We are committed to the development of farmers
Sustainable Agriculture is an important sector in Arth Ganga

**Organic Farming**
- Development of pilot clusters in Uttarakhand, Uttar Pradesh, Bihar and Jharkhand
- Organic farming is being taken up in 50 Hectares of Land in 7 districts of Uttarakhand and 35,000 Hectares in 11 Districts of Uttar Pradesh
- Development of sustainable Agrispaces in Munger, Bihar by IUCN

**Horticulture**
- Agroforestry implementation in Uttar Pradesh, Jharkhand and Bihar
- Plantation of 3,000 Rudraksh saplings in mid Himalayas, Uttarakhand by INTACH with CSR support from HCL
- Integrated action plan by Uttar Pradesh for 27 districts with a cost of Rs. 3878 Lakh
- Development of 76 Ganga nurseries and plantation of 55,69,200 trees

**Medicinal Plantation**
- Promotion for cultivation of medicinal plants in Uttar Pradesh
- Cultivation in 10 districts along Ganga on 2500 Hectare in 180 Gram Panchayats
- Development of 17 large and 50 small cluster level nurseries

**Forestry Interventions**
- 26764 Hectare area planted by State Forest Departments
- Intensive plantation drives through Vriksharopan Abhiyan

For more information log on to [http://www.nmrgang.org.in](http://www.nmrgang.org.in)
Our salutations to the extension and finance fraternities!

I strongly believe that agricultural extension and agricultural finance are two major pillars of Indian agriculture. All innovations, technologies and policy interventions for farmer welfare would be ineffective without extension and finance. As we are aware, Indian farmers have to make complex decisions due to the shifting emphasis of agriculture towards diversification, commercialisation, sustainability and efficiency.

Progressive farmers in India are innovating conventional practices to become successful farm entrepreneurs. They have been instrumental in the expeditious transformation of Indian Agriculture during the last decade... from subsistence to affluence; from traditional to technological; from undefined to precise; from a backyard activity to a multi-fold and multifaceted industry! This metamorphosis has been possible because of our extension professionals, who have logically connected with our farmers to emulate the swiftly changing market dynamics.

Success in modern farming also depends on a proper combination of Money, Management and Marketing. And money, more often than not, comes through credit. The basic role of Credit in Agriculture is to provide capital to acquire any kind of productive assets or agricultural inputs like machinery, fertilizers, seeds, pesticides or water. Credit provides farmers, the means to keep up with the constantly evolving technology. Credit helps in expansion of farming operations and development of new agricultural enterprises.

Public and private sectors in India have recognized this demand and set up specialized agricultural lending institutions. Commercial banks and organizations are also in competition by staffing themselves with experts to monitor their agri-credit programs. However, with growing commercialization of agriculture, the magnitude of loss due to unfavorable eventualities is increasing.

The question is How to protect and support farmers in such situations?

When Agriculture is synonymous to disasters and risks beyond our control, it is necessary to take precautionary measures to control damage faced by farmers.

Summarizing the concept, timely information on new technology through extension services... and assurance of available finance stimulates the adaptability of new innovations for greater and better productivity. The Agricultural Extension and Finance structure in India has been on the forefront in supporting our farmers. Organizations & Professionals have been playing seminal roles for an Aatmnirbhar Krishi in India.

Happy Reading

From the CEO’s Desk...

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Happy Reading
Editorial 03
From the President’s Desk 06
From the Executive Editor’s Desk 07

COVER STORY
We are committed to the development of farmers 08

AT SCRUTINY
Rethink Agri-Finance 20

SPECIAL FEATURE
Swachh Bharat - Swachh River Abhiyan 23

THE LEARNING
The New Dynamics 24

NAFED INITIATIVES IN J&K
Paving Way for Fast-Paced Development and Prosperity 28

THE BIG VISION
Higher leverage of technology vital 30

WAY TO GROW
Digital Initiatives for Agri Extension Services 32

VISION AND SUPPORT
Changing Agricultural Dynamics: New Perspectives of Extension 40

AGRI ECOSYSTEMS
IISR Initiatives to double farmers’ income 42

INSIGHT
Lockdown Brought Forth New Vistas of Communication in the Agri Sector 44

TRANSFORMING BHARAT
FPOs, Futures and Options
The Combo to Raise Farm Incomes 46

INCLUSIVE AGRO-ECOSYSTEMS
Innovations in Digital Augmentation 48

THE NEW TECH
IT-Enabled Agri-Extension Is Crucial 50

INDUSTRY SPEAK
Fintech Solutions for Farmers 52

SHOULDERING RESPONSIBILITY
New Opportunities in The New Era 54

GROUND ZERO
Innovations, Extension Pluralism and Farmers 56
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The Changing Paradigms of Agriculture

The dynamics of agriculture extension have changed. We have moved far ahead of the times when exchange of information was from farmer to farmer. After independence, the government sector played a key role in disseminating information regarding new technologies with farmers. Agriculture universities started coming up. The first one, GB Pant University of Agriculture and Technology at Pantnagar, which was built in the late 60s. Today we have close to 80 State Agriculture Universities and four Central Agriculture Universities, besides four institutions with academic courses, IARI, IVRI, NDRI and CIFE under ICAR. These universities with full-fledged extension directorates and field network of Krishi Vigyan Kendras, exceeding 800 plus, and presence in almost every district of the country, further expanded the scope and ambit of the extension work and technology delivery system. The establishment of extension divisions by the Agriculture Department of the states and the World Bank funding during 1975-1998 created huge nationwide extension paraphernalia. This program boosted farm productivity growth and developed local extension leaderships, which could be sustained during and after the Green Revolution era.

Coinciding with the Green Revolution and immediately thereafter, the private sector, especially the fertilizer and crop protection companies deployed their field development teams. These boosted government extension activities. The private sector was focused on the promotion of their products. In the process, they delivered useful knowledge and technologies.

In the last few years, with advancements in ICT and other digital technologies, the nature of extension work has undergone massive change. Today the private sector, especially the 1000-plus Agtech Startups are playing key roles with their innovative models, making the reach and effectiveness of the extension system incredibly high. The new institutions, especially the FPOs are also playing an important role in bringing farmers on one platform, connecting them to technologies and markets.

For comprehensive development of Indian agriculture, there is need for a collaborative approach among all stakeholders.

The three Acts related to agriculture will unleash the potential of this sector. They shall create the eco-system in which farmers can realize the value of their produce and flourish.

Earlier, the thrust of extension services was to maximize production. Now that our agriculture is marked by surplus, the focus is moving from production to profitability. Surplus management and minimizing post-harvest losses are key areas of concern. The learning is that production alone cannot guarantee income. We need to benefit from the increased production. Post harvest processing and management is the answer.
Telangana to ensure complete seed traceability

In November 2020, Dr Keshavulu Kunusoth won the Policy Leadership Award for the Seed Sector, instituted by the Agriculture Today Group. Dr Keshavulu is Managing Director, Telangana State Seed Organizations. Telangana State Seed Certification Authority also won the award for the Best Seed Certification Agency in the country. The awards were announced as part of the first edition of India Seed Awards, organized by the Agriculture Today Group.

In November last year, Dr Keshavulu told us that Telangana State Seed Certification Authority has introduced several transformative policy changes in the field of seed certification. For the first time in the country, TSSCA implemented the complete online seed certification process and adopted modern IT technologies. These included digitisation of offices (e-office), seed traceability through QR coding and geo-tagging of field inspections. These initiatives, Dr Keshavulu said, ensure transparency, accountability and speedy services to the seed industry and ensure quality in seed supply system.

I was reminded of his words when I read a recent report that seed traceability will be operational from the kharif crop in Telangana. This singular achievement has been possible due to the introduction of Quick Response (QR) code – another first for the nation.

Complete seed traceability system shall be available for the seed certified by Telangana State Seed and Organic Certification Authority and TS Seed Development Corporation.

Thanks to the QR code, the seeds supplied by the Telangana state agencies shall carry information on complete production of the seed – answering the questions of who, when and where. Further, information shall be coded on who supplied the seed to the producing farmers, or the origin of the breeder seed. When and where was the seed processed, along with the date of expiry shall also be coded. In this way, the code will have the information on two generations of the seed, according to Mr Keshavulu. In this way, the seed shall carry information for two generations.

Telangana is today regarded as the seed bowl of the country. It meets about 60% of the country’s seed requirement, in addition to meeting intra-state needs. The seed certified by the two agencies is supplied to about 10 states in the country.
WE ARE COMMITTED TO THE DEVELOPMENT OF FARMERS

Hon’ble Finance Minister India Mrs Nirmala Sitharaman on the government’s vision for the farm sector

Our government is committed towards the development of farmers and workers. Through the Budget, the government will be able to reach out to those who are in need of immediate relief due to the pandemic. Our government wants to lay down the roadmap for a sustainable growth structure. The provisions made in the Budget for the new fiscal shall enable us to work on this vision.

For agriculture and all other sectors, the government has offered a very strong stimulus package and a long term growth model. Atma Nirbhar Bharat shall be achieved by Atma Nirbhar farmers and Atma Nirbhar Agriculture. Our efforts in the direction of a sustainable growth structure reflect the aspirations of over 130 crore Indians.

We are working on creating an ecosystem which involves higher participation and the provision of better opportunities to the youth of our country. The Opposition has been criticizing everything the government does. They have been trying to build the false narrative that the budgetary provisions shall favour only a handful of business cronies.

The construction of houses under the PM Awas Yojana, the construction of roads under the PM Gram Sadak Yojana, rural electrification, building of a robust e-market network for agri produce – all these are the hallmarks of our efforts directed at the focused welfare of the needy. PM Fasal Bima Yojana is benefitting 9 crore farmers. PM Kisan Yojana is benefiting 11 crore farmers. All these initiatives are part of the outreach of our government to help the poor and to help our farmers.

There is need to provide stimulus to capital creation, especially after the pandemic. Our government has made the Budget more transparent. We have brought in greater accountability. Every outlay has been brought under the budgetary accounting mechanism.

Since Prime Minister Narendra Modi took office in 2014, the Centre has consistently worked towards correcting the mismanagement in the MGNREGA scheme. In the current fiscal, Rs 1,11,500 crore have been allocated for MGNREGA. This has been done to effectively deal with the effects of the pandemic and address the requirement of migrant workers in the villages.

Our government has consistently strengthened the procurement mechanism of food grains and other agricultural products in the country. The various initiatives taken by the Modi government will help farmers in the long run. The mechanisms that have been put in place by our government will channelize easy and quick payment for their farm sales.

Ma’am, there has been stiff opposition to the new agriculture laws. How far is the fear of the farmers linked to the minimum support price (MSP)?

I am surprised that the farmers are doubting the intention of the government over minimum support price. The spending of our government on MSP has increased...
I have data to support this. I am also disappointed by these protests because of the extent to which consultations had happened. My Cabinet colleague Shri Narendra Tomar, Minister of Agriculture and Farmers’ Welfare, had wide-ranging consultation with all stakeholders. He talked to the stakeholders and took their inputs. The MPs were asked for their views. The farmers were asked for their views. Members of the Opposition were asked for their views before introducing the three reformist farm Bills in Parliament. The Congress and the other political parties who are opposing the reforms are doing a great disservice to the farmers. All these parties are on record having promised the same reforms. In their own election manifestos, they promised these very reforms to the farmers.

Look at the places where the protests are being held. What are the farmers protesting for? Which part of the Act is hurting them? How is it hurting them? There is not even one question regarding the farm laws which we shall not be able to answer.

Ma’am, a question often brought up by the protesting farmers is that why did the government hurry through in the passing of these laws. The point has been raised that why can’t the government re-promulgate the Ordinance? It has been asked that why can’t the government refer the Bills to a Select Committee as demanded by the Opposition. But there is no end to this debate. Raising these points is not in the merit of the matter. The three farm laws are completely focused on farmer welfare. The law shall provide the choice and the opportunity to the farmers to sell their produce beyond the mandis run by the Agriculture Produce Market Committee (APMC).

When the Congress was asked about how the proposed laws would hurt farmers. Then the Congress shifted the goal-post. They started speaking about the continuation of the Minimum Support Price. They said that government procurement should be hardwired by putting it in the Act. In its own election manifesto, the Congress had promised that the APMCs would be dismantled. At that time, the Congress did not say that MSP will be hardwired. Why is this demand being brought up now? This is indeed a great disservice to the farmers and to the growth of Indian agriculture.

In the context of the three farm laws, why are the farmers doubting the intention of the government? Our government has consistently increased MSP on farm produce over the last few years. Our MSP performance has been steadily going up from 2014 till today. It is truly surprising if the farmers are doubting the intentions of the government. What are their real grievances regarding the farm laws? Prime Minister Modi himself has assured the farmers that he is willing to look at any modification that the farmers want. He is willing to talk about it.

The farmers must tell us where does the problem lie? We are talking of substantial MSP enhancement on the basis of data. The government has provided this information in the House. We are willing to look at the grievances of the farmers. They must discuss the farm laws on the basis of merit.

Are the farmers being misguided by opposition parties? Are the real farmers being presented with a wrong picture and being fed disinformation? The farmers who are protesting – some of them are probably misguided. I don’t know who is stoking the agitation. They must talk to us about their particular points of concern. Whatever they feel is not right – we are willing to look into their concerns. We are willing to concede.
The broad typology of the agricultural extension systems in the country are mainly Field Extension System and Frontline Extension System. Field extension system is concerned with large-scale agricultural technology dissemination to the large number of Indian farmers by development departments and agencies. Frontline extension system of Indian Council of Agricultural Research (ICAR) and State Agricultural Universities (SAUs) focuses on the adaptation and demonstration of the technologies and capacity building of the related stakeholders.

There are four major pillars of agricultural extension system viz., the Department of Agriculture Cooperation and Farmers Welfare (DACFW) and the related ministries of rural development through its network of agricultural and related departments at state, district, block and village level; frontline extension systems by KVKs, ICAR institutes and SAUs; Extension services by different commodity boards; Agribusiness houses and input agencies and extension services by the Voluntary Organizations of the country. Frontline Extension is a catalytic force for bringing desirable behavioural change, which involves a higher level of extension interaction by highly qualified staff of the research and educational system. It is also assumed that the scientist who has generated the technologies can demonstrate his technology better to the farmers in their fields.

The KVKs have been largely regarded as an institutional innovation that effectively link agricultural research and extension at the district level in India. As of now, ICAR has established 721 KVKs across the country.

Skill Development of Extension Personnel: ICT has taken over as a biggest medium to deliver farm advisory to farmers across the country. Human interface is required for interpretation, dissemination and delivery of ICT messages to client farmers for which extension workers need to be adept in handling of ICT tools. Market-led extension should be given priority and farmers need to be taught to e-market their produce.

Agri-preneurship and Business Incubation: Extension service can organise more buyer-seller meets to expand scope for direct selling by farmers, and to explore contract farming where possible for FPOs and village producer organisations. ICAR schemes like Attracting and Retaining Youth in Agriculture (ARYA) and GOI schemes like Skill India, Pradhan Mantri Kaushal Vikas Yojana are playing a significant role in capacity building of the farming community

Developing Post-production Infrastructure and Processes: Value addition and processing of farm produce can also reduce post-harvest loss and

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ICT has taken over as the biggest medium to deliver advisories to farmers across the country. Market-led extension should be given priority and farmers need to be taught to e-market their produce.

