



Seminar on the Role of Technology & Data Science in Accelerating Climate Smart Agriculture Outcomes

Outcome Report

Digital Green

IN COLLABORATION WITH



Digital Green

Seminar on

The Role of Technology & Data Science in Accelerating Climate Smart Agriculture Outcomes

Bringing together thought leaders, experts, donors, practitioners & policymakers to deliberate, share & explore opportunities for collective action in data and technology-led solutions to drive scale and deepen impact of climate-smart agriculture and agroforestry.

IN COLLABORATION WITH



JEEVIKA (BRLPS)
Government of Bihar



Rythu Sadhikara Samstha (RySS)
Government of Andhra Pradesh

05 August 2021 | 7.00 PM - 8.30 pm IST (GMT +5:30)

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Overview

The virtual seminar on 'Role of Technology and Data Science in accelerating CSA outcomes' organized by Digital Green in collaboration with RySS, Andhra Pradesh and JEEViKA, Bihar was held on Thursday, August 5, 2021 at 7:00- 8:30 PM IST.

FAO's 2020 report estimates that close to 700 million people are suffering from acute hunger and this number is rising rapidly. Globally, close to 2 billion people do not have regular access to safe, nutritious and sufficient food. And with a growing global population and changing food habits, the demand for food is expected to increase even further. The threat of global warming and climate change in the agriculture sector is real and severe, affecting food systems globally and locally. Tropical zones in developing countries are at higher risks. Increased frequency and intensity of climate risks, including unprecedented and unexpected variations in precipitation or droughts or heat conditions, are significantly affecting crop growth and yields.

The frequency of natural disasters recorded in the Emergency Events Database has increased almost three-fold in the past four decades from over 1300 events between 1975-1984 to over 3900 events between 2005-2014. Almost all of India is flood-prone, and extreme precipitation events, such as flash floods and torrential rains, have become increasingly common over the past several decades. Erratic monsoon, rapid warming in the Indian Ocean and reduced land-sea temperature differences are causing more extreme rainfall events intermittently with longer dry spells over central India. Among hundreds of millions who are vulnerable to the impact of climate change, an estimated 120 million small-scale farmers are perhaps one of the most at-risk groups. On the other hand, agriculture is also a major contributor to the climate problem. It currently generates close to one-fifth of total greenhouse gas (GHG) emissions. Without concrete actions to address this issue, contribution from agriculture to GHG emissions could increase substantially as other sectors reduce their emissions. Merely focusing on increased yield in the past decades has significantly eroded natural resources including land, soil and water.

The issue is also exacerbated by the fact that one-third of the produced food is lost or wasted during production, storage, distribution or at consumption points. There is an urgent need to take immediate action by governments, businesses, philanthropies and civil societies. Addressing climate change through actions in the agriculture sector has multiple benefits.

It can contribute to reduction of GHG emissions while improving food security to produce enough food to meet growing requirements. Integrated climate action on agriculture will also enhance productivity, resilience and income of an estimated 500 million small scale farmers, who are vital in maintaining local productivity, employment and economy. Investing in climate smart agriculture makes a smart business sense to achieve triple wins – Increased Production, Enhanced Resilience and Reduced Emissions.

Digital Green has been partnering with JEEViKA in Bihar to build targeted advisories on climate smart farming practices, particularly focusing on the system of rice intensification (SRI). Recently, JEEViKA and DG have expanded the scope of cooperation to pilot an innovation around farmer centric Measurement, Reporting & Verification (MRV) system, a technology and data pilot that aims to reduce emissions while helping farmers improve productivity and resilience. Similarly, Digital Green has been partnering with Rythu Sadhikara Samstha (RySS) in Andhra Pradesh to institutionalise video based approaches to enhance efficiency and effectiveness of extension systems to promote Community Managed Natural Farming throughout the state. A comprehensive data system on farmers' practises is helping RySS make informed decisions.

Application of appropriate technology and data science to quantify emissions and farmer practises will result in emission reduction, improve quality of produce and help farmers realise better returns for their efforts. Technology and data science has the potential to drive rapid scale and deepen impact. Central to these approaches are the farmers themselves, a process that empowers farmers through agency, choice and control over their data. Application of technology and data science is a priority intervention under Government of India to accelerate, integrate and sustain development initiatives in the agriculture sector.

Digital Green, is collaborating with JEEViKA and RySS to bring together diverse stakeholders including thought leaders, experts, donors and policy makers through a high-level seminar to discuss, learn, share and explore opportunities for investing in technology and data science based solutions to accelerate outcomes of climate smart, sustainable agriculture.

Objectives

The seminar aimed at bringing together diverse and exceptional thought leaders, experts, donors, practitioners and policy makers to deliberate, share and explore opportunities for collective action in technology and data led solutions to drive scale and deepen impact of CSA and agroforestry.

Seminar Outcomes

- Information and knowledge was shared on ongoing large scale data-driven and farmer-centric climate smart initiatives in agriculture and agroforestry sectors.
- Identified Key Challenges faced by the sector in scalability of existing solutions, specifically around data-based decision management system that benefits farmers.
- Critical feedback was received on Digital Green's proposed MRV innovation, and the feasibility and scalability of the approach was validated.
- Potential pathways were discussed on integrating gender in CSA, making data more farmer-centric while keeping data ownership, privacy and security at the forefront, and creating an enabling policy environment.
- Potential partnerships were identified in taking forward collaborative missions in agri-climate interventions

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We need to think about how technology can enable farmer voice and agency, not extract from it.



– **Rikin Gandhi**
 Co-founder & Executive
 Director, Digital Green

Format

The virtual seminar consisted of an Inaugural Address, a focused presentation on Measurement, Reporting and Verification in CSA by Digital Green, an opening and closing keynote by distinguished speakers, a Spotlight Discussion and 3 Participant-led discussions facilitated by field experts from national and international organizations. This was followed by a plenary session before a conclusion and valediction session.

Participants

The diverse group of **75** participants comprised people from philanthropic organizations like Gates Foundation, McArthur Foundation, USAID, Aga Khan Development Network; bilateral/multilateral organizations such as IFAD, FAO, GIZ, UNDP; think tanks like World Economic Forum, Tata Cornell Institute, International Maize and Wheat Improvement Center (CIMMYT); AgTech companies like AgNext and Credible; and from the Government agencies like RySS and Jeevika.

The event was live streamed and has garnered about **1500** views on YouTube.

Welcome and Introduction to the Seminar

Krishnan Pallassana - Country Director, India, Digital Green



The seminar highlights the important and catalytic role that technology and data science can play in empowering farmers to strengthen resilience, improve sustainable production and become active partners in the development process.



— *Krishnan Pallassana*
Country Director, India, Digital Green

Krishnan Pallassana started the proceedings by welcoming all the dignitaries, speakers and participants underlining the objectives, necessity of the seminar extending gratitude to RySS and JEEViKA for their enthused collaboration on this event and their long standing effectual partnership. He then proceeded to set the tone for the event by highlighting that climate change is no longer an impending phenomena but is here, impacting people in real-time.

Acknowledging the fact that resource poor marginal farmers are the ones who bear the brunt of climate change due to the extreme sensitivity of agriculture to it, he went on to mention the pressure posed on the farmers to rapidly adapt and make themselves and their practice more climate resilient. All this to ensure food security for the rest of us in the coming years. He also recognized existing capabilities of the farmers and threw open a challenge for the group to discuss technology and data-led solutions that could be scaled to make the farmers owners and drivers of the climate-smart practices.

He explained the format to all participants and encouraged them to use zoom chat, youtube chat and similar platforms provided during the seminar to share thoughts and reflections, pose questions and develop ideas to make the deliberations and the overall seminar even more impactful.

Welcoming Ashu Sikri, Senior Advisor (Climate Strategy and Partnerships), Digital Green to the forum, he introduced the next session - a focused presentation on Measurement, Verification and Reporting (MRV) in CSA - an innovation by Digital Green, which is essentially a farmer-centric technology-driven triangulation model for GHG quantification for rapid scale and impact.

Focused Presentation: Measurement, Reporting & Verification (MRV) in Climate Smart Agriculture

A farmer centric technology driven triangulation model for GHG quantification for rapid scale and impact

Ashu Sikri, Senior Advisor (Climate Strategy & Partnerships), Digital Green



Providing the forum with a brief background on agriculture's contribution to GHG emissions, Ashu laid out the global warming potential from agriculture alone growing up to 20% in the upcoming decade. Complementing this grim data set with the laudable efforts of CSA, he pointed out that humanity could emerge a winner from this situation. He emphasized the clear advantages of such practices on improving yields, reducing emissions, improved biodiversity, efficient water usage and improved soil health. Increased resilience to weather extremities and pest infestations is the next logical outcome.

The presentation accentuated the exciting new initiatives like the Public Distribution System evolving to support crop diversity, and technologies evolving to support judicious use of inputs and investments in enabling infrastructure like irrigation and solar power. Underlining the need to have local context when preparing such tools, the presentation emphasized that existing climate models are not accurate for India, simply because they do not account for soil and other local factors. Digital Green's initiative would be to calibrate the existing models to make them best suited for Indian context.

