GLOBAL AGRI CONNECT
CONFERENCE

NABARD

NSFI
Driving Change, Delivering Impact

GLOBAL AGRI CONNECT 2019

ACCELERATING INVESTMENTS IN CLIMATE-SMART AGRICULTURE

OCTOBER 22, 2019 | HOTEL LE MERIDIEN, NEW DELHI

PROCEEDINGS & POLICY RECOMMENDATIONS

National Bank for Agriculture and Rural Development

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- **Research and Development on matter of importance pertaining to agriculture, agricultural operations and rural development including the provision of training and research facilities.**
- **Consultancy services related to Agriculture & Rural Development through subsidiary (NABCONS).**

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- Development functions undertaken through Farm Sector Promotion Fund (FSPF), Financial Inclusion Fund (FIF), Watershed Development Fund (WDF), Tribal Development Fund (TDF) Rural Infrastructure Development Fund,(RIDF) etc.
- Supervisory functions in respect of Cooperative Banks and Regional Rural Banks.

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Setting the Context

by Sai Krishna Nanduri

Since 2011, NSFI has been organising Global Agri Connect (GAC) on emerging themes in the space of agriculture development that are relevant to the sub continent. While the themes are decided upon wider consultation with various stakeholders, the principle mandate remains the same across the years which is to bring together the best practices and innovations that can be piloted or adopted by various other stakeholders across the region for positive results and for scaling up. Since 2015, the conference started giving primacy to the theme of climate smart agriculture given the changing landscape of agriculture and especially the transformation that agriculture is upto, as a response to its efforts of adaptation and mitigation to the climate change scenarios. Over years, more than 130 technologies or innovations have been documented and brought to the attention of various stakeholders.

GAC makes efforts to bring together those innovations and technologies that are creating value to the end user i.e., farmer, along with other stakeholders in agricultural value chains. A technology or innovation is as effective as its utility to its customer. We at Global Agri Connect believe, it is the customer / end user who will determine the merit of the technology and its acceptance / adoption. In spite of best of efforts there is a potential lag between what consumer or end user wants and what the technology or innovation offers. Unlike the consumer goods where the user pays for the technology, given the status of the agricultural economy in the country, we see other stakeholders pay for the farmer's technology use (other than productive inputs). Thus the knowledge report for GAC 2019 brought together the end user's perspective of selected technologies or innovations.

Further, GAC brings together not only merits of various technologies or innovations in agriculture but enables deliberations by distinguished experts on the challenges, opportunities and avenues to scale up the successful technologies. In this direction, the combination of 'Technical Presentations' followed by 'Deliberations by Distinguished Experts' evolved as time-tested model of conference deliberations to enable scaling up of the successful models.

Over years, GAC has built a stakeholder base of more than 5000 professional in India and other parts of the world that are keen on learning from experiences and taking up necessary action towards scaling up successful innovations. The policy recommendations of the annual events are widely circulated among these stakeholders and are taken up with policy makers both in public and private sectors. NSFI constantly strives to innovate and develop models to standardise successful pilots and the consequent learning. The first and foremost filter that is used in the conference deliberations and that of the policy recommendations is about the relevance and utility of such efforts to the end user i.e., farmers apart from other stakeholders in the agricultural value chains. While the earlier versions of policy recommendations are brought out in a synthesis format, given the trending impersonal channels of communication in the society, the current policy recommendations are brought out in first person with synthesis of the deliberations as policy recommendations.

We are happy to present the scintillating and enriching deliberations among the technical speakers and the experts of GAC 2019 through these 'Proceeding & Policy Recommendations'. We wish and hope that the recommendations will be useful for the policy makers in government, private sector corporations, bi-lateral and multi-lateral agencies that are working unstintingly towards building agriculture development ecosystems and value chains in the times of climate change – that protect the farmers and value chain players from ill effects of climate change.

Happy reading and policy making !!

Advisory Council

Vidya Soundarajan
Director, Ecological Footprint, WWF

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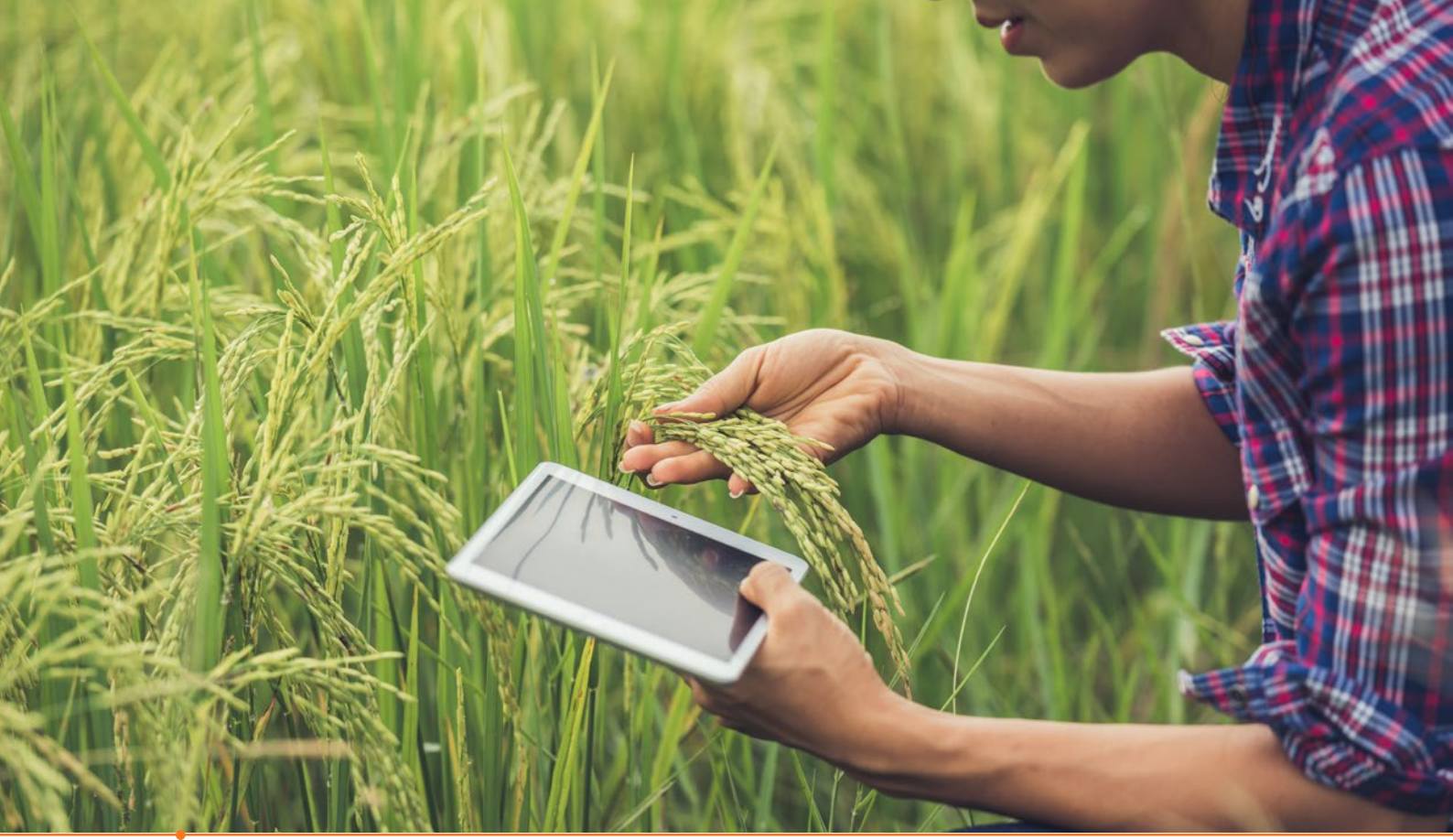


Executive Summary

Global Agri Connect 2019 is set out with the theme 'Accelerating Investments in Climate Smart Agriculture'.

Agriculture both contributes to and is vulnerable to climate change. The extent of climate change impact depends not only on the intensity and timing (periodicity) but also on their combination, which is more uncertain, and depends on local conditions. Climate Smart Agriculture (CSA) has been touted as a method that will help farmers both adapt to a changing climate and to mitigate greenhouse gas emissions while boosting agriculture production. Importantly CSA technologies integrate the three dimensions of sustainable development (economic, social and environmental) by jointly addressing food security and climate challenges.

Cases of successful implementation of climate smart agriculture practices are observed across different parts of India. The Knowledge report 2019 brought in the unique end user perspective for various climate smart technologies, and the report was developed by NSFI in partnership with Yes Bank.

Irrespective of the benefits of CSA, the current rate of adoption by farmers is reported to be low owing to multiple challenges which include socio-economic characteristics of farmers, the biophysical environment of a particular location, the attributes of new technologies, loopholes in the value chain and policies, and most importantly, scarcity of investment in those areas of value chains where intervention is needed the most in order to accelerate investment and achieve sustainability in the time of climate change.

- ➔ To explore various innovative experiences of projects/programmes/ technological solutions articulated by agencies and individuals to prioritise the nature and flow of finances into promoting these solutions/practices,
- ➔ To bring together successful cases of multi-stakeholder partnerships and identify critical elements of their articulation, execution and sustenance during scaling up,
- ➔ To learn from responsible value chains of businesses and identify points of learnings that can be supported with more investments, replicated and promoted.

Global Agri Connect 2019 is set out with the theme 'Accelerating Investments in Climate Smart Agriculture'. Three sessions comprising technical presentation by start-ups and practitioners, followed by panel discussion with experienced members representing different stakeholders was done.

Speakers presented in the conference on various dimensions of Climate Smart Agriculture. The inaugural session of the Conference was kicked off by National Skill Foundation of India (NSFI) Chairman Sanjeev Asthana. The special address was delivered by Shri Kailash Choudhury, Hon'ble Minister of State, The Ministry of Agriculture & Farmers Welfare Government of India. The other members of the inaugural session panel were: S. Sivakumar, Group Head, Agri and IT Businesses, ITC Limited; Saurabh Kumar, Managing Director, Energy Efficiency Services Limited (EESL); Neelkamal Darbari, IAS, Managing Director, Small Farmers Agribusiness Consortium (SFAC); and, Dr. Ashok Gulati, Economist and Infosys Chair Professor for Agriculture, Indian Council for Research on International Economic Relations (ICRIER) who shared their valuable insights on various dimensions of Climate Smart Agriculture and the scope for more and precise investments. Thirteen representatives of CSA Technologies start-ups and CSA practicing Agencies presented the merits of their offerings, and the challenges they faced in scaling them up. Thirteen distinguished panelists deliberated on the dimensions of CSA, its challenges and potential solutions related to sustainable value chain, multi-stakeholder partnership, and more and effective investment.

The major recommendations that emerged from the deliberations of the conference include:

1. **Develop area specific climate smart models** as the size of the country is so huge that the geography and climate conditions vary across the nation.
2. **Design climate-smart financial products** for public and private investments and integrate climate smart interventions in credit from banks and extension programs
3. Investment by the **corporate** coupled with **learning and experiences from the field** may pave the way for implementation of the learnings in their business models, making it profitable for every stakeholders, and bringing more investments.
4. For the future, more **stress tolerant cultivars** are a crucial way to counter the changing nature of pathogens and to reduce the impact of new diseases. It is also the easiest and cost-effective technology to upscale which has the room for good investments.
5. **More investment in CSA in rainfed areas** is required in order to achieve ecological sustainability, poverty alleviation and economic growth in the face of climate change.

6. The earlier we start investing into the **technological dimensions** of Climate Challenges and their resolution, the easier and earlier it will be for us to find the solutions.

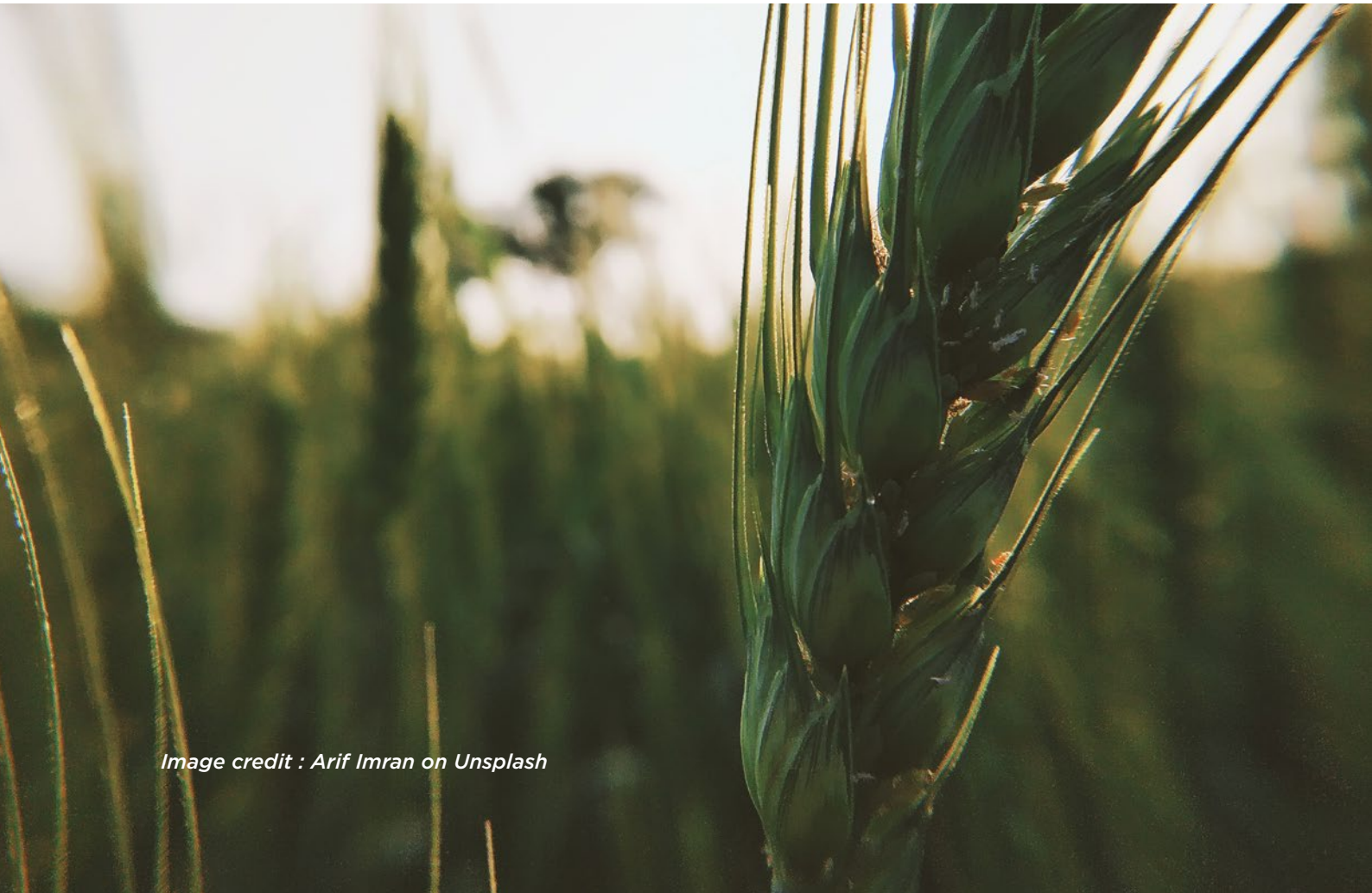
7. We must see that **resource-use efficiency** is maintained while reducing the quantity of greenhouse gasses emission. If we want to achieve climate-smart agriculture or green funds, first we must adopt a circular economy that we use again and again instead of one-term use of resources.

