Mr. Natarajan K on "Coconut Farming and Value Addition (Coir Products) "

Mr. Natarajan K is the Founder of Sri Amman Coirs and Sri Vinayaka Coirs, engaged in Coir Products. Mr. Natarajan says they have been doing agriculture for generations and he is into coconut farming and cultivation of seasonal crops. His area of interest in agriculture is Natural Farming and Poultry.

Talk with Mr. Raveesh L on "Natural Farming and Soil Fertility"

Mr. Raveesh L from School of Natural Farming, Tumkur has been into Natural Natural Farming, Dairy, Honey Bees and Mushroom farming for the past 10 years. He says they are into agriculture for generations. His area of interest in agriculture is Natural Farming.

Talk with Dr K. C. Prashanthkumar, IFS, Deputy Conservator of Forests, Mysuru Division

The topic of the discussion will be around the various Forest Dept. schemes to supplement farmer income and shore up the green cover. Refer the article in The Hindu https://bit.ly/3dpCQxq

Talk with Mr. C. M. Suvarna Kumar on "Market opportunities for sandalwood"

Mr. C. M. Suvarnakumar , General Manager(Marketing) of Karnataka Soaps and Detergent Limited who are manufacturers of world famous Mysore Sandal Soap. Mr. Suvarnakumar says they are the worlds largest purchasers of sandal wood in the Country. To know more view https://bit.ly/3hoyRDN

Talk with Mr. Siddalingappa Totappa Melagiri on "Grapes and Banana Cultivation"

Mr. Siddalingappa Totappa Melagiri is a BA Graduate and into agriculture for last 50 years and cultivates various fruits. At present he is cultivating grapes and banana. He says every year he visits various farms in Maharastra to know about the varieties of grapes cultivated and experience of other farmers.

Talk with Mr. Rajesh Singh Rathore on "Tissue culture teak plantation"

Mr. Rajesh Singh Rathore, Managing Director of Vatican Shona Agrotech Pvt Ltd., has practical experience from as a Farmer to Entrepreneur of tissue culture teak project, importance of drip irrigation and soil test. His area of interest in agriculture is financial planning for farmers, small investors and big investors through tissue culture teak plantation. To know more view https://bit.ly/30DNcX5

Talk with Mr. Robert de Bos on "Recent developments in protected cultivation of flowers and fruits in India"

Mr. Robert de Bos, Director/Consultant , Bangalore Plants First Pvt. Ltd., holds a BSc. degree in Ornamental Horticulture and a MSc. degree in International Agriculture (Production and Marketing Management) from the Netherlands and UK. Has been in the horticulture/floriculture field for many years as a grower, trader and exporter of many crops, his opinion reflects almost five decades of horticulture/floriculture experience all over the world. To know more view https://bit.ly/3duHTwQ

Talk with Mr. Manoj Kumar "How to create mini and micro fruit forests"

Mr. Mr. Manoj Kumar of Fruitful Future is an electrical engineer and was drawn to Nature and environmental conservation early on by virtue of his association with Environmentalist Professor John C Jacob. The concepts of natural living, nature cure and natural hygiene inspire him. He has attended GSDP (Green Skill Development Program) in propagation of Bamboo at KFRI, Peechi. He has been collecting seeds, creating saplings, planting saplings for the last 22 years . To know more view https://bit.ly/2LIhVtk

Talk with Mr. Mani on "Various kinds of moss available and its benefits for urban greenery"

Mr. Mani HK , Co-founder, Greenopia has done Masters in Product design from National Institute of Design (NID). Mr. Mani says that he was an early age entrepreneur having started his first company at the age of 13 and then later started few other successful startups prior to Greenopia.

In greenopia, Mr. Mani handles the product research. product development and corporate sales. The connection between clients and end-users along with R&D gives him the edge to connect insight from client needs to R&D efforts seamlessly. To know more view https://bit.ly/2TpyDlC

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Talking to

SENTHAMIL SELVAN >>

Agriculturist, Arivuthottam

Whilst Mr Senthamil Selvan's body of work post retirement speaks volumes of how you can truly keep yourself on your toes and excel even after retirement, his Arivuthottam is a visual example of how passion and hard work can create magical outcomes.

Arivuthottam was a barren piece of land when Mr Senthamil purchased it. Today it is the realistic example depicting organic farming is possible and profitable. Arivuthottam comprises of different varieties of rose, jasmine, juhi, marigold, hibiscus, etc. It is home to fruits trees, herbs, vegetables and hosts so much more.

Did you have any prior experience or background in agriculture?

I am from an agriculture-based family. During my childhood days, I used to get involved in the cultivation activities. Then, we lost all the land due to different circumstances. After my retirement, I sold my house to buy this piece of land.

What nudged you to enter into the agricultural sector?

The reasons are many.

I always had this inner desire to be an agriculturist perhaps owing to my childhood experiences and memories.

Also, when I was on the verge of retirement, I was posted in our administrative office and was entrusted to increase the agriculture portfolio. I was in charge of Tamil Nadu and Kerala regions. I have met many farmers during those days along with our field officers whose role was to promote agriculture loans.

In those days, farmers were not open to the idea of taking loans. They feared they wouldn't be able to make sufficient profits to repay the loan.

I am also part of Tamil Nadu Science Forum - a voluntary organisation that spreads awareness to people. In fact I was on a deputation from bank to a total literacy campaign. This gave literacy opportunities to nearly 5 lakh people. So, I was very active in social movements. So, I know their grievances and in the agricultural sector there are many.

Today, the food that we eat is very contaminated with all the fertilizers that is being used in the field. On one side farmers do not get adequate income from their land and on the other hand their produce is full of harmful chemicals. I feel bad for the farmer and the consumer.

Hence, I thought of plunging into farming myself. I wanted to create a model farm and then go about create awareness among farmers and the public.

How big is your farm and what all do you grow there?

My farm is in Vellore district about 10 km from Katpadi. I have 3 acres of land. I have 2 acres of fruit trees - mango, lemon, sapota, pomegranates etc. In the other one acre, I did vegetables like tomatoes, chillies, brinjal and greens.

Do you have people working on your farm?

Yes, I have a permanent staff who takes care of the farm. The first 2-3 years was extremely difficult because i couldn't make adequate income. After 2-3 years, it has become sustainable. I now I can

make profit as well. Now my field is just not used for cultivation, it is also a resource repository.

I invite, college students, farmers and even farmer groups to have interesting sessions on farming. Apart from this every month we conduct a farmers's meeting every third Sunday of the month.

Do you provide training on your farm?

We started by conducting these meetings every third Sunday. We have classes on organic farming, its importance, how to make organic pesticides like panchagavya, etc. Some farmers ask us to visit their farm. We do that as well.

I don't do all this alone. Interestingly, I have a group of engineering graduates who are involved with these activities as well.

How do you irrigate your farm?

When I purchased that land, there was hardly any water provision. There was a well which had run dry about over 10 years ago. So, I dug a 420 ft bore well. That supplied sufficient water to my 3 acres. After 3-4 years, that bore also dried up. So, I dug up another 920 ft bore which is my irrigation source currently.

How do you market your organic produce?

When I took all my produce to the market I realised that nobody really cared how the produce was grown. They gave me the same rate as all the other produce at the market. Mangoes were being sold at Rs 6-7 at my farm. If that is not worse, the buyers then take these mangoes to the juice factory which then just get mixed up in all the mangoes coming from everywhere irrespective of whether it is organic or inorganic. I didn't like that because it does not give any value to the manner in which I had cultivated my crops.

I then introduced it to my friends and family in Chennai, Vellore etc. So, my friends and family became part of my market. Likewise, wherever I go I make it a point to speak about organic farming and the importance of consuming organic produce. In due course I realised that farmers' issues cannot be solved unless farmers themselves become sellers as well. Today, farmers do a lot of hard work but they do not know anything else. If this situation prevails, they will never get genuine rates for their produce. Keeping this in mind, during our monthly sessions we take sessions on marketing.

We have now established a NAM Chandai (NAM Market) NAM stands for Natural Agro Market. We established this market with the help of the State government and the Tamil Nadu State Rural Livelihood Mission. They have also come up with Women's Development System.

Our NAM Sunday's concept is that all the organic farmers will bring along their products and sell them out directly to customers. It doesn't involve any intermediaries. We have this market every Sunday from 6 a.m. to 11 a.m. at the State Government Office premise since it is their day off on Sundays. This way they not just make optimum money, they also get paid immediately upon sale. In the traditional system, they get paid only after 2-3 days of purchase of their produce. Farmers also are spared from parting with any commission money. So, they make better money for their produce, get their money without delay and they have no intermediary amounts to pay off. I am the coordinator for this market.

Another advantage of this system is that if they are selling on Sunday, that is the day they harvest their produce as well. That controls a lot of produce from getting wasted and consumers also get fresh food. The genuineness of the products are established and the buyers know the source of the produce they buy. This resulted in expanding the network. So, it is gaining good momentum and nearby districts have started trying this model as well.

How do we overcome pests in organic farming?

It is a myth that you cannot get rich produce if you don't use pesticides. When you use fertilizers like Urea, you may get an immediate yield. But, this is a temporary phenomena. The usage of chemical fertilizers has been around for around 50 years now. In the course of time, the soil nutrients has been depleted along with the micro organisms present in the soil which is essential for cultivation. Farmers may have a perception that they would gain more yield by usage of chemical fertilizers. Nowadays organic farming is getting established and they are cultivating without the use of these harmful chemicals. Having said that,

we do use fertilizers and pesticides. It is just that we don't use the harmful chemicals. One can use compost, effective micro organisms can be used. These remove harmful pests and do not affect the required essentials of the soil. Hence, the organic farmers do not have to settle for bad yield either.

It was government agencies that motivated conventional farmers to start using chemicals on their farm at one point in time. Now things have changed. People are more aware of what they eat, etc.

How do you make your pesticides?

We use only organic pesticides. Chemical pesticides kills the pests; the organic pesticides however, just takes these pests out of their farms. Panchagavya is a good product. It has cow dung, cow urine, ghee, milk and fruits mixed in the right proportions and kept aside for composting. This solution will ultimately contain a lot of micro organisms. Panchagavya can be used for any plant - paddy, horticulture, anything. It can be sprayed or applied directly to the roots as well.

Have you sought suggestions from any agriculture or horticulture officials?

Oh yes. All these people are involved in the training we impart on my farm. We have approval from the State government for our activities. Our NAM market is very popular. Even though we only operate one day of the week from 6 a.m to 11 a.m. all our products get sold by 9 a.m.

What would your advice be to new budding agriculturists?

We whole heartedly welcome them, they should know that organic farming is sustainable and profitable. There are lot of agencies and organizations to guide new agriculturists. Organic manure and pesticides are also available everywhere. Organic produce markets are expanding day by day.

CONTACT -

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Azlan Mohammed Shakib

Aquaponics and Permaculture Designer, Humm of the Earth

With an eye for design and a heart for agriculture, Mr Azlan Mohammed Shakib has been hands-on with Aquaponics and Permaculture for the last 6-7 years now.

"I design commercial aquaponic systems as well as balcony and roof top units as a product designer. With permaculture, I design farmlands for people to manage a more sustainable plot with influence from natural farming."

How did you get interested in agriculture?

I chose agriculture as my path during college days itself. Aquaponics was the first thing that I came across as an Engineer and the modern technique fascinated me. That is when I started designing some of our early systems.

I designed a lot of table-top and balcony systems during those days itself. A few months down the line, I also discovered permaculture which, to me, seems to be the most sensible forms of farming. It is highly influenced by natural farming.

Permaculture is permanent agriculture and its techniques are highly sustainable than the ones we use in other farming procedures. Coming from a non-farming background, it was a very new subject for me to explore. I really wanted to take it up as my profession because nothing is more fulfilling than growing food.

Who are your target customers?

1. People looking to re-design their farmlands into a sustainable farmstead where all the elements are in harmony and require very minimum input.

2. People interested in the most moden farming techniquie (Aquaponics) for a commercial setup as a source of Fresh, Organic produce.

We moved to a farm to apply and experience the principles of Permaculture as we didn't want it to be just a practice where we apply a random technique and get some produce at the end of three months for the clients.

The whole process of Permaculture Design leads to a highly sustainable

homestead where you live on the farm and everything that you utilize comes from the farm. We show people the techniques that we apply and we also develop new techniques.

Does your farm generate revenue?

To be honest, our farm is about 2 years old and generating revenue is still a destination because more than a year was spent to reclaim the farm. The farm was in a binding with the landlord and it was in a very bad shape. We spent most of our time, cutting down weeds, setting up rain water harvesting structures so that we can have sustainable sources of water, recharging bore wells, etc. 2020 should have been the year where we would have started our commercial farming but it has been delayed by a couple months. But that is the plan. We have a 10 year plan and as per plan after the first two years we get the farm to be commercial.

We have more than 200 coconut trees which helps sustain the farm as of now. There is still a lot of potential.

Just yesterday, I was at Oasis International School, which is one of the first schools to introduce aquaponics as part of the curriculum where we are helping them design a workbook and a series of experiments for the children to follow. Yesterday, we installed the school's first educational aquaponics unit. It has got a media bed, deep water culture (DWC) unit, nutrient film technique (NFT) unit along with a fish tank. The entire unit has been funded by the students themselves and they take care of that unit for the entire academic year before handing it over to the next batch of students. So, for the entire year they perform experiments and learn about aquaponics and hopefully by the end of the year they would have gained enough knowledge to design their own systems back home.

What is aquaponics?

Aquaponics is a soil-less technique of growing vegetables using fish waste. It is similar to hydroponics in that prespective but with aquaponics, we fuse hydroponics and aquaculture - you grow fish and vegetables. It is a symbiotic relationship between the Fish and the Vegatebles where the Fish provides nutrients for the plants and the plants in turn clean the water for the fishes. It is a closed-loop system.

What plants can be grown using this technique?

Almost every edible vegetable that we use regularly has proven itself in an Aquaponics system, depending on the structure you have and the technique used, you can even grow small fruit trees like banana and papaya as well. A very basic structure allows you to grow micro greens and wheat grass effortlessly. So, all the way from wheat grass to bananas and papayas can be grown. That includes vegetables like tomatoes, capsicum, leafy greens, etc. The quantity of the vegetable you grow is always balanced with the quanitiy of Fish in the system.

What species of fish do you grow in the system?

Almost all fresh water fish can be grown in an Aquaponics unit. By monitoring parameters like temperature, pH and dissolved Oxygen, we can prepare our tanks for the chosen variety of Fish. If it is salt-water fish you will need salt water to run through the system, which means the crops that you grow will change. You will be growing salt water based greens, which is a completely different ball game - a different design and system and the produce is also completely different. Salt-water Aquaponics is a relatively challenging and unproven field of study and is not recommended for a commercial operation. So, it has to be fresh water fish for the kinds of herbs and vegetables that we consume.

Is the fish nutrient the only input for the plants or does it need external fertilizers?