Ashu's presentation then went on to explain the role of data collection and what should be done with the humongous data sets that are so generic. He then went on to introduce an exciting new tool - Data Wallets which are a virtual repository where farmers will have a digital record of their land, their production practices yield and estimated emissions time for one its information will be available back to the farmers and they can use it to support their own crop planning.

The presentation showcased several use cases of Data Wallets where participating farmers could use it to share data with public or private providers of agronomic services for targeted advisories, to certifying agencies enabling them to integrate into new supply chains, improve their incomes by introducing premium pricing and so on. Financial service providers could use them to serve innovative products to these farmers with improved terms. Another use case can be farmers using the data wallet to aggregate and anonymize their data and monetize it as a group. To show that there could be systems where farmers could provide informed consent on how their data is being used, several data empowerment models were presented like Samati and account aggregator models. Open source protocols such as FarmStack will prove to be great enablers of actual data sharing in a peer to peer way that reduces concentration risks. Ashu concluded the presentation with a hopeful remark and a firm belief in the power of these tools and technologies in helping small scale producers harness the potential of CSA.

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Climate Smart Agriculture is all about production practices that deliver win-win outcomes across economic, environmental, nutrition, and social domains.

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– **Ashu Sikri**

*Senior Advisor (Climate Strategy & Partnerships)
Digital Green*

Keynote Address

Abhishek Singh, IAS, CEO Digital India Corporation; President and CEO, National e-Governance Division, MEIT, Government of India



ABHISHEK SINGH, IAS - DIGITAL INDIA CORPORATION

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Technology makes information accessible to farmers

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— ***Abhishek Singh, IAS***

Abhishek Singh began by acknowledging the seminar platform that had real practitioners and experts of CSA, who by the virtue of their vast on ground experiences have accumulated deep insights into what constitutes climate resilient agriculture. He outlined the challenge of making technology accessible to small scale farmers who cannot invest in very high cost technology. Reflecting on the fact that most farmers in India now own a mobile phone, he proposed a challenge in which agri-advisories, best agricultural practices and other such basic information be made available to them in a language of their choice. He also highlighted the work of Digital India in the area where projects like Kisan Sarthi have been implemented in North East India and delivered profound results. The success of these projects are now being scaled at an all-India level. Collating the data that is generated by these projects and combining it with weather and soil data, Singh remarked that building better farming models and providing highly localised advisories to the farmer is the way forward. Post-harvest, infrastructures like e-NAM enable the farmer to sell at right prices empowering them to take a call on when and how to sell their produce.

He went on to share the success story of technology implementation in Maharashtra where the Government has taken up GIS mapping of landholdings to develop real time insights into the status of water resources such as depletion rates, pockets of their reserve etc. He also cited an example of an application being developed to enhance peer to peer learning between farmers in Maharashtra and spoke about the need to replicate the success across India

Precision agriculture where sensors optimise field irrigation and building agri-data stacks where solutions can be built on top - are other applications of technology that Singh is hopeful could help in enabling sustainable agriculture.

Concluding his address by remarking about the need to create a repository of knowledge based on which easy and free exchange of information can be enabled for farmers, Singh stated that such a repository would accelerate adoption of CSA in India.

Spotlight Discussion:**How Can Technology And Data Science Help Accelerate An Integrated Approach To Sustainable Development By Putting Farmers And Farmer Controlled Data At The Centre Of Climate-smart Actions?***Rikin Gandhi, Co-founder & Executive Director, Digital Green***Speakers:****T Vijay Kumar, IAS (Rtd)**

*Executive Vice Chairman
 Rythu Sadhikara Samstha (RySS)
 (A Government Corporation for Farmers' Empowerment)
 Ex Officio Special Chief Secretary to Government (Natural Farming)
 Agriculture & Cooperation Department, Government of Andhra Pradesh*

**Balamurugan D, IAS**

*Chief Executive Officer, JEEViKA
 State Mission Director, Bihar Rural Livelihoods Promotion Society (BRLPS)*

**Dr Purvi Mehta**

Deputy Director & Head of Asia for Agriculture, Bill and Melinda Gates Foundation

Rikin Gandhi

Leading the discussion with an introduction to the work of RySS in Andhra Pradesh (AP) and JEEViKA in Bihar, Rikin remarked about the varied approaches through which these organizations are building sustainable livelihoods for the farmers - JEEViKA by empowering Women Self Help Groups (SHGs) to adopt sustainable practices and RySS by investing in a landscape based integrated approach in AP. He then tabled the framework for the spotlight discussion:

“How can technology and data science help accelerate this integrated approach to sustainable development by putting farmers and farmer-controlled data at the centre of climate-smart actions?”

Introducing the panelists and highlighting their work achievements, Rikin invited Vijay Kumar to the forum by introducing his work as a pioneer in elevating natural farming at a policy level in India and globally and asking him a key question on what Mr. Kumar thought are the key factors for accelerating CSA and what role can digital and data in the hands of the communities themselves enable. He also inquired whether the ongoing pandemic has driven or hindered the CSA movement.



T VIJAY KUMAR, IAS (Rtd) - RySS

T Vijay Kumar

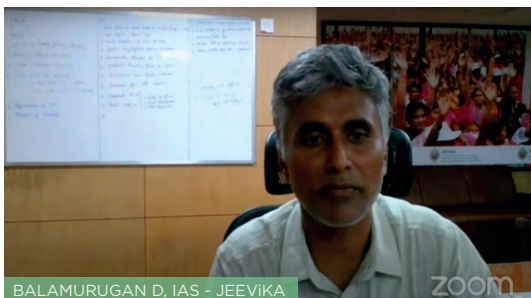
Mr Kumar began by commenting that technology has led to an oversimplification of the agricultural processes. Simplifying the problems and providing technological solutions is a serious oversight which leads to an erroneous confidence that we as humans know how nature operates. There is a serious gap in how agriculture operates within the layers of biodiversity and less than 1% of it is known. He cautioned the seminar forum on assuming that there are neat, boxed solutions to problems of the farmers and agriculture in general. He questioned whether farmers are utilising these technologies or they are merely at the receiving end, and remarked about the extractive nature of the technologies that populate the current market. Observing that digital technologies, where information is placed in the hands of the farmers, will be key in recognizing the existing knowledge of the farmers, he stated that such technologies will give the farmers confidence in their own learnings. With digital technologies, agriculture can be transformed with knowledge intensity unlike the current practices which align with expert intensive agriculture. He concluded his remarks by stating that digital technologies capacitate human connections between farmers and in this way they are critical for accelerating CSA practices.

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We are in a very serious climate crisis, and we have no time to lose. We have to put farmers at the centre of finding rapid scalable solutions.

— **T Vijay Kumar, IAS (Rtd)**
Executive Vice Chairman, RySS

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BALAMURUGAN D, IAS - JEEVIKA

Rikin thanked Vijay Kumar for his remarks, noting that the work of JEEViKA and RySS has been critical in flipping the traditional paradigm of top-down extension and enabling farmer voice and agency. Handing the forum to Balamurugan D, Rikin requested him to elucidate the ways with which, in his experience, the most marginalized people especially the women and landless can be empowered to take control of their own data and be connected with climate smart information and services that can unlock their potential.

Balamurugan D

Opening his remarks by citing the example of JEEViKA's partnership with Digital Green, Mr Balamurugan stated that community institutions and community resource persons play pivotal roles in empowering the most marginalised people by providing access to digital technologies. Reflecting on his past project with Digital Green, he remarked about the efficacy of pico projectors (battery-operated mobile projectors) in Bihar in reaching out to community members and disseminating crucial agricultural information through videos. Citing JEEViKA's partnership with BMGF in Purnia, Bihar where market intelligence information was shared with the community where mobile phones were a shared resource. This is where the power of the community lies. JEEViKA's interventions in Gaya and Madhubani with the SLACC (Sustainable Livelihood and Adaptation to Climate Change) program were centered around community empowerment. He concluded by reiterating Vijay Kumar's thoughts that there are several factors at play at the field level and that as facilitators of such projects we need to understand those factors and their complexities before succeeding at implementing CSA practices.

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Community institutions, and community resource persons play a very important role in getting access to technology. There is no need for each and every person to have a mobile phone to get access to knowledge and information.

— **Balamurugan D, IAS**
Chief Executive Officer, JEEVIKA

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Thanking Mr Balamurugan, Rikin lauded the impressive scale at which impact is taking place in Bihar and AP and remarked at how the success is being incorporated into the strategies of NITI Ayog, the National Rural Livelihood Mission and the Ministry of Agriculture. He then moved on to Dr Purvi Mehta and requested her opinion on how digital technologies and data, strengthening the link between farmers, policy makers, and other actors across the agricultural ecosystem particularly in the face of the increasingly rapid and highly variable changes taking place of climate change. He also asked her about the catalytic opportunities for philanthropy investments in this space.

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Farmers have always had their own mitigation strategies, such as, crop diversification and commodity diversification. How do we bring lessons from the ground to the mainstream is going to be very important for farmer-centric information dissemination.

