gain Global Alliance for Improved Nutrition
HarvestPlus Better Crops • Better Nutrition

GLANCE

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Reflections

Read more...Page 2

Highlights GAINed

Read more...Page 3

Sights from the field

Read more...Page 4

Digi-Tech enabled supply chains strengthen agribusiness

Digital agriculture holds great promise in enabling and catalysing food systems transformation by improving efficiency, quality and productivity of farms. From addressing climate change, to ensuring food security and implementing sustainable practices, digital technology has the potential to remodel the sector without jeopardizing the sector's sustainability goals. Digitalization offers plausible solutions to overcome major agricultural threats faced by Indian farmers, like declining farm productivity, stagnating farm incomes and fragmented land holdings. Challenges in the agribusinesses can also be minimized to a great extent by deploying digital solutions in the agricultural value chains, which in turn would improve operational efficiency and real time visibility. To attain food and nutritional security it is imperative that we build interconnected agri-value chains that make agriculture more profitable, lower production costs and enhance quality.

The world population is projected to reach 8.5 billion in 2030, and to increase further to 9.7 billion by 2050. The world from now must feed two billion more people by 2050 and the demand for food will be 56% greater than it was in 2010. Challenges like climate change, increased food inflation, volatility in food prices, increase in the frequency of droughts & floods and high production costs pose major threats to agriculture. In addition to these challenges, the escalation of global conflicts has left a major dent in the foundation of the global food security agenda; destroying agricultural supply chains. Digital agriculture has the potential to transform agricultural economy and improve the livelihoods of farmers and other stakeholders when deployed at scale.

The challenge of increasing agricultural productivity to meet the needs of a growing population necessitates the digitization of agri-value chains, which provides stakeholders with real-time information by connecting farmers with consumers at all steps of the production and consumption process. Digital tools such as Artificial Intelligence (AI) and Internet of Things (IoT) play a crucial role in enabling better and faster financial management and data transparency among all stakeholders. Furthermore, presence of digital marketplaces, such as 'eNAM', enables market interactions and provides information that would make it easier for farmers to have their commodities marketed. At the same time this opens new avenues for making informed decisions such as what to sell, where to sell, whom to sell to and at what price.

Agriculture, which still largely uses cash; is rapidly going digital, with major producers and dealers accepting digital payments via e-wallets and mobile applications. Government of India has rolled out several initiatives under the Digital India program including 'Kisan' call centres and mobile based apps for weather and crop-based advisories to harness the potential of Information and Communication Technology (ICT) in agriculture and help the farming community. Apps like the 'AgriMarket' provide farmers with market information enabling them to take informed decisions and prevent distress sale.

Today, there is no sector that is not transformed by technology. Technology is now crucial to building fair, sustainable and transparent value chains; through which India can enhance and transform its agricultural landscape, both nationally and worldwide. It is likely that farmers will further adopt digital tools, platforms and techniques to increase profitability, productivity and lower costs. Penetration of smartphones and low cost internet access are already building firm foundations for such agri-tech adoption. As a first step towards making India agriculturally self-reliant, it is critical to connect all stakeholders in the agri-value chain to realize better productivity and yields.

Reflections

> Digital solutions are the need of the hour to create efficiencies across the agri value chain. India has often been at the forefront of affordable and pragmatic digital solutions, and it is exciting to see these getting translated into the agri sector. We at GAIN are proud to partner with agencies that pioneer such solutions and are excited to explore its potential to impact at scale to ensure traceability and transparency.

Bhuvaneswari Balasubramanian
Senior Technical Specialist, GAIN

> Digital and Disruptive agricultural technologies have emerged as a force multiplier for creation of nutrition-smart, traceable and responsive agri value chains. We are headed towards exciting times as value chain actors embrace innovative technologies as the pivot for smallholder agriculture and food system transformation.

Ravinder Grover
Program Lead, HarvestPlus

Digitalization: Revolutionizing Agriculture

Ramdayal Sah lives in the remote village of Belsandi in the district of Samastipur, Bihar. He has 4 acres of land and cultivates majorly wheat, potato, paddy and some seasonal vegetables for home consumption. He has a 6-person family including his two school going kids, parents and his wife.