Enhance farmers' income: Value Addition and Technology Incubation Centre in Agriculture (VATICA) has been conceptualized by ICAR to create a facility to provide incubation training to rural youth in processing and value addition.

Promotion of Cooperatives and Commodity Clusters for Quality Management and Control over Market: Cooperatives need to be federated to FPOs to take advantage of aggregation of resources.

Nutrition sensitive agriculture: Nutri-sensitive Agricultural Research and Innovations (NARI) program is focused on empowering farm women with key areas like innovative practices to promote nutrition-sensitive agriculture, awareness and capacity development of various stakeholders, value chain, literacy campaign, etc.

Climate resilient agriculture: Climate resilient technology demonstrations were undertaken by KVKs in 121 vulnerable districts across 28 states in the country. Districts were identified based on their exposure to recurrent climatic vulnerability such as drought, floods, cyclones, heat/cold stress etc.

Promotion of Cooperatives and Commodity Clusters for Quality Management and Control over Market: Cooperatives need to be federated to FPOs to take advantage of aggregation of resources.

Empowering tribal farmers: Several tribal welfare schemes have been developed in which front line extension actively played a critical role. ICAR has initiated Knowledge System for household Agricultural Management in Tribal Areas (KSHAMATA) in 125 districts where tribal population is 25 per cent or more.

Doubling of farmers income (DFI) villages: ICAR prepared state-wise strategic documents for doubling of farmers income by 2022. The aim is to enhance farmers income in real terms compared to the baseline (2015-16) though productivity enhancement and reduction in cost of cultivation by increasing input use efficiency. KVKs across the country are implementing technology interventions at household level at 2 villages per KVK in more than...
1400 villages. Location and context-specific technology demonstrations in agriculture, horticulture, livestock and fisheries are underway.

Dissemination of agro-advisories to farmers: ICT and social media were employed to deliver need based messages to farmers. Mobile apps, m-Kisan and KVK portal served as vehicles to reach out to farmers with much needed and timely farm extension advisories. Over 6700 WhatsApp groups were created by KVKs for regular two-way interface with farmers. KVKs have now been linked with 3.5 lakh Common Service Centres (CSCs) in all blocks to provide technological solutions to the farmers visiting CSCs with agriculture related problems.

Convergence with the National Programmes: Integrated development of villages in aspirational districts was aimed with the launch of Krishi Kalyan Abhiyan (KKA) by Ministry of Agriculture and Farmers Welfare to intensify development work in 112 Aspirational districts of the country. In each district, 25 villages were selected for integrated development. KVKs organized training programs on beekeeping, mushroom production and kitchen gardening for at least 50 farmers in each village. Besides, KVKs conducted a residential training of three days covering farmers from each of the 25 villages on integrated cropping practices and micro irrigation systems.

KVKs coordinated the activities of the line departments in the district like distribution of soil health cards; mini kits of pulses and oilseeds; saplings of fruits, vegetables, agroforestry plants, bamboo plants; vaccination of bovines, sheep and goats; artificial insemination of cows and buffaloes; and distribution of agricultural implements and uploading the progress report of all the activities in the KVK Portal. Under Jal Shakti Abhiyan, 334 KVKs organized 557 large Kisan melas with participation of 3.14 lakh farmers and school children in identified water stressed blocks and districts across the country. KVKs created awareness among 1.33 lakh farmers in one day on vaccination, disease management and artificial insemination and productivity of livestock during the launch of National Animal Disease Control Program (NADCP).
Credit markets in agriculture have flourished since the dawn of civilisation. One of the most ancient credit systems in the world has been traced back to agriculture in the Sumerian Civilisation, which flourished around 3,000 BC. Farmers were provided credit to purchase inputs and repaid these loans during harvest season, much in the same way the credit markets function today. The use of credit in agriculture has gone beyond purchase of inputs. It is available for various uses like mechanisation, setting up of farmgate infrastructure etc.

Historically, credit in India’s agriculture sector was dominated by informal moneylenders. Through concerted efforts since independence, more and more farmers have been brought into the formal lending system. As per the Report of RBI’s Internal Working Group to Review Agriculture Credit (2019), informal lending constituted 90 per cent of outstanding debt of cultivator households in 1951. The share of non-institutional credit as per the NABARD National Financial Inclusion Survey 2016-17 (NAFIS) stood at 28 per cent. Clearly, while much has been achieved, there still remains a fraction of farmers outside the formal lending system.

There has been strong support to provide institutional credit to the agriculture sector by the present government. Credit availability has been consistently growing over the past few years. For example, between 2013-14 and 2019-20, credit availability has grown from Rs. 7.3 lakh crores to Rs. 13.9 lakh crores. The 15 lakh crore target for 2020-21 is likely to be surpassed as well. Rs. 16.5 lakh crore target for agriculture credit was announced in the Budget 2021 by the Finance Minister. The recently launched Kisan Credit Cards (KCC) saturation drive from Feb 2020 resulted in an additional 1.75 crore KCCs being issued, with a sanctioned limit of Rs. 1.76 lakh crores. In 2019, the facility of KCC was extended to the fisheries and animal husbandry sector as well to meet their working capital requirements.

Growing Availability of Credit for Farmers

Encouragingly, the share of term loans, i.e. loans for capital investments have seen an increased share of 41 per cent in 2019-20, up from a share of 25 per cent in 2013-14. This indicates growing availability of credit to undertake
productive investments. Apart from direct credit support, GOI has launched several initiatives to fund the development of critical infrastructure to support goals.

The recently-launched Rs 1 lakh crore Agriculture Infrastructure Fund (AIF) to fund farmgate infrastructure, aggregation point infrastructure and post-harvest management infrastructure is one example. AIF is also available for augmenting the APMCs infrastructure facilities in the Budget. This is being seen a long overdue reform. Similarly, the Pradhan Mantri Matsya Sampada Yojana (PMMSY) has been launched, which envisages Rs 20,000 crores of investments in the fisheries sector. The Animal Husbandry Infrastructure Development Fund (AHIDF) a Rs 15,000 crores fund is another example.

The provision of credit has no doubt had a transformational impact on the development of agriculture in India since Independence. From 90 per cent of lending through informal means, we have gone to 28 per cent of lending through informal means. The key policy questions that remain are providing formal credit to those outside, reducing regional disparities in credit availability, and ensuring inclusiveness. The RBI report (2019) mentioned earlier found evidence of regional disparities in availability of credit, through a number of measures. It suggested that the Rural Infrastructure Development Fund (RIDF) be strengthened through a higher corpus. The Budget 2021-22 saw an enhanced allocation of Rs 40,000 crores, an increase of Rs 10,000 crore. The report also made several important recommendations at the operational level to improve credit flow to small and marginal farmers.

**Overcoming agri-finance challenges**

The requirement of collateral often emerges as a key constraint in obtaining credit, especially for the landless and tenant farmers. Aggregating farmers, through FPOs is one avenue, through which small and marginal farmers can gain access to crucial productivity enhancing inputs at a lower price. This is a policy thrust as well, with 10,000 FPOs targeted for creation. FPOs are also eligible to avail funding under the AIF, for creation of marketing and storage infrastructure. The structure of FPOs is also desirable as they will play a key role in the diffusion of frontier technologies in the agriculture sector and be able to respond to changing demand.

With digitisation having progressed at a tremendous pace, there exists vast amounts of data that is being generated in all sectors of the economy. Agriculture is no exception. Transaction data such as quality and quantity are being captured, for instance on Agmark net. Applying tools such as data analytics and machine learning crunch this data and arrive at credit-worthiness based on cash-flows rather than collateral. In time, credit ratings for FPOs could also be developed. Many FinTech firms are operating in the consumer loan space that utilise past spending trends to arrive at credit limits. Blockchain is another example, where data entered is verifiable and traceable. With global demand shifting towards traceability, blockchain can play a critical role in both enabling access to finance and markets.

Much has to be done before such a transition can be made. Whilst a lot of data exists with the government, it often exists in silos and is not in a machine readable format. Creating and cleaning data, standardising formats etc. is a herculean task in itself, considering that where any unified database of farmers in India would easily contain data for crores of farmers. Similarly, ensuring quality of data entered into such model is perhaps the most crucial step. The tools at our disposal are only as good as the data being generated. Robust quality control mechanisms for data collection, consolidation and dissemination are a necessary condition. The task is not insurmountable, as the Ministry of Agriculture is already working on creating the Unified Farmer Services Platform, with unique data from crores of India’s farmers.

Significant progress has been made since Independence to formalise India’s agriculture credit markets. Whilst a substantial expansion has taken place, the policy thrust is now shifting towards ensuring inclusiveness in credit flows. Technology can play a big part in ensuring credit flows and transforming India’s agriculture credit markets.

**Fun FACT**

Dr Neelam Patel loves gardening and taking care of stray animals. Peacocks visit her home every morning.
AGRICULTURE CREDIT
STATUS AND WAY FORWARD

The agri credit providing agencies are on track to overachieve the target of 15 lakh crore at the end of March 2021. An enhanced agriculture credit target to the tune of Rs.16.50 lakh crore has been announced in the Union Budget for FY22. The main features of credit flow to agriculture in recent years which has been shaped by government policies and interventions and directions of RBI/NABARD are the following:

- The credit flow to agriculture has nearly doubled from Rs.7.3 lakh crore in 2013-14 and Rs. 13.9 lakh crore 2019-20 in 2019-20.
- During the period, the growth of investing credit has been robust with the CAGR of 22.52 whereas short term credit has grown at the CAGR of 5.99%
- Short term Agri credit is subsidised in terms of interest subvention and kisan credit cards (KCCs) have become popular.

There are certain other features which also need to be considered with respect to agriculture credit in India. There are nearly 86% farmer who are small/ marginal farmers and they have been prioritized for providing credit in recent years. And

ABOUT THE AUTHOR

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as result their share is now 75% and 52% in terms of accounts and amount of credit provided respectively.

There is a regional imbalance in terms of credit flow. Nearly 44% of agriculture credit is disbursed in southern region despite the region having only 19% of the gross cropped area. Central and eastern region having share of 23% in the total agriculture credit disbursed whereas their share in gross cropped area is 42%.

The major reason for higher agri credit flow is southern region is better rural infrastructure available in those states creating the absorption capacity for the credit flow. Therefore, the central and eastern region along with North Eastern region should be prioritised for developing rural infrastructure.

Overcoming this deficit should be an agenda for future development which means higher provision for capital expenditure in rural India for establishing warehouses, improve mandis, rural roads, Agri laboratories, veterinary facilities, micro irrigation network and health facilities. Through the budgetary support from the state governments financial support for the central government and higher allocation of maintained at NABARD. A state specific perspective plan for next 5 years needs to be prepared and operationalized. The demand for higher investment especially in storage and logistic infrastructure is also likely to go up in the backdrop of learnings from COVID. Availability of Rs 1 lakh crore for Agri infra fund by the central government is step in the right direction.

**Future credit requirement in agriculture**

Since 86% of farmers are small and marginal having land of less than 2 hectares, there is need for them to come together to access markets and services required for enhanced agri production and to enhance their incomes. This necessitates that larger number of FPOs including the corporative societies should be registered and made functional. All these FPOs will have financial requirement for meetings their operations and may also require equity support.

Accordingly, the present institutional credit be reoriented in terms of outreach and product development to cater to this need. Agriculture related start-ups (Agtechs) will play a bigger role in the provision of agriculture advisory, mechanised services, market access of agri produce and judicious use of natural resources. There has been a fund flow of nearly 2 billion dollars as per estimates by some organizations in last 6-7 years to agri start-ups in our country. Considering the scale of transforming Indian agriculture from being production oriented to market oriented and to mitigate risks at the farm level, there will be higher requirement of funds to ag-techs and significantly higher scale. Therefore a funds of more than Rs. 10,000 crores can be established within NABARD with the support of other financial credit institutions and GOI. This fund could provide support to other funds supporting the Agtechs.

Today agriculture provides employment to more than 50 per cent of people in rural areas. Youth want to move away from the agri sector to other economic sectors for seeking employment. For this purpose, a detailed human resource development plan within well defined regions needs to be prepared based on the diversified opportunities getting created from agri transformation and agro processing. Small micro enterprises will come up in rural areas requiring diverse skill sets for which there should be skill centres, entrepreneur incubation centre etc. These will reskill/upgrade skills of human resources/entrepreneurs and it will also need funds.

Higher degree of processing of horticulture, dairy, fisheries produce will become a necessity due to enhanced production and diversified and consumer requirements. These will lead to higher funds/credit requirement for these sectors including working capital and investment needs. So, share of these activities in rural credit should go up. The insurance scheme should cover horticulture crops. Higher coverage of animal resources under the existing schemes also needs to be taken up.

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**Ground Level Credit Flow to Agriculture and Allied Sector (Rs. lakh crore)**

<table>
<thead>
<tr>
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<th>MT/LT Credit Flow</th>
<th>ST Credit Flow</th>
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<td>No of times (2013-14 to 2019-20)</td>
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Source: Data from NABARD

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Fun FACT

Dr Bhanwala is fond of trekking, meeting new people and sharing thoughts, and reading
Concept Nursery in Agricultural Extension

N

ational Institute of Agriculture Extension Management (MANAGE) undertakes training, research, policy support implementation of GOI schemes, consultancy and documentation on agricultural extension management. MANAGE imparts training to senior and middle level officers in India and also officers from Asian and African countries.

MANAGE has been successfully running several educational programs viz. Post Graduate Diploma in Management (Agri-Business Management), Agri-Clinics and Agri-Business Centers Scheme; Post-Graduate Diploma in Agricultural Extension Management; Post-Graduate Diploma in Agricultural Extension for Input Dealers; Certified Farm/Livestock Advisor Program; and Post-Graduate Diploma in Agri-warehousing Management to promote agripreneurship and strengthen agricultural extension system. MANAGE is the knowledge partner in implementing Rashtriya Krishi Vikas Yojana – Remunerative Approaches for Agriculture and Allied Sectors Rejuvenation Scheme of GOI.

MANAGE has initiated the following innovative concepts.

Krishi Gyandeep Knowledge Lecture Series

Eminent persons from varied fields of agriculture and development shall be invited to motivate and inspire extension professionals, faculty members, trainees, students and invitees from leading institutions. The series shall be recorded as video films to share through MANAGE YouTube and social media channels to reach a larger audience. Twelve such lectures are planned for 2021-2022.

Dr P Chandra Shekara is Director General, National Institute of Agricultural Extension Management (MANAGE), an autonomous body under the Ministry of Agriculture and Farmers’ Welfare, GOI. Dr Shekara takes keen interest in the promotion of agri-preneurship among agricultural graduates through agri-clinics and the Agri Business Center (ACABC) Scheme by establishing 30,000 Agriventures across the country. He developed the Public Private Partnership concept and pilot-tested it in the field. He also successfully implemented the Feed the Future India Triangular Training (FTF ITT) program funded by USAID in 20 Asian and African countries.