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— **Dr Purvi Mehta**
Asia Head (Agriculture), BMGF

Dr Purvi Mehta

Dr Mehta opened her remarks by acknowledging the challenges mentioned by other speakers with regard to climate change and its disproportionate impact on small scale producers. She emphasized that Digital Green’s feedback loop mechanism on taking technology to the farmers but also bringing technologies and lessons from the farmers is praiseworthy. She observed that farmers with techniques like crop diversification and livestock management have always had mitigation strategies for climate change. She then described how 70% of climate adaptation and mitigation efforts are on diagnosing the problem and not actively finding solutions to it and quipped that only 2% of climate financing is reaching smallholders. Stressing on the fact that climate is a regional issue and not a country issue, she stated that South Asia has 4 countries out of the top 10 most vulnerable countries in terms of climate change impact. She summarized her remarks by saying that climate adaptation strategies should be highly localised and contextualized to the level of smallholders.



Closing Remarks

Rikin posed one final question to the group for discussion- ‘If you had a magic wand to leverage digital and data to address the biggest issues that you see with climate change and moving toward a nature-positive agriculture, what role do you think it could best play?’

Mr Kumar commented that we do not have any time to lose when it comes to intensifying activities and technologies that are in the interest of farmers’ livelihoods, protect our health and that make the soil resilient to climate change. Mr Balamurugan emphasized that technologies and accumulating knowledge has already been worked around and what remains to be done is the last mile connectivity to the smallholders. Dr Mehta drew attention to making agricultural systems efficient which will, by default, help farmers adapt to climate change.

Participant-led Discussions

Shreya Agarwal, Director of Strategy, Digital Green introduced the format and expectations from the participant led discussions. The role of participant-led discussion in the event was to pick the brains of 75 odd industry and domain experts on 3 crucial areas that hold high importance when it comes to accelerating climate smart agriculture outcomes. Each group had close to 15 participants who, under a tight-knit framework of thought-provoking questions, arrived not only at the solutions but also roadmaps on how to reach the goals as defined in the solutions. Highlights were presented in a plenary post the discussion. Presented below are the key questions and takeaways from each of the 3 working groups.

Working Group 1: Engendering Climate Smart Agriculture

Facilitated by: **Tinni Sawhney**, CEO, Aga Khan Foundation



Key Questions Raised and Takeaways

With the constraints of access to technology that women farmers face, what are 2-3 ideas that can ensure that tech and data solutions are more targeted to help women improve resilience, enhance productivity and earn better?

- Access to technological devices through groups or communities by training women leaders of the group and empowering multiple generations.
- Partnering with local educational initiatives to enhance access and digital literacy.
- Developing context specific solutions with help of organizations working on gender digital divide.



The Self-Help Group (SHG) platform is very powerful to empower women and give women the confidence to share practices they might have implemented on the ground.

— **Tinni Sawhney**
CEO, Aga Khan Foundation



How can technology help build agency and empower women to become more assertive, engage in decision making processes and participate in system level structures for farmers (like FPOs)?

- Improving access to information by creating platforms specifically catering to the challenges women face in accessing information, enhancing their leadership ability and the ability to negotiate prices.
- Working on digital platforms to co-develop new frameworks for markets.
- Through market differentiation for sustainably produced crops and getting third party verification done to empower these voices.

What are possible collaborations to ensure technology and data solutions are accessible and available for women?

- Partnering with international organizations and global institutions such as UNESCO which are already working on gender digital divide and develop context specific solutions.

Working Group 2: Agtech and Data Driven Solutions to mainstream Climate Smart Agriculture

Facilitated by: **Stewart Collis**, Senior Program Officer, Digital Agriculture, BMGF



Key Questions Raised and Takeaways

What benefits can having a farmer-centric data system bring not just to the farmers but other stakeholders?

- Capacity building activities need to be aligned with incentives.
- Agribusinesses with their unique position to combine "top down" (eg, remote sensing) with local knowledge.
- By tailoring solutions to specific farmer typologies rather than basing them on averages which discounted the variability on ground.

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Farmer-level data can inform models and policies around what's working and what isn't working. There must be a value there for a farmer to both collect quality data, and share that data.

— **Stewart Collis**

Senior Program Officer, Digital Agriculture
Bill and Melinda Gates Foundation (BMGF)

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What are the benefits vis-a-vis challenges in having a MRV system that includes (but does not rely on) self-reported data by farmers?

- Capture variability at landscape level in order to generate credible emissions estimates which can drive policy and other programs.
- Efficiently validation on methods/models for emissions.
- Participatory approach is critical; SHGs, FPOs, panchayats.

What can be foreseen as potential challenges in building a 'data wallet' for small scale producers and farmers?

- Empowering community based organizations / intermediary who can serve as a translation layer.
- Fintech can play a role in ensuring subsidies reach their intended beneficiaries (especially women), eventually help develop new products.
- Farmer is the primary source and consumer for ground data.

Working Group 3: Enabling Ecosystem for Technology and Data Solutions for mainstreaming Climate Smart Agriculture

Facilitated by: **Hisham Mundol**, Chief Advisor, Environmental Defense Fund

Key Questions Raised and Takeaways

What can be the role of different stakeholders in creating a more enabling environment for integrating technology and data solutions?

- Stakeholders need to generate and collate more data, transform them into models and translate findings into action, however caution must be exercised in the fact that the technology can not be over simplistic. It should be simple but not simplistic.



HISHAM MUNDOL - ENVIRONMENTAL DEFENSE FUND



Technology has to be simple, but not simplistic.

— **Hisham Mundol**
Chief Advisor, EDF



- Create platforms for low cost sensing and use IoT for integrating technology and data solutions.

What are the Pros and Cons of folding sustainable agriculture into the larger agriculture policy framework?

- There exists a complexity in fragmented land and diverse factors such as soil, weather etc and then there is a challenge to scale solutions.
- Collaborative efforts by generating data for AgriStack

Would a holistic policy framework that integrates agriculture, climate and technology strengthen or dilute on-ground efforts?

- If farmer is kept at the center of the framework, then there will be triple benefits.
- Food and agricultural systems are inherently inefficient because of the number of players, if a policy reduces those inefficiencies and generates enough social capital, the challenges of climate resilient agriculture can be met.

Plenary Session

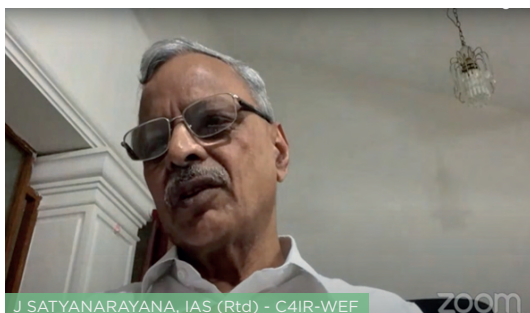
Alesha Miller, Vice-President of Strategy and Partnerships, Digital Green

Ms Miller welcomed the participants back as the working groups closed their discussion and led a brief interaction with the facilitators of the 3 working groups to highlight major points of the exchanges. Points that stood out from all the 3 discussions were: farmer centric co creation and community engagement to build social capital for resilience in the face of climate change; precise valuation of data in order to ensure that farmers are aware of the value of their data in the marketplace; and ways to put women at the centre of digital marketplace so as to improve their odds of surviving and thriving as they begin their practices of climate smart agriculture. She then went on to welcome the speaker of the closing keynote address, Dr J Satyanarayana.

Closing Keynote Address : Transforming Farming through India Digital Ecosystem of Agriculture (IDEA)

Dr J Satyanarayana, IAS (Rtd), Chief Advisor, C4IR, India, World Economic Forum

Dr Satyanarayana provided the closing keynote address by briefly discussing all the major ideas brought up during the seminar and commenced his presentation on India Digital Ecosystem for Agriculture (IDEA) as he viewed from the perspective of Artificial Intelligence for Agriculture Innovation and CSA. He went on to explain challenges that will be addressed by the IDEA ecosystem primarily with respect to degrading natural resources and subsequent climate stress. He states that for agritech innovation to happen, the entire value chain has to be looked at from a bird's eye view.



Centrality of farmers owning their own data is a key principle of data transformation in the country.



— **J Satyanarayana, IAS (Rtd)**
Chief Advisor, C4IR, India, WEF

Unified Farmer Service Interface which he postulated as a critical component of IDEA, creates a consent management framework for data providers and consumers. He then went on to present several use cases and frameworks that are unlocking values of crop planning, farming, value chain from farmgate to fork and data governance with the help of startups, government and other key stakeholders. He also explained the 3P framework and principles for data governance of farmers - personal data protection, prevent misuse of data and promote a trusted data exchange system, to be included in all interventions for CSA practices. He concluded his session by emphasizing that IDEA as a project has responsible use of technology embedded in its principles and AI4AI is a subset of the idea which is looking at emerging technologies like Internet of Things, Blockchain and Drones and both these projects take into account the principles and practices of CSA.

Valediction

Dr Namita Singh, Director - Strategy, Knowledge and MEL, Digital Green

Dr Namita Singh highlighted the major takeaways from Dr Satyanarayan's session, such as IDEA acting as an enabler to farmers taking informed decisions about their data and the architecture being focused on consent, privacy and prosperity of farmers in a detailed and extensive manner. She concluded the seminar by extending a vote of thanks to all the participants, speakers and guests.