8. To mitigate climate risks or adapt to them especially to avoid post harvest losses, there is a pressing need to **invest in farm gate infrastructure,** for the farmers to ensure sustainable value chains for any crop they are growing, so that they get the right value.

9. **Multi-stakeholder partnerships** not only bring together institutional strengths with respective focus on one's mandates, they also allow increased investment to enable sustainable results. Focus on institutional structures and in making the partners understand their respective roles; a robust governance mechanism.

10. **Include farmers as the principal stakeholder group** as the adoption rates significantly increase if they are convinced about the merit of a particular adaptation / mitigation opportunity.

11. **FPOs** are to be recognised as **channels for various technological and behavioural solutions** that can prepare the farmers to face the challenges of climate change and get over them.



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Introduction

Agriculture both contributes to and is vulnerable to climate change. The extent of climate change impact depends not only on the intensity and timing (periodicity) but also on their combination, which is more uncertain, and depends on local conditions. Climate variability, more frequent and intense weather events continue to challenge farmers' ability to sustain and increase food production especially among smallholder farmers. Above scenario makes the already precarious global food security situation even more unpredictable. Policy makers and various stakeholders involved recognise the importance and need for immediate actions and efforts to improve the sustainable performance of the agricultural sector.

India would require $206 billion (at 2014-2015 prices) between 2015 and 2030 for making agri and allied sectors climate resilient. ODA presently received by developing nations who are the most vulnerable to climate change impact, is well below the $100 billion mark. Given the necessity for allocating limited resources across competing priorities, we are in urgent need to analyse and understand the hierarchy of priorities to be able to achieve the resource use efficiency in tackling the mammoth task of building resilience in agricultural systems. Multiple frameworks do exist currently propounded by various agencies in the form of various tools and technologies available before a farmer or decision maker to choose from. However, among various competing priorities in the domain of thematic areas viz., water conservation, choice of genetic material, technologies of resource use efficiencies, technologies of weather forecasting, innovations in post-harvest management and supply chains & logistics, agriculture insurance, tools & means of crop advisory, it is essential to set our priorities right.

Despite national and international investments into promoting the best agricultural practices consistent with sustainable development, most impactful cases of climate-smart agriculture interventions fail to deliver impact when being scaled up. It is widely accepted that complex multi-dimensional challenges cannot be tackled/resolved through a unidimensional or limited set of

stakeholders. Variety of expertise from multiple stakeholders is the need of the hour to challenge the climate challenges. This is critical for achieving India's climate goals and to help the agriculture stakeholders overcome complex challenges. Innovative partnerships and alliances between research institutes, government agencies, NGOs, CSRs and other institutions are the need of the hour. The market is increasingly booming with successful models of multi-stakeholder partnerships in various sectors and it is time the stakeholders join hands in the name of climate change. These models need to be recognised and replicated with context-specific customisations for making Indian agriculture climate resilient.

Business growth and consistency of positive outcomes are only possible where there is a win-win for all the stakeholders involved in the value chain of any given commodity. The key words 'traceability', 'responsible sourcing', 'sustainable technologies and practices' have become the cornerstones of several business models. Increasingly getting popular, efforts of infusing responsibility in the supply chains of various commodities is considered to be leading to business growth and sustainability, given the win-win value proposition that is being enabled. Achieving collective sustainable goals through individual responsibilities is the need of the hour. The session aims to bring together reputed organisations that are exemplifying the concept and showing the path for others to emulate. Further, the sessions envision the characteristics of such systems to enable other stakeholders to join hands and call upon multiple investments for an enriched agriculture development institutional architecture. In frequent cases of high production – low commodity paradoxes, initiatives that integrate and align the demand-supply exchanges through sustainable value chains stand to offer solutions beyond geographical and institutional boundaries. Examples of market demand-led planting and harvesting, selecting varieties that meet consumer requirements, impact of efficient handling and transportation of the harvest on producer returns need special focus and investments from multiple stakeholders.

Building on the learnings of Global Agri Connect 2018, that the current ecosystem of agriculture research and praxis do offer several technologies and innovations, however, they either do not get adopted or face the challenge of scaling up. Cases of successful implementation of climate smart technologies for fruitful impact are observed across different parts of India. The Knowledge report developed in partnership with Yes Bank brought out the end user perspective for about 13 technologies that are climate smart. This collection adds to more than 120 technologies that were documented by the platform since 2015.

Addressing the gap, the 'Global Agri Connect 2019' has organized the conference to deliberate on pertinent issues relating to adequate investments and successful multi-stakeholder partnerships in adoption and scaling up of climate smart agriculture technologies. Technical presentation, experience sharing and discussions of the event focus mainly on the areas of agricultural value chains which need to be prioritized in terms of investments from the public sector as well as private sector, and multi-stakeholder partnership models that are crucial for bringing the best outcomes from CSA. In addition, the deliberations also focussed on the examples of sustainable value chains in developing climate resilient sustainable solutions.

GLOBAL AGRI CONNECT 2019

CONFERENCE PROCEEDINGS-SESSION WISE

Inaugural Session

Welcome address by:

Mr Sanjeev Asthana
Chairman, NSFI

Special Address by:

Shri Kailash Choudhury
Hon'ble Minister of State
The Ministry of Agriculture & Farmers Welfare, Government of India

Mr Saurabh Kumar
Managing Director,
Energy Efficiency Services Limited (EESL)

Mr Neelkamal Darbari, IAS
Managing Director,
Small Farmers Agribusiness Consortium (SFAC)

Mr S. Sivakumar
Group Head,
Agri and IT Businesses, ITC Limited

Dr. Ashok Gulati
Economist and Infosys Chair Professor for Agriculture, Indian Council for Research on International Economic Relations (ICRIER)

Introduction to Knowledge Report by:

Vote of Thanks by:
Mr N Sai Krishna
CEO, NSFII

The Inaugural Session of the Conference commenced with the Welcome Address by **Sanjeev Asthana**, Chairman, National Skills Foundation of India (NSFI). The special address was delivered by **Shri Kailash Choudhury**, Hon'ble Minister of State, The Ministry of Agriculture & Farmers Welfare, Government of India. The other members of the inaugural session panel were: **Dr. Ashok Gulati**, Economist and Infosys Chair Professor for Agriculture, Indian Council for Research on International Economic Relations (ICRIER), **S. Sivakumar**, Group Head, Agri and IT Businesses, ITC Limited, **Saurabh Kumar**, Managing Director, Energy Efficiency Services Limited (EESL), **Neelkamal Darbari**, IAS, Managing Director, Small Farmers Agribusiness Consortium (SFAC), and **N. Sai Krishna**, CEO, NSFI.

The session also saw the launch of the NSFI-YES Bank Knowledge report, which is a compilation of user perspectives of various technologies that were developed in the recent past focussing on climate smart Agriculture technologies.

Shri Kailash Choudhury

Hon'ble Minister of State

The Ministry of Agriculture & Farmers Welfare
Government of India

We have all come together to witness some good examples and deliberate current issues that the agriculture sector is facing. Global warming or climate change is threatening not only our country but also the entire world. Farmers are probably one of them who understand the threats of climate change quite well. I know this because I am a farmer myself. I belong from an arid region where rainfall is scarce, where we keep struggling with increasing agricultural production and try hard to reach the levels of the countries who are good at agriculture.

It is good to see that people from different companies and organizations have gathered together to discuss in favour of the farmers. From the Red Fort, our hon'ble Prime Minister Narendra Modi ji also addressed the nation mentioning the change in climatic conditions and environmental degradation across the country as well as the world. He spoke about the adverse impacts of climate change on farmers, especially the small and marginal farmers who constitute 80-85% of the entire farmers' population. **The major obstacle for farmers to address the environmental issues is that they are not economically stable**. Unless they get a clear idea of where to sell their produce and obtain adequate price, unless they receive adequate supportive services, and unless they are economically well-off, they will keep believing whatever they are getting is because of God's grace. That is why our Government has an objective to double farmers' income by 2022. In order to achieve that, it is decided to give INR 6,000 to the farmers. Pension Yojana (scheme) for kisaan (farmers) has been introduced. **The moment small and marginal farmers cross 60 years, they will get INR 3,000 per month as a part of this Pension Yojana.** Along with this, our Government has also set a **goal to create 10,000 Farmers Producer Organization across the nation** which is expected to improve farmers' income.

There is another initiative by ICAR called **'climate-smart village' where information related to weather, rainfall, wind, etc. will be shared with farmers at the village level which in turn will help farmers decide which crop to sow, when to sow,** etc. This is also supported and has been being promoted by our department. At the moment, this initiative is being implemented as a pilot project in a few states viz., Maharashtra and Madhya Pradesh. If this initiative gets success, farmers from the entire nation will be benefited from at the scale-up phase.

The Indian Meteorological Department is providing weather related to 17 crore farmers through mobile phones and television. Scientists also visit farmers in their village as a part of the ***'Mera Gaon Mera***

Gaurav Yojana' to provide advisory related to sowing and cropping, and technological advancement.

We have launched '**Custom Hiring Centres App' through which farmers will be able to get any type of farm machinery as per their need. It works just like Uber or Ola. There is a number given on the App. Farmers will dial that number and within the radius of about 20-25 kms there will be a delivery centre which will deliver the order.** We have set up almost 40,000 such centres till date. In the future, this number will increase up to 3 lakhs. The success of this initiative has already started to show. However, everything cannot be done by the Government. That is why we all need to come together to fulfil this vision.

Saurabh Kumar

Managing Director

Energy Efficiency Services Limited (EESL)

You must be wondering what an energy guy is doing in a conference which is largely agriculture. I also wondered when I was asked to come here. Let us begin by mentioning what we are. We are a public sector company of the Govt. of India. Currently we have 2,700 Cr annual turnover. Most importantly **we have created a new paradigm of delivering services to the people and agriculture is one of the focus areas.** That is why I thought, an energy guy can also come to this conference and talk about climate-smart agriculture. There are two sides of it, one is the adaptation part which the Ministry of Agriculture, NABARD, etc. do, but equally and more importantly the mitigation part which is I am going to very briefly talk about how and what we are trying to do in association with the Ministry of Power, Ministry of Renewable Energy and actually kind of living up to the goals of the Government of India has set, one of them is doubling farmers' income while at the same time making sure that the vulnerabilities of climate change we are able to cast off.

One such scheme was a pilot which was very successfully done in Gujarat several years ago. And again in a couple of places of Karnataka we are searching which I am going to very briefly talk about. The energy need of agriculture is quite substantial. **20% of India's energy capacity is only used for agriculture which is about 70,000 MW. We have more than 2.5 crore pumps which are grid connected and we have almost the same number of diesel connected pumps which are used for irrigation. The challenge is in most states, particularly in 12 states, the electricity consumption of agriculture is more than 20%. Most of the states' utilities actually provide the electricity inline which is certainly not the healthiest part** and I'm

sure the experts sitting here will realize because it has an **impact on the cropping pattern, what types of crops we will grow** and so forth.

The project which I am talking about is a largely market-based phenomenon where let's say a farmer has a 5 HP pump as per his irrigation requirement. The scheme is that the Govt. will allow him to set up a 15 KW solar plant in his farmland or any other place he has to. Use 5 KW energy required from the solar plant to irrigate his land. The balance 10 KW energy is bought by the distribution company and the farmer gets a share of the revenue from that. Equally, there are incentives that the scheme also has that within that 5 KW, if the farmer is able to reduce his consumption till 3 KW by using drip irrigation or any other means, the farmer is then pushed to add additional 2 KW to the grid and so that he is paid slightly more. So what **it does a) provides farmers a steady source of income outside of agriculture, b) it incentivizes farmers to look at water conservation because of the current situation of groundwater being a big challenge, c) getting electricity during the day which is rare in most of the states that we see agriculture is, and d) it is drought-proof.** If there is a drought and no irrigation is possible, all we can do is at least generating 15 KW of energy and selling it to the grids. So this is the **scheme which is now announced by the Ministry of Renewable Energy as Kusum. We are very proud to be working on this.** To begin with, this is a small pilot that the Govt. has decided to set up. At the moment, it is also being subsidized both by the central and the state governments. But **we feel confident that after the first round we cannot continue with the subsidy at all. There is a business model inherent. We feel that this Kusum scheme is extremely important from the climate perspective. Huge percentage of the country's electricity coming from fossil fuels which is used in agriculture can actually be replaced by renewables.** If we are able to do that, the country's capacity of renewable energy can grow up to 4 lakh MW which will have an immense impact on the environment and economy as far as climate change is concerned.

S. Sivakumar
Group Head,
Agri and IT Businesses
ITC Limited

I will talk about three things. One is why the private sector which is any part of the agricultural value chain should be concerned about climate-smart agriculture, why they are talking about climate-smart as a phrase, and what exactly climate-smart is. Two, what is our perspective of climate-smartness? And third, in trying to accomplish climate-smartness in the ecosystem of which we work, how exactly are we doing things that are needed? So essentially, how and why are going to be parts of my remarks. So **in terms of short, medium and long term perspectives, extreme weather episodes have become a norm now. The amount of rainfall we are getting is no less but we are getting all the rain in far fewer days** which has one kind of an impact. In fact, more often we have the impact of heavy rains, hail storms and droughts in the recent past. And there are unseasonal weathers whether we have dry winters or rainy summers or extended droughts in the monsoon season, so on. So those unseasonal weathers are an issue. So all of these are delaying planting or impacting yield, standing crops getting damaged in terms of quality and productivity. So, **it's an extremely short term implication pretty much here and now. It's not something that climate change has only long term implications for the farmers both in terms of the uncertainty and risks associated with it and but everybody in the value chain whether you are selling insurance or you are financing or you are buying crops – doesn't matter what it is the level of uncertainty because of these extreme episodes.** These are the short term issues one has to tackle with. And then there are medium term issues in terms of depletion of natural resources such as water and topsoil which are very critical from the agriculture perspective. **Wherein global level, today as we stand on in the last week of October, we have two more months to go in the current year until December in the calendar year. But three months ago, all our natural resources that we can renew in the current year, we have finished on 2nd of August this year. That means already for three months, we will be living on the natural resources stolen from our children and our country.** So that's the kind of thing. At the macro level of the world, if you look at any of the regional or local kind of catchments or ecosystems, you will see in terms of whether water balance is already negative in post-monsoon some areas. In 2000, we talked about 2020 is far away, but 2020 is already here. And therefore, even what we talked about in 2020 is not far away. The medium term implications on natural resource depletion is another serious issue**. If it continues as it is, then obviously both farming as a high-risk and no-reward activity and farmers walking away from agriculture or productivity further degrading by virtue of the degrading lands and the coping mechanisms that exist for this climate change is a long term implication.** When you look at short, medium or long term, I think there is something that should concern all of us whether they are any part of the agricultural chain and business let alone consumers and producers.