Fish nutrient fulfills more than 90% of the needs of the vegetables and in most cases it is the only input for the entire system. Some vegetables however demand external micro and macro nutrient that can be added in the water as a supplement to ensure wholesome growth.

A New and/or inexperienced farmer need not worry about external inputs

apart from the fish nutrients as any deficiency in the plant will eventually show itself and can be solved by an external suppliment.

How many days does it take for the nutrient from the fish tank to reach the vegetables?

When you first introduce fish into the system, you do something called "cycling the aquaponic system". Fish waste adds ammonia which eventually comelets the entire Nitrogen cycle while establishing a healthy colony of bacteria that are prepared to always convert the harmful ammonia into useful "Nitrates".

The nitrites and nitrates are less harmful for the fish and this can be taken up by the plants. There is no ammonia in the system once the cycling is finished. Once the system is cycled, throughout the life of the system, the nutrient deposit is almost immediate.

When the fish waste collects in the tank, it will be there and when the pump takes

it from the tank, it goes through the entire aquaponic system to reach your plants and back. In a simple setup, every one to two hours, the entire volume of your fish tank will be cycled through the vegetables. The supply of nutrients is constant and continuous. Once the cycling is over, there is no time delay in the waste to reach the vegetables. Every time water gets pumped to the vegetables, it is packed with nutrients and the pump is on 24 hours.

In regular farming, if your crop takes three months to harvest, in aquaponics, you get your crop within 45 days of introducing it into the system. This is because water supply is optimum and continuous, nutrient supply is continuous and any time the plant takes rest from growing is only when there is no sunlight available. Some aquaponists go to the extend of providing artificial sunlight during the evenings to extend the growth period of plants, in places where it is viable to sell produce at higher prices. This is not recommendable in India.

Are there any calculations regarding how many fishes for the pond etc?

Yes, of course. The complete area available to grow the vegetables is directly proportional to the quantity of fish you can raise. Other factors such as the amount of Fish Feed used versus the totally number of vegetables available in the system is also a crucial factor in a commercial operation. Usually the client has a specific requirement that dictates the design of the system like available land size, minimum harvest required per day, desirable quantity of vegetables, fish etc.

Are there specification of any particular kind of fresh water fish?

Any normal fresh water fish will do. If you are not interested in eating or selling fish, you can grow ornamental fish such as Koi or gold fish, etc which are also available in petstores.

The process of rearing fish in aquaponics is also very simple because the filtration is taken care of by the plants, the water is always running to ensure adequate oxygenation, the temperature fluctuatuin is very minimum in place without extreme temperature fluctuations. The only input is feeding your fish one to two times everyday. Some people even introduce automatic fish feeders so even if you go on a vacation, there is no damage to the system.

Do you provide any training for permaculture/aquaponics?

Yes, we will begin trainings by the end of the year. Once we complete our latest commercial project, one of the commercial farms will be blocked for workshops at our training center.

Are there any other methods to supply oxygen other than the air pump?

With aquaponics, there is a continuous stream of water falling into the fish tank and also when the water flows from the system to the media beds, Fish tanks and deep water culture tanks. There is also water coming from the taps that

gets oxygenated on impact with the water.

Every time you have a well-designed system when you check the dissolved oxygen in the fish tank, the system running by itself produces enough dissolved oxygen and sometimes it is in excess as well.

But, you still need air pumps and air stones when you do deep water culture because you need to aerate the roots to avoid root-rot since thay are always submerged.

How do we manage the pH level of the water?

In the market you get pH up and pH down bottles. If you take the pH down bottle and add it to your fish tank, it brings the pH level down and similarly with the pH up bottle. It is a synthetic chemical but it isn't harmful for the fish or the vegetables.

Having said that, the systems we design is a bit larger and it has a central sump in it. The sump is a body water which is separate from the fish and the vegetables. That is where we try and alter the pH by adding salts to increase the pH or something acidic to decrease the pH. This way it is more natural.

The most important thing in aquaponics is how you compare the vegetables and the fish and how you calculate the volumes. If you do it right, once the system cycles and the aquaponics system establishes, the fish tank becomes a buffer solution which will always keep the pH stable by itself. This will happen when you have a mature aquaponic system and the volumes are right. It is difficult to achieve in a smaller aquaponic system because you will have pH fluctuations and temperature fluctuations at that scale. The minute the outside temperature goes cold, a small body of water gets cold immediately. It takes time for outside temperature to affect larger bodies of water. It is the same for all other parameters. Gauging parameters is more difficult in smaller systems than larger ones.

Initially, you will have to deal with pH issues because one may have made your fish tank with a lot of cement, which starts shooting up the pH value. So, you should try and use inert materials wherever possible. Use fiber glass and plastic preferably because you don't have to worry about pH fluctuations.

In your opinion, is aquaponics in India a hobby-activity targeting urban terrace gardens?

Not really. I do see that there is a very big hobby following when it comes to aquaponics on roof tops and terraces. But, most of my clients are people who have farms and are people who want aquaponic system in their farm for either of the three reasons:

1. They want the vegetables that they consume coming via the aquaponic system from their farm, which is at least 1000-2000 sq feet in size.

2. An aquaponic system built to supplement a restaurant or cafe that the person already owns because aquaponics gives you very fresh produce that can be harvested the same day that you wish to use it.

3. There are also people who want to do aquaponics commercially because income derived from it is very systematic owing to predictable harvest schedules because of monitored parameters, reduced labor, stable use of water and it works in a controlled space, almost all parameters are automated.

But yes, most people see it as a hobby and that is why it's true potential is not met.

Please explain permaculture in India and share a few examples of farms that are doing well using this technique.

Going back at least 40-50 years, our agricultural techniques today are very different. We had a small hint of natural farming and permaculture. The farmer used to grow all his produce for himself and use a larger portion of his land to earn money. Today things have changed. Permaculture has been reintroduced in India as a foreign technique. Farmers who have 10 acres of land are using the entire space to grow one crop. They sell that crop and using that money they buy grocery for their household.

I am sure that there are very efficient farmers as well but most of the farmers don't do it in a balanced format. With

permaculture, if you have a 10 acre land, even a half acre of permaculture will make sure that the farmer can grow everything needs for his household using that unit. That way, everything he gets out of his commercial produce can be kept as savings. The change is very dramatic because you have subsidies available for all the chemicals and everyone focuses on monoculture because it is easier to yield revenue. There is a huge shift from what we used to do versus what we are doing now.

Permaculture may appear new in India but in reality it isn't. It used to be very integral part of what we used to do before. There are many permaculture farms in India that are doing well. There is a community of farmers in Kodaikanal.

Unfortunately, most of these farmers are not Indians; they have come from France etc. and have taken up farmlands for lease. They are living on farms that they don't own and are doing permaculture there. They have formed a beautiful community where they grow food for each other. There are lot of permaculture farms in Andhra Pradesh because the government is directly supporting them. Aranya Agriculture Alternatives does national and international permaculture conferences every year. There is a lot of permaculture going on. Last year at least a 1000 people doing permaculture from different parts of the country were in Hyderabad to attend the international convergence. It is definitely picking up and hopefully whoever is practicing it is doing right. In the next 5-10years it should be part of all farms.

What are the main difficulties for farmers to fully convert to permaculture farming technique?

Most farmers have lost their technical know-how for natural, sustainable farming practices. There are very few difficulties in permaculture. Most farmers think harvesting rain water is a very difficult technique. A successful farmer evolves because he indulges himself into the process of learning. As long as you can invest in learning, there is almost nothing stopping them from moving to permaculture. Today, a farmer can spend Rs 500-1000 on chemicals at a shop and spray it all over his weeds. By evening or the next day, even though the chemical is cancer causing and poison, all weeds on that land gets cleaned out. This is cheap for farmers. But, to do these things the natural way, either you have to employ 2-3 laborers for 2 or 3 days or an expensive machine. The kind of techniques that are favorable are difficult to do, so they opt for the easy techniques. At the end of the day when we pay Rs. 20/- for a kilo of tomatoes, we don't think about how much the farmer has gone through to grow that produce. We just look at the price and buy the cheapest available ones. So, I personally feel we cant blame the farmers because as consumers we decide what the farmers need to grow. If we don't have bananas that have dark spots on them because they will become ripe too fast, then the farmer is compelled to artificially ripen the bananas. If the farmer brings organic bananas to the shop, some will have dark spots on it, some will ripen before the others - that is natural. But because we don't touch it and allow those to rot in the shop, it is a lesson for the farmers to use chemicals. When I interact with farmers, I can see that they want to do things organically but he is compelled to resort to chemicals because his income gets affect otherwise.

So, if consumers' mindset changes, the farmer's practices will also change because their lives depends on what we buy.

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Benjamin Raja

Founder and CEO, Farmagain Agro Private Limited

Low agricultural productivity in a land blessed with the best of climate, soil and sunshine seems like a puzzle to figure out. Mr Benjamin Raja, through his research, concluded that the missing piece of the puzzle is lack of precision agriculture.

"Our first attempt in precision agriculture initially was great but didn't go well in the long run. We did a root cause analysis to understand why we were failing, we figured that the repeatability of the process which was very diligently done in other countries was lacking in our farms. An absolute repeatable precision is only possible with intelligent automation. That's why we indigenously designed and developed GroTron®. Machine Learning and Artificial Intelligence are the building blocks of GroTron®; it ensures Precision Agriculture in a farm with no human intervention, therefore making a farm totally autonomous."

Benjamin brings with him a wealth of knowledge from the automation industry and so decided to build some technology to ensure there is least amount of manual intervention required for the repeated routine processes. After about 4 years of investment into research and development - building sensors, calibrating them and making sense with the sensors with the context of precision agriculture – in 2018, came up with a solid product line to get data from any sensor - soil moisture sensor, temperature, light sensor, EC, pH, NPK, etc..

"GroTron® ensures that this real-time data that we receive from the sensors were put into right use in terms of taking decisions like when to irrigate, which area needs to be irrigated, what fertilizers need to be given when and how much, etc. and we were able to see the benefits as well. The reduction in water usage was at least 50%."

Another goal they had was avoiding soil infertility.

"Last 2 years of our laboratory tests, we are able to see that the contamination of soil is coming down and in the long run we believe the soil contamination can be completely eliminated by ensuring precise fertilization to the extent that the plants require.

We also see that the younger generation is now showing interest in farming because of predictability that comes with the use of modern technology."

What are the features of GroTron® you have built?

1. Irrigation and fertilization gets automated. 2. The system has the ability to neutralize the irrigation water pH. 3. For protected systems, like poly houses and net house, the system has the ability to sense the humidity and temperature within the structure and operate the respective equipment implemented in that farm to maintain the balance between the humidity and temperature set to the right ratio. 4. There are some modern farms that have implemented generators. So, our system has the ability to automatically switch off the generator whenever required. 5. The system tells the farmer, based on his requirement, which fertilizer he needs to buy a month in advance including where he can buy it and the price at which it is available. This information also goes out to the neighbouring buyers. They can be mandis, corporate retailers etc.

Who are your target customers?

We are working with farmers who have farms between 5-10 acres. Most of the farmers dealing with us is in the Tamil Nadu area. We have a small presence in Karnataka as well. In the next one month we will also be penetrating into Telangana and Andhra Pradesh regions. As of now, we are largely present in Tamil Nadu and the crops are regular plantation crops and vegetables.

How user-friendly is your product?

Using the product doesn't demand technical knowledge. If you can use a smart phone you can use this our product too. Even if one cannot use a smart phone, the farm is configured. For example, if it is cane in Guntur and the soil moisture requirement is say, 45% and if there is a fertigation programme we feed it into the system. That is pretty much it. From there, the farmer doesn't even have to log in to a smart phone. The farm pretty much runs on its own. Specific information will be sent to the farmer in several languages. These can be notifications like, tanks holding urea is empty, etc.

Are these sensors wireless?

The sensors are wired to a device that is wireless. There is a small solar device to which the sensors are wired. The wiring will be at the max 5 meters.

Are we talking of fertilization by liquid fertilizers?
Yes - organic or inorganic fertilizers in liquid form.

On an average, how much would the installation cost?
The cost depends on the number of valves and their sizes. However, on an average, the cost of implementation will be at the range of 2 and half lakhs on a 10-acre farm. This includes the cost of the valves. We make the valves work using solar power with a small power backup with no wiring required. We provide the battery back up as well.

What kind of warranty period do you offer?
We give a one-year warranty and the farmer can choose to take extended warranty as well.

What is the minimum land dimension required for installing your system?
There is no minimum dimension. We can install it even on a say, one-acre plot.

Does the system demand any kind of annual maintenance procedures?
There could be some requirements since it is an electronic equipment. But, in the last 2 years, we haven't seen much. So we don't charge any Annual Maintenance Cost (AMC) to farmers as of now.

Is your product available across India?
Right now, it is available only in Tamil Nadu and Karnataka. We are shortly moving towards Andhra, Telangana and Maharashtra. In another 6 months we are looking at penetrating into the Western side of India all the way up to Punjab.

Are there enquiries from places other than Tamil Nadu and Karnataka?
Yes, we are getting lot of enquiries from the Western part of India and that is why we have decided to expand up to Punjab and Chattisgarh. Having said that, we have done almost 10 pilot projects in Maharashtra. But we haven't done any after commercialization of the product.

Do you provide any kind of training to the people who buy your product?
Yes, we do. We have tied up with 6 agronomists who train the farmers. This training entails not just usage of the product but also about precision agriculture. We pay for this training. Framers who require constant support are provided with continuous support. First one year of hand-holding is done without charging the farmers.

Can farmers avail any subsidy for this product?
No, not yet. We have started working with the Central and State governments. We expect something to shape up in course of time.

Have there been any challenges that has been reported by those who have used your product?
If the solar panel gets covered with too much of dust, then the valve operation gets impacted. There are places where we have had issues that way.
Another one we have come across is, in farms they have a tendency of simply switching off plugs. Farmers don't understand this and so they raise a complaint and when we check we realize that the internet is switched off.
In some farms, fertilizer measurements go wrong. That arises if the fertilizer is not properly filled. It could lead to inaccuracies in measurement. Other than these small issues, we haven't come across anything major so far.

Do you provide onsite assistance?
Yes, we do provide onsite assistance and it is free for the first year. So far even for issues after a year we have not been charging because it is not very frequent that there has been issues.

Is the product different for poly houses and open farming?
No, it is the same equipment.

How has the farmers' feedback been about your product so far?
Farmers are comfortable and happy with the product and implementation. Many of them have reverted commenting that they realized there is no water scarcity in parts of land where they felt they had scarcity. They also felt that the fertilizers are used optimally which can be fine tuned with soil conditions. They have seen productivity increase, which is the ultimate goal. There was this farm next to Coimbatore, where a 20-acre coconut farm was on the verge of getting chopped off because the farmer was of the opinion that there wasn't enough water supply. So, we installed our product on their land free of cost to do a case study. So the equipment was agreed to be implemented for 4 months. This was a year back. Now, the trees have recovered and the farmer is highly enthusiastic about our product. He has installed it to the extent far more than what we had expected. Farmers' feedback has been excellent and the productivity increase recorded has been great!