Key Takeaways

The seminar raised pertinent issues with regard to the role of technology and data science to place the farmer at the center of the CSA efforts enabling them to not only use technologies but also to contribute to the knowledge repository, as opposed to merely acting as recipients. Here are the key takeaways from the seminar:

- **Calibrate global climate models to suit local**

To evolve technologies to support tools, such as judicious use of inputs, for marginal smallholders, working within the local context of a region is necessary. Work is being done on calibrating global climate models to Indian factors such as weather and soil to bring regional accuracy.

- **Let the farmers own and lead the use of their data**

Making farmers owner of their data and providing them with opportunities to manage and monetise it with their due consent will be crucial in aligning them with CSA practices.

- **Create a knowledge repository to learn from and teach to the farmer**

A repository of knowledge based on the principles of free and easy exchange of information from and to the farmers will accelerate the adoption of CSA practices in India.

- **Make technology simple, but not simplistic**

Oversimplifying agricultural problems to suit advanced technological objectives must be actively avoided. Technology should be simple but not simplistic. One must not assume the factors while developing solutions to the problems as not much is known about complex factors such as biodiversity, soil and weather.

- **Take technologies and knowledge to the last mile**

A plethora of agricultural innovations have been done and over the years a lot of technologies have been tried and tested. The time is ripe to ensure last mile connectivity of these solutions to the marginal smallholders.

- **Understand the complexity of on field implementation**

On field implementation is categorically different from research and lab technologies; several factors of real time attributes such as soil and weather must be thoroughly understood before demanding success of large scale climate resilient projects.

- **Communities should be empowered and utilised to build solutions for marginalised farmers**

Shared resources within a community can solve the challenges of owning the technology when affordability is low. This has worked well for women SHGs and produced a huge inter-generational positive impact.

- **Collaboration with organizations that have expertise on gender digital divide**

To allow more women to access the resources to become resilient to climate change International collaboration with organizations working in the field of gender digital divide will improve the prospects of women who face tremendous challenges in accessing knowledge resources and technologies.


- **Technologies should be created enveloping concepts of data consent and privacy**

Technology should play the role of an enabler and concepts such as data consent, privacy should be embedded in the technological architecture. This would empower the farmer to not only use and contribute to the technology she is using but also monetise it as per their needs.

Social Media Reach

 **1500** Views on Youtube Livestream

 **45** Tweets Shared
11,200+ Twitter Impressions (for tweets shared around the event)

 **6** Facebook Posts
8500+ People Reached via Facebook

 **5** LinkedIn Posts
6600+ LinkedIn Impressions

 **2** Blogs Shared on www.digitalgreen.org

Profiles of Speakers and Moderators



Abhishek Singh, IAS

Shri Abhishek Singh is an officer of the 1995 batch of IAS with diverse experience of administration, managing law and order, implementing development programs, and of policy formulation at Central Government with regard to use of Technology for improving Governance. He is presently posted as CEO MyGov with additional charge of President & CEO NeGD and MD&CEO, Digital India Corporation. In his role at National e Governance Division, he coordinates projects relating to Digital India, specially Digilocker, UMANG, Geo-Informatics. He is actively involved with Aarogya Setu – the contact tracing App of Government of India. He has done Masters in Public Administration from Harvard Kennedy School of Government as a Mason fellow in May 2013. He is a B.Tech and M.Tech in Mechanical Engineering from IIT Kanpur.



T Vijay Kumar, IAS (Rtd)

T Vijay Kumar is the Executive Vice Chairman Rythu Sadhikara Samstha (A Government Corporation for Farmers' Empowerment) and Ex Officio Special Chief Secretary to Government (Natural Farming) Agriculture and Cooperation Department Govt of Andhra Pradesh, and is known for his exceptional service to the areas of natural farming, Tribal Welfare and Rural Development. After joining the IAS in 1983, he served in various positions in Government of India, most significantly as the CEO of Society for Elimination of Rural Poverty (S.E.R.P) 2000 to 2010 where he implemented a statewide program of poverty eradication through social mobilization and empowerment of women. He is leading the implementation of climate resilient AP Community Managed Natural Farming in the entire state of Andhra Pradesh.



Balamurugan D, IAS

With over a decade of experience in the civil services of Indian National Government, Balamurugan D is the Chief Executive Officer of Bihar Rural Livelihoods Promotion Society (BRLPS) popularly known as JEEViKA, a flagship program of the state for poverty alleviation. His peerless contribution to the Social Pension Programs and community led social system has led to their digitisation and their development as a model for other states. He is the Secretary Cum Commissioner Self Employment and Mission Director, NRLM leading skill development in rural areas for gainful self employment in Bihar.



Dr Purvi Mehta

Dr Purvi Mehta is the Deputy Director and Head of Asia for Agriculture at the Bill and Melinda Gates Foundation. She has her formal education, upto PhD, from M.S. University, India, Tokyo University, Japan and North Carolina State University- USA. Dr Mehta has worked with the CGIAR, as head of Asia for the International Livestock Research Institute and also as head of South Asia Biosafety program (IFPRI, USAID), and brings a blend of Asia and Africa experience. She is on board of several organizations, including, International Alliance for Ecology and Health-Canada, International Centre for Rural Agriculture-Netherlands, Independent Director on Board of National Commodity Derivatives Exchange Ltd (NCDEX), Global Advisory Council - World Food Prize etc. She is honorary professor at Amity University-India and visiting Scientist at Cornell University. She has been closely associated with several agriculture and nutrition policy platforms in India, South East Asia and Africa and serves on several committees and advisory panels. She was the recipient of Agriculture Today Award-2014, for her contributions to agriculture policies in South Asia. Dr Mehta has two books and over 50 publications to her credit.



J Satyanarayana, IAS (Rtd)

Having had an illustrious career in the Indian Administrative Services for 37 years, Dr Satyanarayana retired as the Secretary, Department of IT, Government of India. His stellar accomplishments include steering the Unique Identification Authority of India, Govt. of India as a part time Chairman, designing and implementation of over 30 major e-government projects such as CARD, eSeva, Mee Seva, e-Procurement, AP Online, Passport Seva, MCA21, e-Office, and eTaal, serving as the advisor to the Prime Minister Jan Aarogya Yojana (PM JAY). Currently he is advising the World Economic Forum on building programs for responsible deployment of emerging technologies in multiple sectors such as AI for Agricultural Innovation, FIRST Healthcare, AI for Smart Cities and Data Economy. He is also a Member, Advisory Board, Global Forum on Cyber Expertise (GFCE), Netherlands. Dr Satyanarayana holds a Master of Science from Andhra University and an MBA from University of Ljubljana, Slovenia.



Rikin Gandhi

Rikin Gandhi is the co-founder and CEO of Digital Green. With a Masters in aeronautical and astronautical space engineering from Massachusetts Institute of Technology, and a Bachelors in Computer Science from Carnegie Mellon University, Rikin began his career at Oracle and later joined Microsoft Research India's Technology for Emerging Markets team, where he researched ways to amplify the effectiveness of agricultural development globally. The time Rikin spent in India's rural communities changed his life. He developed a passion for helping the country's rural farmers, whom he saw as heroes. More than a decade later, that passion has become Rikin's career; in 2006, he co-founded what has become Digital Green. With his vision, passion and penchant for scalable innovation, Rikin is one of the leading global voices and a much sought after thought leader in the ag-tech space.



Krishnan Pallassana

Krishnan is the Country Director, India of Digital Green. He is a sustainable development professional, thinker and strategist, including strategic leadership experience for more than a decade with organisations like ActionAid International, The Climate Group and Population Foundation. His multifarious experience includes varied contexts including India, Nepal and Afghanistan as well as varied sectors ranging from disaster risk reduction and climate change to livelihoods and tech for development. He has developed country strategies for institutions like Actionaid, Sphere, The Climate Group and CIFF. Krishnan is also an experienced evaluator and an accomplished international trainer. He is a recipient of fellowship grants from Winrock and Prevention Consortium. Krishnan is a graduate in Physics and a Post Graduate in Business Administration.



Tinni Sawhney

Tinni Sawhney is the Chief Executive Officer of the Aga Khan Foundation (India), a position she has held since April, 2016. In her sixteen-year tenure with the Foundation, Ms. Sawhney has led the programme portfolio as head of programmes, and prior to this she led the rural development programme with interventions in four states. She has previously worked with the UN Food and Agriculture Organisation, leading the South Asia Pro Poor Livestock Policy Programme, the Danish International Development Assistance and the World Wide Fund for Nature. She has over 30 years of experience on sustainable livelihood development in rural India and has worked extensively on issues of agriculture and livestock development for smallholder farmers, particularly in the rain-fed regions of India. She has also worked on strengthening gender perspectives in development, and building robust community institutions to lead development processes.



Stewart Collis

Stewart is Senior Program Officer for Digital Agriculture Solutions at the Bill and Melinda Gates Foundation's Agricultural Development group where he focuses on digital farmer services, smart farming, digital agricultural ecosystems and ag-data platforms in low and middle income countries across Africa and South Asia. Mr. Collis has a technology and business background in software development, data science, climate services and crop modeling.