Lockdowns imposed due to the COVID-19 pandemic brought social life in the village to a standstill. It was then that Ramdayal started realizing the power of smartphones and the internet. He was surprised at how easily information was available and accessible on any subject matter. The smartphone opened new doors for him, which was earlier unimaginable.

It was through a fellow farmer that he got to know about the 'DeHaat' app. He quickly registered himself and found the app useful for navigating issues around pests, diseases, irrigation management etc. When it came to sowing wheat in the month of November 2021, the local 'DeHaat' center informed him regarding biofortified wheat varieties that is BHU 31, marketed under the brand name Triticum 30. The unpleasant memories of suffering during the pandemic, encouraged him to adopt the zinc enriched biofortified wheat without hesitation. Moreover, he was assured that the productivity would be comparable to the traditional variety he used to grow.

He sowed the wheat in his 2 acres of land. He got the hand-holding support from the 'DeHaat' team to geotag it. Once his field was tagged, it was a smooth ride from there on. Through the app he used to get regular push notifications around irrigation requirements, possible threats from pests and diseases, scheduling of fertilisers, etc. Moreover, he also used to get pre-recoded calls explaining the same in his local language which was much more convenient. In addition to this, he was easily able to reach out to an agronomist through a toll free number in the app, to ask his queries regarding critical growth stages to save some amount on irrigation water.

Though he used to get daily market prices offered on 'DeHaat' in messages to buy back zinc wheat produced, he decided to keep it for consumption purposes as he and his family liked the taste and softness of breads made from zinc wheat. He said that he is happy that he could devote more time to other non-farm activities, now that he can get most of the information sitting at home, which was earlier available either at Krishi Vigyan Kendras (KVKs) or mandis.

'DeHaat' is one of the fastest-growing start-ups in the Agri Tech sector and one of the very few companies providing end-to-end solutions and services to the farming community in India. GAIN is implementing a pilot with 'DeHaat' in Rajasthan and Bihar for the commercialisation of Iron Pearl Millet and Zinc Wheat respectively. The platform enhances the digital interaction between value chain actors, information dissemination, along with gathering feedback and process monitoring.

Highlights GAINed...

National Conference on Millets: The Future Super Food for India

Organised by ASSOCHAM in New Delhi on 23rd June 2022

Millets have a long history in India. They can be very well grown in dry areas and areas with low soil fertility. Millets have a very short lifecycle and can be kept for more than 2 years if properly stored. They are highly nutritious and provide immense health benefits and thus is known as the super food.

Under the National Food Security Mission (NFSM), 8% share of the targeted enhanced food grain production is allocated to millets. Recognising the importance of millets in improving the nutritional outcomes, Associated Chambers of Commerce and Industry of India (ASSOCHAM) in association with Ministry of Food Processing India (MoFPI) had organised the **National Conference on Millets: The Future Super Food for India** on 23rd June 2022 at Hotel Le Méridien, New Delhi. The objective of the conference was to strengthen the value chain of millets and improve the institutional and policy environment that foster the millet sector. GAIN partnered the national event as a co-sponsor. The inaugural session was graced by dignitaries including Mr. Prahlad Singh Patel (Union Minister of State Food Processing Industries), Mr. Minhaj Alam (Joint Secretary, Ministry of Food Processing Industries), Mr. Bhupesh Chaudhary (Special Commissioner of Industries), Mr. Ramsinh Rathwa (Chairman, Tribal Co-Operative Marketing Development Federation of India Limited - TRIFED), and Mr. Tarun Vij (Country Director, India, GAIN). Addressing the conference, the Union Minister pointed out that the production of millets in general and the production of Pearl Millet in India has increased significantly in the last five years. He talked about various government schemes to promote and strengthen the value chain of millets and stressed the need to mainstream millets to attain nutritional security.