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Pradeep Palelli

Co-Founder & CEO -- Thanos Technologies Private Limited

With a Bachelors in Electronics and Instrumentation and experience gathered in working with 2 start ups, Mr Pradeep Palelli gathered immense knowledge around environmental sustainability, carbon management, etc.

Mr Pradeep Co-Founded Thanos Technologies Private Limited in 2016. He currently runs Thanos Technologies along with his Co-Founder and CTO Prathyush Akepati.

"At Thanos Technologies we work in the agricultural domain; that is, designing, building and operating agricultural spraying drones. There are other applications related to the same like gathering agricultural intelligence data. This is camera-based data which we process and give insights and various updates to farmers. We have been mainly focusing on automation for the last 2.5-3 years for pesticide spraying and other liquid based spraying mechanism using drones."

Who are the typical customers?

We started off with the idea of trying to solve three problems that Indian farmers are facing with respect to these kind of spraying requirements:

1. Non-availability of manual labor: Labor is shifting to other fields which they believe pay better and so they are scarce especially during peak manual labor requirement time.
2. Efficiency or effectiveness with which untrained manual labor takes up the activities is low. The farmers who own farms follow the right process and do what is best for their fields. But manual labor who are hired for money is difficult to track the quality, efficiency and effectiveness of their work. This has been a common problem faced by all farmers we spoke to.
3. The health hazards - respiratory diseases and sometimes in case of over dosages even death as a result of pesticides and harmful chemicals.

To mitigate these we came up with our autonomous aerial spraying solution. We currently deliver this solution to farmers through our partners, who are mainly agri-chemical companies and agri-service providers with whom we have tie ups.

We are also trying to tie up with FPOs, custom hiring tenders, and agri-cooperatives as well who are more closer to farmers and who can own these drones and deliver services when the farmers need them.

What types of drones are available?

We do one type of agricultural spraying drone - the 10 litre capacity model. We initially started with a 5 litre capacity. Owing to the feedback we got from our initial customers, we realised that the number of refills that is required in case of a small tank is too much. Based on feedback we decided that the 10-litre ones are the most optimum and easy-to-operate model.

Are these drones manufactured by your company in India?

Yes. We have our manufacturing unit in Hyderabad. We design, build and manufacture these drones inhouse. The main reason that we manufacture and not import from China, which is the usual practice, is to make sure that we ensure serviceability in case something goes wrong with the drones.

If we simply import the drones from elsewhere we may not be able to provide a solution if something goes wrong with them, in time. Also, it serves to reduce the cost and ensure good quality drones.

Where do you buy the parts from?

It comes from China. Most of these parts come from Taiwan, China. There are others that provide parts from USA as well. But if you consider quality versus price, almost all manufacturing of electronics happens in China itself. But based on our design we buy the components we need and we get the raw materials from there for the external spraying mechanism and chassis. We process the raw materials such as Carbon Fibre locally on our machines and then build the entire drone in-house.

What is the cost of a drone?

There are 2 variants of the 10-litre drone. The first variant is where you have a single battery pack and it costs 4.5 lakhs plus tax. Then, for somebody who wants to continuously use it for field operations, i.e you want to give the drone to conduct spraying operations throughout the day, we have a separate

model which has 4 packs of battery instead of single pack. This comes for 6.5 lakhs plus tax.

There is a smaller variant. We had created this for one of our customers who wanted to do R&D. This is a 5-litre model. It is not a popular model but is good for people who want to do trials. That is for 3.5 lakhs plus tax.

Are there any recurring charges associated with these drones?

There is an AMC required for this product. Right now, we are just about to start the AMC which will be in the range of 5-6 percent of the total cost every year. But, taking the life of certain parts and usage into consideration, the battery is the most consumable component. These drones run on battery.

There are two types of energy sources - the battery and fuel (petrol). Most drones in India are battery based. Battery, based on how much you use, have a limited number of charge-discharge cycle. You may have to replace the batteries every 12-18 months perhaps.

Does the battery have to be purchased from you?

These batteries are assembled and built in-house are one of the very few drone companies in India that have come up with Lithium ion-based batteries for drones and probably the only one building it in such capacity and offering such flight time (20 minutes) for agricultural spraying drones. All others give lithium polymer batteries for agricultural drones. But we are offering lithium ion batteries of specific capacity because they give higher flight times and longer life as well. Lithium ion batteries have 50% more life compared to lithium polymer batteries when well maintained. Since we are the only ones making them, the batteries have to be purchased from us. Also, lithium polymer batteries are also not made in India. Even they have to be imported.

What is the approximate maintenance cost per year?

We currently charge an AMC of 5-6%. That would be close to Rs.30000 - 35000 per year. This will be the first year that we are doing it. We ensure that all customers buying from us are properly trained. This will avoid unnecessary crashes and costs for our customers. We have another training department in-house that takes care of Training activities. In case the customer is not keen on being trained himself, customer can hire a drone operator/pilot on rent and let them operate it for you.

If something goes wrong, can they get it repaired elsewhere as well?

Currently, they have to contact us. There are about 2-3 dozen Agricultural Drone suppliers across India. Most of these are importers but a handful of them are making it in-house. Also, there are certain variations from drone to drone. Those who import have the same model so the parts may be interchangeable. But given that the technology and components are new, it won't be possible get these drones repaired or find spares in the usual Automobile or Electronics repair shops. Right now you don't have that kind of infrastructure or service set up that you can take the drone anywhere and get it repaired. Having said that, we believe that for the model we are dealing with, we need to set up service centers driven by our self or by tying up with local entrepreneurs. We also want to set up local service centers at the mandal level or the district level so that Drone Owners/Operators can get Spares, Repairs done in under 24 hours.

Prathyush Akepati
Co-Founder and CTO

Do you have service centers?

We have one in Hyderabad. Over time, we plan to open more in Telangana and Maharashtra. As more number of drones get sold and used in the field over time, we will be have District level service centres so that Drone Owners/Operators can get Spares, Repairs done in under 24 hours.

What is the durability of this product?

We consider a life of 5 years for this

Co-Founders with 5L Field Ready Prototype - Agricultural Drone in 2018

product. The entire material used in the frame is carbon fibre. There are just a few metal parts that get rusted. There will be very less wear and tear. The severity of the usage can cause certain mechanical and structural components to change in terms of the rigidity of the equipment itself. By this I mean, the structure may become lose, etc. We take care of such these things in the AMC as well. We also give a few sets of spare parts - a few nuts and bolts and the propellers that are there on the drones and one or two small tools that the customer can use by himself so that he can handle minor repairs himself. It can be taught using a video call.

Do you offer any training?

Right now we are not expecting small or marginal farmers as customers simply owing to the cost of the drones itself. We believe that there are quite a fewfew large customers who may be able to afford this. What we are looking mainly for are groups of farmers (FPOs, Cooperatives) to be able to buy this drone and use it for themselves and also give it out on a hiring basis. Agricultural Service Providers are also our key target customers as their main activity is to utilize such technology platforms to provide service to farmers.

Special training is definitely required because flying a drone is much different than driving a four wheeler or two wheeler. It has got a different set of controls altogether. It moves in the vertical dimension as well, not just on the horizontal axis as on the road.

We conduct a one-month training programme when we have a good batch of interested parties. During that training programme we have 15-18 days of hands-on training on the field itself.

The key requirement is someone who is going to attend this training programme should have already known how to fly the basic small camera drones that you get to see at weddings etc. nowadays. If someone has a good capability to fly those camera drones, one month training is more than sufficient for them to pick up skills for flying agricultural drones. For those already skilled in SMALL category drones, we have a shorter 2 week training programme as well.

Does this training come at a cost?

For someone buying the drone from us, we offer a 2-day free training on the field. This is to make them aware of the control systems, the parameters, how to set and operate it etc.

For the one month training programme, we currently charge Rs.50,000/- per person. For those who have good hands-on experience and piloting skills on SMALL Drones, we have a shorter duration training programme for 2 Weeks for which we charge Rs.30,000/- per person. We already trained one batch of 8 people and are planning to start other batches shortly.

Can farmers avail of any subsidy for purchasing drones?

Currently, these drones are not considered in the common agricultural equipment category like tractors, harvesters etc. For that to happen:

1. Directorate General of Civil Aviation which is the main nodal authority for drones in India, has to certify drones. They have started this process last year and we have also begun the process of getting our agricultural drones certified.
2. Local state agricultural universities and agricultural ministry bodies have to certify this as an agricultural equipment so that subsidies, Mudra Loan Schemes and any other cooperative schemes that farmers avail for ag-

ricultural equipment, can be availed for these drones as well.

Discussions are happening. We are also pursuing state agricultural universities to add this to the list of agricultural equipment. The agricultural ministry and universities are also seriously looking at it.

Right now, subsidies are not available but I believe in a year or so it should be available.

What are the limitations of the Agricultural Spraying drone technology as an application?

In terms of usage, operation of Agricultural Drones definitely require proper training. But farmers do not have to get worried about getting trained themselves. There are skill training programmes that are being conducted across the country by National Skill Training Institute. In addition, Flight Training Organizations and Drone Training Organizations across India are available that can impart Basic and Functional Training. We are also in the process of starting a proper Agricultural Drone Training programmes so as to create Skilled Drone Pilots. This will create employment for rural youth and also entrepreneurship opportunities for someone who wants to get into this field. So, for farmers who may not be able to get skilled, there will be trained youth who will be available at a mandal/district level to take up this service. Right now, there is a shortage of people who are available to operate these drones. Pretty soon this hurdle would be fixed.

The major hurdle that is stopping large scale adoption of this technology now is the regulatory environment itself. Drones have certain regulations in place. This was announced in December 2018. Since then there has been quite a bit of progress that has been made by the government and by the drone companies as well. Like I mentioned before, we are in the process of getting our drones certified. But specifically, for the purpose of agricultural spraying, the ministry of agriculture and a few government bodies are conducting trials using agricultural drones to make sure this technology can deliver the benefits that we believe in. They are conducting trials in various parts of the country on multiple crops like rice, cotton, chillies, sugar cane etc. and submitting recommendations to the respective bodies. This way everybody will have a clear idea if this is an approved application, the dosages one needs to go with, the companies that are certified, etc. so that everybody can start using this technology.

The regulatory hurdles do not allow for scale up of this technology across India at the moment. We understand that there are genuine concerns of Regulatory authorities in approving Agricultural Drones as these are heavy payload drones and have been used for some anti-national or anti-social purposes across the world. As an Industry, we are working with the authorities to see how these concerns can be addressed. We see this being cleared in the next 6-12 months itself post which, over the next 2-3 years, about 5-10% of India's agricultural lands could be catered to by Agricultural Spraying drone technology.

What kind of license should one possess to use this technology?

The drone and the drone pilot also must be certified to use the technology. Whether the drone is made in India or being imported from any other country, the DGCA - the nodal agency needs to certify the drone. Once that is done, then there is a portal called digital sky where all registered and certified drones are listed. Only those drones are allowed to be operated legally. For agricultural training also government is about to come up with certain regulations/ recommendations. Currently, the state agricultural universities of Maharashtra, Telangana, Andhra Pradesh, Punjab and perhaps Karanataka as well are doing their own research and coming out with recommendations for farmers. Everything put together, I am confident that we will be able to help all our farmers access this technology soon.

On what scale of property is this kind of technology recommended?

We do not suggest marginal or small farmers to even think about buying these drones as it doesn't makes sense given their low usability. Maybe the medium and large farmers - the ones who possess 10 acres and above - might be able to consider it. That is the sector from where we get majority of our enquiries.

We advise them that for them to recover the cost of this technology, they many need to hire it out as well just like how some Agricultural Service Providers hire out tractors, harvesters and other machineryfor use per day, per hour, per acre etc. In that way it makes more sense.

It makes absolute sense for farmers who have 100 acres or more but face hurdles of acquiring manual labour during peak times.

Is it useful for orchard farms like mango trees?

For horticulture, coconut and any of those tall crops, we keep getting enquiries because the taller the crop, the more difficult it is to spray manually, so drone technology is advisable. But the problem here is the crop should be more or less of the same height. The height difference shouldn't be more than a foot of difference. But for coconut and mango the difference can be more than 5 ft as well. These drones are operated in an autonomous manner. We do not do manual operations. Height of

the drone is set before it is operated on the field. That is not possible when the height variation is so high and setting the height above the tallest tree would mean improper spraying on the shorter ones. This is because of the lack of direct visual inputs to the pilot owing to the tree height. In addition to this, there are also gaps between the trees thus resulting in wastage of spray as our method of spraying is Blanket Spraying and not Row Spraying. Row Spraying is possible in case of accurate GPS methods such as RTK GPS which adds more cost to the drones. As the next version of our product, which might be out in the next one year, will be more intelligent that will have cameras and sensors on board, this version will be able to detect the tree, its height and then spray. For orchards and horticulture crops, it must be sprayed around the canopies and the canopies are not uniform in heights. The drone has to be able to detect the tree and once it is on top of it, it needs to spray, rotate to cover the entire canopy and move to the next tree. This can be achieved only if the drone can automatically and intelligently detect the tree. Right now, we don't have such drones in India. Some people operate it manually by putting the camera, observing the trees and then they do it. But that is a highly inefficient process. We will soon bring out intelligent drones to do these functions effectively.

Right now, it is best suited for crops below 10-feet.

Is the drone remote operated or will it fly by itself?

The remote will be there. But operating manually using a remote is an inefficient process again and needs to be used only when Autonomous operation is not possible at all. In Manual operation method of drone, the direction height etc. are dependent on the skillset of the pilots. Instead of that, our drones can take certain way points. That is, we mark the boundary of the farm and also input the height and speed at which it should fly. We also feed the width of the trail which is dependent on the nozzles that we put on the drone. This way there is no need for any control from the pilot. Everything will be automatic and hence uniform. It is highly efficient and it takes only about 6-8 minutes to cover an acre of land. So, per hour, you can cover 6-8 acres. We have checked this ourselves. We have covered up to 30 acres in a day using one drone and 4 sets of our batteries.

Can it be used only for spraying pesticides?

Anything in liquid form can be sprayed - not just pesticides. It can be bio fertilizers, micro nutrients, pesticides, etc. Some people think this is useful only for chemical farming. That is not true.

Even in organic farming, farmers are filtering out the solid particles when they use jeevamrutham or panchagavya. Typically, in the last two years, we heard that it is full of sediments and large particles which are not mixed properly. But now farmers are filtering it out because they also use nozzles which get blocked. So ultimately, they are also used in properly filtered liquid form and hence can be sprayed using these drones.

Also, we have different mechanisms for Seeding and DAP fertilizer granulesWith regards to Seeding application, it will be scattered randomly just like how a farmer scatters it with his hand.

For what type of Indian agricultural scenarios would the use of drone be best suited for?