Hisham Mundol

Hisham is the Chief Advisor, India for Environmental Defense Fund (EDF) in India. Hisham started his career with the private sector, in sales, marketing and consulting, with Hindustan Unilever, WorldTel, Accenture & Infosys. He subsequently moved to the development sector where he led public health programmes for the Indian Government's National AIDS Control Organisation. He later set up operations in South Asia for Wikimedia Foundation promoting free knowledge projects like the world's largest encyclopedia, Wikipedia. Most recently, he led the work of the Children's Investment Fund Foundation in India (across health, nutrition, adolescence, education, girls' & women's rights and livelihoods, child protection, and climate change.)



Dr Namita Singh

Namita Singh is the Director of Strategy, Knowledge, and MEL at Digital Green. She is an international development sector professional and research scholar with 14 years of experience in participatory technologies, rural development and gender. Currently at Digital Green she leads Strategy, Knowledge, and MEL in Asia, designing programs using low-cost, contextually relevant technologies. She has done her PhD in Participatory Technologies from The Open University, UK and has a Master of Arts in Social Work from Tata Institute of Social Sciences. She is a published author with several peer-reviewed journal articles, book chapters and guides.



Alesha Miller

Alesha Miller serves as Vice President of Strategy & Partnerships for Digital Green where she supports new partnership and program development, thought-leadership in key cross-organizational priorities, like gender, strategy, and learning. Prior to this role, Alesha was the Managing Director of the Global Food and Agriculture Program where she led research looking at key challenges and opportunities affecting the food system, including urbanization, the rise of global youth populations, water scarcity, and digital technology. Alesha began her career at the Bill and Melinda Gates Foundation, where she held several roles over eight years, including managing strategic partnerships with governments and UN agencies, grant-making to improve smallholder farmer access to markets in sub-Saharan Africa to support smallholder farmers and program-wide work in nutrition and agriculture, gender, and impact measurement strategies for the Agricultural Development program. She has a bachelors from University of Arizona and a masters from Syracuse University.



Shreya Agarwal

Shreya joined Digital Green (DG) in 2011 in India. After a hiatus, she is now back at DG as Director, Strategy based in San Francisco and supports the design and execution of global programs like USAID's Developing Local Extension Capacity (DLEC) program, while guiding cross-cutting efforts in strategic planning, communications, business development, and monitoring and evaluation. Previously, she worked as a Senior Associate with McKinsey and Co. in New York specializing in health care, and the public/ social sector. Shreya's interest in development (and agriculture in particular) stems from her experience working with rural farming communities and government functionaries primarily in India and Ethiopia. She graduated from Delhi University, India with a focus on Mathematics, from Harvard Kennedy School, US with a Master's in Public Administration, and from the Institute of Development Studies, University of Sussex, UK with a Master's in Development Studies.



Annexure 1:

Rythu Sadhikara Samstha (RySS) Andhra Pradesh Community Managed Rural Farming

Visit Website: www.apcnf.in/ryss/

Introduction

The Andhra Pradesh Community-managed Natural Farming (APCNF) programme is being implemented by the Rythu Sadhikara Samstha (RySS), a not-for-profit company established by the Department of Agriculture, Government of Andhra Pradesh. RySS's mandate is to plan and implement programmes for the empowerment and all-round welfare of farmers. RySS is working on system-wide transformation of farmers from conventional farming to naturally grown produce. APCNF incorporates the best global practices from various agroecology practices for climate change adaptation.

Moving to Farming in Harmony with Nature

The Green Revolution in India transformed agriculture production and was instrumental in helping India achieve self sufficiency in the 1960s. The productivity gains made during the period could not prevent the impending agrarian crisis wherein the most heavily irrigated regions of the world- Northern Indian Heartlands of Agriculture- were bringing in the largest rate of groundwater loss in any comparable-sized region on Earth². In addition to this, profit loss because of dual factors of waterlogging and salinity amounts to \$46 million per year³. These losses were primarily borne by the marginal smallholders who escaped the state subsidized windfall of agricultural benefits. Farmers in these vulnerable landscapes remained subjected to hunger, poverty, malnutrition in combination with high climate variability and its adverse effects.

To avert this crisis, a number of solutions were proposed with a common theme- seeking to revitalize rural agricultural systems with a focus on abundant, sustainable and climate smart agricultural practices. From local, small-scale, unorganised solutions, there emerged a set of solutions oriented towards organic agriculture and several states like Sikkim, Karnataka, Mizoram, Kerala, Andhra Pradesh, Himachal Pradesh, Madhya Pradesh, Tamil Nadu, Maharashtra and Gujarat became proponents of such solutions by formalizing policies through state-led initiatives. There still exists a certain degree of variability in these practices, which are carried out by the farmers in response to the unique needs of their farms.

One such set of solutions, known as the Community Managed Natural Farming began to gain widespread recognition in Andhra Pradesh. APCNF is all about farming in harmony with nature, and firmly believes that nature has solutions to all kinds of human-induced problems in the agriculture and food sector. As an alternative to the current agriculture practices the emphasis is on transformational technology. It is based on universal principles of regenerative agriculture - keeping the land covered with diverse crops for 365 days of the year, covering the soil with crop residues, minimizing soil disturbance, using bio stimulants for catalysing soil biology, pest management through botanical formulations and avoiding all synthetic chemicals based fertilisers, pesticides, herbicides and weedicides. The practices are based on ZBNF, NPM, and other local farmer innovations.

An Aspirational Programme

Over the last 4 years, the number of farmers enrolled to practice natural farming has increased from 40,000 farmers in 2016 to around 700,000 farmers and farmworkers in 2019. It is due to this that the APCNF programme has been recognized as the world's largest agroecology programme in terms of number of farmers enrolled. The target for 2020-21 is 10.5 lakh farmers and farm workers - 700,000 farmers and 350,000 farmworkers. The programme intends to bring all its 6 million farmers and farm-workers and 8 million hectares of its land under Natural farming by 2030.

Innovations in the Programme

The real success of the AP programme lies in the scaling up strategy adopted.

- Farmer to farmer extension system. Best practicing, champion farmers are the trainers. There is one farmer trainer per 100 farmers. As NF is knowledge intensive and not input intensive. Hence extension and intensive hand holding plays a critical role. Currently 5000+ strong 'Community Resource Persons (CRPs) are working in the programme disseminating technical know-how at the field level.

- Women self-help groups and their federations are the backbone of the programme. They play a very critical role in: collective action, knowledge dissemination, supporting each other during transition, financing members to purchase the inputs required for natural farming, monitoring the programme, and managing the programme.
- Long term handholding support to each farmer. It is believed that a farmer requires 3 to 5 years to make the transition. In the first year, they take up only a small portion of land under Natural farming, while the rest of the land is under conventional, synthetic chemicals-based agriculture. After seeing the results of the 1st crop, farmers invariably analyze the differences in the 2 plots of land in terms of costs, yields, resilience, health impacts, etc. They also discuss with other farmers and then they make a decision to expand the area. These pioneering farmers are also responsible for motivating new farmers to enroll into Natural farming. The AP project provides for that through the farmer-to-farmer extension system and the network of SHGs. Since the trainers are themselves practicing farmers, their credibility is very high and they are able to motivate farmers to change.
- Whole village approach. In AP, the objective is to convert all the farmers in a village into Natural Farming practitioners with the target of all small and marginal farmers and tenant farmers in the village, who constitute more than 85% of the farmers. It takes 5 to 6 years to change all the farmers in a village. Through the extensive network of SHGs, built over 2 decades, we are able to reach out to all the small and marginal farmers and tenant farmers in the village.
- The support of the Agriculture department in the transition process has been very positive.
- Employing information technology, to spread and consolidate farmer databases, track the APCNF practices throughout the state, monitoring of functionaries, geo mapping fields and disseminating climate information, has been a game changer for RySS as it has helped them keep the farmers committed to the CMNF model. Several collaterals such as Workbooks, primers, crop cards with detailed information on the processes under the CMNF, explained simply with visuals, are being made accessible to farmers in the vernacular language.

Continuing Research, Generating Evidence

The APCNF programme accords highest priority to scientific evidence. Several studies have been commissioned in collaboration with national and international agencies. These studies are for establishing the science behind natural farming, socio-economic impact of APCNF, etc. Third-party Crop Cutting Experiments by Institute of Development Studies (IDS) have shown that the APCNF crops are better than the conventionally grown crops.

In a nutshell the APCNF programme is not only about the Natural Farming technology, but it is about a proper, community managed, State Govt supported implementation plan to take it to every farmer in the programme villages.

The experience of the last 5 years is proof enough that Natural Farming can be scaled up across the state benefiting farmers, consumers and the environment.