ABOUT THE AUTHOR
MANAGE aims to create a database of retired professionals for agricultural development to create a pool of experts for utilising their services for implementing government programs/schemes, action research, training programs, consultancy, policy advocacy initiatives etc. Interested professionals may join SEVA-MANAGE by registering their names at: https://www.manage.gov.in/renb/

National Network of Agri Journalists
MANAGE wishes to create a National Network of Agri Journalists to facilitate rapid communication of agricultural information, new technologies, innovations, policy issues and share best practices in agri journalism. The NNAJ-MANAGE is accessible by members at: https://www.manage.gov.in/NNAJ/

FPO Academy
MANAGE FPO Academy is set up with focus on capacity building of different FPO stakeholders. It shall conduct research studies, policy advocacy, documentation of success stories and models and consultancy activities and other related aspects to help GOI achieve the ambitious target of creating 10000 farmer organisations over next five years. The Academy will partner with different public and private institutes for execution of the initiative. The Academy will also seek association of different private institutes as Knowledge Partners covering agribusiness companies, corporates, NGOs, state level federations, etc. MAHA FPO Federation, MAHA FPC, Center of Sustainable Agriculture, Arya Collateral Servicess Pvt. Ltd, and Agri Sutra are the members of MANAGE FPO Academy.

Awards for Best M.Sc, Ph.D Thesis, Best Book in Agri Extension
In order to improve the professional recognition to the agricultural extension discipline and to motivate young people to pursue agricultural extension profession, MANAGE has introduced Awards for students, scholars and professionals. All these carry citations and cash prizes.

Soldiers for Agriculture - Jai Jawan Kisan
MANAGE is proud to provide a platform for our esteemed retired soldiers and join hands with them to improve agricultural extension services. A detailed program is being worked out.

Attracting Toppers of Agri Universities
MANAGE makes special efforts to attract the top students from agricultural universities to join MANAGE in its projects, consultancy activities and vacancies in order to nurture them as future extensionists. MANAGE will also sensitize M.Sc and Ph.D Scholars on emerging topics which transform agricultural extension discipline.

National Facilitators Development Program
MANAGE envisions to develop a Network of National Facilitators as Master Trainers and Resource Persons to implement GOI initiatives in agricultural extension activities. MANAGE will identify and train highly competent and committed officers from agricultural and line departments, faculty members and scientists from KVKs and SAUs for this purpose.

Awards to Agri Startups, Agripreneurs and Students
The awards shall be given on June 11, the MANAGE Foundation Day to the following:
- Awards to successful Agri Startups and Agripreneurs at national and regional levels.
- Fellowships and Medals to meritorious students of PGDM (ABM) of MANAGE.

CSR Forum
MANAGE envisages to create a CSR Knowledge Forum for agricultural development to act as a platform to share the experiences, ideas, innovations, models, technologies, policy framework to attract more CSR fund for agriculture development.

Agri Film Festival
MANAGE proposes to organize a two-day Agri Film Festival at national level on October 7-8, 2021 to promote production and dissemination of creative films on agriculture and allied themes by institutions and individuals. MANAGE plans to develop a library of short films and documentaries on agricultural innovations, success stories of farmers, agripreneurs, agri startups etc. for greater outreach to many the world over. MANAGE will declare category-wise awards for best films.

Agri Idea Bank
MANAGE has trained more than 200 Startups and continue to add more number of startups to the training programs. All the ideas will be stored in the form of videos in Agri Startup Idea Bank. A brief idea of 3-4 minutes, including one minute introduction of startup by MANAGE followed by startup sharing, their business idea and their experiences. MANAGE Agri Idea Bank is available at: https://www.manage.gov.in/agriIdeaBank/agriIdea.asp
A farmer is a magician who produces money from the mud”, says professional magician Amit Kalantri. But you need money to produce money. Do we allow it? Where do we stand when it comes to investment and infusion of money into the agriculture sector? Here the term Agriculture includes livestock, dairy, fishery and all other allied activities.

A 2008 World Bank report recognises agriculture as “a fundamental instrument for sustainable development and poverty reduction.” This report goes on to admit that “financial constraints in agriculture remain pervasive, and they are costly and inequitably distributed, severely limiting small holders.” More than a decade later these observations continue to hold, as also the recognition that exposure of agriculture to the volatility of global food markets is making it more vulnerable than ever before.

Agriculture is no longer a simple food production vocation. It has to integrate into a modern competitive system dominated by consumer demand and preferences; and these are now value products, consistency in quality, and safety of produce. Integrating the small agriculturist into this chain is a major challenge. We cannot draw solace from the fact that farmers all across the world are facing this situation. Our farmer is more prone to isolation as 86% of our agriculture is characterised by small and marginal farmers, the average land holding being as low as 1.08 hectare. Until and unless agriculture policy and development addresses smallholder productivity, we may not be able to ward off the threat of further marginalisation of the small farmer.

Farmers Starved of Capital and Knowledge

“Our farms are starved of capital and knowledge on modern methods and practices,” writes Prof. Ramesh Chand in the 2017 NITI Ayog Policy Paper titled Doubling Farmers’ Income. A confusing paradox considering the substantial financial outlays, both direct and indirect, in the central and state budgets. The predicament perhaps lies in our fixation with treating agriculture as a mere production oriented activity with the sole objective of providing affordable food, and not viewing it as a vibrant enterprise which could lend dynamism to the economy. What prevents us from recognising our farmer as an entrepreneur, innovator, a progressive business owner, and above all a bold risk taker?

Why should the farmer be starved of finance? Theoretically, a plethora of financial incentives and capital investments have been provided to the farm sector: from high tariffs to protect domestic produce from cheap imports to subsidies on a variety of inputs such as seed, fertiliser, pesticides, energy, water etc. In fact, the rate of subsidy on water and electricity has reached the maximum of 100% in certain states. These financial stimuli are further enhanced through loans which carry either no or

ABOUT THE AUTHOR

Mr Tarun Shridhar is former Secretary, Ministry of Fisheries, Animal Husbandry and Dairying
occupation. Poultry and aquaculture sectors have created business enterprises driven by the incentive of profit and competitiveness. On the other hand, agriculture viz. crop farming has been bereft of self driven motivation, so does not have many business enterprises to show, be it individual or cooperative. This could be attributed to subsidies which, though well meaning, do not adequately address the critical infrastructure or technology gaps, nor do they address the challenge of distorted agriculture markets. One hardly ever witnesses extreme volatility in the milk market; the price fluctuation at most would be 10 pc or under. In the case of crop commodities, it could be 100 pc or more within the same crop cycle.

We would serve the sector well by clearly differentiating between public investment in agriculture and subsidies. At present the bulk of public spending in agriculture is biased towards providing cheap inputs to the farmers.

Mr Shridhar is a prolific writer. His writings on diverse sectors of agriculture appear in reputed national and international publications.

The sector is tightly controlled; from inputs to extension to marketing. Cheap subsidised inputs compromise on quality, and also on basic principles of return on investment by artificially keeping the cost low. This reduces the incentive to perform better, as recovery of cost of inputs has been eased.

Dairy, poultry and fish farmers need to work harder to recover the cost and then generate surplus to stay afloat. Innovation also gets pushed to the margins as incentive has already gone missing. Agriculture extension system has been in a state of disrepair for quite some time now, and private talent does not venture into this territory as we prefer subsidised services, even if they are of dubious quality. The mandi, controlled by the Market Committees is a monopsony of a different and ugly kind. The raison d’etre of the mandi was precisely to free the farmer from diverse malpractices. There is an utter lack of transparency in their functioning, cartels control them, traders pool for price fixing, payments are unreasonably delayed, pushing the farmers again to money

Subsidies do not address major needs

Dairy has created progressive cooperatives which have blended producer welfare with wealth generation, thus making dairy a rewarding occupation. Poultry and aquaculture sectors have created business enterprises driven by the incentive of profit and competitiveness. On the other hand, agriculture viz. crop farming has been bereft of self driven motivation, so does not have many business enterprises to show, be it individual or cooperative. This could be attributed to subsidies which, though well meaning, do not adequately address the critical infrastructure or technology gaps, nor do they address the challenge of distorted agriculture markets. One hardly ever witnesses extreme volatility in the milk market; the price fluctuation at most would be 10 pc or under. In the case of crop commodities, it could be 100 pc or more within the same crop cycle.

We would serve the sector well by clearly differentiating between public investment in agriculture and subsidies. At present the bulk of public spending in agriculture is biased towards providing cheap inputs to the farmers.
The Economic Survey notes: “Given the large proportion of resource constrained small and marginal farmers in India, timely availability of adequate credit is fundamental for the success of farming activities.” How? This is the question.

A Rs 15,000 crore exclusively dedicated package for extending credit on easy terms and differential interest to the Animal Husbandry sector is more than a kingly sum. The Animal Husbandry Infrastructure Development Fund (AHIDF), announced as a part of Prime Minister’s Atma Nirbhar Bharat Abhiyan stimulus package, seeks to incentivise individual entrepreneurs, private companies, FPOs and other such entities for the establishment of milk processing units, meat processing facilities, value addition in livestock products, animal feed plants and other such infrastructure. In an earlier initiative on similar lines, the government had established a Rs 11,000 crore Dairy Infrastructure Development Fund (DIDF) and a Rs 7,500 crore Fisheries and Aquaculture infrastructures Development Fund (FAIDF).

A significant feature of these funds is that they are credit-linked. This is a departure from the conventional mode of assistance which has been restricted to direct subsidy infusion. These funds incentivise the concerned entity by way of interest subventions and credit guarantee. Since the entity is bound by the rules and discipline of institutional credit, the end use of the investment is likely to be more productive. Infrastructure Development Funds are a paradigm change from a culture of direct subsidy to performance oriented incentives. Ideally, this should be the model of finance for the entire agriculture sector.

Income support are important. Subsidies offset high cost of farming. But let these not be confused with investment. There is no dearth of finance, but dearth of good finance. Invest as much in infrastructure, R&D, digitalisation – basically in what generates greater monetary value to the farmer. This should be in no conflict with the government’s welfare and income support to the farmer.

Let the investment be evaluated on the threshold of financial return. A rupee spent should return more than a rupee. The efficacy of this conversion should be measured by how much more. Treat agriculture as business and encourage financial returns on business principles. It is definitely encouraging that on the lines of ease of doing business we have started talking about ease of doing agriculture. Let the focus be shifted from production to farmer, not merely in the idiom of welfare, but prosperity. Union Minister Giriraj Singh, in his inimitable style advised me, “Gareeb ko paise ka swad chakhvain, vikas khud daudega.” Our policy direction should be to make agriculture a profession of choice and not compulsion.
A group of well-known adventurers and kayaking enthusiasts led by Mr Kharod Devang undertook a 45-day trip from the origin of the Narmada River at Amar-kantak to the Gulf of Cambay beyond Bharuch in Gujarat.

The adventurists carried the message of Swachh Bharat – Swachh River. They were supported by Gujarat Life Sciences (GLS), The Science Ashram (TSA), Vadodara, Vaho Vishwamitra Abhiyan and other voluntary organizations. During the journey, they took up demonstrations of scientific bio-compost preparation from the waste and seed ball camp for plantation.

A number of our rivers are polluted by different kinds of wastes. Most of such wastes can be treated by a simple process using multi-microbial mixture Wonderlife – 1,2,3 developed by GLS. This cheap and efficient mixture is being used in sugar mills, gaushalas, and for the treatment of urban waste and kitchen waste. It converts the waste to high value bio compost.

It is usually difficult to approach locations on river banks for growing shrubs, trees etc for the revival of rivers. The creation of bio shield with trees and shrubs is an extremely important requirement, as trees and rivers have a symbiotic relationship. The team organized several camps for seed ball making on the bank of Narmada river to spread the message of reviving and saving the river. Seed ball mixture supplied by GLS is a scientifically-prepared mix of soil, microbes, bio fungicides, bio growth enhancers etc.

The team carried the seed ball mixture given by GLS scientists. The Chairman and MD and his team of GLS and The Science Ashram handed over the complete set of seed ball Mixture and Wonderlife-Composting Mixture to Mr Devang Kharod.

“Rivers are our lifeline. This adventure will bring home the message for Clean River and Swach Bharat and good adventure,” said Dr MH Mehta, the Chairman of National Committee of Eco Agriculture and Chairman of Vaho Vishwamitra Abhiyan for River Revival. Dr Arjun Singh Mehta, MD of GLS, wished the kayaking team success in their mission.

The endeavour is supported by Gujarat Life Sciences, The Science Ashram, Vaho Vishwamitra Abhiyan, Global Foundation (Save our Rivers), Swatcha Bharat, Bharat Boat Club, Shri Ram Sea Swimming Club, National Working Group on Eco Agriculture.
Agriculture Extension has gone way beyond the traditional Extension workers in the Government systems which helped ground the green revolution in India. With the advent of digital technologies and significant number of newer players, there is a need for convergence of efforts among all these actors to ensure farming families are better served in terms of knowledge and technology dissemination.

The new actors who can play a significant role in agriculture extension of the future are documented in the following paragraphs:

**Farmer owned collectives**
Government of India through SFAC, NABARD and other bodies have created thousands of the Farmer Producer Organizations (FPOs) around the country. The current number of Farmer Producer Companies in India is in the excess of 9000. These FPOs have been created in partnership with Resource Institutions (RI), Producer Organization Promoting Institutions (POPI) and other such agencies, who have a vast outreach among farmers and Farmer Producer Organizations.

**Leveraging Individual Agriculture Professionals**
The current population of the students across agriculture and allied sector institutions and across courses would be in the excess of 100,000 with around 30,000 passing out from these institutions on an annual basis. Many of these institutions receive central government funding through the ICAR System.
Leveraging Social Media Pages/Groups

**Facebook**

Cursory searches on Facebook show that there are around 14 large groups/pages connected with Indian agriculture, which have large numbers of members/followers with an aggregate number in excess of 29 lakhs ag-sector stakeholders. (enclosed is Annexure I with a list of such groups along with URLs). Admins of these groups/pages and any other such groups and pages can be co-opted to drive extension outreach to inform and educate their members/followers.

**Facebook case study:** Indian Agriculture Professionals (https://www.facebook.com/groups/agribiz4u/) branding of more than 700,000 stakeholders cutting across industries like Agri-inputs (seeds, pesticides, fertilizers), Agri-machineries (tractors, power tillers, harvesters & sprayers etc), Irrigation equipment (micro-irrigation, drip, sprinklers and rain-guns etc) and Hi-tech agriculture (Hydroponic, aquaponics, protected cultivation, vertical farming), Agtech Startups and Farmers owned organizations like Farmer Producer Organizations (FPOs) and Cooperatives. Significant numbers of members/followers are tech-savvy early adopters and influencers amongst progressive farmers, who routinely use smart-phones (android,ios etc), other electronic devices and regularly access social media tools like Facebook, Google, Youtube and Instagram etc.

IAP provides a phenomenal service to its members/followers by enabling sharing and learning among them and IAP platforms are evolving into crowd sourced digital extension platforms for agriculture.

**Youtube**

Cursory searches on YouTube show that around 22odd IndianAgri-related channels with a large following on YouTube with aggregate number of subscribers (a vast majority of whom are farmers) in the excess of eighty-six lakhs. Enclosed is Annexure II with a list of these channels along with the URLs. Owners of these Channels can be partners for extension outreach to inform and educate their members. Video is a very powerful mode of communication for knowledge dissemination and capacity building.