Drones in Agriculture are broadly divided into either Automation or Intelligence. There are several companies working towards using drones to generate data so as to quickly give recommendations. There can be a daily or weekly monitoring which can lead to proactive applications of pesticides or micro nutrients. One would understand NPK deficiencies, water shortages etc in advance so that you can minimize your cost in mitigating these deficiencies and in turn increase the yield. That is one of the most important applications.

Agri Automation solves the issue of manual labour shortage and counters the inefficiencies of manual work.

What is the biggest marketing hurdle in India for drones?

This depends on the target customer. If we are talking to farmers, price is definitely an issue. But like I mentioned earlier, small and marginal farmers are not our immediate target customers owing to certain operational constraints we have. We are looking at medium and large farmers and agri-service providers of farmers. Even they look for some kind of subsi-

dy. But it is more about the scalability of the solution. The number of acres that a drone can work on in a year determines the viability of this technology. All this can be put in place only after the regulatory environment is cleared. The government is also working very hard with the agricultural ministry to make sure the drones are properly tested and certified so that pretty soon they can get this application to take flight.

In a major way the regulatory environment is the biggest hurdle slowing the pace towards the path of adopting this application but we see this clearing soon as Ministry of Civil Aviation and DGCA are keen on allowing applications that are highly beneficial to the people of the country.

What do you think is the future of drone technology?

When we started in 2016, this technology was relatively new. There were hardly 2 or 3 companies talking about agricultural drones. Whereas in other countries for example in Japan, they have been using drone technology for agriculture since 1990. Most people will be surprised if drone technology even existed back then but, Yamaha company drones powered by fuel like petrol existed in late 1990s and early 2000s itself. The reason they adopted it so fast in time is because there was not enough manual labour available for any work undertakings over there. In China, as on date, we have about 30-40 million acres being sprayed by agricultural drones already. Every year around 40,000 drones are on the field in China.

For us, it may take a little more time. Once the regulations and government policies come out clear (which they already are), in the next 4-5 years we will see a sizable change. We will soon get to a stage when 20%-30% of India's agricultural farms are catered to by drones. Drones are not just used for automation of spraying activities but also to collect certain intelligent input based on cameras. Farmers can make use of this data wherein they can get up-to-date recommendations. To understand the extent of the pest coverage or nutrient shortage or other important aspects of the field, that data is going to be of immense value. Instead of spraying an entire 5-acre land for example, if the pest is only at 1 corner of the plot, it would be sufficient to spray only in that area. This is called targeted application. That is agricultural intelligence. Today with spraying functionalities we are moving towards agri-automation. But we can go way beyond that with Intelligence inputs.

Having said that, this data collection is already being done by a few companies in India. When you mix and merge these two intelligence and automation applications, the benefits that farmers stand to reap is magnificent. This is the crux of Precision Agriculture.

What are your future plans?

We target to manufacture and sell at least 1000 drones in the next 2-3 years itself. Getting our drones certified is part of that plan. With the local manufacturing capability that we have, we are sure to provide good service and excel at the product we deliver to this country's farmers and agriculturists.

Any last piece of advice?

We have given demonstrations in about 30-35 locations in Telangana, Andhra Pradesh and Maharashtra. My advice to everybody in the agricultural industry is to understand the potential of the application, analyse how it suits your requirement and the benefits it will fetch you. We are aiming to get most chemicals to be tested using Drones so that maximum no. of farmers can utilize this technology. We strongly advice/encourage more Agrochemical companies to come forward and test their chemicals for spraying using Drones at the earliest and ensure that all their customers (farmers) can make use of this revolutionary technology.

The ill side of it surfaces only when you don't take care of the safety aspect of the technology. There are people comparing drone technology with spraying pesticides using aeroplanes. This is a bad comparison as the height at which the drones flies and the focused spray of the chemical makes it comparable to Manual Spraying than Aeroplane/Helicopter based spraying. The growth and adoption of the technology rests on the feedback of the users.

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Dr. Vandana Sharma
&
Dr. Sandeep Kaur

Assistant Professor, Department of Food Science
Mehr Chand Mahjan DAV College for Women, Chandigarh

Microbiology specialists with a keen interest in agriculture, Dr.Vandana Sharma and Dr.Sandeep Kaur are also blessed to be employed at Mehr Chand Mahjan DAV College for Women, Chandigarh. The college strongly believes in promoting and executing zero waste management practices. The strategy adopted by this college sets an ideal example to society to reduce and recycle waste. In addition, such a solid waste management strategy opens window of opportunities for empowering women.

"Keeping these objectives in mind and under the able guidance of our worthy Madam Principal, Dr.Nisha Bharghava,Dr. Vandana Sharma and Dr.Sandeep Kaur initiated the mushroom cultivation project in the college in the year 2018."

Under the zero waste management initiative, Dr.Vandana and Dr.Sandeep undertook this research-based project related to optimization and cultivation of oyster mushrooms from domestic and agricultural waste at the college microbiology lab.

"With a team of 10-15 students of B.Sc III (Microbial and Food Technology), we started this project and it bagged the All India 3rd rank under the Best Citizen led Initiative catgeory, Swachh Suvekshan Awards 2019, given by the Ministry of Housing and Urban Affairs, Government of India."

They cultivated this edible and nutritious variety of Oyster mushrooms from agriculture and kitchen waste in used plastic bottles. With this approach, this project proposal offers multiple solutions that includes waste management along with the generation of relatively cheap source of high quality food protein. This represents an effective solution for targeting the issues of multi nutritional problems and malnourishment that occur in India.

Solid wastes that included agricultural waste (wheat and paddy straw), domestic kitchen waste, fruit and vegetable peels, dry garden leaves and single-use plastic bottles were put to use for cultivation of mushrooms. Also, the faculty is engaged in providing hands-on training to women of nearby villages so that they are empowered with entrepreneur skills for self sustainance. Besides this, the approach is also an ideal solution to stubble burning and growing air pollution. These were the objectives behind this project.

Dr. Vandana Sharma

How did you get this idea?

With ever increasing menance associated with ineffective waste mangement, their is an imperative need to promote and adopt scientifaclly sound methods for effective solid and liquid management.With this focus in our mind, we initiated the research based project of mushroom cultivation in our lab involving the undergraduate final year students. This is a very effective and innovative method of utilizing organic wet waste and an answer to increasing air pollution caused by burning of agricultural waste in North India. Also, cultivation in single-use plastic containers is a novel idea. It will not just help in reducing plastic waste but it also reduces the overall cost of production. The spawn which is require for mushroom cultivation is also developed in our laboratory itself. Initially we started with kitchen waste and combinations of agro-waste. Then, we also used dry garden leaves as a potential substrate and it worked. These leaves are mostly burnt at many places that further contributes to air pollution. However, in our campus, we have put them to produce highly nutrious mushroom variety.

What was the area that you utilized and what was the yield?

We got around 150 gram of mushroom per bottle. Right now we are working in our lab. We are planning to start a pilot-scale study and begin a pilot-scale production. That is in process.

Is this currently an experimental project?

Currently we are producing mushrooms. But at present, the production is not at a very large scale. We haven't yet commercialized it. At present we train our students and also women living in rural areas. The commercial production is under process. In a few months we will begin with it.

Is it possible to grow mushrooms at a commercial scale in a 150x160 sq feet room?

It is viable, of course. We need very limited space with shelves to keep bottles or bags over it. The important thing is to keep the moisture level, humidity and temperature under control. You can also get the spawn from authorized spawn dealers if there is no intention of putting up a spawn lab. We have a spawn lab so we make our own spawns. If you have a source of spawn then you can start with available space.

There should be a clear partition of rooms or two rooms - one for storing the raw materials and the other for spawn run. Also, you need an autoclave for sterilization of all raw materials. Contamination, during mushroom production, occurs very fast. That can spoil the whole bag. If you cannot buy the autoclave you can boil the raw materials at a high temperature to disinfect it. After boiling it, it should be dried in a very clean area. You can also opt for chemical disinfection of the area used to dry the raw materials.

What are the humidity and temperature levels that are required?

Temperature should be maintained at about 26-28°C. There should be around 60-70% humidity in the first phase called spawn run and later humidity is increased to 90% at pinning and harvesting phase.

Which variety mushroom do you grow?

These are Oyster Mushrooms (Pleurotus species). It is called Dhingri in North India. This variety of mushroom is very easy to grow and is highly nutrious.

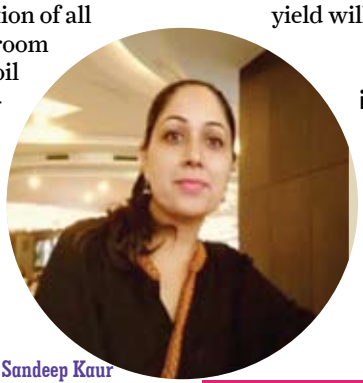
You can use any waste for substrate. We have used waste paper, garden leaves, agricultural waste, kitchen waste etc. You can use a combination of these substrates as well. We cultivated the mushrooms in bottles. These single use plastic bottles cannot withstand high temperatures. So, they are chemically disinfected so that nothing goes wrong and there is no contamination. (Hypochloride solutions can be used for chemic disinfection which is easily available)

Can you describe the steps to grow these mushrooms?

First is the preparation of substrates. We have a room dedicated to collect all the waste materials. All the materials are manually cleaned, chopped and later soaked in water overnight. Next day, all this soaked material is dried. We have three dedicated autoclaves. So our next step is autoclaving of the waste substrates. Simultanously, we disinfect the bottles by chemical disinfection to avoid any contamination. The next step is called spawning i.e packing of substarte in bottles with spawn seeds added by layering (spawn layering) after that we incubate the bottles. The incubated bottles are kept at dark, humid conditions and spawn run starts. After 15-20 days, the bottle turns white. At this point we put holes in the bottle, The next is the pinning stage. This is when you need to increase the humidity to 100% and then decrease the temperature slightly. The small pins start appearing. At this stage, we have to regularly spray clean water and maintain high humidity (90-95%).Soon, the pins increase in size and mushrooms start coming out.Within next 2-3 days, mushrooms are large enough for final harvesting. They can be twisted and they are ready to be harvested. This is called the first flush/crop.The same bottle can be continued and sprayed regularly for second crop to appear. It is all a matter of around 25-30 days before you are ready with your first crop.

After you cut the first crop, can you get the next crop from the same bottle?

Yes; they can be used for 2 more harvests. However, the yield will be less.



Dr. Sandeep Kaur

In an era when normally paddy straw is used as substrate and things can get slightly difficult with mushroom cultivation, these scholars have come up with a procedure that is absolutely simple, cost effective and environmental friendly.

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Mr Biju Purayil

Co-Founder
Urban Harvest

An IT trio decides to leave the corporate world to make a difference in the world. Discussions and debates finally zero down to agriculture.
"We wanted to do something of our own and also something good for the society. We debated a lot of ideas and through this we thought we could employ folks in the villages who wanted to make a living."
The rest of their journey, as per Mr Biju Purayil one of the trio, was experimentive. For them it has been ignorance is bliss. This makes the journey of Urban Harvest quite a ride – a journey that has taught them much. They are far from ignorant today.

What was your nudge to venture into agriculture?

We wanted to do something of our own that is good for the society.

Though none of us had any kind of agriculture background, Our analysis indicated that we could make agriculture profitable. That was the vision with which we plunged into agriculture. It is still a long-term vision. We have just scratched the surface so far. We have been through very tough times. It took almost 2-3 years to get stabilized. Initial years were very difficult. Though my Partner had quit his job, I was still working and then weekends we were at the farm. So it was getting just too hectic and scaling became a challenge. So I had to quit the job.

Did you undergo any training before you went in head on?

Nopes, we did not go through any formal training. But we did a lot of research on internet and visited a lot of farms, spoke to the farmers. And then we started searching for a land, which took us a good 6 months plus. And set up the Polyhouse and started farming.

Did you appoint any consultant or did you just start hands on farming?

To start with we did not have any consultant. We were on our own and we learnt on the job. We believed that whatever we do and whomever we consult, people will have all kinds of tips with all kinds of rosy pictures. The first impression that any read ups or research brings you is all the heavy profit you can make out of roses. Nothing gives us a clear picture of the reality.

How big is your farm?

We now have around 5 acres of green house and we do open field cultivation as well. We started with 1-acre rose plantation, then we took up another 2 acres of land. Also, we have some other land which we leased out and we started cultivating vegetables. That was also a good learning experience.

Initially, we got a good yield and so we invested a lot of money. At one point we were cultivating vegetables in 20 acres of land. We did tomatoes, shallots, different types of gourds etc. One particular year there was this huge price crash during the time when we had about 15-20 acres ready to be harvested. That was a very harsh lesson we learned. We had to just shut down the whole vegetable farming thing. That was till date the lowest point in our venture. We even contemplated going back to our corporate lives. But, thankfully we stuck on and we focused on doing quality production rather than scaling things up too much too quick. We decided to focus on value-adds.

We decided to venture into organic farming as opposed to chemical farming that we started off with. We didn't opt to go for any kind of certification as it seems to be more of a bureaucratic thing. We decided to derive good value for our produce.

As a pilot, we set up our own website for online Vegetable sales called http://www.farmbox.in/ and we started selling our produce to a few apartments.. in and around the area where we stay and sold to them directly. We started this on a very low scale but the returns were quite encouraging. People could place orders every week and we used to deliver every Saturday. We got good reviews and the pilot was quite successful.

However we got busy with another project, We set up another 2 acres of green house and that project is now nearing completion..

What flowers do you grow?

Currently We grow only Dutch Roses. We have mainly 5 different varieties of dutch roses.. Taj (Red Roses), Gold-Strike (Yellow), Awallence (White), Corvette (Orange) and Nobellis (pink).

The new venture is a floriculture venture, funded by our friends and we run this on a profit-sharing basis.

Similarly, we took up another project wherein we have an open field orchard. We now have 2 acres of guava which has started yielding.

Please detail about dutch rose cultivation in poly houses.

Dutch rose is a long stem variety. Initially you get the poly house ready and then do land enrichment – deep ploughing using jcb, followed by rotavator to get the soil to fine dust and get the land levelling done. Next enrich it with a basal dose of neem, honge, gypsum, farm yard manure etc.. Then, we do the bed preparation.

Around 30,000 saplings can be planted in an acre. 30-40 days after planting, you bend the primary shoots which results in more number of . Those are called the ground shoots. Once the bending is done, it takes about 4 months to get the first yield.

Initially the yield would be less but in about 6-9 months you get about average yield and in one year you should get optimal productivity. In an acre of green house, you can harvest about 100 bunches every day. One bunch is about 20 flowers.

What is the initial investment required for cultivating rose in about 1 acre of poly house?

Leaving aside land, the main investment is the poly house which will come up to around 30 lakhs. You can avail a government subsidy of about 17 lakhs. Apart from 30 Lakhs on the polyhouse, you need to spend another 10 lakhs which includes your land levelling cost, basal dose, drip and plumbing set up, bedding and planting expense.

In your first acre there will be a lot of other one-time investment like generator, motor, etc. You don't have to expense the same for the 2nd acre.