What exactly is climate change? So for reasons to deal with drought, ITC has been working on helping farmers with rainwater harvest for over 20 years and last year **ITC crossed a milestone of helping more than million acres getting irrigated and soil treated.** About 3 years ago, we started looking at converging many of these programmes into, what we call, climate-smart village programmes. In partnership with CGIAR institutions – the Climate Change and Food Security Program, we picked up 600 villages from our operational areas in Madhya Pradesh, Maharashtra and Rajasthan in order to make them climate-smart villages on pilot basis. **We have looked at six different components. The first part is weather-smart** – how do you use weather forecast and engage with different agronomic practices. Agronomic practices which are resilient to drought or flood should be applicable to climate-vulnerable geographies. The **second is water-smart**, like rain-water harvesting and micro-irrigation. The **third part is energy-smart** whether it is biogas or biomass generated from agriculture or livestock integrated to your energy needs. For our tobacco crop, we need a lot of energy. We promoted agroforestry 2 years back. The tobacco farmers we worked with were certified sustainable for the entire energy needs in terms of providing their own wood and redesigning the geometry so that the crops don't lose area. The **fourth is carbon and nutrient-smart**, such as site-specific nutrient management, how do you look at residue management, and livestock management and conservation – all these practices help in managing nutrition and carbon. And the **fifth is seed and breeding-smart** - the adopted crop varieties for particular climatic conditions and local regions, and adopted animal breeds, and most importantly seed banks. And **lastly, the market-smart.**

We all know that a large number of farmers are small. So **how do we ensure the collectives of farmers in the form of FPOs or other sort's bargaining ability and accessing knowledge? All of these collectively contribute to climate-smartness – climate resilience and farm productivity.**

Another important piece is partnership. In the climate-smart village programme, we have partnered with CCFAS, a number of local and state universities from the programme area, and some agri-input companies in order to add on to the local farmers' practices keeping in mind any of these six components of climate-smartness. So, as many as 34 different practices got stabilized in two seasons in the programme area in order to bring all the villages into high-climate resilience and high-farm productivity zones. Of course, for that, we need different types of strategies and practices. The productivity in our programme area has moved from as low as 15% to as much as 60% depending where the farmers reside and how much natural resources they have got. The water consumption has also moved from 25% savings to 45% savings. So, there are enormous amounts of opportunities that exist.

Why are farmers adopting climate smartness? Because by integrating climate-smartness into value chains, you are demonstrating a short term benefit to productivity improvement, quality improvement or cost savings on account of different practices and precision farming, I think, there is also short-term economic benefits that has been demonstrated which have encouraged them to take risks in short, medium and long terms. Therefore, there are three aspects we have been focusing on our programme. One is knowledge and innovation. I am happy to see that NSFI has released a knowledge booklet putting together innovations that are happening right from the farm level to the following levels. Second is, partnerships – from the global level to local level. And third is community-level institutions within farmers. These institutions are important for the knowledge generation as well as dissemination and the adoption of practices. These three lessons we have been learning in order to better implement climate-smartness in agriculture.

Neelkamal Darbari, IAS

Managing Director

Small Farmers Agribusiness Consortium (SFAC)

Sivakumar ji very nicely broke climate-smartness into six components, I think, those are the points to ponder as to agri-businesses, creating value for small and marginal farmers, how to be responsible towards the environment, and mitigating the challenges which farmers anyway face. With respect to the agriculture sector of India, we still see that more than 50% of the population is dependent on agriculture. Though there has been a great shift towards the service sector, the shift from agriculture to the manufacturing industries – that really did not happen in a way that should have happened. This means, **we have to look at the larger issue of climate change in conjunction with how a larger segment of the population i.e. farmers can equip themselves and at the same time contribute to mitigating such challenges.**

Climate change is real. This month we are seeing floods ravaging the country. Either there is too much rain or too little rain or rain at the wrong time - not happening after the early signals coming in. The erratic rainfall pattern poses the biggest challenge to the farmers in terms of flood or drought and also in terms of depleting water resources, be it groundwater or reservoirs, etc. Everywhere is water distress! What does it mean when we say that farmers need to understand when it comes to, say, water conservation or water-use efficiency?

There are technologies like AI which are increasingly making solutions get smarter for the challenges before us as policymakers and the implementers of the Government policies. Innovations coming from the scientific community across the globe must reach the farmers, particularly small and marginal farmers. There is a great response when we talk about adopting technologies for water-use efficiency, for example, the proliferation of drip irrigation, sprinkler, etc. Where is it we wish to see it? Is it possible in a state like Rajasthan which is drought-prone? We are still continuing to have flood irrigation in certain pockets in that state, and at the same time, we are not creating enough disincentive to refrain farmers from flood irrigation systems or the crops that require flood irrigation. Traditionally the crops which have been using flood irrigation, can actually switch to water-use efficient irrigation systems? The roles of sprinklers and drip irrigation in prevention of wastage of water have been internationally experimented. How is it going to impact the entire belt which grows paddy? People from the command area of the Chambal system in Rajasthan have opted for the horrible choices for decades due to lack of awareness in the farming communities. Also, to an extent, the extension machinery of different state governments that has not really been able to drive home the point of how the water is precious to the natural ecosystem, not just to the farmers, not just

to their farms, and what consequences we are already facing because of it. **These are all serious aspects from the incentive or disincentive structure that should be put in place. Through those mechanisms, we can reduce the wastage of water which is a critical component of climate-smartness.**

The other thing that the government has radically done in the last 4-5 years is soil testing. The presence of nutrients or carbon in the soil needs to be understood before you put additional nutrients. It was very surprising for us to notice challenging results during the phase-I and phase-II of soil testing programme. The carbon component in the soil was so low! Unless we take some drastic steps to address the issue, there are going to be more challenges. The challenge is the same with the micronutrients in the soil. Farmers must have that critical information of which nutrient component is lacking in their field and what the soil really needs. **Soil testing programmes have provided such crucial data to the farmers. 'Here is the diagnostic report of the soil of your field, and this is what you need to put in order to mitigate the nutritional imbalances present in your soil!' What I feel is whatever we do, seems to lose its steam when it comes to the last mile, typically in cases of small and marginal farmers.**

In SFAC, we have a consortium of small and marginal farmers. One of the tools that we have identified, as the country is also pushing forward, is the foundation of FPOs or FPCs as we call which are nothing but aggregators. Here is a mechanism that we have in place where we help create through NGOs, resource institutions and aggregation of farmers. Any helpful intervention or awareness programme for the farmers is best suited to be done through the FPOs. **Although there are many technologies that have proliferated and so many tools available through the internet, programmes that have addressed farmers and the extension services which have been utilized, I think, the FPO platform is a great tool to spread awareness, to transfer technologies,** and to look at all the smart aspects in agriculture that the previous speakers spoke about.

Whether it is weather advisory or having some platform by which whatever is understood of the weather in short, medium or long term can get passed on to the farmers along with advisory about which the cropping pattern needs to be adopted, along with what kind of seeds the farmers really need which are typically suited to the erratic rainfall pattern that we are currently witnessing. How do these all come together? The challenge is how to create all those responses within the system by integrating all challenges from the perspectives of weather, soil, water-use efficiency, and energy efficiency. Unless all of these, after coming together, are transferred to the small and marginal farmers who make up the large part of the farming communities, there will not be meaningful results. We need to take care of this through FPOs.

All of these have to come at low cost because **we cannot put the burden of all the technicalities related to climate-smart agriculture on farmers.** The cost should be borne by the government. To that extent, I think, we need to keep our focus very correctly on the larger objective of doubling farmers' income. That cannot come in the way of achieving climate-smart agriculture, and reduction of cost is an important component of that. Therefore, we have to find ways by which all of these come together with least possible costs to the farmers, particularly to the small and marginal farmers. **I think, the cost of these innovative interventions and the responsibilities that we have towards the environmental issues including climate change have to be borne by the policymakers and the governments, and of course the civil society.**

I would like to mention marketing also as a

critical piece. Marketing involves huge costs. Government has done so much in this part, such as the e-naam platform, amendments and modifications in the different APMC Acts of the states. Some of the states are still struggling with the new models, acts, etc. Custom hiring centres for an example.

How do you reduce carbon footprint and utilisation of fossil fuels with fewer number of tractors, fewer number of implements out there in the field, capital which could be employed elsewhere – these are all things which will need to be addressed.

Dr. Ashok Gulati

Economist and Infosys Chair Professor for Agriculture,

Indian Council for Research on International Economic Relations (ICRIER)

Let me talk about the topic from 2002-03. In 2002-03, those who were working in the agriculture sector, remember it was a drought year. Our agriculture product, food grains, dropped by 38 million tons in a single year. The country was in panic about how to cope up with that. In 2014-15 and 15-16 we had two back to back droughts. But the country exported 63 million tons of food grains together during 12-13, 13-14 and 14-15. I want to contrast between the 2002-03 situation and the situation ending around 2014-15 and 15-16. In one case, we were in a tight spot and in the other, we were very comfortably placed and still exporting. We are considered as the largest exporter of rice in the world today. Then, what is the thing that has changed the agriculture scenario? Remember, this is happening in the face of climate change.

Mr. S. Sivakumar gave detailed descriptions of six elements of (climate) smartness. Gustakhi maaf, if I may add one more – smart policy! **I think much of the problem of India stems from very rudimentary and old-fashioned policies we are adapting. We need to do a lot more on the policy front to change the scenario to cater both the adaptation part and the mitigation part of climate change.**

What do I want to ensure? Some stability in the production? Some stability in the income of the farmers? Assurance to the consumers that we will not be starving? All the answers start with seeds in agriculture. **The catalyst of change is seed. That is how the green revolution came, and that is how the new agriculture will come. Seeds require a lot of investments. Are we investing enough in drought-tolerant varieties?** What are we doing with the fertilizers? Our Urea price today is $80 per ton. This is the cheapest urea price anywhere in the world. If you go to the US, it is $400. Go to Europe or even Pakistan or Bangladesh or Nepal, even South East Asia, anywhere...you compare. Subsidy is given on the basis of granular urea. You put it into the field, 75% of urea either evaporate or permeate through the soil. The water table is under threat because of this, because of our non-smart policies. We do not give subsidies on soluble fertilizers where the efficiency can be more than 90%. Only 25% granular urea is absorbed

by the plants; the rest 75% is polluting the environment, either up or down. This is our policy!

Let us talk about water! 1 kg of rice in Punjab requires 5,000 litres of irrigation water. You give water for free. What do you expect? You expect the water table going down by 33 cms per a year. Do not blame the farmers! Do not blame the technologies! Blame totally out of time and out of space policies! The other day, I was visiting a place where drip irrigation is practiced in the paddy fields. Study shows 65% water can be saved compared to flood irrigation. Productivity can go up if fertigation is applied along with drip irrigation.

Mr. Saurav talked about Kusum Yojana, and we conducted a global survey on this. What we have been suggesting for almost two years now, you can double farmers' income in a single year if you make only one change in policy. **In one acre of land, we can put 500 solar trees at a distance and height of about 10 feet. Enough sunlight will come. Photosynthesis can take place without interruption, and you can keep growing two crops. Surplus power can be put back into the grid and price can be obtained. The field can become an income generating factory where solar power is the third crop in the farmers' fields.** Finally, the Government of Delhi has announced that farmers would get 1 lakh rupees per acre without farmer's investment into solar panels. Somebody else will invest. **The only thing needed is change in policy which will allow to buy back surplus power from the farmers and put it into the grids for the larger benefits.**

So, there are two things that actually damage the environment from the agriculture side - rice cultivation and the livestock sector. How much are we investing in the livestock sector to raise productivity? We need a much smaller number of cattle and much higher productivity to mitigate the damage to the environment. Flood irrigation in the rice fields is creating methane gas, and that also needs to change, though technologies are there.

My little suggestion is, we need to be smart in policies. Unless we change the policy, it is exceedingly difficult to change the behaviour of farmers. We know the problems, we have the potential band of solutions, but we do not have smart enough policies.

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GLOBAL AGRI CONNECT 2019

CONFERENCE PROCEEDINGS-SESSION WISE

Session – I

Prioritisation of CSA Investments: Race against time

Technical Speakers

1. **Dr. Sabyasachi Das**
   National Coordinator
   Revitalising Rainfed Agriculture Network (RRA Network)
2. **Mr Sunil Kumar**
   Chief General Manager
   National Bank for Agriculture and Rural Development (NABARD)
3. **Prof. Arun Kr. Joshi**
   CIMMYT Asia Regional Representative & Managing Director
   Borlaug Institute for South Asia (BISA)
4. **Mr Shakti Dhar Suman**
   Director
   Equicap Asia Private Limited

Panel Discussion

1. **Dr. Arabinda K. Padhee, IAS**
   Director, Country Relations and Business Affairs
   ICRISAT
2. **Mr Takumi Kunitake**
   Deputy Director of South Asia Department
   Japan International Cooperation Agency (JICA)
3. **Dr. Patrick Cortbaoui**
   Managing Director
   Margaret A. Gilliam Institute for Global Food Security of McGill University, Canada
4. **Ms Vidya Soundarajan**
   Climate Change Expert
   Infrastructure for Climate Resilient Growth (ICRG)
5. **Mr Amar Prasad**
   Director (CSR) & Head
   PTC Foundation Trust

Technical Session 1

Dr. Sabyasachi Das

National Coordinator

Revitalising Rainfed Agriculture Network (RRA Network)

I bring some experiences and stories on the rain-fed areas in the country and as to why it is important to invest in the rain-fed areas which are more fundamental to the climate change scenario. India is not doing well in terms of land degradation, water security, food security, and groundwater crisis according to the recent IPCC report. **85% of lands which are under the process of degradation are from the rain-fed areas.** Rain-fed areas are much more vulnerable to droughts. If we look at the works of ICRIER, ICAR institutes and their studies in the drought-prone districts in the country, we will find that **the rain-fed areas are the drought-prone areas and also the flood-prone areas.** For the past 10 years, the number of droughts per 6 year cycle has increased by 186 to 222 in 26 districts. India has 71.7 million hectares of rain-fed area which is the largest in the world and 85% of our rural poor are living in these rain-fed areas. **68% of the farmers live in rain-fed areas. 52% of our crops are rain-fed. As for the contribution, 89% of the millets, 40% of rice, 88% of pulses, 69% of oilseeds, 78% of cattle, 64% of sheep and 72% of goats come from rain-fed areas. Hence, the country's nutrition is provided by the rain-fed areas and despite this, the residents here are the most malnourished population in the country.**

84% of the total agricultural budget is allotted for non-core activities and does not cover too much of the climate-resilient agriculture. It mostly goes for price support, direct insurance subsidies, crop-insurance, chemical fertiliser - thought this has some link to climate change. In the last five years, the budget for core-agricultural activities has reduced from 64 - 65% to 16%. **This year, the budget for fertiliser subsidy is 80,000 crores while the expenditure on watershed for the last 30 years has remained around 40,000 crores. 97% of the budget is for rice and wheat. What will people do to focus on other climate-smart crops or orphaned crops, as you say? In the last five years, watershed investment has gone down significantly though we have Jal Shakti Mission for convergence of the watershed programs.**

Prioritise investment in rain-fed agriculture to make it easy for rain-fed farmers as they are facing a lot of problems and leaving the farm. Every one minute, 23 hectares of land from the rain-fed areas face desertification. **We need to diversify the crops, seeds, production systems, etc. We need to have a decentralized landscape approach and a multi-stakeholder delivery mechanism immediately.**

Sunil Kumar
Chief General Manager
National Bank for Agriculture and Rural Development (NABARD)

As NABARD, we are engaged in promoting a number of climate-resilient and sustainable models. One of the most important models is a watershed development program under which 1.96 million hectares of degraded land has been brought under treatment and made suitable for cultivation. Watershed development program looks at soil and water conservation making it climate-resilient. Another intervention is a tribal development program in which we have supported 5 lac tribal families through water-based sustainable livelihoods. More than 20 million fruit trees have been planted in another programme as well. **We have implemented more than 300 projects under a climate-resilient umbrella programme on natural resource management which provides environment-friendly sustainable livelihood options for small and marginal farmers.**

NABARD is the national implementing entity for the Adaptation Fund, Green Climate Fund and the National Adaptation Fund which is hosted by the MoEFCC. With these three funding mechanisms, about 38 projects amongst which many of these introductions pertain to climate-smart agriculture, are being implemented with a total sanctioned outlay of 1800 crore rupees. Under the National Adaptation Fund for Climate Change, we are implementing 30 projects, some related to climate-smart agriculture, throughout the country with a total investment of 130 billion USD and 45% of the investment is for climate resilient agriculture. We also have projects on climate resilient livestock management, coastal resource management, etc. benefitting 1.9 million households directly or indirectly. 6 projects under the Adaptation Fund of UNFCCC are being implemented in 6 states with a total investment of 9.58 billion USD covering 19 districts and 35% of these projects are pertaining to climate resilient agriculture.