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**Mr Khaimar is an ardent practitioner of Vipassana meditation. He likes to chant mantras for more than one hour daily. He believes that such practices can help every person who follows them.**
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**Leveraging Agripreneurs**

MANAGE, Hyderabad, Govt of India has trained in the excess of 70,000 Agriculture Graduates to become entrepreneurs under the ACABC scheme of MoAFW. These budding entrepreneurs can become extension service providers in their local communities.

**Leveraging Startups**

There are more than 1000 Agri-food Sector startups active in India with at least 100 new serious ones emerging every year in this vast country. The current Government has created a phenomenal success story out of Startup India which will end up creating thousands of large entirely
new businesses over a period of time. Many of the old style business houses in agriculture too will face competition from the new breed of startups that will disrupt many existing models and also businesses. When we started work in Agriculture 20 years ago, there were virtually no startups in the field of agriculture as against the thousands today. Setting up startups was not focus of elite mainstream institutions like IIT/ IIMs. It was unheard of IT and other industry professionals to come into Agriculture. This has undergone a sea change and the situation is completely different now. The Prime Ministers emphasis on Startup India as well as lately the Atmanirbhar India will feed into each other and change the face of this country by unleashing energies of its largely young population through a revolution in the number and impact of startups (current total number is greater 80,000) in the coming decades.

Forging partnerships between new actors, pioneers of Green Revolution

All institutions including ICAR Institutions, State Agriculture Universities and colleges, Door Darshan (Krishi Darshan), DD Kisan, 700 + Krishi Vigyan Kendras (KVKs) all over India and all such agencies which have very large repositories of content in multiple digital formats should consider making their content free globally without restrictions on their usage including commercialization by startups and others.

All these public agencies in agriculture need to partner up with all these new actors on the scene in the agricultural sector to create synergies and knowledge dissemination linkages to farmers. It will help public bodies get their knowledge and research reaches lab-to-land fruition.

Many technologies already developed by public institutions under ICAR, CSIR and others can be commercialized by these agencies in partnerships with startups, fpos, agripreneurs and new age digital platforms.

There are millions of beneficiaries of various schemes under MoAFW (including NHB, DoAHB), APEDA, MoFPI and other bodies. It would be ideal if these databases are made available to startups, against their bonafide requests, for targeting them for various services by the startups.

Government functionaries have spoken about an agristack to help farmers for better reach of various farm schemes. This is also envisaged as a one-stop-shop for data, including access to finance by farmers, startups and researchers for developing new apps, so that the benefits reach the grassroots as has been spoken about in the media already. This would be a giant step forward for new age agriculture extension of the new India.
The people of Jammu and Kashmir have been suffering due to disturbances supported from across the border for long, depriving the people of benefits of development. People of this region were deprived of full rights enshrined in the Constitution of India and the benefits of various central laws that were being enjoyed by other citizens of the country. As a result, full economic potential of the region could not be realized.

The Centre now aims to bring about development and good governance practices in the newly created Union Territories of Jammu & Kashmir and has chalked out a road map for this purpose. Agriculture and allied sectors are one of the areas of focus, considering that these sectors are the main source of livelihood for over 70 per cent population of Jammu & Kashmir.

Apple cultivation and its value chain is one of the mainstays of J&K’s economy, with revenue of around Rs 1,500 crores annually. Apple is produced in almost all the ten districts of Kashmir region and constitutes 90% of the total fruit crop in the Valley. Almost 80 percent of apple produced in India comes from J&K. More than half the population is engaged in the cultivation of apple directly or indirectly. Apple industry is also a major contributor to GDP of J&K. It contributes around Rs 48.27 billion to the state’s economy every year. The apple sector is lucrative and generates employment. One hectare of an apple orchard generates 400 man days annually on an average, with 3.3 million persons being directly or indirectly dependent on it for livelihood.

NAFED takes pride in contributing to the GOI mission for bringing about fast pace development of Jammu & Kashmir. The efforts are aimed at improving the life conditions of the people through creating job prospects and enhanced incomes. NAFED is implementing the market intervention scheme as the designated nodal agency of GOI to support the apple cultivators of the UT. The scheme was launched in September 2019 and was continued in 2020 with the aim of providing remunerative prices to growers for their produce.

NAFED executed an MoU with the UT of J&K on January 1, 2021 with the aim of long term sustainable development in the region. The MoU stipulates a broad frame work of developmental activities in the UT which includes preparation of investment plan, high-density plantation (HDP) of temperate crops for increasing their productivity, creation of post harvest infrastructure hubs and formation of crop specific FPOs in each district of the UT.

High Density Plantation of Apple

HDP of apple will be undertaken over 5500 hectares in two phases. It has been planned to create infrastructure
NAFED initiatives in Jammu and Kashmir for end-to-end supply chain which will include pre-conditioning, controlled atmosphere CA storage (60,000MT), onion storage (20,000MT), processing facilities (50,000MT), ripening chambers (5000MT), refrigerated transport (25–30 nos.), dry warehousing (20,000MT) and grading facilities. NAFED in participation with the private sector initially plans to create three clusters, one each in north and south Kashmir and one in Samba/Kathua region of Jammu Division.

The investment required for HDP is Rs 1700 crore approximately over six years. It shall be done in participation with farmers, lending banks and the assistance program of GOI. The investment required for creation of infrastructure will be Rs 500 crore approximately. It shall be implemented in association with the private sector and lending banks. The infrastructure created under this MOU is expected to increase the productivity of apple in the valley by four times. It shall reduce post harvest losses by 50 percent. This will improve the income of farmers and also provide quality produce to consumers.

Presently India is ranked eighth in global apple production. The existing apple productivity level of 11 per hectare in J&K is far below the level of 40 per hectare in countries like Chili, France, Italy, etc. Through these initiatives, India is set to emerge as the leading apple producer in the world. The production and infrastructural development will improve the export prospects of apple from the valley, besides creating direct and indirect employment opportunities for the youth.

The proposed value chain will also comprise import of quality planting material and root stock for development of high-tech nurseries. The important links in the chain are raising root stock/grafts for HDP; setting up virus indexing labs as per latest protocol for testing of Quality Planting Material (QPM); branding and marketing of fruit crops like Apple, Walnut, Cherry, Olive, Litchi etc.; GI tagging of premium/niche products and creation of market linkages for exotic and non-seasonal vegetables and flowers in metros across the country. Being one of the National Implementing Agencies for creation of FPOs, Nafed will also form FPOs in all districts of the UT.

Action has been initiated for implementation of the identified projects as per the MOU. Empanelment process of five private agencies has been completed. These will organize the supply of imported, quarantined planting material of dwarfing root stock for HDP of apple. These agencies will also supply drip irrigation and anti-hail nets to farmers opting for HDP plantation. An online platform has been created for seeking applications from farmers.

The process of setting up of four high-tech nurseries has been initiated in collaboration with the private sector. The UT Administration has allocated land at three locations, namely Samba (Jammu region), Kupwara (North Kashmir) and Haripari gram (South Kashmir) to NAFED for setting up post-harvest and processing Hubs. These hubs shall be created by NAFED in association with the private sector. Action on various other initiatives is under progress.

These historic initiatives will benefit around 10 to 15 lakh families in the UT and pave way for bringing prosperity and development in the lives of the people of Jammu and Kashmir.
There are two major categories of agricultural insurance: single and multi-peril coverage. Single peril coverage offers protection from single hazard while multi-peril provides protection from several hazards. In India, multi-peril crop insurance programme is being implemented, considering the overwhelming impact of nature on agricultural output and its disastrous consequences on the farmers. GOI launched the Pradhan Mantri Fasal Bima Yojana (PMFBY) and Restructured Weather Based Crop Insurance Scheme (RWBCIS) since the Kharif 2016 season to address these multiple concerns. Both PMFBY & RWBCIS have completed 10 cropping seasons and provide farmers with a security net against natural calamities.

PMFBY: a new era for farming community
Since the launch of the PMFBY, the government has brought a number of changes in operational guidelines and emphasized more on use of technology. Accordingly, National Crop Insurance Portal (NCIP) (https://pmfby.gov.in/) has been developed for ensuring better administration, coordination, transparency, dissemination of information and delivery of services. This includes uploading/obtaining details of individual insured farmers for better monitoring and to ensure transfer of claim amount electronically to the individual farmer’s Bank Account.

In order to ensure timely payment of claims, the scheme envisages mandatory use of smartphone based apps (CCE-Agri App) for real time transfer of data on national crop insurance portal. Farmers’ app has also been launched, on which farmers can track their crop insurance application and get all information about it. Farmers can intimate individual crop losses and accordingly insurance companies can initiate the crop loss survey.

PMFBY is a unique crop insurance scheme which highlights the use of geospatial techniques viz. remote sensing, Geographical information System (GIS), Global Positioning System (GPS) based mobile application in crop loss assessment, yield estimation, smart sampling of crop cutting experiment based on crop condition.

Use of technology in Crop Insurance
One of the major initiatives in the scheme is to promote the use of remote sensing & GIS technology which envisages to:

- Smart sampling
of Crop Cutting Experiments (CCEs) which will reduce large number of CCEs as well time.

- Crop acreage estimation of major crops
- Digitization of land records in GIS; to reduce area discrepancy factors and excess insurance
- Direct yield estimation of major crops for timely claim settlement
- Parcel level Assessment of crop damage due to localised events viz. floods, inundation, hailstorm etc through high resolution satellite imagery or Unmanned Aerial Vehicle (UAV).
- Introduction of GPS enabled smart phones for monitoring CCEs, crop loss surveys through GOI CCE app. GPS-tagged data is transferred and stored on central servers on near real time bases which improves data quality and aids in quick data analysis and decision making.

**Crop insurance approaches**

Crop insurance is based on either area approach or Individual approach. In PMFBY, claims are paid directly to the beneficiary farmer's bank account. In the case of individual approach, assessment of loss is made separately for each insured farmer and claim paid directly to insured farmers.

**Coverage of Risks and Exclusions**

Following stages of the crop and risks leading to crop loss are covered under the scheme.

a. Prevented Sowing/ Planting Risk: if more than 75% of notified crop area in insurance unit remained unsown/ prevented sowing/germination failure during sowing period due to adverse weather conditions such as deficit rainfall or adverse seasonal conditions are eligible for preventing sowing failure risk. The pay out to insured farmers under this cover would be 25% of the sum insured and the insurance cover will be terminated.

b. Standing Crop (Sowing to Harvesting): Comprehensive risk insurance is provided to cover yield losses due to non-preventable risks, viz. Drought, Dry spells, Flood, Inundation, Pests and Diseases, Landslides, Natural Fire and Lightening, Storm, Hailstorm, Cyclone, Typhoon, Tempest, Hurricane and Tornado.

c. Post-Harvest Losses: Coverage is available only up to a maximum period of two weeks (14 Days) from harvesting, for those crops which are required to be dried in cut and spread/small bundled condition in the field after harvesting against specific perils of Hailstorm, Cyclone, Cyclonic rains and Unseasonal rains. Assessment of damage is made on individual farm basis.

d. Localized Calamities: Losses to notified insured crops resulting from occurrence of identified localized risks of Hailstorm, Landslide, Inundation, Cloud burst and Natural fire due to lightening affecting isolated farms in the notified area.

Crop insurance will be effective only in combination with risk reduction measures like physical measures, biological measures, timely cultivation practices, diversification measures and timely credit availability. It is important to link crop insurance with risk education and prevention. Over the years, the premium shall come down and it shall be financially viable for all stake holders.

Investment in infrastructure like automatic rain gauges and data collection systems is a basic need for making the crop insurance a more transparent and precise product. The weather database will help the policymakers and underwriters to understand the risk involved and heterogeneity in geographical areas. Location-specific insurance products, insurance education for small and marginal farmers and capacity building of various stakeholders like FPOs, SHGs, cooperatives, banks and insurance companies can play a significant role in the crop insurance sector.
T-based mobile applications and digital platforms have revolutionized the reach of extension services to the farmers, be it information and advisory services, training and production technologies, facilitating logistics support or a buy-sell platform for farmers.

Multiple initiatives have been taken for extension services for farmers which are as follows:

Kisan Suvidha- An Integrated Web App for Farmers
A farmer needs a wide range of information and services at various stages of crop lifecycle. These include advisories, inputs, machinery, certifications, marketing and logistics, credit, insurance, subsidies etc. Since, agriculture is a time bound activity, prompt and timely delivery of these services is of utmost importance. Similarly for allied activities like animal husbandry, the services like livestock disease management, veterinary services, vaccinations, marketing, etc. need to be provided. To enable the digital delivery of agriculture related services and information to farmers, multiple farmer oriented mobile apps and portals have been developed by respective departments.

Kisan Suvidha is an Integrated Web App for Farmers developed by National Informatics Centre (NIC). It aims to bring all agricultural schemes/services under one umbrella for access by the farmers via a single interface, obliterating the need for multiple apps/web portals. It is available in four local languages – Hindi, Gujarati, Assamese and Malayalam at the URL https://kisansuvidha.gov.in.

APIs / Webservices from the existing applications are integrated with the Kisan Suvidha web app for providing agriculture-related services. All new services are
Kisan Suvidha is a scalable app. It allows seamless integration with any portal or app based on defined protocols.

Kisan Rath Mobile App was developed by NIC. It was launched during the pandemic in April 2020 by the Department of Agriculture Cooperation and Farmers Welfare (DAC&FW) to resolve the transportation issues of farmers, FPOs and traders. It facilitates the farmers, FPOs and Traders to post their load requests. These requests are sent to transport aggregators and individual transporters who can revert with a quote and contact the requestor.

It is integrated through APIs with six transport aggregators portals on boarding almost seven lakh vehicles. The app is integrated with eNAM for onboarding FPOs and traders and picking their load requests. It has also onboarded Custom Hiring Centres who may use their tractors for transporting small loads.

The mobile app is available in both Android and iOS versions in 10 languages including Hindi and English. The Fruits and Vegetables (FV) Module of Kisan Rath for Sale Purchase of Fruits Vegetables is being used by Assam since September 2020.

The FV module facilitates the Farmers, FPOs to list their produce for sale and which can be viewed by the traders (buyers) who are interested in purchasing these. The traders can also post their demand which various farmers can see and revert with their
availability and quotes and can contact the traders for finalising and concluding the sale.

**Agri Clinics and Agri Business Portal**

Various digital initiatives have been taken to acquaint farmers and agriculture community with Agriculture Technology and Management Agency (ATMA) services. Their purpose is to implement and monitor the extension services up to field level. They assist the Agri-Clinics and Agri-Business (AC&ABC) scheme for registration and processing, management of training applications.

Agri-Clinics and Agri-Business centres Scheme was launched in April 2002 by GOI. The objective was to supplement the public extension system through committed private extension services at free or nominal cost by educated and trained candidates in a self employment mode, by the Extension Division of DAC&FW.

There are two main components for the scheme: Training and Subsidy.