All this put together will come up to around 40 lakhs per acre.

Approximately what turnover can one expect?

This fluctuates widely. Our initial research got us to dream that we could make a 3 lakh profit from an acre of green house. Typically what happens is you get on an average 2 lakh from an acre, of which operational expenses would come up to around a lakh. Rose cultivation is a very labor intensive business. Per acre of rose, you would need at least 5-6 people working on your farm everyday. Your productivity

gets messed up even if a day of labor is missed. Operational expenses are high, especially when it comes to pesticides.

When we were into chemical farming, we realized the amount of pesticides that get pumped into crops and it ends burning a big hole in your profits. That is how we ventured into organic cultivation. But, with roses we decided to keep it the way it is because it is the major chunk of our revenue. We would want to transition into organic rose cultivation at some point. I guess Right now, it's a little too early for that.

How do you market your roses?

Initially, we used to give it to the auction market. There is an international flower auction market in Bangalore. That is one customer. But, over the last 5 years we have gained entrance into the ecosystem here. In and around Denkanikottai there are a lot of poly houses who grow a lot of roses. There are lot of buyers who cater to the needs of the folks all over the country. There are lot of buyers from Hosur, who come to our farm and pick our roses. So, off late we have not been in a position to give any of our roses to the auction market. Buyers pick it at the farmgate. We have about 10-15 regular buyers who pick our roses at the farmgate

Do you stay on your farm?

We are based in Bangalore. We keep shuttling to our farm and mostly stay over for a day or two when visit the farm.

Is Urban Harvest a farm or a company?

Urban Harvest is a partnership company with a vision to make agriculture profitable. We set it up 5 years back. Some of our friends were also happy to invest.. The majority stake is held is by us three founders and then we have given a minimal percentage to outsiders who are friends and family. Now there is a company that does mainly roses and is venturing into orchards. In another 6 months or so we will be selling guava and we have also set up an orchard with other fruits. We are experimenting with fruits like fig, lemon and jujube. We have to evaluate our guava harvest and then take a call on whether to expand into other fruits. Right now the results seem very encouraging. We have identified some 10-acre plot where we want to start partnering with some friends and do more cultivation.

We basically follow a partnering system where we take funds from people who show interest in investing in our venture and set it up for them. We run it for them in return for a percentage of the profit. The second rose project works on a similar model. All the investment, including the land, is funded by investors. Identifying the property and setting things up, farming etc is taken care of by us. We then share the profits we yield on the farm with the investors.

What would you advise people, like you, venturing into agriculture and getting on board with nil agricultural experience?

My advice would be to not do farming as a part-time activity. They should venture into it only if they are passionate about it and would love to get involved in it. When the 15-20 acres of vegetables let us down, I seriously thought of quitting this. But, gratefully things worked out. But, lot of passion, commitment and capital is required. There is a lot of social good you can do. We certainly have increased the standard of living of the villagers in the area where we developed our farms.

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Microsoft launches agritech startup scheme in India

Microsoft has launched a support scheme for Indian agtech start-ups, to help them "build industry-specific solutions, scale, and grow with access to deep technology, business, and marketing resources."

The program, named Microsoft for Agritech Startups, will offer a range of tech and business tools to early-stage Indian companies operating in the space. The program is split into three tiers, each catering to startups at different stages of growth.

All participating companies from seed to Series C stage will be able to get beneficial access to Microsoft's Azure cloud computing platform, including free credits, technical support, and help with onboarding to the Azure Marketplace, where they can both buy services from, and offer their own to, other Azure network partners.

They'll also be able to use Azure FarmBeats – which Microsoft unveiled late last year – which brings together agricultural datapoints from sensors, drones, satellite imagery, and multiple other sources, and uses artificial intelligence and machine learning to turn them into actionable insights. AzureBeats industry partners include drone manufacturers DJI and SenseFly, ag robot developer EarthSense, and sensor maker Teralytic, and it counts the likes of the US Department of Agriculture among its customers.

Startups looking to develop new, customized solutions will be able to use Azure FarmBeats to obtain and analyze agricultural data and build their own models, without the timeframe, cost, and other resources required to collect their own datasets.

Microsoft for Agritech Startups will also help participating companies which have ready-to-go enterprise solutions to sell their products and services through Microsoft's partner network, and by developing joint go-to-market strategies with the US tech giant.

"Sustainable agricultural technology can transform the global food landscape. Agritech startup innovations are addressing some of our key challenges connected to agriculture and food production," said Sangeeta Bavi, director, startup ecosystem at Microsoft India.

"The Microsoft for Agritech Startups program is among the early steps in our journey towards empowering these startups in India and transforming global agricultural practices."

Indian agtech has been thrown into the spotlight by the Covid-19 crisis and the lockdowns and movement restrictions it has caused. Speaking as an AgFunder Digitalks panelist in April, Temasek's agribusiness managing director Anuj Maheshwari said that ag marketplace startups in the country were seeing increased demand as commodity traders and buyers sought new ways to connect with farmers.

The ag marketplace model "never really took off because switching costs was too high," but that "changed overnight with Covid," he said. The boom, he explained, was in large part due to intervention from the Indian government, which – in the absence of traditional farmers' markets – is using online platforms to buy and sell produce to keep the agrifood economy ticking over. Microsoft isn't the only major tech company reaching out to India's agtech startups at this time. In April, IBM began offering 30-day free trials to its Operations Dashboard, a weather-monitoring tool for farmers and agtech startups.

Source : agfundernews.com

Farming can't be sacrificed at altar of trade

To fix the problem created by the swelling corporate milk output, India is under pressure to open its dairy sector to US imports. Just like accusing Canada of protectionist policies, Trump has called India 'tariff king. The proposed US-India trade deal, too, has the US seeking an increased market access for its highly subsidised farm produce.

For decades, American dairy farms have been hit by low prices. While the small dairy farms have increasingly pulled down shutters, the continued expansion of corporate farming has resulted in surplus milk production, leading to a fall in prices. In the past six years, milk prices have seen a 40 per cent drop on an average.

In 2016, more than 43 million gallons of milk was thrown away by the farmers. This huge milk waste could have filled 66 Olympic-sized swimming pools, says an estimate. Regardless, corporate milk production continued to soar while another 3,000 dairy farms closed down in 2019, says a report of the US Department of Agriculture (USDA). This necessitated US President Donald Trump to look for export markets.

President Trump blamed Canada for adopting protectionist policies. He was particularly harsh about the need for Canada to pull down the import tariffs on dairy products. This became a contentious issue while the US was renegotiating the NAFTA treaty with what is now called as the US-Mexico-Canada Agreement (USMCA). Canada relented, made a limited concession, allowing the US a small opening — 3.6 per cent access to its market. In addition, it also allowed the entry of infant formula, cheese, cream, butter and other products. Mexico, too, allowed the import of certain US cheeses but otherwise remained firm on not opening up any further. Meanwhile, Kenya is under a lot of pressure to allow US dairy products under the proposed US-Kenya FTA under negotiation.

It is now the turn of India. To fix the problem created by the swelling corporate milk output, India too is under pressure to open its dairy sector to American imports. Just like accusing Canada of protectionist policies, President Trump has repeatedly called India 'tariff king' and often expressed his dissatisfaction by saying, "We're not treated very well by India." He had been particularly harsh on the high import tariffs on Harley Davidson motorcycles. India had obliged, and Prime Minister Narendra Modi informed the US President of the duty cut offered.

Since then, America has upped the ante, which was quite evident when President Trump announced before departing for India in February: "We are doing a very big trade deal with India. We'll have it. I don't know if it will be done before the election, but we'll have a very big deal with India." He was referring to the US-India Free Trade Agreement (FTA) which has been under negotiation for quite some time. But, in the meanwhile, a 'quick trade deal' for an early harvest is almost ready. "We can do an early harvest in terms of 50 to 100 products and services," Commerce Minister Piyush Goyal had told a virtual meeting of the US-India Business Council.

While a 'quick deal' or a bilateral trade agreement does not have to strictly conform to any World Trade Organisation (WTO) obligations, the attack on the Indian agriculture and dairy sectors appears to be on both the fronts. To meet the WTO commitments, India had in June allowed the import of five lakh tonnes of maize and 10,000 tonnes of milk and milk products at a lower import duty and that too when farmers cultivating maize and those producing milk were faced with depressed prices. The proposed US-India trade deal, too, has agriculture and dairy placed high on the agenda with America seeking an increased market access for its highly subsidised farm produce.

Although 93 per cent of the small dairy farms in America have closed down since the 1970s, the consolidation of big dairy farms in the US in tune with its policy of 'get big or get out' has turned it into the world's second largest milk producer.

In India, there are 8-10 crore dairy farms. Even though a large number of dairy farmers have an average of two to five head of cattle, India is at present the world's largest milk producer. Over the years, the number of families owning 15-30 cows has been steadily on the rise. Although between 2000 and 2016, as per a study, India has seen almost 52 lakh small farmers quitting dairy, the country can't afford any more closure of dairy farms. Any further opening up should be a matter of concern given the extent of agrarian distress that prevails.

Further, the three ordinances that form a part of the marketing reforms in agriculture too are aimed at the commercialisation of Indian agriculture: bringing in corporate agriculture and consolidating production in the years to come. These autonomous reforms appear to be in sync with the WTO policy that restricts the product-specific support under minimum support price (MSP), keeping it within the agreeable limit of 10 per cent of the total value of production.

By Devinder Sharma

Read full article @
https://bit.ly/32a43B3

Source : tribuneindia.com

Agri subsidies in the European Union countries

England's farmers braced for post-Brexit subsidy gap

Biggest funding shake-up in decades as CAP agriculture policy payouts under EU are set to be wound down

For Will Benson, taking over the tenancy of a National Trust-owned sheep and cattle farm in the Lake District seven years ago was the fulfilment of a long-held dream.

From next year England sets about its biggest shake-up of farm funding in decades as it winds down payouts under the EU's common agricultural policy, a vast subsidy system dating back to the 1960s.

Since the early 2000s "basic payments" have been allocated according to the acreage farmers cultivate, but now the UK has left the EU these will be gradually reduced as ministers test a system of environmentally-based payouts instead.

However, the new scheme remains at an embryonic stage and preparations have been delayed by coronavirus, leaving farmers such as Mr Benson trying to plan for the unknown.

But he quickly realised that without government subsidies, his farm in Grasmere — where native sheep breeds graze freely on and below the fells — would make a steep loss. Now the 40-year-old faces the gradual removal of the £20,000-a-year subsidy payments, with little information about what may come next. "There is a void. I just don't know what, if anything, is going to replace it," Mr Benson says.

For northern English farmers, the funding cuts will hit hard because their animals compete in the market with animals from Scotland, where the devolved administration plans to keep subsidies unchanged for another three years.

Geoff Long, a sheep farmer in Cumbria, said the competition from north of the border would prevent English farmers charging more for their livestock once subsidies were cut. "A lot of men are saying, 'If our lambs are £10 a head dearer because of the cuts to basic payments, they'll ship them down from Scotland and level up [the price]'," he said.

UK Farming

Will Benson faces the gradual removal of £20,000 a year in subsidy payments, without which his UK Grasmere farm will make a loss © Asadour Guzelian/ FT

European farm subsidies aim to protect farmers and stabilise their often volatile incomes. In the UK, they account for all of net profits on the average grazing livestock farm, according to government data, and for more than half of profits at typical cereals operations.

UK farm productivity has lagged behind other large European countries, but farmers also need the subsidies because of the pricing power of the country's supermarkets, which have pushed food prices down to some of the world's lowest.

Across different farm types, the subsidy payouts averaged £27,300 in 2018-19. But the system has drawn resentment by doling out far larger sums to wealthy landowners who cultivate large areas of land, such as the British monarch and the household products billionaire James Dyson.

George Eustice, the environment minister, has called it a "bureaucratic shambles" and "arbitrary". Such concerns spurred Westminster to rapidly wind down basic payments.

The changes in England next year will start with a 5 per cent cut to payments of less than £30,000, rising to a 10 per cent cut to the tranche between £30,000 and £50,000, 20 per cent on payments from £50,000 to £150,000, and 25 per cent above that.

No details have been released of the subsequent tapering. A framework for the new environmental scheme is included in the agriculture bill currently before the House of Lords, and is due for a nationwide rollout in late 2024, with basic payments ceasing altogether in 2027. The new scheme began testing last year and is due to move to pilot stage in 2021.

Ministers have pledged to maintain total levels of farm funding — about £3bn a year — until the current parliament ends in 2024, but the timing of the old and new schemes means many farmers face a looming funding gap.

Julia Aglionby, professor in practice at the Centre for National Parks and Protected Areas, warned that "if there is too large a void…then farmers will find alternative income sources".

"Some of these could be environmentally damaging," she said.

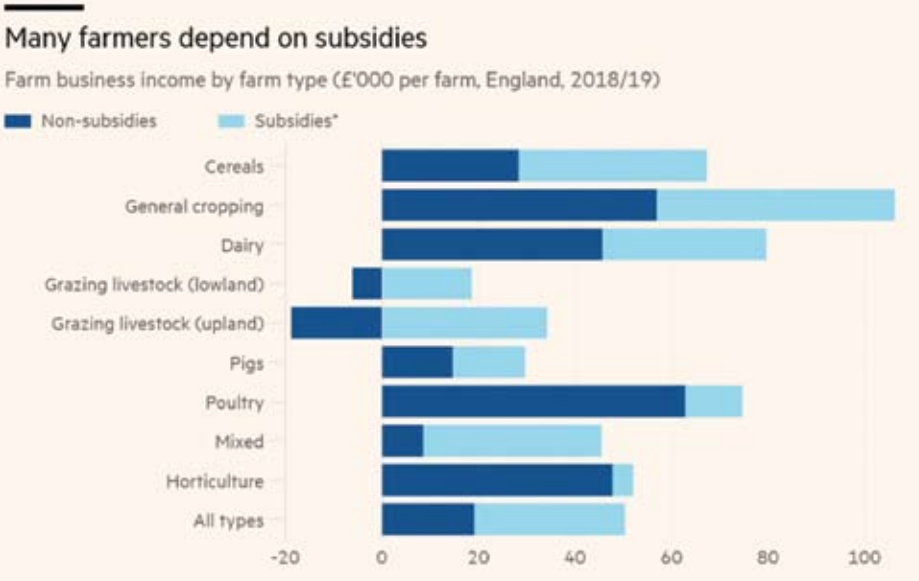
The new system, which is based on the principle of "public money for public goods", will aim to pay farmers for outcomes from fostering bird habitats to creating wetlands or preventing flooding.

Unlike the EU's basic payments, which only required basic "cross-compliance" with agricultural regulations, earning the environmental income will incur work and costs. But a government consultation document released earlier this year indicated it would not require actual food production — a shift that alarmed farmers.

Tom Bradshaw, vice-president of the National Farmers' Union, said: "We'll be very excited if they get this scheme right, but what's pivotal is that it should underline that farming and food production go hand in hand with environmental delivery."