Some of the climate smart introductions that have been supported through these projects are conservation agriculture, which includes zero tillage, mulching, in-situ management of top residue, strengthening of soil carbon, water sector, promotion of micro-irrigation, rainwater harvesting, recharge structures like percolation plants, check-dams, etc. In the livestock sector, fodder bands, indigenous breeds, cattle sheds; climate resilient varieties like resistant seeds, vermi-composting, promotion of integrated farming system, organic farming, aquaculture, seed banks, automatic weather plants, etc.

There is a dilemma between commercial and traditional practices, we have noticed as an implementing entity. Traditional practices are considered to be more climate-resilient. For example, there is an ongoing debate on zero-budget natural farming and quite a lot

of people are opposed to it, although it has been announced zero-budget. **There is a need to define area specific climate smart models because the size of the country is so huge that they cannot have an approach which is relevant for all the states and all the districts.**

We'll also need to have a pre-planned approach for public and private investments. We need to come out with financial products which utilise resources efficiently. We'll need to design financial products to suit climate-smart practices, maybe fixing a separate scale of finance for lending through Kisan Credit Cards for climate resilient agriculture.

We need to integrate climate smart interventions in government policies, credit banks and extension programs. There is a need to incentivize farmers to adopt climate smart practices. We need to create awareness among the farming community on climate related challenges. We need to sensitize our stakeholders on regional and specific climate smart options.

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Prof. Arun Kumar Joshi

CIMMYT Asia Regiona

Representative & Managing Director - Borlaug Institute for South Asia (BISA)

We are working upon stress tolerant cultivars and trans-boundary diseases. Climate change adversities affect small and poor farmers through biotic and abiotic stresses. **It's not only about water and sky and soil, but also about insect-borne diseases. Vectors are being affected. They are changing and evolving and they don't sleep.** We cannot trust a disease which never sleeps. So, we need to invest in seeds. Seeds means genetics. Genetics means DNA and when you have strong DNA, you are powerful. You can fight all the time.

I will be giving you just one example- introduction of early-heat intolerance in wheat. This is very new. This was not known 10 years ago. Due to this, **we can now plant wheat in the 3rd week of October. And due to this single introduction, in Punjab and Haryana, your yield will increase by 8 quintals per hectare. About 0.8 tonne. This is an average. This can be more than 1 tonne. This is income to the farmers. It's not only yield. It saves water. In October the soil is still wet....if you wait one month, the soil will become dry and then one has to irrigate. No need to do that. Just plant. You will save water.** You will escape the heat stress later on and cause no burning because you will plant immediately through machines like happy-seeder or any other. So this early planting helps in a lot of ways. In the last two weeks of October 2017, lands were dry. In 2018, it is green. Lands which were fallow before are now being planted upon. Simple interventions like this help us fight with climate change.

It's not just us who have been impacted (by climate change). All living organisms have been impacted. And they don't sleep. They are stronger than all of us. New diseases are emerging and they move like a drone and we help them....hundreds and thousands of flights...our clothes, books can carry any insect, any pest, any spore. Millions and millions of spores can cling onto you. A disease came in 1999 in Uganda, we call it UG-99. Very scary disease..almost 80-90% of the world became susceptible. So how did we handle this? Through resistant varieties. There's Wheat Blast in Bangladesh. It has come all the way from Brazil to Bangladesh. It can kill the whole wheat crop in 3 days.

The summary of these examples is- **it is impossible to harvest good crops with bad seeds.** If we have good plants, good seeds, we need not worry. But for the future, we need more and more stress tolerant cultivars. It's the easiest technology to upscale. Early warning and resistant varieties can reduce the impact of new diseases. So we need good investments.

Shakti Dhar Suman
Director

Equicap Asia Private Limited

All the developmental agencies, up till 2002, were investing into infrastructural development through government agencies only. They realised that infrastructure development could not be done only by the government. The private sector is also required to support development of infrastructure. In this regard, EquiCap Asia which is a fund manager-cum-developer for Infraco Asia, a multilateral firm put their resources and created a trust - Private Infrastructure Development Group (PIDG). Other than PIDG, we created various facilities for promoting investment in infrastructure by the private sector.

We have invested in a lot of sectors, including the agriculture sector in the form of investing in agriculture infrastructure projects. We have already made investments in a project on climate-smart agriculture in Himachal Pradesh. This is a protected agriculture process which reduces the dependence on rain and provides opportunity for optimum usage of fertilisers and water. The likelihood of getting affected by natural calamity factors is less.

- Another important part which we have introduced in a project is providing capacity building support to farmers in the region in the modern technologies for them to adapt to climate change and mitigate potential risks.

- The second project which we are implementing right now is on organic fertiliser in Uttar Pradesh. This project is also linked with waste management and organic fertiliser. We take the sugar industry's waste to make organic fertiliser. This helps in soil stabilisation and water consumption in agriculture.

- The other project we are implementing is the contour atmospheric storage project in which we are targeting to associate with the apple producers of Uttarakhand. In association with them, we will have a storage facility and a processing facility to help and support them.

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Panel Discussion 1

Dr. Arabinda K. Padhee, IAS

Director, Country Relations and Business Affairs

ICRISAT

CRISAT's mandate crops are climate-resilient and politically sensitive too. Government also looks for climate-resilience or climate-smart agriculture. An empirical research conducted by researchers, mainly from IFPRI and CCCAF study has some very interesting findings. **The researchers mapped the policies and programs on agriculture and allied and rural development sectors, particularly of the union government, and found that 15 percent of the total expenditure on Government programs in these sectors, particularly schemes like NFSM, RKVY, Pradhan Mantri Krishi Sichai Yojana, Fasal Bima Yojana and others, are in the climate-smart agriculture.**

When we talk about the impact of climate change on the agriculture sector, we need to invest more. When there are more public sector's investments, we can expect investments from the private sector also. **Often the private sector's investment is regarded only as a corporate fund, but it also means the investment from farmers.**

Agriculture is not only being impacted by climate change, agriculture also contributes a lot to greenhouse gas emissions. The GHGs emission from the agriculture sector accounts for 17.6 percent. The energy usage of the agriculture sector is quite significant. We need to find out a strategy for how we can reduce it. In my previous capacity, I was dealing with the fertilizer subsidies. I would fight every moment as to how our policies are a bit inconsistent with what we prescribed. **After prioritizing our CSA investments, the CCCAF has come out with a framework where they say that we need to assess the practices which are already available. We need not reinvent it. And also, we want to identify the options and then we should go for the cost-benefit analysis followed by the portfolio analysis, and the evaluation of the probable barriers.**

The Ministry of Rural Development runs the largest wage-employment programme, NREGA (National Rural Employment Guarantee Act). I was also involved in implementing the programme in my home-state Odisha. Speaking from my experience, **if we prioritize NREGA and all other schematic interventions for climate-smart agricultural practices, we can do a lot. It is the need of the hour that we start discussing how we bring synergy among all the ongoing schemes including NREGA.**

Though we did sensitize the state-level bureaucrats about climate-resilience, the entire NREGA money goes to the Block, the intermediate tier of the government system, and they make the work plans. Furthermore, in the Indian context, the actors in the policy space and implementation at the local government level is Panchayat, Hence, if we sensitize them about the impacts of climate change, they could work out activities which could be climate-resilient.

Takumi Kunitake
Deputy Director of South Asia Department

Japan International Cooperation Agency (JICA)

JICA is a bilateral development agency and we extend support to the Government of India including the state Governments as technical support projects. While we support infrastructure projects, agriculture is one of the important elements in our portfolio. We are now supporting agriculture projects in five different states. These projects are not specifically climate-smart, but there are some components which are directly linked to climate-smart agriculture. In the projects we supported, components are rehabilitation of development of irrigation schemes and also aggregation of farmers through farmers producer organization, the supply chain development, value addition and efficient water use like promotion of the drip irrigation systems. Efficient water use is the biggest contributor to climate-smart agriculture, in the projects JICA is supporting.

When we talk about how we can prioritize climate-smart agriculture, I think one thing we need to consider is the economic system of the agriculture sector. **The ecosystem, policy & regulations, infrastructure, technologies, markets, human resources, finance, the Government, the private sector and the farmers are defined by those systems and they are impacting each other. So, it is better to have a view more integrated rather than seeing it one factor by factor**. So for instance, when we look out the value chain development contract farming may provide farmers to stabilize their income and also technology transfer. Factors such as infrastructure can be taken care of by the Government. The private sector may provide technical support to the farmers which may include efficient water use. The farmers may purchase agricultural inputs which support the sustainable production of agriculture. So I think, the **integrated investment or the integrated intervention is pretty much important to mainstream the climate-smart agriculture.**

Dr. Patrick Cortbaoui

Managing Director

Margaret A. Gilliam Institute for Global Food Security of McGill University, Canada

We at McGill University promote applied research / operational research that has end users and it is not just academic research just to publish papers at the end. **We believe that farmers are the innovators. Small holders are the ones who need to tell us their needs and our role is to help them fulfill their needs as per their priorities. All across the supply chain they have to participate in the supply chain and find solutions.** We believe that there is a need for food diversity as food security is an important factor in smallholder livelihoods. They need to have the capacity to withstand shocks and manage risks which will help them manage their nutritional status as individuals.

Climate Smart Agriculture is an approach that requires all stakeholders to be involved and we need an inter-sectoral approach. It requires participation of all stakeholders private, academia, NGOs and farmers themselves. We need to understand the needs and priorities of these stakeholders more so the small holder farmers who 90 percent of the food produced globally. Without the farmers' involvement we cannot adapt and we cannot achieve climate smart agriculture and without them other other stakeholder participation we cannot succeed. We can always measure the success of climate smart agriculture for a short term. However, if we rush for short term indicators and measures we may hinder efforts for long term impact or success.

On private sector participation in ameliorating climate challenges and the way to prioritise investments in climate smart agriculture, we need to take it up in three stages viz., (1) initial assessment of CSA options; (2) Identification of different stakeholders; and (3) cost-benefit analysis of the options.

Vidya Soundarajan
Climate Change Expert

Infrastructure for Climate Resilient Growth (ICRG)

The first of which is to distinguish a little bit between climate-smart agriculture and the road of building resilience of the entire agriculture sector with it. So **building the resilience of the agriculture sector was beyond the crops. It's about the entire value chain.**

We have excellent agricultural specialists in the country who have contributed a lot. There is a lot of research happening that is bridging the gap between pure agricultural science and understanding embedded with climate change. Need for research is huge. **Focused research makes us able to understand climate science in a simplistic way, otherwise a huge gap is always there between these extremely complicated climate models, regional climate borders and downscaling which is not completely understood by the agricultural practitioners.**

The programme I am representing here today is funded by DFID and called Infrastructure Climate Resilient Growth. It mainly works on mainstreaming the MNREGA scheme with climate resilient strategies. We have been working on specifically raising large-scale investments for immediate climate change action. We managed to raise over 3 Billion Pounds for climate resilient strategies, water management or agriculture or GCF programmes. That's a lot of money.

A lot of multilaterals and bilaterals including DFID are seriously considering bringing in climate change related funds. Even there is a conversation going on about creating climate change frameworks and platforms. A climate finance network that is operational also exists. But the recipient from our side in India, from our side in the state, from our side in the various sectors, I think, we have enhanced understanding. There will be better synergy and greater access to funds and that is when we need to focus on getting people to identify clear strategies, thereby looking for more money.

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Amar Prasad
Director (CSR) & Head
PTC Foundation Trust

With regard to the CSR spent on climate-smart agriculture, corporates, as far as I know, are intending to spend more money. They may not call it climate-smart agriculture, but work focusing on it. For example, we have taken projects in two districts of Bihar where a major part of the funding is invested on farm mechanization with improved tools which will help in reducing soil moisture evaporation. Zero tillage machines are also being used which in turn will help farmers in a big way.

But the issue was that initially the farmers were not ready to accept these types of innovative technologies which took a lot of time to convince them. This is one of the important factors we need to consider. After completion of the one year of project, the farmers were happy as a result of investment in the farm sector, reduced cost, increased production, improved soil and other benefits.

Recently, PTC Foundation has invested a vast amount of money in Punjab and Haryana on stubble burning issues which we have been facing, especially in Delhi NCR. **We have sensitized the farmers and provided the latest equipment like happy seeder, mulcher, etc. which helps in in-situ conservation of moisture available and also simultaneous seeding and mulching of the stubble. In this manner, we are able to save the environment, increase the production and reduce the cost of production.** Though we have been working on this aspect of the agriculture sector, we don't call it climate-smart, but that's the way we are going.

I want to share a policy issue related to the quality of seeds. A few years back, a lot of work was done under the DFID funded projects in the rain-fed areas of Eastern and Western parts of India. In partnership with the agricultural universities of Jharkhand, we had developed varieties of paddy which were very suitable to the upland and dry and rain-fed areas. It took a lot of time to convince farmers. Within 4-5 years, it started gaining the desired outcomes. The farmers started accepting them. The lodging problem of paddy did not occur. The duration for crop maturity was much less, only 85-90 days, even lesser. And the yield was 30 per cent higher. Later on, we observed a problem that arose from a different side. Once the project was over, there was no seed producer for the type of variety we had been promoting. ICAR had notified this variety suitable for Jharkhand and Odisha. Hence, we need producers who produce this type of seeds and make it available to the farmers. It is likely to happen that seed-growers do not grow this type of variety. They only grow those types of seed varieties that cater to other interests. We have to take a practical approach in this regard.

And one more point, while we talk about climate-resilient agriculture, we also have to take an integrated view with regard to the forest. There is a massive interface between agriculture and forestry. We cannot consider agriculture alone, we have to take forestry into account. We should have an integrated policy where forestry and agriculture related to climate change mitigation should be integrated together.