National Institute of Agricultural Extension Management (MANAGE), Hyderabad, provides training to Agricultural Graduates through Nodal Training Institutes (NTIs) AC&ABC scheme for performing extension services. The trained candidates would establish business units under agricultural allied activities. Subsidy component is implemented through NABARD.

Trained candidates establishing agri-ventures availing credit facilities are extended with subsidy depending on their project, gender, social category and regional preferences.

The IT system is available at https://acabcmis.gov.in and provides vital services to various stakeholders. More than 35000 applications have been registered online by the candidates and about 7032 applications received online in current financial year.

**ATMA Platform**

The ATMA scheme was launched in the year 2005-06 with the aim to make the extension system farmers driven and facilitate technology dissemination up to field level. It facilitates farmers, farmer groups, NGOs and Krishi Vikas Kendras for active participation in the new technology evolution and dissemination among the group up to field level. For successful implementation and monitoring of ATMA scheme, NIC has developed the digital platform for ATMA – Extension service available at https://extensionreforms.dacnet.nic.in/

A provision has been provided to update the extension activities details which have been performed at village level by the states and district extension officials. The platform facilitates monitoring the physical and financial targets and achievement of the extension activities. The portal is integrated with Agriculture DBT portal, Kisan Suvidha app for sharing the details of beneficiaries under the scheme.
Indian farmers are going hi-tech

Digital Money  Modern Farming  Digital Marketing

www.nabard.org  /nabardonline  /nabardonline  /nabardonline

Taking Rural India >> Forward
India is primarily an agriculture-based country and its economy largely depends upon agriculture. Contribution of agriculture during 2020-21 is 20% of the national GDP and it provides employment to over seventy per-cent of Indian population in agriculture and allied activities.

There will always be a need to invest in agriculture to support ever increasing population and changing dietary preferences. This requirement of financing agriculture is further fuelled by emerging markets of higher value agricultural products. In addition, climate risks increase the need for investments to make agriculture more resilient to such risks. In Indian context, the requirement of agriculture finance is more relevant because of its typical agriculture situation. With total land holdings of 14.64 crore, the average land holding size is 1.08 ha. The Indian farmers are operating on total area of 15.78 crore ha. The condition is further aggravated by the fact that for more than 68% of the total land holdings, the average size of only 0.38 ha.

Agriculture finance supports food production. It also helps in improving the overall income and economic well-being of the farmers as agriculture has been the basic requisite for national sovereignty.

At the time of Independence, the most important source of agricultural credit were the moneylenders. They accounted for as much as 71.6 per cent of rural credit in 1951. This was because there was no other source for the farmers to borrow money. Thus they were exploited by money lenders. Exorbitant interest was charged on loans and accounts were manipulated, forcing the farmers to sell their produce at low price to the moneylenders.

The government undertook various steps to regulate the activities of the moneylenders and free the agriculturists from the clutches of money lenders.
The expansion of institutional credit to agriculture was initiated through various steps viz. Reserve Bank of India Act 1934, District Central Co-operative Banks Act and Land Development Banks Act, etc. Although the co-operative banks started financing agriculture with their establishments in 1930’s; real impetus was received only after Independence when suitable legislation was passed and policies were formulated. Thereafter, bank credit to agriculture made phenomenal progress by opening branches in rural areas and attracting deposits.

Till 14 major commercial banks were nationalized in 1969, co-operative banks were the main institutional agencies providing finance to agriculture. After nationalization, it was made mandatory for these banks to provide finance to agriculture as a priority sector. These banks undertook special programs of branch expansion and created a network of banking services throughout the country and started financing agriculture on large scale. Thus, agriculture credit acquired multi-agency dimension. Development and adoption of new technologies and availability of finance go hand in hand. In bringing Green Revolution, White Revolution and now Yellow Revolution, finance has played a crucial role. Now agriculture credit has come to stay through multi agency approach.

The growth and deepening of agriculture finance markets is constrained by a variety of factors which include high transaction costs to reach remote rural populations; co-variance of production, market, and price risks; lack of expertise of financial institutions in managing agricultural loan portfolios, etc.

### Challenges in agri-finance sector

The challenge is that the growth and deepening of agriculture finance markets is constrained by a variety of factors which include high transaction costs to reach remote rural populations; covariance of production, market, and price risks; lack of expertise of financial institutions in managing agricultural loan portfolios, etc.

Agriculture finance and agricultural insurance are strategically important for eradicating extreme poverty and boosting shared prosperity. Majority of farming community rely, to varying degrees, on agricultural production for their livelihoods. The agricultural sector is a major economic sector and a critical source of livelihood for major portion of our population.

### About the Authors

Dr. Pravin Chandra Sudhakar is Manager, Agriculture Insurance Company of India. For nearly a decade now, Dr Sudhakar has been handling various aspects of crop insurance viz. Product pricing, Marketing & Publicity, Underwriting & Claims. He has been involved with the drafting of Pradhan Mantri Fasal Bima Yojana (PMFBY).

Dr Malay Kumar Poddar is Chairman-cum-Managing Director, Agriculture Insurance Company of India. He has been deeply involved in the development and implementation of various crop insurance schemes and products introduced by GOI, GIC and AICI. He has been closely associated with international research organizations, the World Bank and global reinsurers working in the field of climate change and risk management in agriculture. He has served as a Member of Task Force on NITI Aayog’s (National Institute for Transforming India) Crop Insurance Committee.
population. Agriculture is particularly exposed to adverse natural events, such as insect damage and poor weather conditions that negatively impact production. The economic costs of major climatic disasters may increase further in the future due to climate change. Farmers have developed risk management strategies to cope with these adverse events, sometimes with assistance from the government.

Agricultural insurance is one financial tool that agricultural producers can utilize to mitigate the impacts of unpreventable risks. It is an important element of a comprehensive agricultural risk management strategy. Innovative agricultural insurance products and vehicles can lessen economic losses to farmers, herders, agricultural financing institutions, and governments in the case of adverse natural events.

**Mitigating the risks**

Agricultural risks can be financed with farmers’ self-retention, private financial markets, governments, and international donors through an appropriate layering of risks. High frequency but low consequence risks that affect farmers from a variety of mostly independent risks may be caused by inappropriate management decisions and are thus exposed to moral hazard and adverse selection problems. They should be dealt with at farmer level and financed by individual savings/credit. The less frequent but more severe risks that affect many farmers at the same time needs to be insured. The low frequency but high severity risks such as major droughts or floods are catastrophic in nature, and their probable maximum loss can be very large. Financial products, backed by governments, may offer new risk transfer solutions for these risks.

To the extent a country manages climate risk effectively it also helps to eradicate poverty. The lack of insurance is a critical reason for continuing poverty. What is less evident and well known is the role natural disasters play in perpetuating poverty. The lack of insurance is a critical reason for continuing poverty. Any producer who insures his or her crops and animals, would be making plans to rebuild shortly after a disaster occurs. Without it, producers will be lucky to build a shelter and provide food for his distraught family.

Even more difficult will be rebuilding the business which took years to develop. The devastated producers will find themselves back in the poverty cycle. The ability to adequately address the risk of loss cannot be over-emphasized. Because insurance is designed to address catastrophic risk, to an individual farmer or to a country, it too must become a pervasive risk management tool. Insurance also provides sufficient collateral to secure loans. In virtually every developed country there is some form of insurance available; otherwise, lenders would not put their capital at risk. Without adequate insurance, a lender’s need for asset preservation would prevail over taking risks that would put their assets at significant peril. Lenders need some type of risk transfer mechanism to support their own business risk. Without a healthy lending industry, economies grow stagnant.

In India, several crop insurance schemes have been introduced incorporating improvements over its predecessor viz. Pilot Crop Insurance Scheme (PCIS) – 1979, Comprehensive Crop Insurance Scheme (CCIS) – 1985, National Agricultural Insurance Scheme (NAIS) – 1999, Pilot Weather Based Crop Insurance Schemes (WBCIS) - 2007, Pilot Modified NAIS (MNAIS) - 2010, National Crop Insurance Programme (NCIP) comprising MNAIS, WBCIS and Coconut Palm Insurance Scheme (CPIS) -2013 and recently Pradhan Mantri Fasal Bima Yojana (PMFBY) – 2016. Predominantly, Indian crop insurance schemes are yield guarantee schemes except weather-based crop insurance, which guarantees weather conditions. In case of deviation from guarantee, an indemnity pay-out is triggered.

**Yield Insurance Scheme**

The success of area yield insurance scheme in India is primarily due to two reasons:

1. Availability of long period land utilization and agricultural statistics in India since 1884.

2. Established system of Season Agricultural Operations (SAO) credit, which is presently available through Kisan Credit Card (KCC).

These strengths of Indian agriculture
data and credit system provided the platform to launch of very successful area yield index crop insurance in India with compulsory crop insurance for farmers availing crop loans through formal credit sources. Over the years, these features remained the core of Indian crop insurance programmes.

The present crop insurance scheme being implemented in India i.e. Pradhan Mantri Fasal Bima Yojana (PMFBY) is a flagship scheme of Ministry of Agriculture and Framers Welfare, Government of India.

The scheme provides coverage against wide range of perils and periods. The cover starts before sowing and extends up to two weeks after harvesting. The scheme provides comprehensive insurance cover against failure of the insured crop in an insurance unit (mostly Gram Panchayat). The scheme also provides protection against sowing failure/failed germination of the major crops if it happens in more than three-fourth area of the insurance unit. Compensation for losses to individual farms due to occurrence of hailstorm, landslide, cloudbursts, natural fire due to lightening and inundation are also payable after loss assessment of the insured crop.

Compensation for losses up to 14 days of harvesting due to hailstorm, cyclone, cyclonic rains and unseasonal rains are also payable after loss assessment of the affected crop, if the crop is left in the field for drying. Losses due to attack of wild animals’ cover has also been introduced in PMFBY. Thus, PMFBY provides insurance coverage for the crop from sowing to 14 days after harvesting. Besides above, on-account indemnity payment provision is also available for widespread losses due to natural events during crop season. Thus, PMFBY provides coverage on area index basis and also on individual farm basis for selected named perils.

**Bangla Shasya Bima Scheme**

PMFBY requires yield data for final settlement of indemnity, if any. Yield data for this purpose is generated through Crop Cutting Experiments (CCEs). There are many crops viz. apple, mango, vegetables, other plantation and commercial crops, for which statistically sound CCEs methodologies are not available presently. These crops may be insured under Restructured Weather Based Crop Insurance Scheme (RWBCIS). This scheme uses weather data as proxy to yield data.

Every crop requires a range of weather conditions to grow and yield to its potential. In every geographical location where crops are grown, weather normal is also quantified. RWBCIS uses these two factors to set crop wise and location wise weather triggers, which if breached during the season is assumed to cause some yield loss and pay-out is triggered accordingly. All weather parameters which could be quantified and recorded at a weather station viz. rainfall (deficit, excess, dry spells), temperature (high, low, mean), wind speed, Relative Humidity, etc. could be used as a proxy for crop losses under the scheme.

To alleviate the administrative limitations, manual intervention and delay in assessment and settlement of claims, the Government of West Bengal launched a technology-based Bangla Shasya Bima Scheme (BSBS), the flagship Crop Insurance Scheme of the State from Kharif 2020. The scheme leverages on satellite data, rainfall data and field level data generated for ground-truthing. It will lead to faster and more objective assessment and settlement of crop insurance claims.

Apart from the above, tailor made crop insurance and other agricultural insurance products catering to the needs of cultivators and all associated stakeholders needs to be offered in Indian conditions. These are important for achieving the financial stability of persons engaged in agriculture and associated activities including cattle, fishery, farm implements, agriculture infrastructure, etc.

Agriculture insurance support to the can thus be provided to the agriculture sector by way of underwriting agricultural insurance including private commercial insurers wherever possible. Support from government will be required in data infrastructure for speed, reliability/quality and transparency and creation of enabling legal and regulatory framework. Agricultural insurance premium subsidies will continue to support well-defined social objectives.
Agriculture extension services in India are highly pluralized. Broadly, extension service providers could be categorized into three systems, viz., public extension system, private extension system and individuals based (Farmer to Farmer or Lead farmer to farmer) extension system. While the first two systems are more or less organized in nature, the third system is largely unorganized. Agricultural research and education has been the primary domain of ICAR Institutes and Agricultural Universities (SAUs, CAU, DU). Public sector extension services have been under severe criticism for not being able to contribute to desired developmental impacts in the country.

With changing circumstances of agriculture and increasing trends of globalization, commercialization and drive towards sustainability, extension is being looked upon to play an expanded role with a diverse set of objectives. These include better linking of farmers to input and output markets, reducing the vulnerability and enhancing the voice of the rural poor and developing micro-enterprises. The biggest challenge with extension is how to transform and strengthen pluralistic agricultural extension and advisory systems in moving toward the broader goal of increasing farm income and improving rural livelihoods. The focus is primarily on technical knowledge, management skills, entrepreneurial skills and information services that small-scale farm households will need to improve their livelihoods in the rapidly changing global economy. Also included is information on how extension should help all types of farmers in dealing with escalating natural resource problems, including climate

About the Author

Dr Rajbir Singh is Director, ICAR-Agricultural Technology Application Research Institute, Ludhiana since 2015. He has infused new energy in the functioning KVKs and is working hard to popularize nutri-gardens in each KVK. He has developed strong convergence between KVKs and ATMA for joint action plan and established partnership for organising farmer oriented programmes with public, private and international institutes.
In the current scenario, agricultural extension has to go beyond production, with a focus on making farming and associated activities profit-oriented just like any other business organization. Empowering farmers to become active players in an increasingly globalised system means moving beyond the traditional focus on farmers and technologies to farmer relations with other actors through markets. This calls for changes in the prevailing agriculture scenario so as to meet the new demands that can only be addressed by enhancing the capacities of the extension functionaries.

Assisting resource-poor farmers with appropriate technology may provide the opportunity for rural households to increase their productivity and incomes. There is a dire need for a shift from a single commodity, monodisciplinary base to a farming system and multidisciplinary based approach together with a change from a top-down extension model to a participatory approach to technology assessment and adoption.

**Innovative extension approaches**

**Farming system perspective:** Farming systems need interaction among components. Empowering farmers to be active players in agricultural research programmes involves supporting farmers and their organisations through innovative funding, guaranteed stakes in R&D organisations and platforms for dialogue. Research organisations need to create opportunities for interaction with farmers, new forms of learning and rewards and champions of change.

**Participatory research methods:** Participatory approaches are being used to diagnose market chain challenges and opportunities and facilitate change in market systems. New platforms for interaction between farmers, farmer groups and businesses are being created.

**Action research:** People learn best, and more willingly apply what they have learned, when they do it themselves. People themselves have the capacity to solve their own problems and bring about change.

**Mass Media Support & Use of Information and Communication Technologies (ICTs):** Extensionists should equip themselves effective ICT and mass media tools at free or at nominal cost to increase timely and transparent flow of information among different stakeholders. ICTs can revolutionize interaction through Information Kiosks, tele-centres, toll-free call centres, websites, mobile phones software applications etc. New advanced instruments like Personal Digital Assistants may be provided to Extension agents for technical information, communicating, field recording, database maintenance and scheduling.