Another concern is how the payments are calculated. The consultation suggests they could be based on income foregone from other activities and costs incurred for environmental work.

There are also worries about implementation. The National Audit Office warned last year that "Defra [the Department for Environment, Food and Rural Affairs] has not allowed enough time to fully develop the payments system". An existing environmental scheme, Countryside Stewardship — which is due to be



Kevin Attwood: 'If you are paying £1 for every pound of income foregone there's no incentive to participate' © Charlie Bibby/FT

phased out — has been well known for late payments.

The scale of the changes is such that some of England's 136,000 farms are not expected to survive. Ministers say they will offer farmers the option of taking subsidies as a lump sum during the transition, enabling some to quit or retire. But Prof Aglionby said not all those facing financial pressure would do so.

"There are many more factors a farmer takes into account than the profitability of their farm…There's an assumption people will go out of farming if they are losing money, but some will want to stay. For those, they will be carried out only in their coffins."

Prof Aglionby said farmers needed support and education through the transition. David Kennedy, director-general at Defra, told a parliamentary committee the department would launch a "very ambitious" scheme to boost productivity from 2021.

Richard King, a partner at farming consultancy The Andersons Centre, said he doubted farm funding would continue at current levels beyond this parliament. "Our judgment is that it would be surprising if, in 10 years' time, agriculture is getting the same level of support it is getting now…[government] will be looking for savings everywhere."

George Eustice, the environment minister has called the subsidy payments system a 'bureaucratic shambles' and 'arbitrary' © Simon Hadley/Alamy

Defra said: "We will continue to engage with and support farmers as we phase out direct payments over a seven-year period, giving them time to adapt their businesses. We will also offer financial assistance to help farmers invest in improving their productivity and managing the environment sustainably."

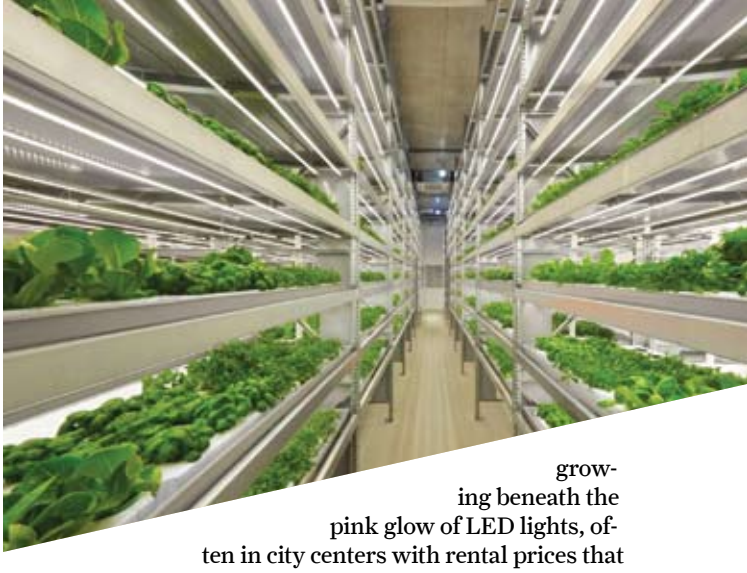
For now, farmers are rushing to bridge the funding gap. Mr Attwood said he would cut costs, seek productivity gains and explore diversification — although the holiday homes he already runs ceased to bring in income during the coronavirus lockdown.

Mr Benson has already moved to boost his income by selling lambs directly to local butchers and hotels rather than at auction. But many other aspects of his farm, like how many ewes he can keep, are limited by his tenancy.

He expects "massive hardship" as basic payments fall. "By the time [the new environmental payments] are ready, my tenancy could be out the window," he said.

Source : www.ft.com

Vertical farming software startup iFarm raises $4m



Vertical farms could well be on the right side of history – and especially so in light of Covid-19, with many vertical farmers now feeling their approach is the key to more resilient, hyper-local, and traceable supply chains.

But that does not mean it always makes financial sense to build or own a vertical farm. Even after years of progress as access to vertical farming technologies widens, the whole operational side is still an Enigma code of frustratingly complex logistics. Drawbacks like high electricity and rental costs combine with the complexity of indoor plant science and high-spec robotics. The vital linkage point is a farm's artificial intelligence, which still has a long way to go.

It's why some early-stage investors — excited in principle by what vertical farming could bring to cities, deserts, the Arctic, or even Mars — sometimes seek out ventures more tangentially related to the space. AFN's parent company AgFunder, for instance, invested in Intelligent Growth Solutions, a UK startup providing tech for prospective indoor farmers – including smart grid systems to reduce electricity usage.

Similarly, iFarm — a Helsinki-based startup providing software solutions and hardware advisory services for indoor farms — is another 'picks and shovel seller' by the vertical farming goldmine. It's working on solving some of the AI backbone pain points for anyone building their own vertical farm, and has just raised $4 million in funding.

The round was led by Gagarin Capital Partners (a Silicon Valley VC focused on AI and named after the first man in space) and joined by Matrix Capital, Impulse VC, IMI.VC, along with various undisclosed business angels.

In an email to AFN, Gagarin's managing partner Mikhail Taver explained the rationale for why he would prefer to see iFarm providing solutions for vertical farms, rather than owning and operating them itself.

"A pure SaaS approach enables us to scale a lot faster since we do not depend on capital intensive hardware and do not face the challenge of complex and expensive logistics, thus reducing the need for working capital," he said. "It is always faster and cheaper to install another server rather than build a million square feet of vertical farms in a faraway country."

Vertical farming as a service

Indeed, as some of the early movers in the space like Plenty, Aerofarms, or Bowery are finding, building and operating a vertical farm needs a hefty wad of capital. There's the initial vertically stacked infrastructure to design and install; those layers upon layers of leafy greens or strawberries quietly growing beneath the pink glow of LED lights, often in city centers with rental prices that would make open field farmers balk. Then, there are the data capture systems to wire up – sensors and AI to spot growth patterns and correlate them with changing inputs to discover best practices.

That's already a lot to think about – and pay for. But there's more to worry accountants. It turns out that vertical farms may need a whole newly-bred set of seeds better suited to life indoors; Temasek and Bayer just set aside $30 million for a startup devoted to this purpose. Or there's the costly question of incorporating aspects of robotic harvesting or maintenance.

On the robotics front, iFarm chief technology officer Max Chizhov said his team had been experimenting with operating drones indoors to hover around, helping with inspections and data collection. "If your farm is ten meters high," said Chizhov, "it's really a problem for all these people who observe the farm every day."

Indoor drones

Elsewhere, iFarm's automated vertical farm management technologies allow customers to start growing salads, greens, berries, and vegetables in the urban environment – from empty warehouses and factory floors, to basements and distribution centers. The technology is based on an adaptive protocol that includes computer vision and machine learning, all drawn from data about thousands of plants collected from a distributed network of farms, as well as industry knowledge. The iFarm Growtune platform, Chizhov claimed, can determine the plant's weight, any growth deviations or pathologies, and build a system that improves crops' quality characteristics on its own. It provides recommendations to farm staff and adjusts microclimate settings to ensure better results.

The company will use the funding to bring iFarm Growtune to another stage, enabling operations of multiple varieties of vertical farms and quadrupling the number of plants available. In addition, iFarm will be optimizing its automated production lines to reduce labor costs and complete experiments with growing strawberries, cherry tomatoes, sweet peppers, radish, and other crops.

Describing his firm's due diligence of these claims, Gagarin's Taver described how he had brought in "technical experts to do hardcore technical questioning."

This investment, he said, is "a part of a larger agtech strategy." Gagarin's team "strongly believe in the sector and specifically target indoor farming

Read full article @ https://bit.ly/2YKYcjC

Source : agfundernews.com

Fully digitalized farming is nearly a reality!

Emerging economies must keep pace

It is no secret that the future of farming is fully digital. It is also no secret that farming at present is already largely digital. Precision farming – the use of sensors, drones, data, and robotics – has the power to revolutionize agricultural sustainability through improved crop yields, efficient water usage, and reduced use of harmful chemical pollutants like pesticides.

Making that fully digital future a reality, however, is easier said than done. It requires both experimentation and a major investment in technology and training. With the EU set to put its colossal financial weight behind digitalization in agriculture over the coming decade, it's vital that emerging economies — particularly those on Europe's border dependent on the continent's markets to sell their produce — keep up the pace. Otherwise, they risk being left behind.

The EU's landmark €750 billion ($885 billion) Covid-19 recovery package, agreed after a marathon negotiation stretching over four days, could be an agricultural gamechanger. Included in the funding agreement is a hugely significant €15 billion ($17.7 billion) for the European Agricultural Fund for Rural Development (EAFRD). Digitalized agriculture – aimed at meeting the EU's ambitious 'Green Deal' goals – will be a major target of the extra spending.

The funding boost should be warmly welcomed by proponents of sustainable agriculture. But for those of us involved in agribusiness on the EU's border, we must also be wary of the risk it brings. A widening sustainability gap between the world's wealthiest nations and emerging economies is a strategic headache – for businesses themselves, for efforts at rural sustainable development in emerging nations, and for the global fight against climate change.

In truth, agricultural companies in emerging markets – including my own in Ukraine, Kusto Agro – have long noted where the wind is blowing. Changing consumer habits, as much as anything, have forced the issue. Increasingly, buyers around the world demand transparency on how their food is produced. The whole food production process, from planting to plating, needs to be traceable by food standards authorities. Making such information easily and quickly accessible is only possible with large-scale digital monitoring of agricultural processes. Led by the EU and US, it is fast becoming standard and required practice all over the world.

But implementing precision farming is an altogether more significant challenge. Importing cutting-edge technology is costly and training farmers to use complex digital farming systems involves significant investments of time and resources. Moreover, it takes perseverance to reap the rewards. Precision farming is an incremental process, where farmers must make use of imperfect data to make delicate adjustments to moisture levels and yields. Mistakes are inevitable; but achieving sustainable outcomes demands sustained effort.

For companies in emerging markets there are also significant cultural challenges to overcome. Historically, agriculture is not considered a glamorous job, which makes it difficult to recruit the top science and engineering graduates that a digitalizing industry needs.

Fortunately, that image is changing as more and more agribusinesses structure their corporate identity around a sustainable, forward-thinking philosophy. Genuine commitments to digital innovation help to attract talent with the promise of learning valuable technical skills that will serve them well throughout their career. It also helps that in many emerging nations, including in Ukraine, much of the country's dollar income derives from agriculture, giving the industry a renewed prestige and the financial means to attract bright young people.

The tools for achieving total digitalization in agriculture are, therefore, within our reach. And if we can rise to the challenge, the benefits will be monumental. Agriculture in emerging economies will remain globally competitive and in touch with consumer demands. We can play our part in tackling this century's greatest challenge: climate change. We can unlock vital sustainable development by creating highly skilled jobs in rural areas and spreading the benefits of growth more evenly across regions.

The EU's drive towards sustainable agriculture and a green transition should be applauded for its ambition. But most importantly, it should spur the rest of the world on to embrace a totally digital farming future.

Source : agfundernews.com

GLOBAL hunger fell for decades But it's rising again!

There are almost 60 million more undernourished people now than in 2014. For decades leading up to the millennium, there were record harvests, incomes rose and food prices fell. That's no longer the case.

In the past half decade things have been going backwards and could continue to worsen, the UN's Food and Agriculture Organization (FAO) forecasts in its annual review of the world's food security and nutrition.

It's a vision it describes as "an alarming scenario".

Reforms to global food systems could help matters, but it won't be easy and the full ripple effects of COVID-19 are still to be felt.

What does the report say?

With improved data, the FAO says it has greater confidence than ever in its latest estimates of world hunger.

Food insecurity – both moderate and severe – has "consistently increased" since 2014, when the prevalence of under-nourishment was at 8.6%. It is now at 8.9%. Between 2018 and 2019, the number of hungry people grew by 10 million people.

The majority of this increase has come from Asia, where the majority of undernourished people live – some 381 million. But Africa's hungry population is the fastest growing and currently stands at 250 million.

There have been some positive developments. Fresh data from China showing how the country has improved diets over many years has enabled the FAO to revise down the number of hungry people it previously estimated had been in the world since 2000.

And between 2000 and 2019, the global prevalence of "child stunting" – impaired growth – declined by one-third.

There is also the complicating factor of obesity: just as the world is getting hungrier, every world region is also becoming more overweight. However, the FAO cautions that this should not be confused with improved nutrition – food insecurity often causes poor diets and weight gain.

Why is hunger getting worse?

When people get poorer they get hungry.

Since the 2009-9 financial crisis, economic slowdowns have hit many economies. The past decade has also brought a rising amount of debt to many poorer nations, which the FAO says has reduced growth. It may be one reason why almost 10% of the global population survives on $1.90 a day or less.

The report also identifies a high level of "commodity-import dependence" – a reliance on food and goods from outside a country's borders that can increase food prices and scarcity. This has been seen during the pandemic as some countries have restricted food exports.

Added to this are conflicts, violence and "altered weather conditions." And then there's pests – such as locust swarms, which could leave millions at risk of starvation this year.

- **Almost 690 million people in the world were undernourished in 2019 – that's 8.9% of the world population, a new UN report says.**
- **This figure could exceed 840 million by 2030, if current trends continue.**
- **Factors increasing global hunger include economic slowdowns and extreme weather events.**
- **The UN warns that without efforts to reform global food systems, its target of zero hunger by 2030 will be missed.**

The COVID-19 impact

The FAO doesn't know exactly what the virus will do to global hunger yet – it's too early to say. However, whatever the scenario, it is expected to worsen food security and nutrition. The reasons include food supply disruption, which has already happened, albeit less catastrophically than some had feared.

The pandemic could increase the total number of undernourished people in the world by between 83 and 132 million in 2020. Although, earlier this year, the UN World Food Programme was forecasting an even more bleak scenario.

What can be done?

"Reducing the costs of nutritious foods and ensuring the affordability of healthy diets for everyone requires significant transformations of existing food systems worldwide," the FAO says.

Clearly this will not be easy. International trade barriers and rising tariffs may have to be lowered, while agricultural policies will need to be shifted towards a more "nutrition-sensitive investment", such as supporting fruit and vegetable crops.

In fact in many areas government policy will be key, from changing the taxation of energy-dense foods to improved regulation of food industries and better policies to support nutrition education.

This is why, despite the considerable challenges, the FAO says there are "significant opportunities" too.

By Harry Kretchmer

Source : World Economic Forum

From crop to cup

How coffee travels through its supply chain?

- ***More than 150 million people drink coffee on a daily basis in the U.S. alone.***
- ***This is the journey of how you get your coffee, from growth to consumption.***

There's a good chance your day started with a cappuccino, or a cold brew, and you aren't alone. In fact, coffee is one of the most consumed drinks on the planet, and it's also one of the most traded commodities.