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GLOBAL AGRI CONNECT 2019

CONFERENCE PROCEEDINGS-SESSION WISE

Session – II

Leveraging multi-stakeholder mandates: Investment vis-à-vis Management

Technical Speakers

1. **Ms Sriparna Sanyal Iyer**
   Vice President
   Infrastructure Professionals Enterprise Pvt. Ltd.
2. **Ms Simrat Labana**
   Project Management Specialist
   Food Security Office, USAID
3. **Ms Elizabeth Gogoi**
   Senior Consultant
   Climate Change Portfolio, Oxford Policy Management

Panel Discussion

1. **Dr. Ashok Dalwai, IAS**
   CEO
   National Rainfed Area Authority & Chairman, Committee on Doubling of Farmers Income
2. **Mr Arindom Datta**
   Executive Director & Head
   Rural & Development Banking/ Advisory Rabo India Securities Pvt. Ltd.
3. **Mr Prabhjot Sodhi**
   Head - Circular Economy
   United Nations Development Programme (UNDP)
4. **Mr Roshan Lal Tamak**
   Executive Director & CEO
   Sugar Business, DCM Shriram Ltd.

Technical Session 2

Sriparna Sanyal Iyer
Vice President

Infrastructure Professionals Enterprise Pvt. Ltd.

We have been implementing the DFID funded programme which seeks to amend climate issues within NREGA. NREGA is the world's largest social protection program which allows 100 days of wage employment to anybody who demands unskilled labour. India's NREGA is seen as a big contributor towards the Nationally Determined Contributions (under the Paris Agreement) but little is known about how to do it.

In this project, i.e., the Infrastructural Climate Resilient Growth (ICRG), we are piloting this approach in one of the three blocks in the states of Chhattisgarh, Bihar and Orissa where the focus has been on improving the planning and design of NREGA structures, specially endorsed for water conservation and water harvesting so that there is an improved irrigation system and water availability.

A big criticism of the NREGA program in general is the durability of NREGA structure. The structures that are constructed fall into disuse within 2 years or so. Therefore, we are looking at diversifying the livelihoods of those beneficiaries who depend on these structures from enhanced farm crops.

The bases for our intervention in embedding climate within NREGA are based on two documents.

- The first is a climate modelling document developed by IISc, Bangalore. We have Climate Modelling Data of the certain blocks till 2050 which will tell the propensity of floods, droughts and the combination of both.
- The second document which is known as the Vulnerability Assessment where we look at biophysical and socio-economic factors (six factors) and assess the vulnerability of those blocks.

Combining the modelling and the vulnerability assessment data, we came up with Adaptation Packages. For 103 blocks we have recommendations that have come out of this big science that we have brought down to block level in order to examine the tendency for drought and sensitize those blocks towards climate issues and diversification.

Our biggest success has been in Odisha where we have non-financial MoUs with the Odisha Livelihood Mission. At state level, there is a convergence committee which works really well because at that level we have all the decisions as to which department is putting and how much money around a NREGA structure.

We do an assessment of the schemes at the planning level and programs at the GP level. At the resource level, we look at exactly what needs to get done. As an example, I went to one of our villages in Keonjhar after

two years and I did not recognise the place because it had changed so much. We had a land development intervention there funded by NREGA through the Orissa Livelihood Mission and the convergence was facilitated by us through the Integrated Tribal Development Agency. There has been a lot more investment in the improved agriculture seeds and equipment. 80 households have benefited from the program. 46 acres of wastelands have been developed into productive lands. An investment of 42 lacs has been leveraged out of which only 6 lacs have been the NREGA investment. Recently, ITDA, AOIC and OLM have picked up this area as a focus for all their programs. Crops which were impossible to be grown earlier are now being regularly grown there. One of the questions I asked ITDA and OLM very recently is, **"What is it that this project has done which they were not doing earlier?" They said that it was this community mobilisation. The awareness that people have on climate issues, the fact that they are demanding certain kinds of infrastructure under NREGA are surely going to help agricultural livelihoods in the long run.**

If you want to scale up the ICRG approach, these are some of the numbers you can look at and it's been very difficult to break into the Ministry of Rural Development unfortunately. But after 3 years into implementation, I am happy to announce that a section of this year's Master Circular does include a section on climate change. It does include a framework for monitoring the climate outcomes of NREGA and I think the credit should go to my program. I just wish that the uptake was a little bit earlier; we would have seen more similar interventions.

Simrat Labana

Project Management Specialist

Food Security Office, USAID

USAID has two projects which look at building the resilience of communities. They both have a different set of partnerships and a slightly different approach.

The first project is about reaching out to 80,000 farmers in 9 states of India, more specifically, 31 districts in partnership with a private sector company called Skymet who has co-invested in the project. It's an equal cash partnership between the USAID and Skymet. This kind of interesting model will come up more and more as farmers demand solutions for climate change, climate variability and are looking at informed decisions for their farming operations. **In this project, what is also unique is that the private sector company has not partnered with the sub-awardee to implement it. They have their skin in the game. It's an in-house team which is implementing this project all over. Their drivers for doing this are two-fold. One, they want to learn what they experience in the field, and two, the learning that they get is what they want to implement in their business models.** For USAID, this is an interesting model of

investments because we see partnerships which will last beyond our level of funding. So our hope of partnering with the private sector is that the investments we make are purely catalytic. Once that pilot has been implemented, we expect that institution or that agency to take it on.

The second project is CCAFS which is an adaptive research based organisation. In partnership with them USAID is implementing a Climate-Smart Village project in 3 states, viz. Uttar Pradesh, Madhya Pradesh and Bihar reaching out to about 12,000 farmers. There are adaptive research based interventions in farmers' fields. BAIF, a community mobilisation organisation, is implementing programs on the ground. Though the project does not have as strong a digital extension outreach, this model is equally effective in terms of climate resilience. **When we go and talk to farmers, we take note that the need for climate information or adaptation is very rare.** However, there is a very interesting aspect in this project. In a tribal district called Betu, Madhya Pradesh, the adaptation and skill-building requirement is entirely different as opposed to farmers in Bihar or Uttar Pradesh. Because it was a tribal district, women farmers were more interested in coming up or the society there is such that women were at the forefront of our intervention. Therefore, close to 3,500 farmers were women tribal farmers.

We have found that co-investments were possible by way of local government or national flagship programmes. So they were able to tap into NREGA for building small structures. **These are all models of co-investment that every project has to look at for sustainability's sake.** We often implement multi-locational projects, multi-partnership projects which can be a challenge at times. In our experience, we have found that whatever little communication issues that do arise, one should always try to have coordination meetings at least, annually or bi-annually and take the partnership forward. **Half-way through project implementation, we have found that it would be good to start inviting external stakeholders for co-investments as well rather than, in your concluding workshops,** when you say, "Oh please come and do take it forward". Those have been our learnings, and I hope the project does well beyond the funding as well.

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Elizabeth Gogoi
Senior Consultant
Climate Change Portfolio,
Oxford Policy Management

I am going to focus on one program that we are recently completing. It is a 5-year programme, funded by DFID, which is being implemented in 10 locations, both national and sub-national including 6 states in Indian in partnership with a huge number of organisations across the region. This is an example of multi-partnerships and multi-sector collaboration. It has the broad focus of mainstreaming climate change adaptation into the developmental process and planning process for which we had to find financial policy planning entry points across those 8 nations. We are proud of some of the successes we have had.

We have leveraged 1.2 billion USD for adaptation which is a 44 return (1:49) on the original funding from DFID. We can measure success in terms of impact on vulnerable populations. For example, 3 million people have benefited from the real-time weather forecasting and early warning system in Odisha.

Today, I am going to give a very broad overview on climate resilience in agriculture which has obviously given Odisha a big part of this program. The mandate we focused on in the program is the resilience aspect of climate-smart agriculture. We have implemented different ways of scaling up CSA. **We developed an approach that focused on different phases of the agriculture value chain where we used a different set of entry points - institutions, finance, information and knowledge management, and technology and asset management.** For an instance, we added climate-resilient agriculture value chains in seven locations across the country. **We were interested not only in introducing and institutionalising this type of analysis and decision-making within the government but also in providing an evidence-base which can identify what actions and changes we needed.** For example, **with the Assam Agricultural University, the analysis studied the value chain of a whole variety of crops. This led to the government adopting a detailed roadmap for driving ginger crop, and also to establish a framework for creating seed banks.**

We have also worked with a number of governments such as Bihar, and in Pakistan and Bangladesh to integrate climate-change into various overarching areas of agriculture policies. One example that we used to try and promote climate-resilient agriculture at scale is a work in Maharashtra with farmer producer companies (FPCs) that would serve as an entry point for us. Promote a huge number of FPCs, they'll be able to share the best practices. Promote value addition and fetch a better price through collective bargaining. But the government has itself noted that the large majority of these FPCs have failed to grow robustly since the initial push. We agreed with the government that we need to focus on this. We undertook an evaluation of 21 FPCs in

4 districts and built a partnership with a World Bank program on climate resilient agriculture, and then we identified how to improve the capacity of knowledge on FPCs. We also work with institutional finance to help us understand the information gap FPCs face, when to make decisions or when to extend the credit. We tried to address this clear disconnect between the FPCs and the IFLs in terms of the information barriers and capacity gaps. **We developed an FPC rating tool to allow financial institutions to systematically evaluate the factors that facilitate or restrict FPC's business operations and training readiness.**

One criterion that is linked to climate-resilience included a number of indicators, such as how many climate resilient crops were being cultivated, how many technologies could be considered climate resilient or water management technologies. Across all the criteria, there are also gender-related indicators. **This tool has now been adopted by the government in the World Bank program and 619 FPCs have been evaluated by using it. We have also tried to roll it out through training with FPCs and local banks who are using the tool to understand what climate-resilient agriculture means.**

We have developed model FPC business plans, and now we are trying to roll it out to make sure this has maximum impact. We have also emphasized a part of the program on documenting learning.

Our partnership with other organizations has brought success. No organisation can implement climate-resilience agriculture at scale on its own. We have really had to tap into other people's local networks and specific expertise. We also really try to forge partnerships and work with people who are not like us, such as non-climate change organisations. However, the key thing here is to recognise that there are limits to collaboration and we must recognise the interest, incentive, internal constraints to forge those collaborations. **In a 5 year programme, it was just enough time to build those partnerships, and I think less time is very hard. The more time that you have available allows you to invest in those partnerships. A part of that is very simple - it is making sure that everybody else can also take credit for the work because it helps them build their own local reputation and contacts.**

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Panel Discussion 2

Dr. Ashok Dalwai, IAS

CEO, National Rainfed Area Authority & Chairman Committee on Doubling of Farmers Income

In order to achieve sustainability, having robust institutional mechanisms is particularly important. So, you must be having some experiences about building institutions. It could be small, capable of scale-up. We are all talking about building partnerships with the purpose of attracting investments for promotion of climate-smart agriculture.

We are talking about ensuring sustainable productivity and production because that is one of the commitments we have made as part of the sustainable goals. That has been done keeping in mind the growing population. A large number of people who are poor and a large number of people who are not poor have no access to nutritious food. So, we need to keep this in mind while practicing climate smart agriculture. The first point I want to make is that **if we can find value where people are concerned, then there is greater incentive to provide support to the delivery system.**

The second point we are trying to address as part of climate smart agriculture is mitigation, that means reducing the quantity of greenhouse gasses emission. That is where our intervention will be required.

The third point is, we must see that resource-use efficiency is maintained. **How do we break 'cafeteria technologies'? Because it is an extractive system of production in agriculture and elsewhere that contributes a lot to greenhouse gas emission. If we want to achieve climate-smart agriculture or green funds, first we must adopt the circular economy that we use again and again instead of one-term use of resources.** If that is to be done, can we all together identify where the wastes are happening? **Today, the waste or the food waste happening across the globe is so much that the greenhouse gas emission from the food wastage is more than the quantity of greenhouse gases that other domains are producing.** One of the instruments shows that if the greenhouse gas emission from the food wastage in the world is counted, that domain will rank at number 4 in terms of its contribution to climate change.

Why is food being wasted? Only because we do not have good agri-logistics skills. We are growing not for consumption but to waste it. **India itself is an example where a 2013 study shows that 100,000 crores worth of agricultural commodities got wasted because of poor agri-logistics.** The private sector along with the public sector can play an especially important role in strengthening agri-logistics, such as storage, transportation, warehouses, aggregation platforms, etc. What do we do for that? If we are talking about crowding

investments through partnerships, the first thing we should do is to adopt and revise policy framework where the private sector can play its role. Then, the public sector and private sector should come together to fill this gap for producing more and charging an ecosystem in terms of resource use. This is one way we should look at.

All of us are sitting on the delivery side. Then how do we arrange our own system? The NGOs, the public sector, the private sector, and everybody else who wants to do something. How do we create a platform to be able to have an efficient and effective delivery? We together go to the people because they are receivers. Many of the time we fail to recognize their partnership, their stake in the process. That is why the **delivery system and the receiving system should understand each other and build a platform to bridge the gap and work together for better efficiency.**

Another point I would like to make is that many of the time we create institutions, but the institutions do not operate properly because all the partners never understood their respective roles. Let us take a very concrete example for effective delivery of extension services to practice climate-smart agriculture, agro-ecology and efficient use of resources. Since 2005-06 there was a policy called National Agriculture Technology Project or ATMA – Agriculture Management Technology Agency. At the district level, all the public sector agencies, the private sector agencies and the NGOs came together and prepared an action plan for village level, block level and district level. During the pilot phase in Madhya Pradesh, it showed fantastic results. The moment we tried scaling it up, what we saw was that the action plan went from top to bottom. So how do we ensure that the people who come one after another understand the importance of this convergence of efforts, thoughts and minds. That is the challenge we must address.

And last, of course, is the technology. The technology is very neutral – scale-neutral and people-neutral. Since the situation is overly complex, how do we bring in that technology deployment? We have enough technologies today and those are commercially viable also. But then, various technologies are not known to everybody, not accessible to everybody across the country. What is done in Delhi may not be known to someone in Karnataka. What is made in Andhra may not be known to someone in Uttar Pradesh. So, we need a technology online platform, a simple portal, where technologies can be accessible by everyone from any corner of the nation. We will be able to see whether the same technologies are applicable everywhere.

I believe it is possible for the public sector and the private sector to come together if we break the barriers. One of the first experiments that has started is to have a group of secretaries. Every year the secretaries of the related domains sit together and see where the overlap is, where they can put their thoughts to, etc. It was one of such groups of secretaries' meetings which thought about promoting micro-irrigation at a larger scale apart from budgetary allocations. So public-private partnership is possible to accelerate climate-smart agriculture.

Arindom Datta
Executive Director & Head

Rural & Development Banking/ Advisory Rabo India Securities Pvt. Ltd.