Mr Tarun Vij shared his insights on the drivers of the food system and the importance of millets in the food ecosystem of India. He also talked about the role of food environment, food supply chains and consumer behaviour in delivering affordable and healthier food choices to people. He explained the GAIN India programs and how they contribute to better nutritional outcomes. Ms. Jyoti Rupa Pujari (Senior Project Associate, GAIN) highlighted the challenge of malnutrition worldwide and in the Indian context, feasibility of biofortification as a complementary approach to end hidden hunger. She also mentioned the approaches undertaken as part of the commercialisation of the biofortified crops program to strengthen the value chain of iron enriched Pearl millet. Mr. Prateek Uniyal (Program Manager, HarvestPlus) gave an overview of the problem of hidden hunger in India and the varietal development and seed multiplication of biofortified crops.

The one-day conference witnessed interactive panel discussions around promoting millets as a super food, exploring opportunities to harness consumer demand and the way forward to develop and strengthen the value chain for millets. Representatives from the industry, civil society organisations, start-ups, research organisations were also present at the event. Deliberations and suggestions on including millets in diets as a sustainable approach to alleviating malnutrition and action points to achieve nutritional security were also presented. With India now being the 5th largest exporter of millets globally, there is an urgent need to spread awareness of millets worldwide. More investments are required in the production and processing of millets which will create value generation and promotion of sustainable and healthy food choices. The Government of India is also making provisions to facilitate the movement of the surplus production of millets to other states through the Food Corporation of India (FCI) to cater to the needs of consumer states.

पोषण बढ़ाने का एक स्थायी तरीका है बायोफोर्टिफिकेशन

आज समाज नेटवर्क

चंडीगढ़। आजादी के बाद से, भारत के खाद्यान्न उत्पादन में पांच गुना से अधिक की वृद्धि दर्ज की गई है, जिसमें 2019-2020 में 292 मिलियन टन का रिकॉर्ड देखा गया है। अनाज उत्पादन में आत्मनिर्भर होने के बावजूद, विशेष रूप से महिलाओं और बच्चों में कुपोषण अभी भी कायम है और शायद हाल के समय के सबसे गंभीर सार्वजनिक स्वास्थ्य मुद्दों में से एक है। इन समस्याओं को हल करने के लिए एक बहुआयामी दृष्टिकोण की आवश्यकता होती है जिसमें कमजोर लोगों तक पहुंचने के लिए सामाजिक-सांस्कृतिक संदर्भ में पहुंच, सामर्थ्य और मापनीयता शामिल हो।

पोषण की कमी को दूर करने में फूड फोर्टिफिकेशन के महत्व को स्वीकार करते हुए, ग्लोबल एलायंस फॉर इम्प्रूव्ड न्यूट्रिशन (जीएआईएन) गतीय और राज्य स्तर पर सरकारों, एसएमई सहित निजी क्षेत्र के भागीदारों, नागरिक समाज संगठनों और अनुसंधान और शैक्षणिक संस्थानों के साथ स्टेपल फूड फोर्टिफिकेशन को बढ़ाने के लिए काम करता है। तरुण विज, कंट्री डायरेक्टर, गेन ने बताया कि सूक्ष्म पोषक तत्वों के कुपोषण से निपटने के लिए प्रधान फसलों का बायो-फोर्टिफिकेशन आर्थिक रूप से व्यवहार्य दृष्टिकोण साबित हुआ है। इसके साथ ही गेन ने 6 राज्यों (पंजाब, उत्तर प्रदेश और बिहार में जिंक गेहूं और कर्नाटक, महाराष्ट्र और राजस्थान के लिए आयरन पर्ल मिलेट (बाजरा) के व्यावसायीकरण के लिए हार्वेस्टप्लस के साथ सहयोग किया है।