According to the National Coffee Association, more than 150 million people drink coffee on a daily basis in the U.S. alone. Globally, consumption is estimated at over 2.25 billion cups per day. But before it gets to your morning cup, coffee beans travel through a complex global supply chain. Today's illustration from Dan Zettwoch breaks down this journey into 10 distinct steps.

Coffee from plant to factory

There are two types of tropical plants that produce coffee, both preferring high altitudes and with production primarily based in South America, Asia, and Africa.

- Coffea arabica is the more plentiful bean, with a more complex flavor and less caffeine. It's used in most specialty and "high quality" drinks as Arabica coffee.
- Coffea canephora, meanwhile, has stronger and more bitter flavors. It's also easier to grow, and is most frequently used in espressos and instant blends as Robusta coffee.

However, both types of beans undergo the same journey:

1. Growing : Plants take anywhere from 4-7 years to produce their first harvest, and grow fruit for around 25 years.

2. Picking : The fruit of the coffea plant is the coffee berry, containing two beans within. Ripened berries are harvested either by hand or machine.

3. Processing : Coffee berries are then processed either in a traditional "dry" method using the sun or "wet" method using water and machinery. This removes the outer fruit encasing the sought-after green beans.

4. Milling : The green coffee beans are hulled, cleaned, sorted, and (optionally) graded.

From factory to transport

Once the coffee berry is stripped down to green beans, it's shipped from producing countries through a global supply network.

Green coffee beans are exported and shipped around the world. In 2018 alone, 7.2 million tonnes of green coffee beans were exported, valued at $19.2 billion.

Arriving primarily in the U.S. and Europe, the beans are now prepared for consumption:

5. Roasting : Green beans are industrially roasted, becoming darker, oilier, and tasty. Different temperatures and heat duration impact the final color and flavor, with some preferring light roasts to dark roasts.

6. Packaging : Any imperfect or somehow ruined beans are discarded, and the remaining roasted beans are packaged together by type.

7. Shipping : Roasted beans are shipped both domestically and internationally. Bulk shipments go to retailers, coffee shops, and in some cases, direct to consumer.

Straight to your cup

Roasted coffee beans are almost ready for consumption, and by this stage the remaining steps can happen anywhere.

Read full article @ https://bit.ly/3h6PJxL

Source : World Economic Forum

Q01 INTER CROPPING OPTIONS IN EUCALYPTUS FARM ?

setri1: **A friend of mine has a three acre three year old eucalyptus farm but the growth of the plants was not upto the mark as he is having a regular job and couldn't provide sufficient time to farming. Now he wishes to plan for inter crops between the eucalyptus plants simultaneously as he got work from home option for some months due to covid. So, any guidance by experienced people with inter crop knowledge could be helpful.**

Answer 1 – garao56: Generally no inter crops are raised in Eucalyptus plantations under rain fed cultivation . Under irrigated conditions if space between plants is 14 x 2 meters inter crops such as turmeric, ginger, wheat , sugarcane, banana etc can be grown.

setri1:Thank you for the information, it is on irrigation basis and not rain fed cultivation, but not sure of the spacing between plants.

Answer 2 – garao56 : Generally Eucalyptus plants spacing is 8 x 5 feet in which tractor can be moved for inter cultivation getting 1000 plants per acre. In case of inter cultivation more space is required. Farmers rarely taking up inter cultivation in eucalyptus plantations.

Q02 PAPAYA CULTIVATION TRAINING

amith1973: **I am a working professional and wish to start Papaya farming shortly. I have 2 acres of land In Karimnagar in which I would like to do Organic Compost farming and Papaya farming. I stay in Secunderabad and wish to take up any short term training. Please help.**

Answer 1 – garao56 : Dear Sir, You need not under go any training for papaya cultivation , please visit any papaya orchard nearby and get tips from the experienced farmers and also local horticultural officer. We will be guiding you from planting to harvesting . Please take up Red lady Taiwan variety.

Answer 2 – vdeepakrao: Try to visit the Center of Excellence, run by the Dept. of Horticulture, Mulug(On Hyd-Karimnagar Road), Adjacent to the Professor Jayashankar University.
they'll be able to guide you.

Q04 OPTIONS FOR POND

pareshtiwari: **Hi, Can anybody suggest, what commercial activities possible in fresh water pond other than Fish Farming. If possible with some examples and references. Thanks**

Answer 1 – maitys : All you need to innovate and explore yourself …that's all about "ATMA NIRBHAR BHARAT" instead of taking reference from virtual landscape and implement ….some referral info .

1. Intensive Duck farming or Integrated Duck-Fish Farming
2. Shell Fish Culture (Shrimp, crayfish, crab, lobster, clams, scallops, oysters, and mussels etc.)
3. Aquatic plant crops cultivation for Human and Livestock consumption (Lotus , Water chestnut ,Water cress , Water Spinich , Makhana , Wasabi , Bog Cranberry ,Water Celery , Lemon Bacopa , Pennywort , Aquatic Mint , Duckweed , Azolla etc.)
4. Pearl Oyster farming
5. Spirulina / Algae Culture and many more ...

Answer 2 – garao56: IF the size of the tank is large fisheries activity is profitable ,Depending up on the quality of water fresh water or brakish water fishes/prawns/crabs rearing can be taken up. Other aquatic plants cultivation may not be economical

pareshtiwari:Thank you Mr Maitys for taking time to reply, shall explore vegetation options, if you have references of people doing it please share. It shall help me.
Thanks again

pareshtiwari:Thank you Mr Rao for your valuable inputs

Q05 FARMING OF MOSAMBI

maheshkumarpatel: **Kindly advice for the plantations of satgudi mosambi in Gujarat.**

purnachan: **Mosambi plants required in bulk**

Answer 1 – garao56:Please contact us for project report and for technical guidance. G. Anandarao

Answer 2 – maitys : Mosambi and Satgudi are two different citrus varieties commonly grown with almost similar fruit characteristics. Mosambi has prominent streaks on the thick rind and a circular grove at the styler end or base. Fruit shape is sub-globose and has more numbers of seeds mostly cultivated in Maharastra . It lacks flavour and sometimes it can be almost insipid due to unbalanced sugar acid ratio.
Sathgudi fruit surface is smooth, spherical in shape, rind is thin, semi glossy, finely pitted and has segments , mostly cultivated in Andhra Pradesh .Telangana & Tamilnadu

This variety is a high yielder (16-18t/acre) and popular in South India because of wider adaptability and better consumer acceptance.
Batavian (Bathayi) another lesser known variety of sweet orange mostly grown in the coastal districts of Andhra Pradesh . Batavian variety closely resembles Sathgudi. It develops yellow patches on green background when it is basked to protect itself from fruit sucking moth
Soil : A well drained loamy soil of uniform texture upto depth of 2-3 m having good fertility is considered ideal for cultivation. The plant is highly sensitive to waterlogged situation. Heavy soils, if well drained, yield good crops but the cultivation becomes difficult. Soil pH of 6.5 to 7.5 ideal.
Climate : Tropical climate with moderate annual rainfall of i.e., 750 mm are ideally suited to Sweet orange and Acid lime. They can be grown successfully even upto an elevation of 900m above mean sea level and the best growth performance occurs around temperature of 32 deg C.

Answer 3 – garao56: Please inform farm location to enable you to guide.

Q06 NEED GUIDANCE TO START-UP HORTICULTURE FOR SOUTHERN KARNATAKA

dadsdream: **Hi, this is Sreenivas, planning for horticulture cultivation. I have a piece of land which measures about 4 acres and has ample free time (3 days in a week to be precise), I am planning to rejuvenate the land. Please share any relevant information on what I can do with that land. All kinds of suggestions are welcome. Thanks in advance**

Answer 1 -- garao56: Dear Sir, Please inform hitherto what are the crops/fruit plants taken up on the land. If new development is to be undertaken you have to develop the land by providing the following developmental activities.
1. Jungle clearance
2. Leveling
3. Bund formation
4.Development of well/Bore well
5.Pumpset
6.Fencing
6.Farm house /worker's quarter
7.New crops/Fruit crops proposed to planted on the land
Please inform the above particulars to enable us to prepare project report for availing any term loan from Banks

dadsdream: It was previously cultivable land, left uncultivated for 4-5 years and there was a dried-up small river, which has been filled up with trees and bushes and topped up with mud about 3 years ago. The average rainfall is about 250-400 mm per year. I have borewell with about 2.5-inch water output.

Answer 2 -- garao56 : Please take up land development like fencing, leveling, bunding, filling with earth etc and take up plantation of fruit crops. which type of fruit crop you are interested please inform to guide you.

Answer 3 -- purnachan: Sir, where exactly is your land located?
We can guide you in setting up a profitable horticulture farm in less than 2 months

Answer 4 -- kskarnic : Please provide location of the land available facilities on site like irrigation facilities farm animals topography of the land existing crop or is it Barn would you be a absentee landlord or stay at the site. Availability of labour. Nearest market and any other information about the land status etc. All these information is essential to suggest activities that can be taken up without hassles.

Answer 5 -- garao56: Please take up land development and plantation of taiwan gua, apple ber, custard apple, pomegranate or any other fruit of your choice. If term loan is required from bank for meeting the expenses call on us.

Q07 POINTERS FOR PAPAYA FARM NEAR CHENNAI

arunlouie: **Hi All, I am planning to start Red Lady Papaya cultivation, gone through many forums and videos. This is my first step in farming, so I want to be sure I take all the guidance.**
Can someone allow me for a farm visit of Papaya farming in northern districts of Tamil Nadu? Organic or in-organic, both are fine.
Please help.

Answer 1 - garao56: Please visit nearby available papaya field and (have feeling of seeing is believing) and seek technical advice from us .

Q08 NEED INFORMATION ABOUT PALM OIL TREE PLANTATION

hornspace: **Please tell me full information about palm oil tree plantation & give me a contact number**

Answer 1 -- purnachan: Sir, Please contact

Answer 2 -- garao56: Please contact us for guidance

Q9 CAPSICUM CULTIVATION IN OPEN LAND

shreenureddy : **Hi All, I am planning to go for Capsicum cultivation in open land. Pls provide me the cultivation procedure and yield and the harvesting times of it. Thanking you in Advance. With Regards, DS Reddy**

Answer 1 -- maitys: Capsicum is basically a cool season crop and day temperatures less than 30°C is favourable for growth and yield. Fruit will show poor setting and poor colouring when temperatures are above 30°C .

Answer 2 -- intertrade : Which area?

shreenureddy: Vizianagaram in Andhra Pradesh

Answer 3 -- intertrade : Vizianagaram in Andhra Pradesh it is ruled out

Answer 4 -- maitys : If you are a seasoned farmer , then shadenet and insect proof nylon mesh with drip system is other low cost alternative . If you are first timer then skip it and go for any other vegetable crop.

Q10 VERMICOMPOSTING PROJECT

sumukha: **Namaste, I need both inputs as well as raw materials to start a vermicomposting project in 1-2 Acer land near Bangalore (Magadi). Looking at a trial project and want it to be inexpensive to start with until I feel confident and comfortable doing it in effective, efficient and methodical way.**
The farm already consists of 100 coconut trees, 50 mango trees and 100 silver oak trees. Can any of the leaf from these plans be used as raw materials?
Thank you in advance for your inputs and support.

Answer 1-- vtnaren : Hi, I have a team which undertakes vermi-compost training. I have been involved in training more than 5,000 farmers across Karnataka. Please give your contact details, Thanks

Answer 2 -- garao56 : Dear Sri Sumukha, Please contact nearby dairy farms for supply of cow dung for vermicomposting , the leaf material and other debris available on the farm is limited supply . If you are taking up the vermi-compost unit please approach us for project report for availing loan from bank .Also subsidy can be availed from KVIC under the PMEGP scheme .

Answer 3 -- spbrar: I would like to know a first hand input on the vermi-compost setup and avail financial support form government scheme. please share your contact details to speak direct. regards,

Answer 4 -- purnachan: Sir please visit GKVK, Bangalore-65 It is a Government Institute.

Q11 SHRIMP FARMING IN KARNATAKA

avinashmj: **Hi All, Myself Avinash from Bangalore, Karnataka want to start shrimp farming in Karnataka and am looking for suggestions and shrimp farmers for guidance, I would appreciate if somebody can give genuine information on shrimp farming process. Thanks in advance.**

Answer 1 -- garao56: Dear Avinash ji, please inform as to whether you are planning to take up in brakish water prawn culture (Vannamei culture) or Fresh water prawns G.Anandarao B.Sc(Ag)

raaj0bd4: Pls advise the best from the both

Answer 2 -- garao56: Dear Sri Avinashmj, Please inform the location of the farm and if you are developing the farm afresh there is subsidy scheme for getting subsid from Pana Mandthri Mathya sampada Yojana scheme (40%) .Please confirm to enable us to help you.

Answer 3 -- lisaross : Please share your contact details.

Q12 MORINGA FARMING

gosampada : **Need guidance and feasibility to do Moringa farming about 60 Acres in North India about 30 kms from Delhi. Interested parties please revert.**

Answer 1 -- shanmuga06: We are having the annual crop moringa & perennial crop moringa planting materials like seeds/saplings.

Answer 2 -- garao56 : Please contact us for guidance

udayabhanu: **Will need guidance for moringa farming in Mayurbhanj district of odisha. Also need moringa leaf powder. Will be grateful.....**

Answer 3 -- raja_reddy : Can I have your contact details to contact you?

Answer 4 -- raviedu : Moringa needs a hot climate for better production - either for leaves or pods. North India is not a viable option for large scale cultivation of moringa.

Answer 4 -- garao56: Moringa can be grown in North India but the plants will shed leaves during winter season, rainy and summer seasons the growth will be normal.

BEEMA BAMBOO FARMS

akilandam : **Kindly give me contact details for Beema bamboo plantation farms with in Tamilnadu and Bangalore. I wish to visit and know details of Beema bamboo cultivation details**

Answer 1 – garao56 : Elicit from Tamilnadu and Karnataka members.

Answer 2 – happirehabcenter : If you want to buy planting material for Bamboo, we can help you

Answer 3 – barathigrowmore: We are very much glad to know your interest in the Beema Bamboo plantation.
We are the developer of the bamboo variety "Beema bamboo" and propagating Beema bamboo. We are one of the leading Plant Tissue Culture lab in India, in existence for the last 24 years, supplying bamboo plants throughout the world. We subculture over 1 lakh cultures every day and supply 10 million TC plants every year.
We produce and supply tissue culture plants of many bamboo species such as Bambusa balcooa variety "Beema bamboo", Bambusa tulda, Dendrocalamus asper, Dendrocalamus stocksii, Dendrocalamus hamiltonii and Thyrsostachys oliveri, Dendrocalamus brandisii, Bambusa nutans
Beema bamboo is a clone of bamboo developed by us, selected from the open-pollinated population of Bambusa balcooa found in North Eastern India followed by multiplication through Tissue Culture. This new high yielding clone of bamboo – BEEMA BAMBOO is responded to field management practice and yields according to the Agri-inputs.
Our Beema bamboo can be grown everywhere from small farms to large scale farms, and is,
a. A Fast growing bamboo species
b. Thorn less
c. Thick walled
d. High yielding
e. Suitable for cultivation as field crop
f. Clump forming and non-invasive
g. Sterile, do not produce seeds and do not die, and hence once planted, replanting is not necessary even for centuries.
h. Has a Calorific value of 4000 KCal energy and 1 to 2 % ash content and highly suitable for both combustion and gasification systems of power generation.