**Market driven approach:** The present extension services have to more market focused and work in ways that strengthen the roles and opportunities of other factors in a value chain. Production and marketing of agricultural and allied sector products through creation of basic market facilities and market information for the farmers is essential. There should be massive scaling up of federal e-commerce/digital platforms like e-NAM for farmers.

**Role of group farming:** The extension approach needs to be changed from individual to group or association approach for effective decision making. Interest Groups, SHGs or cooperatives have been successful models for effective production or marketing. Networking of Institutions: Agricultural development is best promoted when all components involved in a common goal interact effectively. Since extension efforts by ICAR institutes have limited reach, efforts should be made to bring together different agencies or actors involved in agricultural extension. Universities their associated KVKs and public/private institutions can pay a significant role.

**Integrating Agricultural Knowledge and information system (AKIS):** Agricultural research, extension and education operate in a common system that generates knowledge and information for farmers. Farmers, agricultural educators, researchers and extension personnel must be integrated to harness knowledge and information from various sources for better farming and improved livelihoods.

**Policy measures:** Appropriate policy measures should be undertaken to strengthen government schemes and programmes.

**Agricultural extension during pandemic-like scenario**

Extension providers need to be properly equipped so as to address changes in the development scenario, as well as to meet the emerging demands and needs of farmers and FPOs, especially on agribusiness, value addition, and marketing. Extensionists need to be trained on next generation extension tools and media. COVID-like situations demand skills in social media and its uses, including the current tools, methods and models for crisis communication. Extensionists need to be equipped to use Facebook, WhatsApp, Twitter, YouTube, etc. They need to learn and master skills to disseminate information and monitor, track, measure, and analyse social media traffic. Skills in mobilizing farmers and facilitating interaction are needed to secure coordination of different agencies to broker gains for farmers. Input-output transactional costs can be reduced and social participation can be increased if farmers are organized in commodity groups.
The people working outside agriculture have progressed much faster than those who work in agriculture sector. The income of non-agricultural workers was always higher and hovered around three to four times the income of an average cultivator in India. In the year 2011-2012 a non-agricultural worker earned 3.15 times the income of a cultivator.

Despite the income disparity between farm and non-farm income, agriculture remains a top priority for economic reasons because it still accounts for a substantial part of GDP (16%) and employment (49%). Decline in productivity and income has a serious implication on rural household poverty, and on other economic, social as well as sustainability indicators. Hence increasing the income of farmers from different sources across holding, size and region is a major priority for policy planners.

**Sugarcane as a potential sector**

In the ambitious target of doubling farmers’ income, the sugarcane sector can play a vital role. Sugarcane is one of India’s most important agro-industrial crops. It is grown in more than 5 million hectares, and occupies 3 pc of gross cropped area. About 7 million sugarcane farmers and their dependents, five lakh people in sugar mills and a large mass of agricultural labour are involved in sugarcane cultivation, harvesting and ancillary activities. The turnover of the sugarcane and sugar-related economic activities is in the range of Rs 850-900 thousand millions per annum. Out of this, around Rs 600-650 thousand millions accrue to the sugarcane farmers of the country.

The sugar industry in India has been instrumental in accelerating the socio-economic development in villages through mobilizing rural resources leading to generation of employment, increase in income and overall improvement in facilities for transport and communication.

To harness the potential of sugarcane sector towards doubling farmers’ income, ICAR-IISR has taken several initiatives during the last five years. The R&D program of the Institute was re-visited, re-defined and re-oriented to address the ambitious target of doubling farmers’ income through the provisions of technological interventions and advisory services.

**Initiative to help sugarcane farmers**

The most important initiative taken by the institute is implementing a joint project in Public Private Partnership mode in command areas of four sugar mills owned by DCM Shriram Limited (DSL), New Delhi.
Initially the MoU was signed on August 19, 2017 in ICAR-IISR, Lucknow to implement the project in eight selected villages for four years, i.e. up to 2020-2021. Enthused with the overwhelming outcome of the joint efforts in 2017-2019, the MoU was revised on September 27, 2019 to implement the project in 20 villages. The project implementation period was extended to July 2024.

ICAR-IISR, Lucknow conducted the benchmark survey in eight selected villages to assess the existing agri-production system and income level of 4,136 farm families cultivating crops on 2098 ha area in the project area. On the basis of information derived from collected data, the blueprint of required interventions (sugarcane-based and allied agri enterprises) was prepared, which are being introduced in the project area. On the basis of information generated on actual farming situation and farm income, interventions related to sugarcane based system, other cropping/farming systems was listed, was prioritised and introduced.

Agriculture and dairy animal rearing is the main income generating activity in all villages followed by non-farm income through seasonal labour. The other source of income for villagers is small business, service, carpentry and fishery enterprise. Dairying and goatry are traditional enterprises and may play role in enhancing income with the help of new government initiatives. Fishery enterprise is on very small scale. The development of this enterprise on commercial scale can be encouraged.

**Identified Interventions and Strategy**

The information that emerged from the bench mark survey conducted in the selected villages was deliberated upon by a group of social and biological scientists. Their assessments were cross-checked. These were validated with available/existing resources. The most viable and feasible interventions were considered for introduction in selected villages. These were categorized as sugarcane based and general interventions.

On the basis of information generated on actual farming situation and farm income, interventions related to sugarcane based system, other cropping/farming systems was listed and prioritized. Their respective tentative contribution in doubling farmers' income was conceptualized.

**Increasing Trend of Income**

The analysis of data collected in the benchmark survey revealed that the present level of income (2016-17) from sugarcane is between Rs 52500-70000/ha. With the help of introduced interventions, the income of farmers from sugarcane is targeted at Rs 1.16-1.45 lac/ha by the year 2020-21. The overall average annual income of marginal, small and large farmers in base year 2016-17 was assessed at Rs. 53432, Rs. 76346 and Rs. 173168, respectively.

All interventions were planned in such a way to enhance the income of marginal, small and large farmers to the tune of Rs 1,09,750; Rs 1,60,375 and Rs 3,39,000, respectively. The contribution of sugarcane sector in overall income enhancement is expected at about 55-60 pc, and contribution of other allied agri-enterprises is expected at 40-45 pc.

Due to introduction of cane-based interventions in the selected villages, the average yield of cane increased from 548 q/ha to 710 q/ha. The net income of farmers from cane cultivation increased by 1.9 times (from Rs 70,000 per ha in the year 2016-17 to Rs 1,32,000 per ha in the year 2020). The introduction of agri-enterprise based interventions like water saving irrigation, soil health management, mechanization, compost making, vaccination and de-worming of animals, silage and hay making, milk procurement through cooperatives/sugar mills, vegetable marketing etc. paid dividend in terms of income enhancement of farmers. The income of marginal, small and large farmers increased by 2.0, 1.6 and 1.5 times respectively in a short span of three years.
Agriculture extension is a vital information transferring system organized to disseminate the latest methodology of agricultural research to farmers. Effective communication is therefore the backbone of the system. Please elucidate on the role of media in bridging the gaps between all stakeholders.

The success of agri-programmes largely depends on nature and extent of utilisation of mass media for mobilising people for development. As long as political news continues to dominate the media coverage in an agriculture-based economy like India, agricultural and rural development issues will take a back seat.

No doubt mass media can play an important role in effective transfer of tech-
nologies and enable the farmers to make informed decisions regarding their agricultural activities. However, agriculture reporting is given negligible priority. Media coverage on farm issues remains abysmally low in the country.

Unless this scenario changes in traditional media (print, radio and electronic), any effort to bridge gaps between different stakeholders in the farm sector remains a big challenge.

Of course, we have DD Kisan, the dedicated government TV channel on agriculture, and some farm-specific programmes aired on All India Radio (AIR). But the quality needs to be improved further for effective diffusion of technologies.

Agriculture is the world’s largest job providing sector. In developed countries, agriculture is highly commercialized and remunerative. In developing countries the situation is not so positive. How can media boost the speed and effectiveness of agriculture extension, economically and for a greater impact?

When we talk about speed and effectiveness of agriculture extension, it reminds me of a recent initiative of Lucknow-based ICAR-Central Soil Salinity Research Institute (ICAR-CSSRI) in addressing Panama wilt disease in banana cultivation in Bihar and Uttar Pradesh during the Covid lockdown in 2020.

CSSRI scientists could not visit farmers’ fields often due to the lockdown. To save farmers’ crops, CSSRI scientists for the first time used the zoom platform to connect with farmers and guide them to resolve the problem.

There are several mass media tools before us but one should know which, where, what and how to use them to get the desired results.

One should also keep in mind that information prepared for general circulation may not be useful to all farmers and localities. There should be a communication strategy in place to address the location-specific problem and use the right communication tools for disseminating the information.

Social media is becoming a very important tool in connecting progressive farmers with all relevant stakeholders across the entire Indian geography. Does this reduce the effectiveness and impact of mainstream media? How can social and mainstream media play complimenting roles in reaching out to a wider audience?

A paper by the Columbia Journalism Review states, “Social media hasn’t just swallowed journalism, it has swallowed everything. It has swallowed political campaigns, banking systems, personal histories, the leisure industry, retail, even government and security. The phone in our pocket is our portal to the world.”

Social media news coverage is very popular but it is not highly trusted. In mainstream media, every information has to be passed through a gatekeeper but not in social media. Research shows that traditional media remains the most trusted sources of news. So both social and traditional media have a significant role to play. It is up to consumers to decide as they use both.

Considering lower literacy rate in rural India, more caution needs to be taken to ensure farmers do not fall prey to fake news.

What steps are being taken by the mainstream media channels to remain relevant in the very sensitive domain of Indian Agriculture and Extension Services under the influence of the current digital revolution?

It has become, for long, solely the job of government media to extend support to agricultural or rural issues without much participation of private media. The space devoted for agricultural issues has so far been negligible compared to other sectors such as politics, industry and entertainment.

I don’t think that at present, mainstream media is worried about digital media influence as far as agri-coverage is concerned.

Indian Agriculture and our farmers have been a strong and unflinching support system for the entire nation during the Covid lockdown. What have been the major challenges for the media in fulfilling responsibilities while handling such a critical, crucial and sensitive subject under pandemic restrictions?

I strongly feel the media could not capture as much as it could the challenges faced by the farming community during the lockdown. The major challenge was reporting agriculture issues without visiting farm fields.

For example, flower growers had faced huge loss in the closure of market during the lockdown. Extra efforts were to be taken to get facts checked from multiple sources and see farm fields through video call to ascertain the extent of damage so that a credible and authentic report could be filed.
The government is working hard to ensure that 10,000 new FPOs are formed over the next five years. Small holders aggregating their demand and supply through FPOs are the new thrust areas. About 4,500 plus such organisations are at various stages of formations across the country.

Post-production management of agri-produce is becoming a challenging task day by day. This is mainly due to paucity of market infrastructure and of skill-sets required in the domains of assaying to grading to warehousing and collateral management. The absence of talent is also hurting efficiencies in risk management, e-NWR-based ecosystem, agri financing and altruistic trade practices, to name a few.

Agri businesses are suffering from skill shortage despite having better access to information in the post-production management space. This makes it obvious that organisations run by farmers and FPOs will require education and hand-holding for much longer period. To fill this knowledge vacuum, massive institutional effort is the need of the hour. This shall empower FPOs and also the corporate sector for effective price risk management to turn agriculture into a profitable profession. This is where NCDEX has been working very hard since last few years.

Whether there is a shortage or

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surplus situation, volatility in prices is not a preferred choice in any business, especially agri businesses. Indian farmers had been facing distress for years, mainly on account of lack of price risk management practices. Even the level of hedging is very limited in the corporate sector. This is indicated in SEBI’s constant efforts in areas of regulations through mandatory disclosures in the listed companies balance sheet to massive education drive for all the stakeholders of the agri value chain.

Since 2016, 298 FPOs from 14 states with the base of over 5.68 lakh farmers have been on boarded by NCDEX till November-2020. Out of this 113 FPOs, representing over 2.52 lakh farmers, have successfully used commodity derivatives to hedge price risk in 18 commodities. With NCDEX’s support, many of them learnt to hedge their price risks by selling their produce in advance through Futures contract. In terms of quantum, close to 42,000 tonnes of various commodities have been traded by these FPOs via Futures contracts. Over 7,500 tonnes or nearly 18% of the total positions were converted into delivery of various commodities. With more awareness and training, and availability of more risk management tools, the number of FPOs ensuring fair prices for their farmer members will grow.

While FPOs are acquainted with operational nuances of Futures contract, the instrument has its own limitations. For example, the need to deposit margin money and daily mark-to-market margins may impact cash-flows of FPOs. Secondly, Futures can protect from downside in prices, but doesn’t allow to gain from upside in market prices. In this context, there was a need to have a cost-efficient tool, which can eliminate both disadvantages.

In this direction, upon SEBI’s approval to Options in Goods segment, the country’s top agricultural derivatives exchange is gearing up to take a quantum leap in providing FPO-friendly price risk management tools that will significantly reduce the distress in the sector.

In Options in Goods segment, FPOs can buy Put Option which gives a right to the buyer to sell his produce. There is no obligation to exercise the put option through delivery. In case the spot price goes higher than his sale price contracted via Put Option, the farmer has the discretion to sell goods in the physical market. This whole exercise can be done merely by paying a small premium as against relatively higher margin plus mark-to-market settlements that exist in Futures trade.

In short, unlike in futures contract, the Options in Goods empowers FPOs or farmers to lock their minimum sale price. It also empowers them with the right to secure higher prices if spot price moves beyond the locked-in sale price.

Since launch in November 2020, around 41 FPOs including two consortiums have locked in their harvest time price for approximately 3000 tonne of agri-commodities through Options in Goods on NCDEX platform. This has been done without giving away the right to sell at higher price if market prices move upwards. The options familiarization programme, initiated by NCDEX under guidance from SEBI, has evoked excellent response. Under this programme, premium on options on behalf of FPOs has been paid by the exchange out of the fee foregone by the regulator. This has raised expectations about NCDEX among farming fraternity. The exchange shall leave no stone unturned to rise to the expectations of FPOs, regulators and policymakers in the coming years.

Current time is better suited to deploy market based instruments to hedge against price volatility, which continues to be the pain point for the Indian farming community.

My stress busters are photography and reading. I am currently reading The Journey of Man: A Genetic Odyssey by Spencer Wells

Unlike in futures contract, the Options in Goods empowers FPOs or farmers to lock minimum sale price. They can secure higher prices if spot price moves beyond the locked-in sale price.
Digital technologies are penetrating the agriculture sector rapidly but lack dynamics, granularity, and demand-driven advisory. At the same time, agri-food systems are undergoing a transformation. The systems are marching towards economically viable and ecologically sustainable options for healthy diets, healthy people, and a healthy planet.

Such eco-agriculture transformation requires a systematic characterization of farming system dynamics and farm typology. This must happen at much higher spatial and temporal granularity with real-time analytics and advisory. The data-driven digital augmentation to quantify farming systems and site-specific recommendation on a real-time basis (in-season) is made possible by recent advances in Geo-Agro. These are driven big-data analytics in deep learning intelligence, cloud computing along with smartphone-enabled citizen science. Precision decisions at farm-level are now smarter, efficient, economical and much more useful than ever before.