2020 में कार्यान्वयन शुरू होने के बाद, परियोजना बीज और खाद्य उद्योग के साथ साझेदारी के माध्यम से पोषक तत्वों से भरपूर फसलों के पैमाने और पहुंच को प्रेरित करती है। इन बायोफोर्टिफाइड फसलों के बीज और अनाज को तेजी से बढ़ाने के लिए गेन ने छोटे और मध्यम खाद्य प्रोसेसर, मिलर्स, एग्रीगेटर्स, किसान समूहों और अन्य मूल्य श्रृंखला अभिनेताओं के साथ साझेदारी करता है। कोई भी एकल प्रयास सूक्ष्म पोषक तत्वों की कमी को दूर नहीं करेगा, और बायोफोर्टिफिकेशन मौजूदा इंटरवेंशंस को पूरा करता है, जैसे कि सप्लीमेंटेशन और इंडस्ट्रियल-फूड फोर्टिफिकेशन विशेष रूप से भारत जैसे विकासशील देशों में।

Interview on "Biofortification is a sustainable way to increase nutrition" appeared in Aaj Samaj. It discusses how hidden hunger affects a large proportion of the population as well as the economic development of the country. Furthermore, it emphasizes how large-scale food fortification has proven to be a game changing solution to combat malnutrition and increas micronutrient density among Indians.

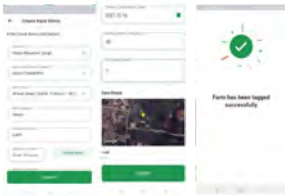
बायोफोर्टिफिकेशनः भारत में सूक्ष्म पोषक तत्वों की कमी से निपटने के लिए एक कुशल उपकरण

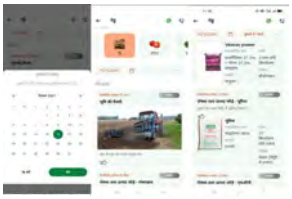
भारत ने पर्याप्त खाद्यान्न उत्पादन में जबरदस्त प्रगति की है और 1947 में स्वतंत्रता के बाद से एक शुद्ध खाद्य निर्यातक बनने की ओर अग्रसर है। हालांकि, भारत एक महत्वपूर्ण वैश्विक खाद्य बोझ के लिए जिम्मेदार है। ग्लोबल हंगर इंडेक्स 2021 में, भारत 116 देशों में से 101वें स्थान पर आया, जो 2020 में 107 में से 94वें स्थान पर था। यह अब अन्य एशियाई देशों, पाकिस्तान, बांग्लादेश और नेपाल से पीछे है।

खराब रैंकिंग के लिए मुख्य रूप से आबादी के कमजोर वर्गों के बीच प्रचलित सूक्ष्म पोषक तत्व कुपोषण को जिम्मेदार ठहराया जाता है, जिसके लिए औद्योगिक खाद्य फोर्टिफिकेशन के साथ पूरक दृष्टिकोण के रूप में बायोफोर्टिफाइड - पोषक तत्व समृद्ध फसलों (जो उच्च सूक्ष्म पोषक तत्व वाली प्राकृतिक नस्ल की किस्में हैं) को अपनाने और व्यवसायीकरण करने की आवश्यकता है। विकासशील देशों में भूख, एनीमिया और सूक्ष्म पोषक तत्वों की कमी के बढ़ते प्रसार को देखते हुए, ग्लोबल अलायंस फॉर इम्प्रूव्ड न्यूट्रिशन (गेन) और हार्वेस्टप्लस ने एशिया और अफ्रीका में बायोफोर्टिफाइड फसलों के व्यावसायीकरण के लिए सहयोग किया है। भारत में जिंक समृद्ध गेहूं और आयरन पर्ल मिलेट पर ध्यान केंद्रित किया गया है जिसमें 6 राज्यों को शामिल किया गया है। 2020 में कार्यान्वयन शुरू होने के बाद, परियोजना बीज और खाद्य उद्योग के साथ साझेदारी के माध्यम से इन पोषक तत्वों से भरपूर फसलों के पैमाने और पहुंच को उत्प्रेरित करती है। गेन का उद्देश्य आबादी, विशेष रूप से सबसे कमजोर समुदायों के बीच पौष्टिक और सुरक्षित भोजन की खपत में सुधार करके पोषण परिणामों को आगे बढ़ाना है। एक स्थायी और लागत प्रभावी सिद्ध दृष्टिकोण के रूप में बायोफोर्टिफिकेशन पोषण अभियान, और मिड डे मील और आईसीडीएस जैसी सामाजिक सुरक्षा योजनाओं आईसीडीएस जैसी सामाजिक सुरक्षा योजनाओं जैसी विभिन्न पहलों के माध्यम से छिपी हुई भूख और कुपोषण से लड़ने के लिए सरकार के प्रयासों का समर्थन और गति प्रदान करता है।