I will be making three points and they are related to the issues of stakeholders working together in climate-smart agriculture. I work in RaboBank but I won't talk about RaboBank alone. The first point I am making is that we need to teach people climate-smart agriculture and climate change. We used terms like climate-resilience, adaptation, mitigation, climate-smart, climate issues. These are not easily understood by stakeholders. It is extremely important to really appreciate this point. We need to talk about water issues, soil issues and weather issues. **The biggest problem is all the research papers on climate-smart agriculture is far too technical for other stakeholders to understand and appreciate what's going on. So, we really need to make the terms more understandable for every stakeholder.**

The second issue is unlike the Netherlands, Germany and the West, the government, the public sector, the development sector, the research and the private sector, it's extremely difficult for all sectors to come together for climate issues, specifically in agriculture. This is extremely important and is related to the point I am going to bring. We have predominantly smallholder farm systems, approximately 129 million smallholder farmers. As Professor Gulati mentioned, climate issues or climate solutions start from the seeds. In traditional farming, the farmer is himself or herself responsible for bearing all the risks of production. All the other players in the supply chain including the retailers, the processors, etc. - they come into the picture only after the producers reach the market, and participate in the other risks like, market risks, price risks and all of those. But the production risk is greater, and we are telling the farmers to change his or her farming practices to get the new seeds. **We really question ourselves that the entire onus of climate-smart agriculture is ultimately put on the farmers in the India context, mainly smallholder farmers. If we get the large private sector players, the result is the financial institutions and the banks to participate in that risk of changing farmers' behavior and farming practices. It is going to be a herculean task for all of us.**

The last point is we just heard a presentation on cropping. The only way and that is how we are grappling and finding solutions to climate-smart agriculture across the globe. Technology is a key because there are far too many data points. **It is far too complex for human beings to be able to solve the problem of climate change. Without technology crunching the data meaningful for different stakeholders, we are not going to solve this problem.** All of us, be it the government, the banking system, the bilaterals, the private sector, the earlier we imply technology, the easier it will be for us to find the solution. Otherwise, it will remain just far too complex.

Prabhjot Sodhi
Head - Circular Economy

United Nations Development Programme (UNDP)

It takes all about partnerships. We look for an interest and an influence. Every stakeholder plays a great interest and a great influence. And this interest and influence are sometimes missed out by the people who are basically implementing. And these go across three large stakeholders. There are some primary stakeholders who are ultimately getting affected. There are secondary stakeholders, there are intermediaries – we all are there. Also, there are some key stakeholders, financial institutions and the private sector who play a significant role in the system and we all approach them.

Image credit : Ricke 76 on Unsplash

I want to raise two points with regard to stakeholders' participation. Number one is that **we are trying to build a trustworthy relationship with our stakeholders. Often, we miss a point and those are their branding, ethics, problems and systems. We are more concerned about what are my priorities, my ethics, my problems and my system. When it comes to multi-stakeholders, it becomes more difficult. And this is what is the key issue which builds and breaks the trustworthy relationships.** It is not one-time but a continuing effort. We do not understand each other's dos and don'ts. If there is a workshop going on and you do not put all the stakeholders' logos that is not acceptable. So, these are just a set of thoughts I thought to set it out to you.

The second point I want to make is rectifying the conflict of interests between partners and stakeholders. How we as partners are leading to effect and create it into a conflictive situation of interests. Now there will be good or bad. My good can be your bad and vice versa. You know, that sort of combination that surrounds this. So identifying this sort of stakeholder opponents and oppositions is something I will leave you today to discuss. Every day of my job, I do this analysis. Every minute before I take a decision on the work I do. I work across governments. I work across international organizations. I work across grassroot organizations making it a correlation between three.

Roshan Lal Tamak
Executive Director & CEO

Sugar Business, DCM Shriram Ltd.

I represent D.C. Shriram Ltd. and in the sugar business we have four sugar plants covering about 300,000 ha area. The number of smallholder farmers is approximately 200,000. This is the scale of our business in Uttar Pradesh. We have created a multi-stakeholder partnership with multilateral agencies like IFC, Corporate like Coca Cola, NGOs, technology providers, etc. Apart from them, there is the Govt. organizations as well like Indian Institute of Sugarcane Research and Sugarcane Breeding Institute, all in a single platform.

As far as our learning goes, we have overcome some doubts to run this partnership. Firstly, as the prime stakeholder of the partnership, **we should be clear about our responsibility** because we have to run successfully. **Secondly, we should clearly identify what we expect from our partners to bring in** this platform. **Clear-cut goals and clear-cut responsibilities** are the first requirements. **Thirdly, everybody should participate physically and financially.** Otherwise, there will not be commitment. So, choose your partners carefully. They should be credible; they should be capable.

It is not enough to carry a partnership if your organizational values are not aligned. There has to be some commonality, some threads of similarity which are aligned with the organizational values and the objectives. Only then, the alignment will be ensured, and the partnership will work. However, what happens ultimately? If you do not take up the activities, the impact will not be there, the effectiveness will not be there. **Choose a few interventions but implement those on stake with effectiveness to create impact. That impact will certainly enthuse every stakeholder and will have cascading positive impact.**

From my experience what I have seen is during the initial phase, **there is a lot of enthusiasm amongst the partners. Over time, it fades. So, in order to keep the momentum on, there should be a robust governance mechanism, at least at three levels – operational, managerial and strategic levels. Only then, you will be able to keep the momentum on.** We have practiced it and created the impact. We have been able to save 275 million liters of water in the last 3 years in our agricultural operations which has been authenticated by the Indian Institute of Sugarcane Research. Slash burning is a big issue in agricultural crops. I can say proudly, 99% sure, that in our area growers do not burn slash. This was possible due to continuous capacity building, and implementation of all the incentives in project mode. As I mentioned earlier, there has to be a definite road map. Road clarity should be there. Equitable resource allocation should be there. D.C. Sriram believes that sustainability should be the core of a business.

GLOBAL AGRI CONNECT 2019

CONFERENCE PROCEEDINGS-SESSION WISE

Session – III

Sustainable Value Chains as Cases of Responsible Investments

Technical Speakers

1. **Mr Nitin Gupta**
   Vice President
   Olam Agro India Ltd.
2. **Mr Manish Gupta**
   Supply Chain Coordinator
   Better Cotton Initiative
3. **Dr. Ravi Chandra**
   Value Chain Expert
   United Nations Development Programme (UNDP)
4. **Mr Guna Nand Shukla**
   Associate Director
   Agriculture & Natural Resources Practice, GRID, PricewaterhouseCoopers Pvt. Ltd.
5. **Mr Varun Khurana**
   Co-founder and CEO
   Crofarm
6. **Mr Kunal Prasad**
   Co-Founder and Chief Operating Officer
   CropIn Technology Solutions Pvt. Ltd.

Panel Discussion

1. **Mr Siraj Chaudhry**
   Managing Director & CEO
   National Collateral Management Services Ltd. (NCML)
2. **Mr Sudhakar Desai**
   CEO
   Emami Agrotech Ltd.
3. **Mr Aleen Mukherjee**
   Executive Vice President of Business Strategy
   NCDEX & Chief Operating Officer, NICR
4. **Mr Murli Dhar**
   Director
   Sustainable Agriculture Program, WWF-India

Technical Session 3

Nitin Gupta
Vice President
Olam Agro India Ltd.

We are operating in 74 countries having a farmer base of 2.3 million farmers - the world's largest agri asset base in the world. I will present 3 initiatives which Olam has taken in different geographies which are very close to my heart. I want to tell you about why we are talking about sustainable agriculture and what is climate smart agriculture. In Olam, we use 're-imagining agriculture'. By 2050, the global population is going to cross the 8 billion mark. To feed the population, we need to double the foodgrain production, but the way agriculture is taken up today, it has led to the depletion of the natural resources, be it soil or water. Moreover, we all are polluting the environment. In a way, agriculture production is going down.

Agriculture is suffering from climate change. To substantiate that with some of the facts here, 7% of the world's freshwater is consumed in agriculture. We can clearly see how we are consuming the water and that is how the water tables are depleting. We can clearly see that in countries like India, Vietnam, Thailand, Indonesia who are the major producers of rice and these places are mainly where the water tables are going down. With global warming, with every 1 degree rise in global temperature, the yields of most of the crops will come down by 5-10%. Every year, in one or the other geographies, either there are floods or droughts. Because of climate change, there are also lots of insect and pest attacks, fungal and bacterial attacks. Ultimately, it is leading to the decline in agriculture production. In one way, we must increase the production but because of what is happening, production is going down.

Agriculture itself is a contributor to climate change. In the case of rice, we do a normal, traditional way of growing paddy where we flood the field throughout the season and then grow the paddy. You put fertilisers and pesticides into the flooded fields, which creates anaerobic condition that generates methane gas, one of the biggest contributors to global warming.

There is a need to restart or rethink or reimage or redoing the way we are doing agriculture. Keeping this as a base, **I would just like to quote three brief examples in the case of rice. One is laser land-levelling. If we can do that, we can reduce the emissions by close to 1%. Second, better inputs in the forms of the better type and quality of pesticides, chemicals or fertilisers, the time of using and the dosage of using. This can reduce the emission of methane gas and other gases by 10%. And third is the alternate wet and dry method. By alternate wet and dry method, you can reduce emissions by close to 30%.** There is no need to grow rice by flooding the fields throughout the year. Normally what happens in the case of paddy fields is the farmer leaves the straw in the fields itself. Either they burn or leave the straws

in the field itself. That too leads to a lot of greenhouse gas emission in a particular way. It is especially important that those straw or wastage which are left in the field must be removed.

Olam, in different geographies, including Thailand zone, in ties with UN and IRRI, has developed the SRP - the Sustainable Rice Platform. There is a total of 41 indicators and 12 platforms and we have to abide by all indicators and platforms covering all the aspects of doing a farming practice in SRP which includes the soil condition, the health condition, the crop point of it, the water aspect of it, the yield aspect, etc. Olam has started the SRP programme in Thailand where we have close to 5000 farmers who are a part of this programme. We have just started the same in Vietnam. In India, we have recently launched that in the Bulandshahr region. Some of our partners include IFC, Western Sydney University of Australia, Syngenta. **We have also developed an app called Agri Central App wherein close to 4 lacs farmers are registered right now. Those farmers are given the real time information. They are provided the right kind of information about the climatic conditions including temperature, moisture, rainfall conditions.** In addition to that, they have been given different news too, like, the marketing aspect and what is happening around.

About the second project, Olam is working in two countries in Africa. Globally, the cocoa production is close to 4 billion metric tonnes, that is 70% of the produce. Olam is directly working with the farmers in IVC- close to 1 lakh farmers. **We have tried and developed a completely sustainable and traceable supply chain. We are providing training to the farmers in terms of adopting the right kind of package and practices over there. We have developed an in-house platform called Olam Farmer Information System (OFIS) which teaches geo-technique of the farm. It gives real-time information about the crop cultivation.** Whatever is being produced in IVC is brought to Singapore wherein we are converting that into cocoa products like cocoa powder and finally bringing that into India and selling it to some esteemed customers. **There is complete traceability in the supply chain.**

The third example that I would like to quote is the case of cotton. We have developed a complete supply chain and an ecosystem of cotton. **On one side, we are working very closely with the farmers in terms of improving the yields, reducing the cost of inputs, developing the right kind of skill set and capacity in the farmers. On the other side,** we are developing a complete community base by building schools and hospitals and developing infrastructures, and **by linking the farmers to the market materials and the right kind of customers so that they can sell their produce directly to them.** In a nutshell, when we are talking about CSA or sustainable value chains, this is how Olam has set up examples to **develop sustainable and traceable supply chains.**

Millennial generations are very particular about their food habits and when it comes to the food safety and food hygiene part of it, they are ready to pay any price for it. We need to develop whatever we are doing in line with the customers' requirements. If those kinds of market linkages are there, then the whole supply chain can be sustainable and traceable.

We as Olam, feel that, there are four pillars of sustainable supply chains, one is, the farmer- by building the right kind of capacity, second, backing them up with the right kind of technology, third, bringing the right institutional framework and finally, the market linkages. If these four pillars are in place, the supply chains can be sustainable and traceable and feed the 10 billion-strong population that we touch by 2050.

Manish Gupta
Supply Chain Coordinator
Better Cotton Initiative

Since morning we have been listening to the challenges in the farming practices and some solutions. Many companies are working towards more solutions, so is BCI. BCI is the joint effort ranging from the farm to the fashion industry, working together to make cotton production more sustainable. The BCI was born out of the round table discussion that was done by WWF in 2005 and some designing brands decided to address the challenges which lie in cotton production.

Challenges like child labour, smallholder poverty, pesticides, water management, soil depletion we have been listening and we are, too, not left out of these challenges. Cotton becomes more important at scale because when we see the volume, these challenges become more alarming. Cotton is grown in 85 countries with a production of 83 million metric tonne per annum which is affecting the lives of 250 million farmers. When we see the volume, cotton becomes more important. It has more opportunities for improvement. When we see the improvement, we get the opportunity to place the impact on it. BCI is addressing those challenges and working on the principles which are directly addressing these challenges.

- Promoting water stewardship,
- Crop protection,
- care for the health,
- soil testing,
- nutrition,
- enhancing the biodiversity for better the soil health,
- Care for the fibre quality so that farmers can fetch a better price for their yield,
- Promoting decent work to address child labour and to ensure farmers' safety and health,
- Disposal of chemicals and residuals,
- Management practices.
- Increase awareness of the farmers regarding accounting, etc.

All of these can promote decent work.

BCI has been working with 2 million farmers since 2017 and other partners. In India, we have about 24 implementing partners. All of them are working in the field with the farmers and building their capacity. BCI's existence is definitely for the producers or farmers, the environment and the sector's future. There is, now, less impact of cotton production on the environment through our farmers and the sectors get the continued supply of produce. **BCI set its goals in 2009 when it decided to make cotton production better for its producers to transform cotton production worldwide by developing better cotton as a more sustainable mainstream commodity.**

BCI never wanted to be limited to the niche, to just input or supply; it always wanted to be a commodity product. So, it set its goal that, by 2020, 20 million metric tonnes of cotton will be being produced as a BCI product. BCI's goal is not only on the production side, but on the sourcing side too. 10% of 25 million metric tonnes will be sourced by retailers by 2020. We will be engaging somewhere around 5 million farmers worldwide. In 2017-18, BCI reached out to 2.2 million farmers. 2 million farmers got the license to sell their cotton as a BCI product which was produced in 21 countries. 10% of world produce was a BCI product in 2017-18 looking at the distribution of 2 million farmers. In India, we have 575,000 farmers when we talk about production. India's contribution was 572,000 metric tonnes of cotton in 2018-18.

The beauty of the BCI Programme is that it is an industry driven programme. It is a membership organisation; we have retailers, banks and supply chain actors, which comprises the largest membership base. Retailers are the drivers. They place the requirement of better cotton to their supply chain that translates to the farmer. They are at the forefront of building capacity for the farmers. It is a growing community. In 2009, we had some 40 members and now, we have 7000 members; 43 members of civil society organisations; 30 producer organisations; 1458 suppliers and manufacturers who are our supply chain- buying and selling better cotton; 139 banks who are the drivers of this programme putting up the support to build the farmer; 17 associate members. Apart from that, we have some users who kind of use our garments and this number is close to 4000. This year, we are celebrating the 10th year anniversary of BCI and we would like to thank our members and partners who have been a part of our journey. **We have grown from 40 to more than 7000 members; 6 brands to 139 brands.** We would like to thank those members who have made this journey highly successful.

Image credit : Deepak kumar on Unsplash

Dr. Ravi Chandra

Value Chain Expert

United Nations Development Programme (UNDP)

I will talk about the UNDP experience of working in the farm space in the last 4-5 years. Our focus is on capacity building and ecosystem strengthening. Investment in ecosystem strengthening and capacity building, in general, is very less and we would like to have more investment in it. The focus of UNDP in the last 4 years has been on post-harvest management because the market access is where the value-addition of farmers happens. That is why **we have created two kinds of farmers - women business managers and women sourcing managers. After being trained by the implementation partners for 12 months, they are totally engaged with buyers.** So many buyers are brought out to the farm spaces-aggregation spaces. We engage with those buyers very proactively and all the works are done by women.