References

1. <https://www.ceew.in/publications/zero-budget-natural-farming-sustainable-development-goals-0>
2. Tiwari, Wahr, & Swenson, 2009, p. 1, <https://www.tandfonline.com/doi/full/10.1080/14735903.2019.1694465>
3. <https://hal.archives-ouvertes.fr/hal-01954413/document> p. 19
4. https://apagrisnet.gov.in/GO/2019/2019AGLC_RT282.PDF
5. <https://apcnf.in/wp-content/uploads/2020/05/Can-Zero-Budget-Natural-Farming-Save-Input-Costs-and-Fertiliser-Subsidies.pdf>
6. https://www.researchgate.net/publication/338918376_Zero_Budget_Natural_Farming_-_An_empirical_analysis
7. https://cstep.in/drupal/sites/default/files/2020-09/CSTEP_ZBNF_Report_Final_Latest.pdf



JEEViKA Tackling Rural Poverty through Sustainable Agriculture

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Introduction

Popularly known as JEEViKA, the Bihar Rural Livelihoods Project is a trailblazing effort working towards social and economic empowerment of the rural poor. The project is run by the Government of Bihar through the Bihar Rural Livelihoods Promotion Society (BRLPS), an autonomous body under the Department of Rural Development and is a part of India's National Rural Livelihood Mission (NRLM). The grand objective of reducing poverty is being achieved by enabling the poor households to access gainful self-employment and skilled wage employment opportunities through building dedicated grassroots institutions for the poor. The project has delivered significant improvement in the livelihoods of the rural poor on a sustainable basis. For instance, until 2021, approximately 12.26 million women have been mobilized in 1,047,594 SHGs in Bihar¹ — many from marginalised Scheduled Caste, Scheduled Tribe, Extremely Backward Caste and Other Backward Caste communities—have been mobilised into self help groups. Through this initiative, these women and their households have access to financial services, value chains in agriculture, livestock and nonfarm sectors, and nutrition and sanitation services.

A Flagship Rural Poverty Reduction Initiative

The state of Bihar has long fought the challenges of social economic prosperity, languishing at the bottom of the heap in many socio-economic indicators. Social segregation along caste lines, gender discrimination, poor infrastructure and a near breakdown in provision of public amenities had accentuated the abysmal income levels, especially in rural Bihar. In the late 2006, the Govt. of Bihar inaugurated the JEEViKA project, executed by the autonomous Bihar Rural Livelihoods Promotion Society. JEEViKA gradually became the flagship rural poverty reduction program of the government, operating in 9 out of 38 districts of Bihar. This led to a steady turnaround and a few visible positive impacts were:

- Increased productive asset ownership of landless households
- Increased number of women becoming trusted clients of the banking system
- Farmer producer companies are delivering higher value for small-holder farmers, giving them access to peri-urban and urban markets and are also integrating digital technologies in multiple aspects of the value chain
- Lesser high cost debt among the engaged households
- Increase in women's empowerment and intra-household decision making
- The network of Bank Sakhis, an important SHG theme, has resulted in effective delivery of USD 20 million every month in rural areas².

Transforming through SHGs

JEEViKA has laid down strong foundations of visible transformative change in Bihar. Some of most encouraging numbers are as follows³:

- For their financial inclusion goals, the program led to a credit linkage of INR 11992.16 Crores for its beneficiaries
- About 6 lakh SHGs have undertaken paddy and wheat cultivation with current best practices such as System of Rice Intensification and Direct Seeding of Rice in Paddy cultivation and Zero Tillage and System of Wheat Intensification in Wheat Cultivation and seed replacement in both.
- About 1.81 lakh beneficiaries have been made a part of poultry producer groups
- 65 thousand households benefited from the Dairy Intervention leg of JEEViKA
- 32 thousand households were linked with non-farming producer groups
- The project has led to training of 2.7 Lakh youth under the Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY) and Rural Self Employment Training Institutes (RSETIs) programmes
- For the sanitation leg of the program, 1.26 crore Individual Household Latrines were constructed and about 38 thousand villages were declared Open Defecation Free.

A Community Based Approach

The programme mobilizes rural women into a variety of community institutions including (1) affinity-based self-help groups; (2) village organizations (VOs) composed of these self-help groups; (3) commodity-specific producer groups; and (4) higher federations. The programme follows a saturation approach- 80% of the target population must come under the fold of JEEViKA Samuh- to ensure an effective delivery of program benefits. To push the objective of creating entirely self managed and financially sustainable community institutions, JEEViKA builds vibrant and bankable women SHGs and their federations which do not have any subsidy components but provide need based grants to these institutions. These grants, part of the Community Investment Fund aim at diversifying the sources of livelihoods and bring a dramatic improvement in the quality of life of the rural poor.

The approach, among other areas of work, is now focusing on sustainable agriculture and helping these women identify and practice climate resilient agriculture. This is being executed via Sustainable Livelihoods and Adaptation to Climate Change (SLACC) project that aims to align NRLM activities with climate change adaptation goals and strengthen community based climate planning and adaptation measures into the sustainable livelihood program. Within this project activities like: development of season wise configurations for major crops grown in the area, scheduling and monitoring of farm activities, access to weather based advisory and highly accurate weather models etc. are being carried out which has led to a huge number of farmers adopting climate resilient practices and expressing satisfaction with the results⁵.

So far, the programme has managed to create a large cadre of Community Resource Persons (CRPs) and Community Mobilisers (CMs) who act as resource persons for mobilization of community into Self Help Groups and Village Organizations. Other human resources being developed are bookkeepers, para professionals such as Women Outreach Workers(WOW) and village resource persons (VRPs) whose primary work includes supporting SHG workers in promotion and strengthening of livelihoods.

Creating Impact through Empowerment of Women and Communities

JEEViKA believes in effective partnerships with different agencies such as civil society organizations, private companies and other international organizations to bring about qualitative change in the life of their beneficiaries through scalable interventions. Jeevika SHGs continue to demonstrate higher levels of empowerment, in terms of decision making, political participation and a move from salaried employment towards animal husbandry and other self employment options. In the SLACC project alone 200 villages were digitised, about 80% of the beneficiaries showed interest in organic farm advisories, and 90% demonstrated increased awareness towards climate resilient practices⁵. Jeevika continues to raise benchmarks in building climate resilience in the lives of those who will be most impacted by it- the smallholders.

References

1. https://womensgroupevidence.org/sites/default/files/2020-04/JEEViKA_Brief_April_1_2020.pdf
2. <http://20.198.83.63:9090/dashboard/>
3. <https://socialprotection.org/sites/default/files/14%2005%202020%20-%20Webinar%20Questions%20%20Comments%20FINAL.pdf>
4. JEEViKA Annual Report 2019-2020
5. https://aa.JEEViKA.gov.in/sites/default/files/nrlp_repository/8JEEViKA_Corporate_Brochure.pdf
6. https://www.livelihoods-india.org/uploads-livelihoodsasia/subsection_data/sustainable-livelihoods-climate-smart-agriculture-to-enhance-rural-livelihoods-and-adapt-climate-resilience-practices-by-cropin.pdf

Digital Green Improving Farmer Incomes while reducing Carbon Emissions

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Introduction

Digital Green is a global development organization that empowers small scale producers SSPs to lift themselves out of poverty by harnessing the collective power of technology and grassroots-level partnerships. For over a decade, DG's work has increased the effectiveness, impact, and efficiency of extension service providers through use of scalable and cost-effective technologies that assist rural communities to access and share information with which to make farm-related decisions.

DG's signature approach, community based video extension, reimagined message delivery by using affordable video screening tools in a group setting rather than traditional in-person visits and, in doing so, increased cost effectiveness. DG married evidence on what practices matter most with farmer feedback on what they need to learn to ensure relevance. To date in India, DG has trained more than 17,000 frontline workers who have reached 2 million rural community members (90% women) with localized videos that promote improved agricultural and nutrition practices. Over half of all viewers have adopted at least one practice (most adopt 4 on average), a rate that exceeds traditional extension approaches.

Reducing carbon emissions from agriculture and realizing environmental, livelihood and social co-benefits from doing so is a tremendous opportunity which requires engaging small-scale producers and collaborating with the government extension system. DG and JEEViKA would be partnering to reduce CO₂e emissions from agriculture in Bihar leveraging the strong extension system.

Reducing Carbon Emissions in Bihar - A pilot MRV project

As a National Support Organization to the National Rural Livelihoods Mission in India, Digital Green works in close partnership with State Rural Livelihood Missions and Departments of Agriculture in multiple states. DG has partnered with and supported the agricultural extension program of the Bihar Rural Livelihood Promotion Society (JEEViKA) since 2008. DG is now working with JEEViKA to reduce CO₂e emissions from agriculture in Bihar, India by 25/20% by 2031 (relative to 2020 baseline) without compromising yields.

Currently, there is very limited visibility into actual emissions from agriculture and how they are impacted by changing practices. There is a crucial need to be able to measure the change in emissions to be able to manage and reduce emissions. There is a need for an objective, data driven platform that has environmental/technical integrity and benefits farmers in order to catalyze a lot of enabling activity. The recent times have seen a momentum in the market and among policymakers to support emission reductions from agriculture. For instance, agribusinesses want to reduce their scope 3 emissions to meet net zero commitments which are important to their customers and investors. Also, demonstrating reductions in supply chain emissions helps companies reduce their cost of capital. Policymakers recognize climate smart agriculture as a key tool in the path to achieving sustainable development goals and achieving (Nationally determined contributions) NDC targets.

In the agriculture sector, it is ultimately the farmers' practices that deliver mitigation benefits so it is critical that they have awareness of these practices and are in a position to leverage benefits from implementing changes. What we also need is to channel the emerging interest into action is credible accounting of what's happening on the ground and how that translates to emissions and a way for farmers to leverage this data. It is required that there is a robust, credible methodology for recording data on farmer practices: extension agent and/or farmer self-reported, verified by local extension agents, that estimates for GHG emissions using third party climate models that are calibrated for India conditions; and a farmer data wallet which builds agency, positions farmers to realize benefits through visibility to their own farm and by sharing data with various stakeholders.