Such a digitalization level helps to address the gaps at multiple levels (e.g., data, soil health, yield, ecology, economy, resilience) for demand-driven agro-ecological interventions across the scale (e.g., space, time, and package).

The GeoAgro Pro
The leveraging of the latest cutting-edge technological innovation driven by geo big-data, earth observation, citizen science and ICTs made digital agriculture extension possible through GeoAgro Pro. It is a demand-driven digital augmentation platform for accelerating sustainable intensification with a bimodal agricultural extension advisory for targeting site-specific interventions. The GeoAgro Pro is designed to empower extension agents, farmers, cooperatives for on-farm data collection and disseminating in-season advisory services to target site-specific technology interventions for sustainable intensification.

Dr Chandrashekhar Biradar is a Research Team Leader and Principal Scientist at CGIAR Research Center. Dr Biradar has authored and co-authored over 225 scientific publications and received numerous international awards. He has developed several innovative methods and models for sustainable farming, agro-ecology, and pioneered biodiversity farming for diet diversity.
Digital extension is the most viable alternative for smallholders for accelerating agro-ecological transition. This can happen through on-demand analytical services. These aim at quantifying functional domains (farming systems, farm typology, crop rotations), soil and water resources (irrigation, soil moisture, nutrients, carbon sequestration), and drivers (climate, access, diet pattern, socio-economics). The purpose is to target site-specific interventions for accelerating agri-food system transformation.

It also aims to identify a potential niche for scaling across the regions and discuss foster development in the agro-ecology context. The objective is to provide a comprehensive decision support system for transforming agroecosystems for better food, nutrition, soil, and planetary health. It also enables vital services to policymakers. This becomes possible by providing quantitative and spatially distributed information about impacts and tradeoffs for different policy and technological development options.

First bimodal smartphone app for Digitalization of Agriculture with real-time advisories, backed by science-based evidence, field experience, and thousands of research and outreach data points in each season across the agro-ecosystems.

**GeoAgro for Digitalization of Agriculture**

- Digitalization and precision computing, open access, algorithms, analytics to process data on time
- Smartphone enabled apps and cloud web-GIS for decision making at the point, farm, and administrative units

**How it works**

**Registration:** Register to add your land (farm, field, and parcel) with basic details, then digitize farmland boundary using geotagging and crop details using agrotagging

**Digital Diary:** Update day to day activities as a digital daily to keep track of on-farm activities, inputs, and the market access for better advisories and precision decisions

**Advisories:** Get satellite advisories, digital assistance, and extension advisories and socialize on-farm experience and expertise with fellow farmers via likes, comments, and Q&A.

**Geotagging:** Geotagging is a simple process of adding geographical identification such as GPS location information (e.g., latitude and longitude) to photos, farms, fields, and surveys. Geotagging can help users find a wide variety of location-specific information from a device. For instance, someone can find images taken near a given location by entering latitude and longitude coordinates into a suitable image search engine. Geotagging-enabled information services can also find location-based interoperable data, information, news, websites, or related resources. Geotagging can give life to the data, location of the content of a given picture or other media or the point of view, and conversely on some media platforms show media relevant to a given location.

**Agrotagging:** Agrotagging is a process of adding additional agricultural information such as on-farm activities to the geotagged farm, field, photo, and/or geotagged field data such as agronomic practices (variety, date of sowing, harvest, tillage, preceding and following crop, etc.), inputs added (water, fertilizers, seeds), yield harvested (grain yield, biomass) and farm type to which the field belongs, etc.
With the introduction of global companies as investors, the agricultural sector has witnessed a technological boom. Artificial intelligence, blockchain, machine learning, satellite imagery, computer vision, drones, advanced sensors, automation etc have become part of the agricultural sector. This hi-tech edition integrated with daily agronomic activities may not be the reality across the world today, but one step at a time, we are witness to a monumental difference.

The Indian agricultural sector has witnessed exponential growth in the last five years. An increasing number of companies are taking a keen interest in this space. Indian agriculture is expected to be a profitable investment now, and even more so in the future. An increasing number of multinational companies are investing in agricultural infrastructures such as cold storage, irrigation facilities and warehousing, looking at the potential growth of the market.

Various factors throughout the value chain obstruct the growth of the agricultural sector and impact individual farmer incomes negatively. Since the lion’s share of India’s farm holdings (approximately 86%) are owned by small and marginal farmers, considering solutions to challenges must involve their needs as well.

Finance Minister Nirmala Sitharaman had proposed an increment of the agricultural credit to Rs 16.5 lakh crore, which was the highlight of the agricultural budget of 2021. The Digital India movement initiated by the government...
can help farmers to a great extent. The emphasis that digitisation had in this year’s Union Budget is indirectly going to affect the agricultural sector, an impact worth looking forward to. Though this movement is not directly focused on farmers, focusing on digital projects will promote the use of technology.

The Growth of AgriTech
The introduction of technology in agriculture has ushered in the era of AgriTech companies. AgriTech companies are coming up steadily with various business models like the margin-based models, subscription-based models, and transaction-based models. These players bank on data-fed conclusions to accurately predict and work for the supply and demand of inputs, along with various other factors, thereby strengthening the path to scalability within the segment. Global farm applications using technology like AI has an estimated value of around $850 million in 2019 and is expected to grow 25% more by 2030. The Indian AgriTech market is valued at around $200 million and has penetrated less than 1% of its estimated potential.

The Agricultural industry is looking towards the development of a robust ecosystem, strong technology and investments in research and development, cross-country collaboration for innovative ideas, and a favourable regulatory environment. Since there is so much additional potential for investment within the multi-fold segments of the value chain, there are several different ways in which AgriTech will be able to support the pain points within farming processes, enabling a structural change and sturdiness within the landscape.

Today, farming is synonymous with toil and tribulation, resulting in uncertainty regarding the crops of farmers, not knowing whether they will be met with abundance or loss when it is time for harvest. However, with the use of technological advancements, such issues can be controlled.

The global pandemic has made the adoption of food safety and quality assurance a necessity. Mechanisms such as Total Quality Management (TQM) including ISO 9000, ISO 22000, Good Hygienic Practices (GHP), Good Manufacturing Practices (GMP), Hazard Analysis and Critical Control Points (HACCP) will be assets for the industry.

According to the Department for Promotion of Industry and Internal Trade (DPIIT), the Indian food processing industry cumulatively attracted FDI equity inflow of about US$ 9.98 billion between April 2000 and March 2020. The government assisted farmers during the pandemic with various reforms such as the amendment of the Essential Commodities Act. Technology is currently advancing at a breakneck pace, much like the exponential growth experienced by database technology in the late 20th century.

Integration of technology in agriculture aids farmers by increasing their income and hence their buying and selling capacity. It provides them with various cost analysis assistance so that the funds can be assigned in the right manner for every task carried out by the farmer, or every transaction that takes place. Farmers are also being guided towards the formation of FPCs/FPOs. These allow them to carry out the processes of post-processing and production, along with manufacturing and selling of their goods through the FPOs, adding a profitable value.

AgriTech Support for Smallholder Farmers
In order to be independent, smallholder farmers should have control over the products and factors impacting their businesses. The issues that they face, like climate change, ongoing enterprise rates, finding the right value for the produce, selling it below the cost of production etc need to be addressed. IT-enabled agriculture has made that possible.

Smallholder farmers face various doubts such as how to grow the crops, how much should they age them, how much nutrition should be provided as per the nutrition recommendation, pest and disease alerts, understanding the quality of the produce that is required by the market and linking it to the market or buyers. These concerns can be taken care of through IT-enabled agriculture. It is essential for smallholder farmers to adopt IT-enabled agriculture to be truly Aatmanirbhar.
MAKING AGRI FINANCE ACCESSIBLE

FINTECH SOLUTIONS FOR FARMERS

In the last few years, ag-tech entrepreneurs have making significant inroads and creating an impact at the ground level. These startups cover a wide gamut of agricultural domains and have attracted the interest from multiple stakeholders, including the Indian government and domestic as well as international investors. While it is a great time to be an entrepreneur in this space, the Indian agricultural ecosystem has always been complex. A quick glance at the ecosystem shows that ensuring scale as well as quality is not an easy task.

At the macro level, there are multiple sub-sectors within Indian Agriculture in which we are among the top players globally. Beyond the traditional agriculture cultivation of core crops like paddy, wheat, soyabean, pulses etc, we have made great strides in allied sectors as well. All these sub-sectors are large and complex, supporting a large part of the Indian population’s livelihood both directly and indirectly.

Indian agriculture suffers from multiple challenges at various levels across different moving parts of the agriculture ecosystem like Agri Financing, Agri

ABOUT THE AUTHOR
Mr Dhyanesh Bhatt is the Co-founder and Group CEO at Gramcover, with over a decade and half of creating scalable and sustainable insurance solutions for the corporate, government and rural markets. He has spent more than a decade working with multiple stakeholders including government, corporates, financial institutions and technology providers to structure value-creating solutions that are both sustainable and can be brought to scale.
Inputs, Agri Production, Warehousing and Distribution as well as Market Linkages.

India has more than 145 mn land holdings. More than 86% of India’s farmer population is constituted by small and marginal farmers. Most of India’s agriculture is rural, is geographically significantly dispersed, and low on technology as well as mechanisation access.

Challenges faced on agri inputs, production, market linkages and distribution network contribute to the difficulties in agriculture financing. Lack of relevant data sets has prevented innovation in agri financing historically. Agri financing in India has primarily been driven by the Indian banking ecosystem through NABARD, Cooperative Banks, Rural Regional Banks and Public sector banks. They have followed traditional credit scoring mechanisms to underwrite and approve various financial requirements of the agriculture ecosystem. However, there is a change brewing.

According to the Ag-Tech in India (Investment Landscape Report 2020), the Indian agri-tech ecosystem has transformed significantly in the last decade or so. There are close to 600 active Agtech startups in the ecosystem that have collectively raised more than 1.7 bn USD in 2014-2019 at a CAGR of 48 pc for the capital invested. These startups interacted with more than 14 million farmers across various areas like Agbiotech, Agfintech (finance and insurance), Upstream Agtech, Downstream Agtech, Precision Agtech, Agautomation and Aginfratech. There are multiple active Agritech startups in each of these domains. We will discuss a couple of Ag-fintech startups in greater detail.

Helping small and marginal farmers

The significance of Ag-Fintech startups becomes apparent when we see that while they constitute only around 2% of the active startups in the overall category, they have impacted more than 32% of the total 14 mn farmers touched by Agtech so far. While Samunnati has been working in the Agri Value chain financing ecosystem across several years now, other startups like FarmArt, JaiKisan, Freshokartz etc have been gaining traction over the last few years. All these entities are leveraging technology, data and farmer connects to create alternative mechanisms to underwrite the risk profile of the farmers and bring agri finance access to the small and marginal farmers.

Agri fintech entrepreneurs follow different approaches to reach out to the farmer, including a direct approach, or aggregation through FPOs or other entities. Some entrepreneurs work on creating stand-alone fintech solutions for the farmer. Others follow an embedded approach. In the next few years, we can expect a lot of players in other domains like Precision Agri, Downstream Agtech, and Upstream Agtech to get into the AgFintech space as they reach a level of maturity and scale. This will hold true for not just the core agriculture ecosystem but also across horticulture, dairying and fisheries.

Agri insurance forms another crucial part of the Agfintech domain. India is severely under-insured. The story is even more challenging in rural areas. Approximately 60% of the gross cropped area, 95% of Indian livestock and most of the people living in rural areas are either uninsured or inadequately insured. The same holds true for asset insurance and health insurance. Gramcover has been leveraging technology and a rural Point of Sale (POS) partner network to bring insurance access to rural India across the GOI subsidized programme like Pradhan Mantri Fasal Bima Yojana (PMFBY) as well as non-subsidized insurance products like parametric weather-based crop insurance, livestock insurance, motor insurance, benefit health insurance and life insurance. In the last three years, Gramcover has provided insurance access through more than 3 million insurance policies across multiple states.

These are early days for the entrepreneurs venturing in the AgFintech sector. While the sector has grown significantly in the last five years, the potential ahead and room available for each of these startups is immense. How far can the Agfintech entrepreneurs move the needle? This will depend on the innovation and collaboration that various players of these ecosystems demonstrate, so that they can leverage this opportunity to create value and impact, both at scale.
Over the years, multiple challenges have been faced by the seed industry at various points of supply chain management. Some of these are infested stock for storage, inefficient packing causing seed spillage, redundant moisture levels etc. Other important management areas for the industry include seed processing, drying and storage, preservation in cold storage, effective management of seed operations for better seed preservation etc.

Our trainings and workshops became a part of the revolution in the industry. We made efforts in staying updated with all the industrial trends and do what is takes for upliftment through various effective training programs.

We identified effective management of seed operations for better seed preservation as one of the areas that needed attention. We are all aware that effective seed operations don’t arise out of some isolated process or activity regardless of how efficiently they are handled. It requires an integrated approach to plan, coordinate and execute various operations to impact better storability of seeds.

We also need to realise that there are several factors effecting seed storability. Many seed companies have good standard operating procedures and experienced manpower to manage operations at different levels. Despite the best efforts, sometimes we fail to understand the exact reason(s) for seed deterioration, as it is a cumulative consequence of

Mr Gubba Kiran, CEO of Gubba Cold Storage, is regarded as the face of Gubba for the Indian seed industry. He has led the company into efficient service in cold storage preservation. He has been instrumental in creating the Gubba brand from 0.7 million cubic feet to one of India’s biggest cold storage companies with presence on 11 million cubic feet. He has played a key role in educating pharmaceutical companies in preserving critical products at Gubba
shouldering responsibility numerous factors.

The best way to deal with the situation is to develop an integrated approach to ensure better seed preservation, not leaving anything to chance.

In August 2017, we saw the need for Operations Excellence through Lean for the Seed Industry. We conducted a training program and covered the following areas:

- Core Concepts of Lean Management - Value versus Waste
- Observing current processes with Lean Vision
- Team project: Actual process observation at the plant
- Applying Lean to Improve Seed Operations

In 2020, before the covid broke out we conducted Lean Kaizen One Day Workshop for the Seed Industry where we discussed the following:

- Discrete Operations E.g. Packing
- Flow Improvisation
- Storage & Dispatch
- OEE Improvements

After this workshop in early 2020, the world was faced by the pandemic challenge. This was a challenging time for us too. We took it up with enthusiasm and adapted to conducting the trainings online. During the lockdown, we conducted two webinars to keep the industry engaged in these tough circumstances. To our surprise, the webinars were a huge hit. We had about 1000 registrations, and about 500 participants attended it. After this, we had made it a tradition in Gubba to have informative and engaging webinars once every month.

The new year started with a bang. In January 2021, Gubba collaborated with Federation of Seed Industry of India (FSII) and conducted a session on Research Priorities for Indian Seed Sector. The programme consisted of a panel discussion in which some of the best brains from the seed sector and research fraternity took part. The focus of the discussion was on the possible scenarios of seed research in this new decade.

In February 2021, Seed Industry in Hyderabad was exposed to a highly informative program on Scientific Seed Fumigation & Preservation methodology for better Seed Health. UPL and Gubba Cold Storage in association with GrainPro & Jardines as Knowledge Partner jointly organized Seed Fumigation & Preservation Workshop 2021 for the seed industry.