Answer 4 – garao56 : There are about 100 species of bamboo in India, kindly specify the scientific name of Beema bamboo to have better understanding the particulars of the same

Answer 5 – barathigrowmore : Dear Sir, Scientific Name is "Bambusa Balcooa"

GUIDELINE FOR TEAK PLANTATION

nikhilt099 : **Hello Sir, Can any one help me for teak plantation.**
1. From where I'll get plants
2. What time requires for growth of these plants
3. Cost of baby plants
4. Cost of plants during selling . Ko
Nikhil Tiwari, Shahdol district, Madhya Pradesh

Answer 1 -- kmc_345c : Call me regard teak plantation for cultivation & marketing.

Answer 2 -- veerakart : Contact me for teak plants, I am from Tamilnadu and supply teak plants all over India

Answer 3 – mayuka : Hi, I am Farmer from Satara Maharashtra I have planted 1000 Sagwan plants 3.5 years before. If any detail information, please reply here I will definitely transfer my experience.

Answer 4 --garao56 : Dear Sri Nikhil, first of all inquire with the Forest Department ,Nursery in your state , you will be able to get teak root cuttings at cheaper cost. You have to wait 20 years for getting yield and income. If you are having assured income please go for teak plantations. Other wise take up Kamar variety of plantations (soft wood type tree) which will be coming within 15 years . Please plan for getting income every 7 to 15 years by planting poplar, Kamar, teak in different extents in 20 acres.
Take up medicinal plants in between the forest plants by getting organic certification for your land for export purpose.

LEMONGRASS CULTIVATION

octopusinc: **I am thinking of cultivating lemongrass and palmarosa. they seem easy to grow, have good pest resistance, have high value, and can take three harvests in a year. is this a good plan? or are there some more points that i need to consider. Your thoughts please..**

Answer 1 -- rajendrakisanmitra: Definitely I will help you iam consultant for this and buyer for lemon grass and plamarosa oil please contact me

Answer 2 – prprasher : Hi I m Ganesh Prashar from Himachal Pradesh I cultivate Lemongrass farming in 15 Hector land and also have Dry Lemongrass Green Leaf near about 2500 kg buyers contact me

jay3311: **I am looking for lemon & also lemon storage for around 200ton . Contact me**

Answer 3 -- rkrkrk1212 : Please share your contact details

Answer 4 -- garao56 : Please think of marketing arrangements and then take up cultivation of lemon grass and palm rosa.
Please contact us for project reports. G.Anandarao B.Sc(Ag)

Answer 5 -- shanmuga06 : We are having the lemon grass plants available in quantum.Kindly contact us for your requirements.

Q16 GERBERA POLYHOUSE FARMING

agarwal71: **I want to start gerbera farming at my farmhouse sonarpur gangajowara polyhouse farming. PLEASE tell me details**

Answer 1 -- maitys : The wedding season happens to be peak time of cut flowers (Gerbera, Rose, Gladiolus, Carnation, Orchids, Aster , Chrysanthemum etc.) Business in India.
In peak season you may get Rs 5-Rs 10 (includes packing ,C&F charges) per Gerbera stick rate and in non-ceremonial seasons rates will drop per piece to Rs 2-Rs 3 per stick in major cut flower trading hubs in India i.e. Mumbai, Bangalore, Hyderabad, Kolkata, Delhi ,Ahmadabad, Madurai , Lucknow etc. West Bengal based floriculture farmers prefers to cultivate Gerbera in open land keeping the peak season demand in mind .
As per Flower Council of India ,floriculture is a Rs. 20,000 crore business in India, per annum. Due to pandemic floriculture market took a reverse turn …wait and watch then proceed. The United Nations has warned that the world could see a hunger pandemic by the end of 2020. So it's makes more sense and practical to grow vegetables instead.
If you have strong investment and marketing back up then you can go for high end fruit cultivation viz. Blue berry , Strawberry , Fig etc. in playhouse as well .

Answer 2 -- garao56 : Marketing will be problem in this karona pandemic time. Please take up vegetable initially and later Gerbara cultivation can be taken up in the same polyhouse after harvesting vegetables like capsicum,musk melon, braccoli etc

Answer 3 -- kaushlendrakm : First of all thanks for the post. As I read that due to pandemic floriculture market took a reverse turn.....Wait and watch , cause of I am a gladiolus grower.

Q17 GUIDANCE FOR MUSHROOM CULTIVATION AND MARKETING IN 1200 SQFT LAND IN BANGALORE

premsudha : **Hi, I need some Guidance for mushroom cultivation and marketing in 1200 sqft land in Bangalore,Near DLF newtown.**
Is mushroom cultivation profitable ?
Are there any buyers?
What kind of mushroom has good business?
Some information about exporting mushrooms

Answer 1 : garao56 : Milky white mushrooms & oyster mushrooms can be cultivated easily, initially you have to market the produce on your own or with the help of super bazars.
Please contact us for guidance and for project report

Answer 2 : maitys : Mushroom cultivation is a technical process. Having an indoor space with Pre wetting area , Composting yard, Bunkers, Tunnels, Soil chambers etc. , some substrate and spawn is not enough to grow mushroom and earn money . Mushroom is a climate sensitive crop Temp, RH , Co2 etc. affects the crop . It's OK if you are a trainned mushroom grower . Most of the mushrooms sold in super markets are product of large business houses ; are treated with potassium metabisulphite due to market demand as mushrooms become extra white after the treatment and the casing adhering is also removed. Supermarkets pays one third of the MRP of the mushroom variety to the farmers (incl consumer packing & C&F) with 30 days credit facility etc. , GST invoice billing and so on Marketing of mushrooms in India is not yet organized. It is the simple system of producers selling directly to retailer or even to consumer, which has its own limitations. If you can manage to sell your entire fresh , perishable produce to consumers directly you are a lucky mushroom grower. An indoor space in the prime location of Bangalore ...I would sugest CFA supported Cold Supply Chain (Fresh vegetable , Fruit etc.) under MFPI and Atmanirbhar Bharat reform policy .

Q18 WHICH PAPAYA VARIETY IS BETTER?

dk.a55d4 : **Which Papaya variety is better? Tiwan Red lady-786 or Australian Green Berry Inrespect of Virus, duration,Yield, fruit shape and size, taste,colour, price and ease of marketing. Please guide**

Answer 1 -- brij07 : It depends upon the area in which you are planning the cultivation. The red lady 786 variety is being cultivated in India for very long so it has become susceptible to viruses and other diseases whereas other varieties are new that why these varieties are less prone to disease. In terms of quality, taste, and color, red lady variety is better than all other varieties. Shelf life is also a major factor here, the shelf life of red lady is better than any other varieties available in the market. But if your area has a dense plantation of papaya then you should not go for the red lady.

dk.a55d4:Thank you so much fo clearing my doubt. Well explained. Thanks

Answer 2 -- garao56 : Even though Taiwan Red lady variety is suffering from mosaic virus it extensively grown for better quality of fruits. G.Anandarao

dk.a55d4:Yes true Redlady is most preferred, but is the best way to control virus.

Answer 3 -- garao56 : Dear Sir, In the nursery itself seedlings contains virus may be 5 to 10 % of plants observed after attainment of some growth within 3 to 6 months which may not affect the economic yield. Removal of infected plants and destroying them.

Contolling aphids, vectors by periodical spraying of systemic insecticides.

Q19 REGARDING MIXED CROPPING OF COCONUT PLANTS WITH ARECANUT PLANTS

abhi1994: **Friends I have 2 acres of land in my Village in mysuru district I have plans to do mixed cropping of coconut and arecanut plantation so anyone here plz guide me the best method to this plantation,**
I hope to get best replies as soon as possible friends
Thanking you ABHISHEK M

Answer 1 – sriramsree : kindly approach nearby KVK institute,they can support you about subsides and other assitance.

Answer 2 – venudvg2010 : Don't go for Areca nut. Instead of that you can plant Mahogany which can give you good returns in 8 - 10 years. Don't waste your resources. This is my opinion. You can contact me for further discussion.

Q20 WHICH CROP CAN BE CULTIVATED WITH LESS MAINTENANCE ?

kramsami : **Hello, I have a land around 4 acres in Kanchipuram, TN but I live in Bangalore. I tried lease with few people but none of them working. Can someone suggest me the better solution. Is there anything I can cultivate without a person or atleast I can use them once or twice a week to maintain the cultivation?**

Answer 1 – snetra1 : Sir, You can plant trees and put a small Pump room(Bore well) cum small House and put somebody to work!If approach local Forest Dept.they can help you!

Answer 2 -- maitys: Fodder

Answer 3 – shersil : Sir if you are interested you can contact me. We can talk about this more.

Q19 BIO CNG FROM COW DUNG AND AGRO WASTE

rachanam: **Hi, Can anyone share his thoughts on BIO CNG from Cow Dung and Agro Waste. Interested in set up Bio CNG/ Bio Gas plant in Gujarat. If any have experience of the same please share statistics. Does it commercially sustainable ? Thanks,**

Answer 1 – man1950 : Please visit the nearest Khadi And Village Industries Office.They will give you complete details about loans/subsidies/authorised and certified vendors

Answer 2 -- maitys : Govt. of India policy support

Government of India has released the National Policy on Bio-Fuels 2018 vide gazette notification no. 33004/99 dated 8.6.2018 revised notification no. 20/222 dated 28-02-2020 .

The policy emphasizes on promotion of advanced Bio-fuels including CBG

The Galvanizing Organic Bio-Agro Resources Dhan (GOBAR-DHAN) scheme was launched by Government of India to convert cattle dung and solid waste in farms to Bio-CNG (CBG) and compost

The Guidelines provides for Central Financial Assistance in the form of capital subsidy and Grants-in-Aid in respect of the following activities .

1.Installation of plants of Biogas production from Industrial Waste, Sewage Treatment Plants, Urban & Agricultural Waste/ Residue through Biomethanation.

2.Installation of plants of Power generation or production of BioCNG/enriched Biogas from Biogas produced from Industrial Waste, Sewage Treatment Plants, Urban & Agricultural Waste/ Residue.

3.Installation of Biomass Gasifier for feeding power into the grid or meeting captive power and thermal needs of rice mills/other industries and villages.

4.Installation of Plants of recovery of energy/power from Municipal Solid Waste.

Technology :

1.Projects based on Waste-to-Energy conversion technologies namely, Biomethanation, Combustion, Gasification, Pyrolysis or a combination thereof or any new technology as approved by MNRE shall be eligible for CFA (Central Financial Assistance)

2.Projects for generation of Power from Biogas shall be based either on 100% Biogas engines/gas turbines or steam turbines with a minimum steam pressure of 42bar.

3.BioCNG/Enriched Biogas to be produced shall meet the specifications of BIS IS 16087: 2016 or any other further revisions in the said specifications.

Criteria :

To avail financial support, the applicant must have availed term loan from any Bank/financial institution. One time back ended Central financial assistance for Waste to Energy projects through banks/FIs will be provided for offsetting loan amount. Loan may be taken from any Indian Bank (commercial and co-operatives)/Financial Institution or International Bank/Financial Institution.

CFA :

1.Biogas (Rs. 1.0 crore per 12000m3 Biogas /day.(Maximum CFA- Rs.10 crore/project)

Read full info @ https://bit.ly/3gOPZ3Z

AGRICULTURE REVIVAL

Needs further attention to micro level fine-tuning

More attention to the ground level realities. The social and economic and the panchayat level reforms are critical. These further details call for critical analysis on policy implementation.

The revival of the economy seems to be very much dependent upon the agri sector. All other sectors, industry, infrastructure etc seem to be still in the lockdown mode.

This kharif season agri output is projected at 108.22 million tonnes, as the kharif acreage hits all time high as a newspaper headlines scream!

The government has put lot of emphasis on small and marginal farmers in the revival of economic growth, rightly so therefore!

As the vast majority of farmers belong to this category only, it is only right that we seem to care much for these two segments of millions of farmers, the small households in the rural India. Indian agricultural transformation depends very much on what we do for this farming segment and what is happening already is a question we have to examine much more carefully and also what we find from the ground realities. These two segments lie at the very bottom of the pyramids to say.

In our experience the old regime is also like what the new regime with all its noise is going. Agriculture and rural development doesn't get wet we are all talking about!

Technological revolution is transforming Indian society. including the agri sector.

There is this smart phone revolution. Now, in almost every household in the villages, the new generation of boys and girls, the IT tech has transformed their lives, they are educated and aware and they use smart phones and the governments must do much more than what is being done and more so now, after the Covid menace online usage is increasing.

In agriculture, there is also the digital revolution. From now onwards technologies are becoming everyday reality. This is a new field and a vast territory and only more qualified hands can do justice by taking up this awareness campaign.

This is now a sadly neglected area and given the current environment when most of our exerts are urban based professionals, economists or retired bureaucrats, the grass roots realities of India seldom get attention.

Though Covid is a great tragedy and disrupted much of our normal life and created much agony and great losses it seems that Indian won't be the same again unfortunately.

Digital transformation of much of our society must be welcomed for what it is capable of doing and also still newer techs like AI and Cloud and others could help to impact the life of the people outside the offices and let us hope much of our farming scenario would be impacted by the many revolutions including the much-touted digital one!

Our point is that right now, the many tech revolutions seem somewhat far away or far ahead. The people at the bottom level are yet to seem to get the benefits in their day to day lives.

The potential for much change seems visible and yet the lives of the hapless farmers who had suffered much for lack of priorities for so long remain where they were. For much of our post-Independence period, right?

There are many other issues at the grassroots level.

One is the panchayat raj institutions

We restrain further comments or such revelations might antagonise the local vested interests.

As we have been long saying as of today a small farmer is either a debtor or a litigant or both.

Life in the villages is not so easy and pleasant, as we all seem to imagine.

So, one more lesson for tackling the rural realities that stand in the way of further progress is to realise, for the experts and the expert professionals, in the Indian scene, either an economist and bureaucrat is that these category of experts also live in fear of the incumbent governments. So, you really don't get realistic appraisal of many of the policies.

Now, we feel the time also has come to realise that we shouldn't simply talk of policies in general, vague terms.

We need not mention the government policies in vague terms, we have to further analyse the implementation details and then come to comment, be it the ease of doing business or many other bureaucratic hurdles in policy implementations.

One more aspect of rural development policies is the state of public opinion at the grass roots levels, the media is not a free media anymore and everywhere. These are stray thoughts and we need a more open society and a commitment for values like truth and honesty in politics. Perhaps, the education spread and growth in social media can partially rectify the current deficiencies.

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Farm Land Discussions related to buying and selling farm land	569	3.7K
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