While there is a lot of excitement and hype around technology like remote sensing and low-cost sensors to monitor and quantify practices and emissions, a lot of these are still very nascent and need time to be proven out. Further, a lot of these technologies are currently not relevant to the Indian context with their current prices. What can work in the current scenario is leveraging the rural livelihood development programs given their massive reach and the trust they have in the community. Such programs are already recording a lot of data on farmer practices via paper registries but that data is not fully exploited. Also, a methodology can be modeled that relies on the local extension agents to record data and as technology matures, shift towards a model where farmers self-report, and technology is used to validate certain parameters. This can help reduce costs and enable scale.

DG will strengthen the climate focus of the largest provider of extension advisory services, i.e. JEEViKA, in Bihar and reaches 300,000 small scale producers (SSP) with evidence-backed, locally relevant climate-smart production practices. Adoption of practices is expected to reduce 45,071 metric tons of CO₂e over the life of the project. The monitoring, reporting and verification (MRV) system DG and JEEViKA model will create feedback loops that inform: farmers' decisions to adopt practices; application of research-backed advisories to local contexts; development of state climate action plans by the government of Bihar; and a path to scale.

Farmer advisories, monitoring, reporting and verification, and farmer empowerment

This project has three reinforcing elements: farmer advisories, monitoring, reporting and verification, and farmer empowerment. JEEViKA will increase delivery of more targeted, locally relevant advisories demonstrating evidence-based practices (e.g. optimizing use of nitrogen-based fertilizers, residue management, low/zero-tillage, early sowing, water management, etc.) that reduce emissions while increasing yields. JEEViKA extension agents will track adoption of practices and important on-ground indicators such as access to irrigation and soil hydrology. Data and feedback analysis inform production and distribution of subsequent videos in an iterative cycle to meet participants' needs and interests. Improved targeting of more locally relevant advisory content will increase likelihood of adoption and accelerate emissions reductions.

To increase efficiency, reduce opportunity for error, and allow policymakers visibility into climate impact data, Digital Green will introduce an open source MRV solution to track adoption of climate smart practices and quantify their climate impact. Although it will initially rely on JEEViKA VRPs to capture data, over time it will integrate inputs from third party datasets, including soil maps and other public repositories, IoT sensors, and remote sensing, as well as self-reported data from farmers (validated by VRPs), thereby improving accuracy while reducing costs. DG will also test agro ecological models to quantify GHG emissions reductions from agricultural practices. While each model has different data requirements as well as significant overlap. DG will also test for applicability in the context of SSPs Bihar.

A key focus will be to enable farmers to share data to realize benefits. Various stakeholders increasingly value climate smart production and are willing to pay for such credentials. Today, there is no model that places the needs of SSPs front and center; existing MRV solutions focus on data collection on behalf of specific certifiers or buyers who control the data about the practices used by individual farmers. DG model shifts that focus so that each SSP owns and controls their own data and can share it how they choose.

The overall objective is that by 2031 multiple government and private actors in Bihar collaborate to reduce emissions from agriculture by up to 25% relative to a 'Business As Usual' scenario (up to 9.6 MTCO₂e), without compromising yield / productivity, through adoption of climate smart practices by small scale producers (SSPs). The success of this program can also inspire similar actions in other states where DG works closely with the government extension system.



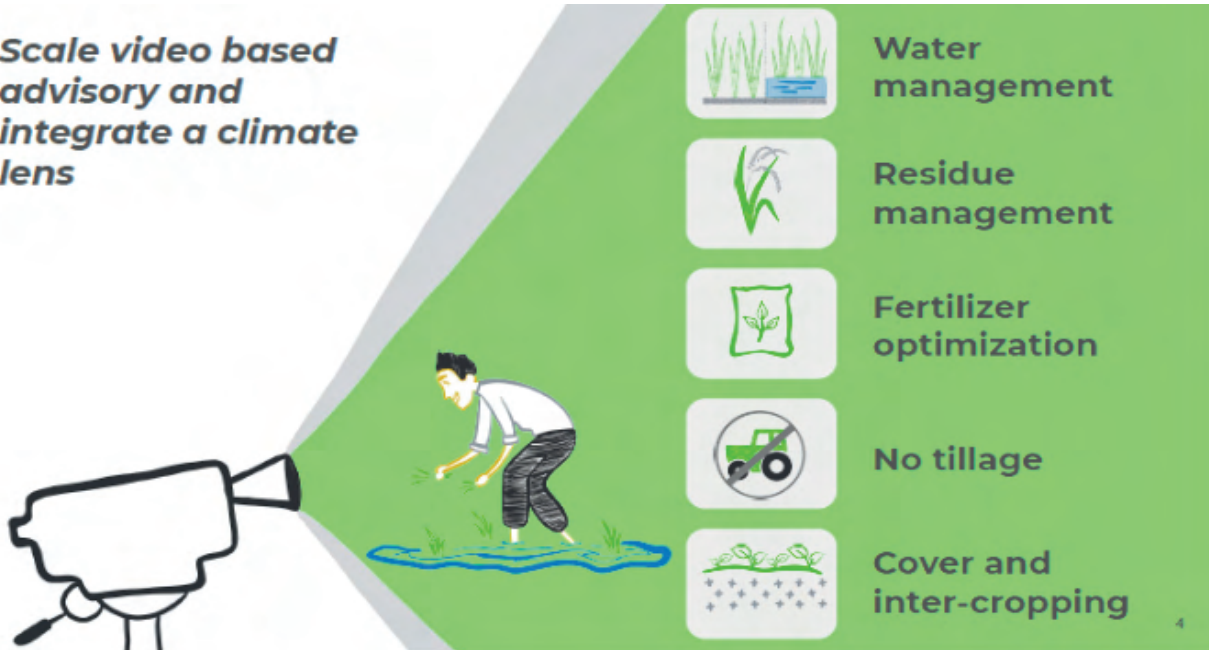
**Climate Smart Agriculture:
Production practices that deliver win-win outcomes**



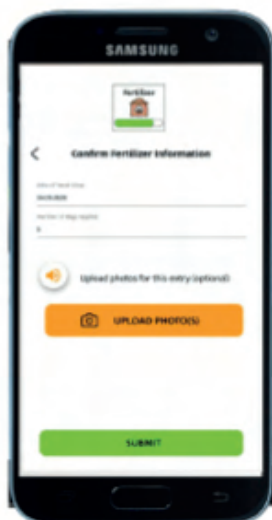
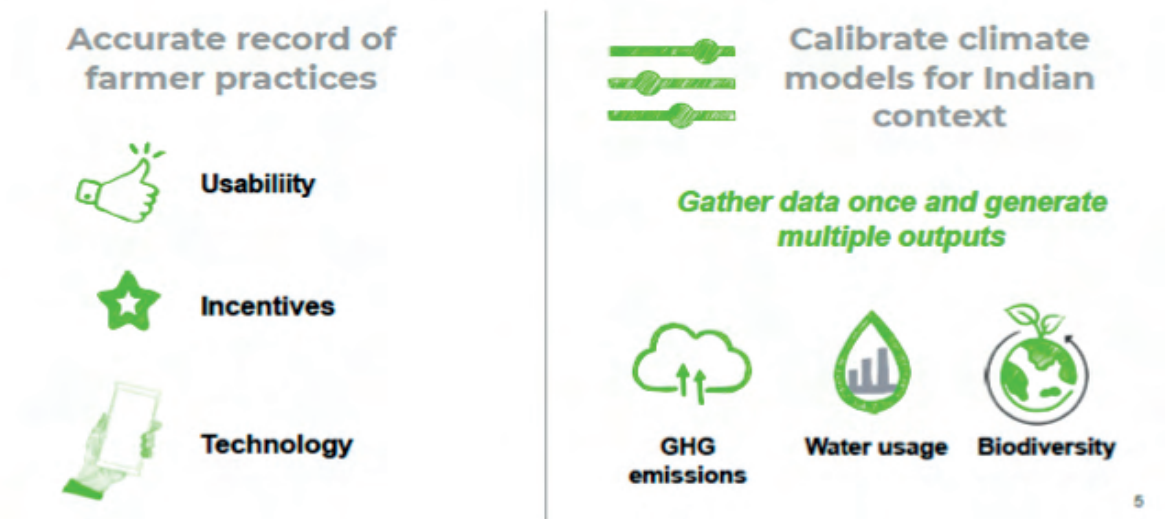
Empower farmers to generate credible claims on emissions



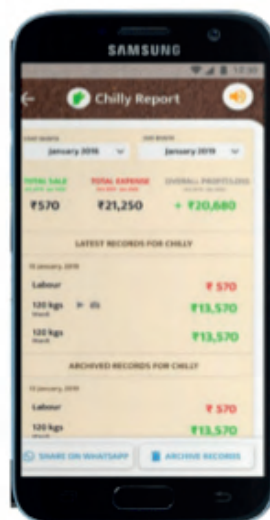
Scale video based advisory and integrate a climate lens



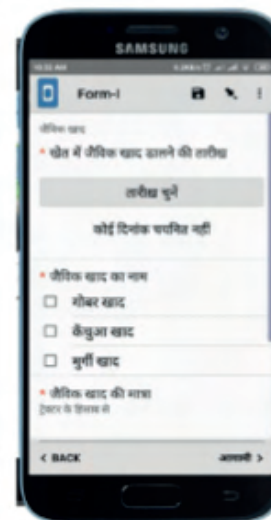
MRV: Measurement, Reporting and Verification



Residue Management (Farmer)



Revenue and Expenses (Farmer)



Manure Application (VRP)

data wallet empowers farmers to unlock benefits



7

Thank You!