One of the important things is, these two cases of women sourcing managers and women business managers have been tried at scale. Around 80 collectors in 3 states have been supported through this model. Managers certify the women business managers. They take the manager certificate which can be a tradable commodity for moving upwards. The focus is entirely on women because most of the farm works are done by women. However, we are not focusing enough on training women on business as farming is male dominated. Basically, what this model does is women can do the business more successfully. More than 60,000 tonnes of market linkage happened. 60 crores for market linkages were facilitated.

A recent study has been done on climate change effects on forward actors of value chains. By forward actors, we mean, when the harvesting happens, what happens to the different processors, traders, etc., what different prices are set. When we started commissioning this study, we found that there is a little literature on how forward actors cope with climate change. In the study, losses were quantified. **In rice millers in Bihar and UP, the total value chain losses in the post-harvest phase from farm to market is around 300 crores for wheat, 80 crores for rice, for maize it was around 90 crores, 130 crores for tomatoes and 600 crores for potatoes. Who are bearing these losses? The losses are borne by farmers. Losses for forward actors are transferred to the farmers. The government and policy makers have a role to play.** This information gap is the first thing that we are trying to address.

Another key learning is that the breaking of gender-barriers in the market space is possible.

We need long term market investments in farmer producer companies, if you want to bring a market case where the FPO determines the price of the commodity than a buyer determining the price of the

commodities. The idea is to reduce the cost of crop cultivation and increase the value addition. We need to handhold FPOs in terms of the compliances of farmer producer collectives like GSTs, mandi licenses, etc. which are especially important. That is where most of the effort from the donor, the buyer and the stakeholder sides should go.

Guna Nand Shukla
Associate Director
Agriculture & Natural Resources Practice, GRID, PricewaterhouseCoopers Pvt. Ltd.

I will present a very small work that our firm has been doing with the support of DFID and the Indian government in a few districts of Bihar. It is a project called BAGR (Bihar Agriculture Growth and Reformation). I belong to a firm called PWC. I will very briefly introduce this program of ours. I represent a team called Agriculture and Natural Resources which is having a dedicated team for agriculture. We have a few specialists to talk about agriculture here. I will tell you a bit about how this program was initiated.

The state of Bihar like many other states predominantly has smallholder farmers, almost 85%. The landholding, a major indicator, is 0.39 hectare per farmer which is much less than the national average of 1.08 hectare. I will leave only these two indicators to the house to imagine what practical issues farmers are having. We cannot aggregate the land. There has been very limited land consolidation. That is why the way out is to aggregate their operations. There is this concept of aggregating farmer operations through FPOs, FPCs, producer groups, and many such groups which we have been talking about. This initiative has been going on from 2015. We started a collaboration with DFID and the Government of Bihar. We are supporting them in implementing the roadmap plus in forming FPCs. We are working in around 25 blocks and 11 districts. We have formed around 3,400 producer groups and then fraternised these groups into FPCs.

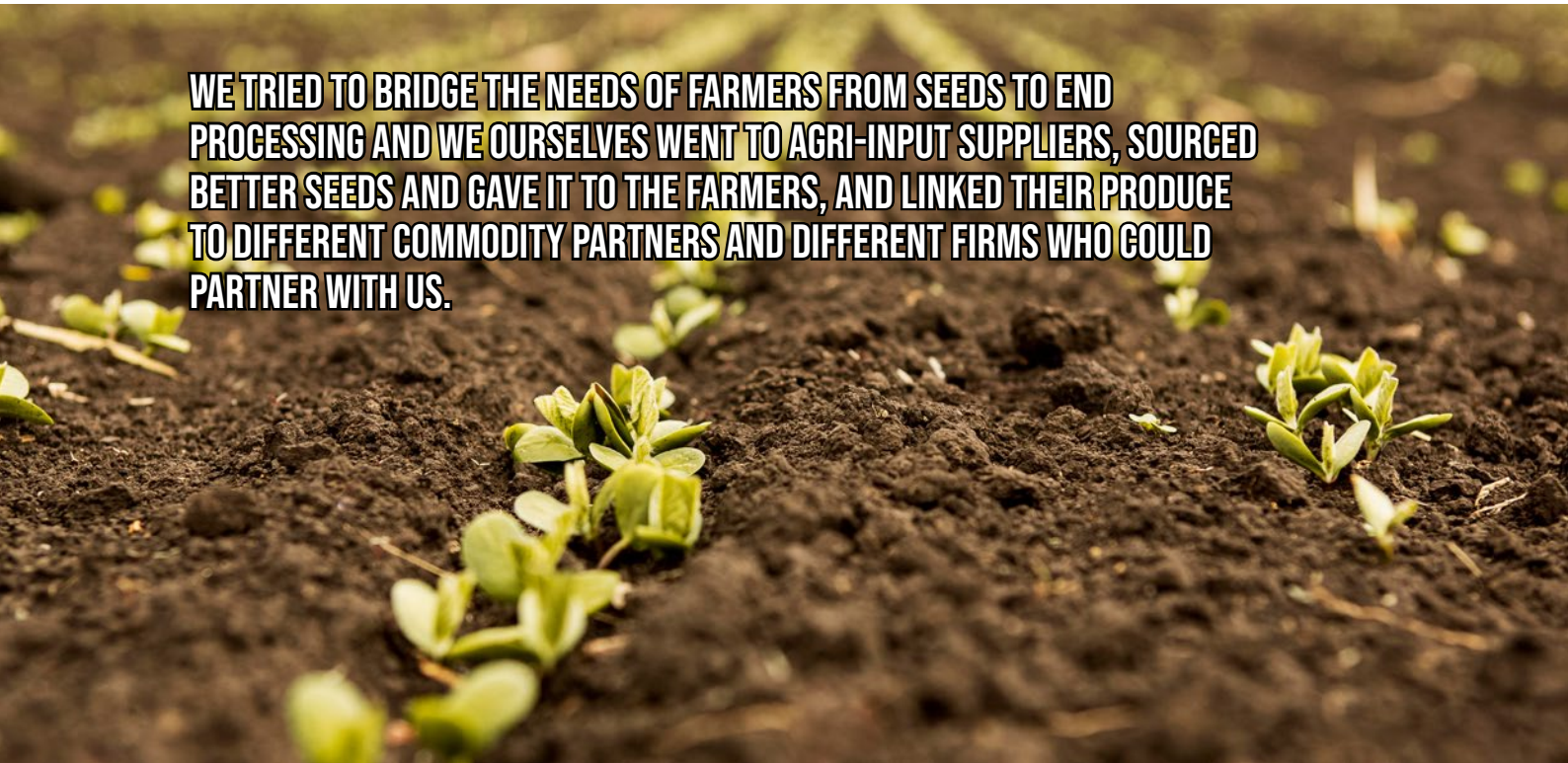
When we initially started thinking about the approach of forming FPCs, the general idea was, let us raise the firms first, the farmers will get into it. We did it the other way around. We formed producer groups (PGs) constituting 25-30 farmers and made them do commercial transactions first. This was important for us because we did not want our PGs to dive on their own. **What we learnt from the field was that the farmers come together for a scheme and for technical and franchise assistance, and they disburse when that glue of financial assistance is off.** We started a concept where there is no subsidy from the government to the farmers to form their groups. Farmers bring in their own share of capital; they infuse their own interest capital and do transactions. We were able to form around 20 FPCs as of now in 25 blocks across 11 districts in Bihar

along with multiple other things. To portray the bigger picture, we were able to touch the lives of 75,000 farmers.

I will be showcasing just one case study. Earlier, all our farmers used to operate individually. There were lots of smallholdings, a lot of dispersion and convoluted supply chains. We tried to bridge the needs of farmers from seeds to end processing and we ourselves went to agri-input suppliers, sourced better seeds and gave it to the farmers, and linked their produce to different commodity partners and different firms who could partner with us. We partnered at all the stages. At the input stage, Krishi Vigyan University came to take their seeds. That partnership led to better products, better products led to better productivity and then to better commodity houses. **This is the model we have been trying to implement - aggregating farmers without any subsidy, getting the work done together without any financial assistance. technical aid, and capacity building.** At times, our PWC team is the only one that was given technical assistance.

We were mainly able to reach forward and backward linkage partners. Our women processing groups are producing turmeric and selling to other areas. A few of our FPCs are now registered vendors to ITC - majorly wheat and small quantities of soya. We have been trading in a big way with Big Haat too. IFFCO has been our fertiliser supplier. The main thing we are driving is aggregation. Apart from that, we have done policy reforms. In making sustainability a core for farmer organisations, we have learnt to aggregate them in a proper way without showing them that we would give X amount of support only then we would hook up together. We need to orient them commercially.

After having done this with 20 FPCs, what we want to do next is to make a federation of FPCs in Bihar. Government has been creative enough to support us on this. And now we are trying to link these FPCs institutionally to formal credit banks. We were able to do it with Samunnati. Other FPCs are now going forward and we will support them with formal channels and link them to agri-tech. **There has been a lot of talk about technologies, but until the recipient does not accept the technology, these technologies are all just difficult for them to get.** I welcome all of you to collaborate with these FPCs, and all forward and backward linkage partners.



Varun Khurana
Co-founder and CEO
Crofarm

I run an agri-tech start-up from CroFarm. We are in the perishable supply chain; so by and large it is fruits and vegetables. It is a B2B supply chain. We are digitised of late. The goal of this supply chain is manifold. One is to reduce the demand-supply gap, both in terms of quality and quantity. Second, in the supply chain, we see wastages of over 50%. What we have been able to do is to bring this down to at least 3-4% in our supply chain. In summers, it can go to 5-6%, and in winters, it could be 3% only considering the way the whole system moves if we serve the small and medium businesses. So, by and large, you have kirana shops, you have fruits and vegetables, thelewale, so on and so forth. We have 3 distribution centres in Delhi NCR and more than 2500 odd retailers on the platform. We serve over 50 retailers every day, moving 40-50 tonnes of produce on our system on a daily basis. Overall, clocking 40-50 crores annually.

What makes this system very, very unique is the fact that we are dealing with perishables. The challenge of dealing with fruits and vegetables is your propriety is sitting on a time bomb. It is degrading with time. The more time the produce stays in your system, you are impacting its freshness, and the likelihood that you are giving the worst quality to your retailer increases. That is where we use technology, mostly prediction-based technology to make sure that when the produce comes, within a couple of hours, it just goes out. It spends very little time within our distribution centres and that is how our wastage levels is significantly lower than what exists in the market.

One other good thing is that a lot of other speakers have talked about the traceability aspect. This is one thing which has a lot of impact on the whole supply chain. Why I have said that is because, if you look at the traditional mandi system, the growers come, deposit their produce, ask, “kitna milega”, and then the produce finds its way out. What is the source of the produce, if it is contaminated or has some problem - there is no way to trace all of that. **Within our system, we are able to track every produce and farmer that comes, and that enables us to actually see which all retailers and procurers they have gone to. In case there are rejections, we are able to track that down all the way to the source and actually pass that feedback on to the grower where we can tell them, you know, today, you’ve supplied us a tonne of cauliflower, out of the total produce, we normally see 6-7% rejection but in your case we saw 12% rejection which is higher than normal. Then the farmer would give back the reasons why that happened. Thus, it pushes farmers to grow better and better and better the produce.** The entire system has enabled us to build data for the growers and to actually charge a premium.

This is very interesting. In the agri-supply

chain, we try to optimise for cost. We try to optimise for every rupee or logistic that we spend. But our learning across this journey of 3-odd years has been that people are actually willing to pay more for it. They are willing to pay more for better quality. Better quality can mean different things for different commodities. Like, in case of commodities like ladies' finger or okra, people are happily willing to pay more when it is smaller and rawer. Similarly, in case of banana or papaya, the colour is an important criterion to select a produce. If your banana is too ripe, too yellow, customers will not be willing to buy it no matter what the price is. On the other hand, if it is too green, then again, we have a challenge that it is raw. If it has the right combination, people will pay 50-60% more premium. This is what we have been seeing over the last 3 years.

One of the biggest challenges we observe in this space is consistency. In a country where climate changes, things change, getting procurement from different farmers, you see some profits- from a consumer or retailer perspective, "Your supplies are good and steady for a few days and then it declines". **What we have learned is, if you are able to control things better and make it more precise at the farm gate and deliver consistency, the premium that you can command is significantly higher. That is one of the biggest opportunities and challenges.**

Since this is about climate change and climate-smart agriculture, let me close with a few climate-related things that we see in our supply chains. We are entering winters here in Delhi and at this time, we will see that a lot of the produce will become dirt cheap. Cauliflower sells at Rs. 3-4 during winters. In summers, this goes up to about Rs. 50. I think **there is a huge opportunity where you can conquer the variances in climate by using climate-smart practices, keep the optimal quality throughout the year. This is a huge opportunity.** I would like to end this conversation on that note.

Image credit : Nandhu Kumar on Unsplash 2

Kunal Prasad
Co-Founder, Chief Operating Officer
CropIn Technology Solutions Pvt. Ltd.

We have worked with close to 200 organisations in the last 2-3 years by offering our advisory and consulting experience and helping climate-smart technologies to be adopted by the organizations. All of these organisations have come to us and said, we want to bring climate-smart practice into our programmes; programmes which would be impacting the lives of close to 2.1 million farmers. We have innovated the customized set of technologies, and the data of the past have helped us to transform the future of all the farmers who worked with us.

We have worked on a World Bank project in Bihar. Our work showcases the exact impact that technology can bring to the livelihoods of those who have never seen mobile phones; we are able to change the lives of those who were introduced to our technologies. Based on the success of the program in the last two years in Bihar and MP, we plan to scale up from 8000 farmers to 1 million farmers in the next 2 years. So that is the impact which the project brings at scale. If you want to reach out to 1 million farmers, the only way you can do that is by bringing transformational change to their lives.


Image credit : Balaji Malliswamy on Unsplash

Let me explain the result. **In the first year, the adoption was 35% because the farmers do not really adopt if you just bring the solution. The next year, when we continued the program, the adoption grew close to 85%. This happened because the farmers saw that the technology worked better when advisory was provided as well.**

We use advanced technology like machine learning and AI to look at each and every single farmer's location, to take the weather information of the next 5 days, to check how the weather is going to be for the farmer, to correlate 77 different crop varieties which the farmers are growing, to check if the weather is going to impact one crop and benefit another crop and so on. After that, we provide advisory to the farmers. At the time of sowing, information is given on whether the planting date is nearby or not, planning for fertilisers, pests and disease management which is much more of an early warning system, and the planning for harvesting. This is how we are bringing in our climate-smart solutions.

Panel Discussion 2

Siraj Chaudhry

National Collateral Management Services Ltd. (NCML)

National Collateral Management Services Ltd. (NCML)

There are many people who have been engaged in the efforts to change how crops are being produced and converted into food and being carried for the consumers, how the consumers are making their voices heard by sending a message down back to the farmers saying what they want and what they want to know about what is being produced. This is an exercise and effort which will continue, and I hope we make more success, and the examples that we heard will succeed eventually. Stories of success in various countries will grow and encourage each other to take more such initiative which should attract more commitment as well as capital in the future.