The objective of the workshop was to transfer knowledge to the seed industry on good fumigation practices in a scientific manner, seed treatment chemicals and latest technologies available to preserve the seeds to ensure better seed health.

The following are the important components of an informative training program.

**Self - Assessment**

Since you will meet so many experts from your domain with different visions, you will be able to, in reality, assess yourself and your company and be able to understand the gaps. When the conclusion is taken positively, plan of action is worked upon and the execution is done, wonders will happen.

**Networking**

Network is net worth, they say. This is true. When you get the opportunity to enter a space where everyone is like minded, aiming at the same goal (here, the development and digitalization of agriculture) you will naturally be engaged in every conversation and have the right set of circumstances to develop professional relationships.

**Focus and intensity**

These workshops are very much focused. Most of what has to be delivered before, during and after the workshop is well defined. Hence, there is no room for unproductive conversations. Your time is treated like money.

**Renewed Motivation**

Workshops are always generative with a tint of fun. You will be engaged in activities like never before. As a result, you are most likely to return from the workshop with renewed motivation to pursue your goals and find your enthusiasm rekindled.

**Improved Customer Valuation**

Customer is the king. Our ultimate goal is to be able to understand what the customer wants and make him happy. When we meet like-minded people, we are able to understand other's client's vision, address our hurdles better and make it a win-win for all of us.

So far so good! We promise to keep up our word of delivering quality trainings as per the situation, technology and time demands.
The importance of good extension system to improve agriculture is no secret. Innovations are the backbones of extension. These lead to socio-economic progress and prosperity of farmers. Here, extension plays an essential role to disseminate innovation in the farming community. In the present scenario, there are government extension agencies, non-government organizations, community based organizations and workers from corporate sector under the CSR programme.

Such initiatives started in the beginning of the 21st century when the idea of public-private partnership (PPP Model) flourished and Agricultural Technology Management Agency (ATMA) was formed. Later with the advent of internet and mobile technology, many other options also grew like community radio, television channels dedicated to farming, e-magazine and various OTT platforms to disseminate innovations. These started supporting extension systems directly as well as indirectly.

This brought a sea change in the Indian extension system. Now we have multiple service providers among farmers catering to the information, advisory and support services. Breaking of monopoly leads to democratic approach and the availability of options.

This was new to the farmers, and they have maintained a slow pace in their response. It is the responsibility of the extension system to enable farmers to make right, optimum and beneficial decisions. Over the years, extension pluralism has proved to be effective in case of information function. But researches have shown that there are chances of duplication of efforts if synergy is not maintained.

The Importance of Synergy
Now the question arises as to who will bear the responsibility of bringing all the players under one umbrella? To synchronize the large orchestra is not an easy task. The present pluralistic extension is resulting in a silly symphony with malafide intentions of mushrooming extension agencies. There are many cases where a single farmer was
found to be the beneficiary of multiple agencies. Sometimes there may be possibility of unknown duplication of effort.

Looking to the scope of wider coverage and increased farmers participation in extension programmes, there is an urgent need to bring all agencies under one platform. This will lead to better coordination, effective cooperation, harmonic convergence and greater impact of extension efforts. This will also help to reduce trust issues between stakeholders and increase the exposure of needy farmers to choose between service providing agencies.

Grass root extension workers will be able to maintain uniformity in information to be provided, hence reduce communication gap and confusion. A healthy and actionable guideline for convergence may be worked out on local basis with flexibility of time bound revisions for all the agencies working in a district or block level. Technical backstopping of extension personnel of various agencies is also a major concern to match with government policies and programmes.

To achieve this objective role, extension can be redefined for leading the pluralistic system. To play a fairer and better role of a leader in the district, Krishi Vigyan Kendras should be revamped to follow a single line of command. This will help to improve the convergence of extension agencies.

**Need to Involve The Youth**

Being an owner of fragmented and, small or marginal land holding, nearly 12.6 crores of farming families are struggling for livelihood security because of non-involvement of youth in the farming affairs. It is opined that this number will continue to grow because of fragmentation of land and families. Also there is lesser scope of absorption of rural youth in other sectors of economy.

There are many factors which keep youth away from agriculture. Some identifies reasons are long working hours, uncertainty of production and market prices, lack of asset building, bad experiences of their parents in agriculture, lack of social identity and shyness in meeting new people. Due to lots of labour and risk involved in farming, the youth tend to stay away from their farms. In every village we find seasonal youth migrants who work for nearly eight months in different states and came back to their homeland for four months. Because of all these reasons they lack participation in decision.

Looking to these facts, Dr MS Swaminathan stated in his famous article on Shaping our Agricultural Future, “Unless farming becomes both intellectually stimulating and economically rewarding, it will be difficult to attract and retain rural youth in farming.” World Bank estimated that by 2050, half of the Indian population will be urban. On the other hand, it is estimated that the percentage of agricultural workers in the total workforce will drop from 58.2% in 2001 to 25.7% by 2050.

Ageing farmers and need of interested rural youth in agriculture is becoming a prime concern in India. Therefore our pluralistic extension system should also focus on them by providing forward linkages of village-based primary and secondary processed products. Surprisingly very few innovations address this large segment. Farmers are thriving on their Jugaad technology to meet the need.

Targeting the larger mass for better access to the best technology and markets can only be achieved by integration of extension efforts by all the agencies and applying participatory approach. Federation of farmers proved to be inclusive as well as participatory to identify and utilize potential of rural youth. Evidence from states like Kerala and Maharashtra are trend-setting and encouraging. They proved that when good intentions are combined with integrated extension efforts, chances of sustainable livelihood become strong. Here every extension agency played a vital role to play its part fairly and brought about desirable changes. It is felt that pluralistic extension system requires integrity of inspired extension personnel with commitment. We should strictly stick to the optimistic side. Farming is a profession of hope. So are the other ventures related to farming.
Higher use of technology will help effective roll-out of agri insurance:
Shri Purushottam Rupala

Shri Purushottam Rupala, Union Minister of State for Panchayati Raj, Agriculture and Farmers Welfare, has called for higher use of technology in enhancing the coverage of agricultural insurance.

Speaking at the Union Bank of India (UBI) Agriculture Credit and Insurance Awards 2021 organized by the Agriculture Today Group, Shri Rupala said that credit and insurance play a major role across diverse sectors of agriculture. Both shall immensely boost our efforts in achieving the national dream of doubling farmers’ income.

Shri Rupala said he remembered the time when as a farmer, he had to take agriculture credit with interest at the rate of 18 per cent. He observed that now, farmers get agriculture credit at zero per cent. This, he said, is the result of government policies focused on farmer welfare, he said.

Shri Rupala urged the cooperative and commercial banks to ensure that the farmer did not face any delay in availing agriculture credit. He said that the coordination between the banks and the respective state governments and the Centre should be efficient in order to ensure timely provision of agricultural credit to the farmers.

Shri Rupala appreciated the role of the Agriculture Today Group in honouring the role models in diverse sectors of agriculture. He gave away the awards to the distinguished winners of the first edition of the Agriculture Credit...
Delivering the welcome address at the awards event, Ms Mamta Jain, CEO and Editor of the Agriculture Today Group said that it was a matter of pride for the Group to felicitate the individuals who have played a seminal role in diverse sectors of agriculture.

Dr MJ Khan, Chairman of Indian Chamber of Food and Agriculture, said that the dynamics of Indian agriculture have changed. He said that the focus has shifted from deficit to a situation of plenty, and from production to post production management. Dr Khan said that traditional agriculture gave way to precision agriculture and then to digital agriculture. Dr Khan moderated the session on Opportunities and Challenges in Agriculture Finance held as part of the award function.

Speaking on the occasion, Dr HK Bhanwala, Executive Chairman, Capital India Finance Limited said that on the patterns of India-stack data like Aadhar, we also need agri-stack data. He said that the availability of such data shall enable efficient delivery of agricultural credit and insurance support for farmers.

Ms Anamika Roy Rashtrawar, Managing Director, Iffco Tokio, highlighted that insurance inputs and finance management are two highly important aspects of farming. Efficient delivery of both can help in maximizing the potential of our farmers, she said.

Mr Barkat Ali CGM, Business Development, Financial Inclusion and Micro Markets, State Bank of India said that the bank has launched diverse initiatives to to educate farmers on how they can benefit by forming FPOs. Mr Ali said that seamless digital financing shall change the way agricultural credit is provided.

Mr Ajay Singhal, Head Marketing, Agriculture Insurance Co. of India Ltd. said that in the sector of agriculture finance, opportunities surpass the challenges. He said that credit flow is higher to southern states because of better infrastructure in these states. He also spoke in favour of digitization of land records.

Mr Lal Singh, Chief General Manager Agri-Business, Union Bank of India said that for realizing the dream of Atma Nirbhar Bharat, diversification in agriculture is important. Mr Singh said that if the farmer is assured of adequate remuneration for other crops, he shall shift from the wheat-paddy cycle.

Shri H R Srivatsa, Chief General Manager Corporate Communications Department, NABARD, said that the availability of agricultural credit and the provision of agricultural insurance work as twin drivers for the growth of the agriculture sector. He said that it is important to acquaint farmers with the emerging technologies.

Mr KC Mishra, the Founder of e-Kutir said that the farmer needs convergent solutions for agricultural activities. Mr Mishra urged that banks must fund the FPOs in order the aid their growth and strengthen their efforts for farmer welfare.

Mr Shailender Tiwari, Chief Technology Officer of Gramcover said that the centralized database of all land records shall enable faster delivery of all welfare services and schemes for farmers. He said that it was important to bring more and more farmers into the ambit of insurance in order to mitigate their risks.
Director General ICAR Dr Trilochan Mohapatra has said that disruptive technologies and new generation innovations are change-makers in the agriculture sector.

Dr Mohapatra was speaking at the Agriculture Extension Awards 2021 organized by the Agriculture Today Group. Dr Mohapatra was the chief guest at the awards function. Dr Mohapatra congratulated the winners, and also appreciated the role of the Agriculture Today Group in instituting these awards.

The DG said that bringing about attitudinal changes at grassroots level was the toughest job. The farmers could be motivated to adapt to new technologies only through constant demonstration and persuasion. Dr Mohapatra appreciated the role played by the vast network of KVKs in bringing about this change. He said that third party evaluation has affirmed that the KVK systems are delivering well.

The award function, organized online, began with the welcome address by Ms Mamta Jain, CEO and Editor of the Agriculture Today Group. Ms Jain thanked the members of the Jury for their generous guidance and support in organizing the ATG Agriculture Extension Awards.

Speaking on the occasion, Dr MJ Khan, Chairman, Indian Chamber of Food and Agriculture (ICFA) said that FPOs are playing a stellar role in enabling the farmers to reduce costs and find higher price for their produce. Dr Khan said that globally, the movement was now towards digital agriculture. The start-ups in the ag-tech sector, he said, would play a major role in empowering farmers with technology and in finding new markets.

The first panel discussion of the awards ceremony was on the theme, ‘Business Opportunities and Major Challenges’. It was moderated by Ms Mamta Jain.

Dr Mamta Tewari, Director HRD, Agriculture University, Kota said that a major focus of her work has been empowering rural women and youth. Dr Tewari highlighted that building a strong rapport with the community immensely helped the professionals engaged in agriculture extension. She also stressed upon the importance of involving both genders in the extension outreach to create strong social and economic impact.

Mr Sunil Khairnar, Chairman Indigram said that social media platforms are a highly powerful medium of connecting agri-professionals and farmers for knowledge sharing. He said that there was need to keep a strict watch on the content posted on such platforms. He said that with such strict check, such groups emerge as active and dynamic forums of professional interactions.

Dr Ravindra Kumar Sohane, the Vice Chancellor of Bihar Agricultural University, Sabour said that during the training programs organized by the university, it has been observed that the rural youth are highly aspirational, and hungry for such guidance and hand-holding. He said that extension professionals must realize the value of their work in changing the lives of the poor and the deprived sections of the society.

Shri Hukam Chand Daiya, Owner and Administrator of the Kheti Badi Facebook Group revealed that farmers from 100 nations along with agricultural scientists, manufacturers and traders were now part of their Facebook group. Shri Daiya said that his group maintained...
a strict check on the content posted on the pages, and this adherence to quality interactions had greatly enhanced the popularity of their group.

Dr Ashwini Pathak, Director, Indian Institute of Sugarcane Research said that the country could make significant gains in doubling farmer income in public-private partnership mode. This model had been successfully followed by their institute for farming, dairy and bee-keeping, and impressive results had been achieved.

Dr Kinjulck Singh, Scientist at KVK Rewa said that during the lockdown, she and her team focused on popularizing technology through WhatsApp videos and blogs. She said that it was important to focus on skill development of the rural youth and provide them training to generate employment opportunities.

Ms Sathiyabama Bhaskaran, Head Knowledge Transfer, East West Seeds, India, said that farm production and income could be increased through sustained knowledge transfer involving smallholder farmers, and coordination among all stakeholders.

Dr Vikas Gupta, Scientist at KVK Leh, said that agri-scientists can create entrepreneurs if they empower farmers with the right technologies. Dr Mahendra Singh Raghuvanshi, Team Leader, National Mission on Sustaining Himalayan Eco-System said that a major area of concern for farmers across the country is dealing with post-harvest losses. Farmers need training for processing and value addition.

Policy Interventions and Digital Innovations

The second session of the award ceremony was on the theme, Policy Interventions and Digital Innovations. The session was moderated by Dr P Chandra Shekara, Director General, MANAGE, Hyderabad. Dr Shekara said that India is marked by great diversity. Hence farmers need region-specific and real-time information. The major challenge was how to transfer appropriate technology to the needy farmers.

Dr AK Singh, Deputy Director General (DDG) Extension, ICAR said that extension professionals must empower the youth and enable them to make agriculture more remunerative. He said that remunerative and sustainable agriculture was a common goal, and extension professionals were the precious link to help the farmers achieve these goals.

Dr Jagdish Prasad Sharma, Vice Chancellor, SKUAST Jammu said that post-harvest processing and management is the need of the hour. Dr Sharma highlighted that higher production alone cannot guarantee income. The nation needs to benefit from increased production and also focus on reducing the cost of production.

Dr Chandrashekar Biradar, Research Team Leader and Principal Scientist at CGIAR Research Center, said that innovation is crucial in empowering agri extension. He said that the need was to reach technology to the farmer, and the digital medium could serve as a useful tool for the purpose.

Dr T Janakiram, Vice Chancellor, Andhra Pradesh said that the initiatives taken by the university in horticulture training have yielded highly positive results. He said that group connect was a powerful way to encourage the rural youth to adapt to new technologies or consider new employment opportunities.

Dr Ranjana Nagpal, DDG, National Informatics Center spoke about the many utilities of the Kisan Suvidha app for farmers. She said that the app has multi-lingual platforms to maximize information access for farmers.

Dr RK Rana of ICAR-Agricultural Technology Application Research Institute, Ludhiana said that extension programs must have a bottom-up approach, along with the traditional top-down approach. He said that commission agents are fearful of declining influence, and want to learn new skills and diversify their business.
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