8



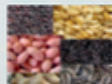
Major Challenges faced by Indian Agriculture Sector



Food Sufficiency but Nutrition Deficiency



22.5% farmers below poverty line



Deficit of Pulses & Oilseeds



Inadequate market infra / linkages



Yield Plateaus



Unpredictable, volatile prices



Degrading Soils, Water Stress, Climate impact



Post-harvest losses, wastages

Digital & Emerging Technologies can make a difference

Source: DFI Report (MoAC&FW, 2018)



Vision of IDEA

*“To build a **National Digital Agriculture Ecosystem**, to elevate Indian Agriculture Sector to higher levels of efficiency and productivity, and to improve the welfare and income of farmers”*

Envisaged outcomes of IDEA



The farmers take **informed decisions** on what **crop** to grow, what **variety** of seed to buy, when to **sow**, and how to **maximize the yield**.



The **agriculture supply chains** become more efficient, transparent and cost-effective.



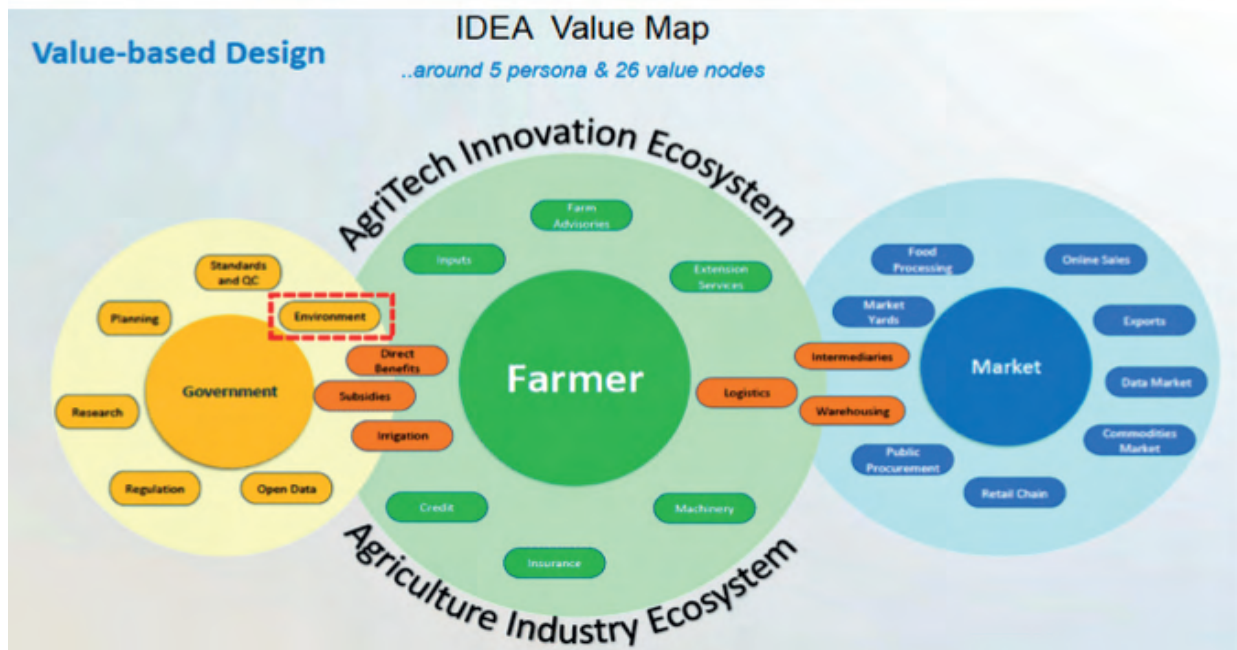
Precision agriculture becomes a reality with access to the right information at the right time.



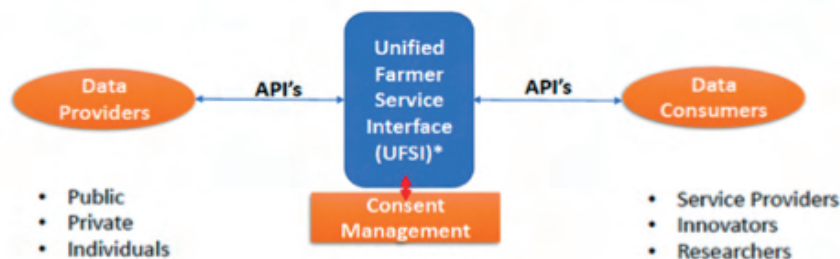
Farmers know whether to sell or store their produce, and **when, where and at what price to sell**.



Farmers benefit from **innovative solutions and personalized services** with protection of **privacy**.



UFSI - a critical component of IDEA



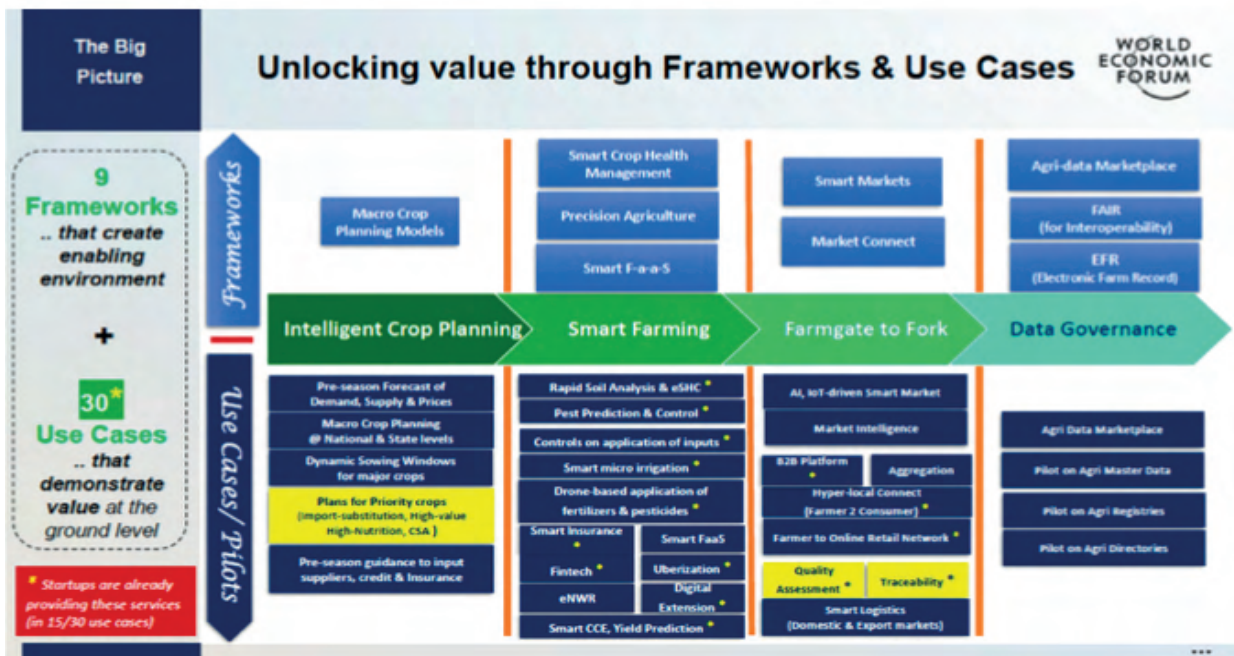
* Multiple FSIs can exist

- 1 at National level (UFSI)
- 1 each at State level (in State Core)
- All are federated @ UFSI level
- Consented exchange of data



AI4AI Vision

“ To transform the state of agriculture by deploying emerging technologies in a scalable, inclusive and **sustainable** way. ”



3P Framework for Data Governance



Principles for Responsible Data Sharing

Expert Committee	Appoint a committee of experts to focus on data protection and data privacy requirements.
Nature of data	Match level of safeguards to the nature of data (e.g –personal, non-personal data)
Data minimization	Collect minimal data to meet the specific purpose
Consent-based	Seek appropriate consents for collecting and using data for a specific purpose
Grievance redressal	Define processes to respond effectively if a data provider seeks information about the usage of its data, or raises any grievance
Privacy and security by design	Ensure sufficient legal (such as licensing agreements) and technical security measures (such as smart contracts, encryption, pseudonymization) for data protection and privacy



Quotes from Participants

“

*This platform opened up some much needed discussions.
Thank you for bringing them up on this seminar.*

”

“

*We need to have solutions that can increase farmer incomes,
and ensure incentives for farmers to adopt CSA practices.*

”

“

*Technology in itself won't make much impact on agriculture
unless its application is simplified for farmers. Furthermore, it
has to be bottom up and relevant for marginalised farmers.*

”

“

*Farmers are masters of knowledge. Our efforts should be to
facilitate the process wherein farmers can pull the required
information, and make choices.*

”



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