Starting with the very basic level, I think, when we are talking about investments in sustainable value chains, the questions that need to get answers are - **what to produce, where to produce, how to produce, and for who to produce. These questions require different answers because the way the things have been done in the past is what needs to be changed.** Change is never easy because it is expensive. Change requires persistence as you know getting failures is a new learning. What you heard in our conversation or presentations are stories of organisations who have taken a challenge to make those changes, how things have been done. These initiatives are gradually yielding results and it should become the source of encouragement and inspiration for a lot of other organisations.

One thing that you may have noticed is the number of people who came and spoke before us are not from the private sector like the large companies. There are a lot of such organisations whose commitments are supported by various developmental agencies at times. So, how do we encourage the private sector to invest in a sustainable value chain? It starts from what we call organizing the unorganized because that is where we stand today and the agriculture in this country to a large extent it is. There are organizations who are taking initiative to organize agricultural practitioners as well as practices.

Sudhakar Desai
CEO
Emami Agrotech Ltd.

There is a village called Pattikonda near Kurnool District, and that is where I studied my 1st standard. The tomatoes there were in distress and the price was so low that it was sold only at Rs. 1 per kilo. Just a few weeks back, the price was 60-80 rupees. That was the price of the second largest producer of tomatoes. The farmers invested 30,000-40,000 rupees per hectare. I was thinking, what the solutions were. This happened because suddenly the government changed the dynamics of commission agents, and then there were no takers. What would you do in a situation like that? If you have already-built cold storages, for example, you can take care of that issue. Or can the government give the bawarkar scheme by saying that I have a promise that this is the price you will get? And they should deposit the residual balance money to the farmers.

Indian agriculture has done miracles when it comes to such issues. We have big industries in dairy, rice, wheat, and edible oils which I handle. Our business is linked to, as a result of, oil seed development not being sustainable in India because the domestic crops have been stagnant and the needs for import were growing up. We import a lot of oils, about 150 lakh tonnes. It is a 1 lakh crore industry which makes us quite import-dependent. When we look at that, we see improvement in yields and productivity. In this context, I will draw some examples.

CSA, if it is managing agri-business by understanding all the inter-linkages, but that is where complexity starts because the linkages are too many, just like in the case of palm oil. If you stop deforestation, there are millions of workers and farmers involved in that. There should be a balance between all the issues. The major issue is productivity. CSA is for improving productivity. With the same acreage of 9 million hectares of land, where Argentina produces 55 million tonnes of soyabean seeds, we produce 10 million tonnes because of the climatic conditions. This year also we are experiencing such climatic adversities. Initially, there was a less rainfall and drought-like situation during the monsoon season which delayed the sowing of oil seeds, and suddenly, there was heavy rainfall. This kind of situation is extremely difficult to handle. Climate change is a real problem in the context of increasing productivity of oil seeds and other crops.

The problem, that comes to my mind, is it is not about the volume of the production, but the yield which is low. Therefore, the economic viability of the farming community – 'is it profitable?', I ask myself. Because after all the efforts, such as government schemes and other interventions, the per capita income of the 70% population of which 50% of the population earns 3-4 dollars per day. So, in the coming 10-15 years, massive effort is required in this direction. I do not believe that it is taking all stakeholders together. In India, we are in a situation where we have to

keep the farmers in the front of the economic activities, and the rest of us should support everything. All those efforts and models we are working on, I think, the government ... A lot of money can be brought into protecting productivity and yields.

In terms of where to invest, value chain analysis exposes the strategic and operational misalignments and misallocations of resources which are extremely important to improve metrics in agriculture. If you bridge the gap between the farm gate price and the consumer price, you get about 25 billion dollars there. If you consider micro-credits and better supply chains and land data, you get 50-60 billion dollars available to you. If you do price ... management ... NCDEX efforts to take the risk management to farmland, you can easily increase 15% of the value that a farmer or a producer gets. If you get the soil data and fertilizers right, you can increase value addition by 15%. There are some especially important government policies. We have SAFTA (South Asian Free Trade) agreement and ASEAN agreement with a number of countries. Import 45% edible oilseeds to protect the farmers ... Bangladesh can send their ... This creates a massive distortion. So, we have to take an interrelated comprehensive approach for the oil seeds growth in India.

There are various growth models related to agriculture in various countries. But, we need to design the Indian model of growth for smallholder farmers keeping the climate and the alarming situation of water resources in mind.

Aleen Mukherjee

Executive Vice President of Business Strategy, NCDEX & Chief Operating Officer

NICR

I represent the organisation called NCDEX - National Commodity and Derivatives Exchange. We are a price discovery platform, and we help value chain participants to manage their price risk. Currently, we have taken an initiative to work with the farming community at an aggregated level. We work with various farmer goods organisations across the country including 13 states in 17 commodities. 245 farmer producer companies are attached to us. On a regular basis approximately 20-25 farmer producer companies representing around 2 and half lakh farmers manage their price risk through our platform.

Saying that, I think, sustainable value chain is an important topic within the main topic of accelerating investments in climate smart agriculture as the moderator has pointed out very aptly. At the end of the day, farmers do not always take the right price or cannot sustain his economic livelihood from his farming activity. If there is going to be an investment at his farm debt, the questions are, how do we get into that? What are the challenges in those areas where we can see that the value chain thing can become sustainable, not only from the farming point of view but from the market point of view too.

In my opinion, the conference has focused more on the production side. That is why I am going to focus a little bit on the post-harvest side. Interesting presentations have been delivered. But there are some points I could not find which we also try to push. As soon as the harvest happens from the field level what exactly is happening?

I will give you 3 short examples from recent times. You know, maze is a pretty large crop in Bihar which gets harvested around April/ May onwards. Moisture is a huge problem there. Till today, the farmers still dry their crops on the highway. The problem is, though you have helped them grow a crop with all those resilient varieties, if you do not have a proper post-harvest management structure at place, the farmers lose the value of the crop. The question - is there any alternative for the farmers to dry that crop?

Second example is a very recent one. We know, the monsoon has not been that predictable in the current season. We have been working with the FPOs and soya bean farmers of Madhya Pradesh who do not have any place to dry their crop and the crops are not dried. In the meantime, the traders or buyers from the market who buy the produce, definitely want the produce to have 10 percent moisture content. Therefore, if farmers are not being able to bring the produce with 10 percent of moisture content because of lack of infrastructure, then who takes the hit? A speaker previously did mention that the risk at the end of day is still borne by the farmers, whatever we say. So, the question is - if the risk mitigation aspects are not there in the post-harvest phase, how are we going to ensure a sustainable value chain?

Now, the third example. As we say, we are a derivatives platform, and we encourage FPOs to use our market platform for risk management. There is an FPC in Gujarat who wanted to bring in jeera (cumin) and get a good price on the exchange platform. Jeera being hygroscopic in nature attracts moisture, and because of that, the farmers could not deposit and lost maximum value. Why? Because they did not have post-harvest infrastructure to dry their crop.

What I am trying to put forward is - the infrastructure aspect at the farm gate level is very important for the farmers to ensure a sustainable value chain of whatever crop they are growing which ultimately helps them get the right value. The issue is that the private enterprises today are still not building those infrastructures. Therefore, we must address how the **Government or social impact funds or the private sector or donor funding can actually bring in that investment in this system including post-harvest infrastructure.**

Murli Dhar
Director, Sustainable Agriculture Program
WWF-India

I am the odd person among all of you. People must be wondering why the World Wide Fund (WWF) is talking about the subject of sustainable supply chains. Manish Gupta from Better Cotton Initiative has already introduced us through his presentation. BCI was born from a roundtable meeting we conducted way back in 2005 in Switzerland. Since its birth, it has become one of the fastest growing sustainable standards across the standards available in the world.

I will be only focusing on the conservation side. We, at this point of time, have been discussing 3 questions - what to produce, where to produce and how to produce. I will be re-emphasizing on how to produce.

Globally, you might be knowing, agriculture is causing a lot of deforestation. The best examples are in Amazon and Borneo where palm oil as well as soybean cause large-scale deforestation because of which a lot of destruction happens within that environment. So, **what we should try to understand is what kind of systems are needed to be brought in in order to adjust those challenges which agriculture is causing across the globe in the forms of the adverse impact on the forestry and on the resources like water which is being extracted to produce what we are trying to produce.**

What we have done with the commodities who are being drawn with a highly intensive agriculture system is we try to introduce the regional sustainable standards in all commodities to bring transformation into market space. This is basically the genesis of the program on which we are working. The idea is to bring transformation to the market space so that whatever the adverse impact agriculture is putting on the environment including deforestation can be reduced. Some of them we already know, like BCI for the cotton industry.

We have been working in India with almost 1,500 farmers and the idea is to create good models so that those models can be integrated within the different supply chains. We are working on all commodities including cotton who have adverse impacts, like deforestation, on the resources including water.

Image credit : Amanda Easley on Unsplash

Policy Recommendations

There is a need to define area specific climate smart models because the size of the country is so huge that the geography and climate conditions vary across the nation. ‘

1. **Develop area specific climate smart models:** There is a need to define area specific climate smart models because the size of the country is so huge that the geography and climate conditions vary across the nation. ‘One size fits all’ sort of CSA practices and technologies cannot be implemented and applicable successfully in all the states and districts; otherwise, the ultimate outcomes can be disastrous which eventually lead to less or no adoption by farmers.

2. **Design climate-smart financial products:** There is a high need for a pre-planned approach for public and private investments where financial products must be designed and suited with climate-smart practices, such as fixing a separate scale of finance for lending through Kisan Credit Cards for climate resilient agriculture. Integration of climate smart interventions in credit banks and extension programs has the potential to bring more investment in the financial aspect of CSA.

3. **Facilitate role of the private sectors:** CSA requires more investment than what it is getting right now because the cost of the impact of climate change on the agriculture sector is much greater. Though the public sector has been investing in it, the private sector’s involvement in this yet to become higher. When we talk about the private sector, we often think about corporate investments. However, we need to design policies related to finance in such a way that farmers can invest in too since they are also a part of the private

sector. A good investment requires commitment and understanding to the project. Investment by the corporate coupled with learning and experiences from the field may pave the way for implementation of the learnings in their business models, making it profitable for every stakeholders, and bringing more investments. It would be good to start inviting external stakeholders for investments and co-investments as well during the half-way through project implementation rather than asking them later on, at the end of the project.

4. **Focus on Seeds and Genetic Material:** It is not just humans who are affected by climate change, but all living organisms are impacted. Climate change has been changing the ecological dynamics which in turn has altered the very nature of pathogens. New diseases are emerging and spreading very fast. Good seeds and/or seeds of resistant varieties result not only in good harvest, but less risks too. For the future, more stress tolerant cultivars are a crucial way to counter the changing nature of pathogens and to reduce the impact of new diseases. It is also the easiest and cost-effective technology to upscale which has the room for good investments.

5. **Increase investments in the rain-fed areas:** Rain-fed agriculture is one of the most threatened systems by climate change in India as rain-fed areas come under drought-prone as well as flood-prone zones. 89% of the millets, 40% of rice, 88% of pulses, 69% of oilseeds, 78% of cattle, 64% of sheep and 72% of goats come from rain-fed agriculture and allied sector. The inhabitants of these areas are the most malnourished population in the country, despite its contribution to the country's food security. More investment in CSA in these areas is required in order to achieve ecological sustainability, poverty alleviation and economic growth in the face of climate change.

6. **Adopt technology support to find solutions:** There are far too many data points in the journey of addressing challenges of climate change and it is far too complex for us to be able to solve this problem without sufficient evidence from data and their analytics that is relevant and meaningful for different stakeholders. All of us, be it the government, the banking system, the bilaterals, the private sector, the earlier we start investing into the technological dimensions, the easier and earlier it will be for us to find the solutions.

7. **Promote resource-use efficiency and support circular economy:** We must see that resource-use efficiency is maintained while reducing the quantity of greenhouse gasses emission. If we want to achieve climate-smart agriculture or green funds, first we must adopt a circular economy that we use again and again instead of

Image credit : Thomas G. from Pixabay

one-term use of resources. Public and private sector should come together to fill various gaps in producing more and charging ecosystems in terms of resource use. Sustainability should be the core of a business. Further, focus on agri-logistics to be given primacy given the need to reduce wastages in the supply chains and thus mitigating the potential climate risks from greenhouse gas emissions.

8. **Enable sustainability and traceability in supply chains:** Climate change as much affects the production side of the supply chain as much it is the case for partners in the forward side of the chain. Thus, it is imperative to build the capacities of stakeholders both on the forward and backward linkages of a supply chain. While players in the forward side of the commodity supply chains face significant post harvest losses, the cost is borne by the producers. This situation can be changed only through sustainable supply chains, traceability and smart policy making. Traceability helps in identifying specific locations for climate smart investments both for adaptation and mitigating investments; and builds accountability among different players. To mitigate climate risks or adapt to them especially to avoid post harvest losses, there is a pressing need to invest in farm gate infrastructure, for the farmers to ensure sustainable value chains for any crop they are growing, so that they get the right value.

9. **Use of simple words for climate change communication:** There are a lot of terms or technical jargons like climate-resilience, adaptation, mitigation, climate-smart, climate issues, etc. which are not easily understood by many stakeholders including farmers. Even all the research papers on climate-smart agriculture is far too technical for other stakeholders to understand and appreciate what is going on. Communication is the foundation of successful partnership. Therefore, use of simple terms is very much needed in verbal communication or reports or policies to make the terms more understandable for every stakeholder.

10. **Converge and collaborate for increasing investments:** Several models of multi-stakeholder partnerships are being tried out and some with substantive success. Such partnerships not only bring together institutional strengths with respective focus on one's mandates, they also allow increased investment to enable sustainable results. Special focus on convergence with various government schemes proved to be generating results with opportunity for scaling up. Partnerships with Government investments in programmes such as NFSM, RKVY, Pradhan Mantri Krishi Sichai Yojana, Fasal Bima Yojana, NREGA can go a long way in not only increasing the pie of investments in climate smart agriculture but also ensure longevity of results through synergy of expertise in multi-stakeholder partnerships. This will also offer an opportunity to sensitise several internal stakeholders of each partner group on climate resilience measures. However, there is a need to focus on institutional structures and in making the partners understand their respective roles. It also needs a robust governance mechanism, at least at three levels – operational, managerial and strategic levels, which will help in keeping the momentum on and avoiding fading of initial enthusiasm.

11. **Include farmers as the principal stakeholder group:** When we go and talk to farmers, the need for climate information, for adaptation is exceedingly rare. There is a need to incentivize farmers to adopt climate smart practices. We need to create awareness among the farming community on climate related challenges. In some cases, initially the farmers were not ready to accept certain innovative technologies. However, once they are convinced that the technology works better, farmers would be incredibly happy because they see investments in the farm sector reducing their own cost of production through resilience measures. Though farmers may appear to be beneficiaries of such measures, given the demographic profile of the farmer base we cannot expect farmers to be addressing the climate challenges themselves with one's investments (alone). Other players such as the Government, Private Sector need to step in since everyone's skin is in the game and all are likely to get affected by climate change since agriculture is not only affected by climate change but also is contributing to climate change. In such partnerships institutional mechanisms are essential for sustainability.

12. **Make FPOs the vehicles of technology transfer:** In the context of FPOs emerging as vehicles of change and agricultural transformation in India, they are to be recognised as channels for various technological and behavioural solutions that can prepare the farmers to face the challenges of climate change and get over them.

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