The feature story on " Biofortification: An efficient tool for tackling micronutrient deficiencies in India" appeared in Navsatta. The story mentions how biofortification represents a promising solution to micronutrient malnutrition and can assist in moving from food security to nutritional security in India.

Sights from the field...





Digital Interventions for Commercialisation of Biofortified Crops

Digital technologies, such as Artificial Intelligence (AI), Machine Learning (ML), remote sensing, big data, block chain and Internet of Things (IoT), are transforming agricultural value chains and modernizing operations. Successful adoption of digitisation in agriculture would lead to better and efficient utilization of resources and inputs, increased productivity and enhanced resilience and sustainability.

GAIN is implementing a pilot with an Agri-digital marketplace called 'DeHaat' in Rajasthan and Bihar for the commercialisation of Iron Pearl Millet and Zinc Wheat respectively. 'DeHaat' is one of the fastest-growing start-ups in the agri-tech sector providing end-to-end solutions and services to the farming community in India. GAIN along with 'DeHaat' has developed an implementation model which encompasses digital tools in addition to last mile ground presence at key nodes in the value chain to ensure traceability and improve the ease of operations for value chain actors. The platform enhances the digital interaction between value chain actors, information dissemination, along with gathering feedback and process monitoring.

The platform works by facilitating farmers, especially Small Holder Farmers (SHFs) to grow biofortified crops and ensures last mile delivery of biofortified seeds and inputs. The agri-digital marketplace also guarantees the supply of quality farm produce based on the demand of food processors while maintaining traceability of the produce. On- farm integrated crop advisory services such as weather forecasts, timing and quantity of fertilizers and plant protection chemicals, irrigation scheduling and market information are provided to farmers. Digital efforts to create awareness among Rajasthan and Bihar farmers for the adoption of biofortified seeds, developing market linkages with bulk buyers/processors are also targeted.

The marketplace acts as an end-to-end solution platform, from farmers to consumers. It utilizes digital technologies such as mobile applications, call centres, satellite monitoring, geotagging etc. along with traditional operations for engaging all the value chain actors to commercialise the two crops. The marketplace ensures traceability in the value chain by QR coding of biofortified seed packages as well as grain bags, maintaining records of farmers purchasing these seeds, quantity purchased and tracking and aggregating the grain produced, providing call centre support and continuous advisory to the farmers cultivating biofortified crops and processing of biofortified grains through identified millers.

A live dashboard for real time data visualization and monitoring provides insights to the stakeholders on multiple parameters such as the quantity of seeds sold, number of farmers, aggregators, processors, grain distribution partners and other value chain partners enrolled, the quantity of biofortified grain commercialized, usage of mobile application, call centre, IVRS activity, advisory responses from farmers and demand forecasting to millers. Key nodes of value chains like seed retail, farmer enrolment, grain harvesting, aggregation, transportation to millers /processors are monitored on a regular basis.

The pilot in the two states was targeted at 1,000 farmers covering an area of 1,500 acres and grain aggregation of 500 MT. Currently we are planning to scale up the digital interventions to 4 states aiming to reach 20,000 farmers in an area of 30,000 acres and grain aggregation of 10,000 MT. Upscaling traceability solutions with expansion beyond processing (from seed distribution to retailing of consumer food products) is also envisioned.

Quote from the farmer...

"Before Covid, I used to get information related to crop cultivation and market prices through KVKs or mandis. Now after registering myself on the 'DeHaat' app, things have become very easy for me as I get regular and timely push notifications on all aspects including pest and disease management, irrigation management, daily market prices etc... I am happy that I have the time to get involved in other non-farm activities also."

Ramdayal Sah, Farmer, Samastipur, Bihar

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