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MARCH 2024

AGRICULTURE The National Agriculture Magazine TODAY

VOLUME XXVII | ISSUE 3

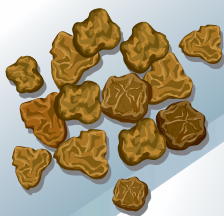
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COVER PICTURE CREDIT - SNEHA KOPPULA

Publisher & Printer – Dr. MJ Khan on behalf of M/s Concept Agrotech Consultants Limited, Published from 306 Rohit house Tolstoy Road New Delhi-110001 and printed by Everest Press E-49/8, Okhla Industrial Area-II New Delhi-110020

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GENDER EQUALITY FOR GLOBAL GOOD

At the World Economic Forum in January this year, India spearheaded the launch of 'Alliance for Global Good – Gender Equity and Equality'. The recognition that global good hinges on gender equity and equality marks a new beginning which is exciting and interesting.

Economic advantages in agri food systems have generally been inequitably skewed towards male counterparts. Unequal pays, lack of land titles, less access to education, resources and facilities, gender based violence have stifled the natural potential of women farmers. Even the ones, who emerge out of a patriarchal system, have stories of years of struggle and hard work. What one male farmer achieves in a year, women might take three because of the society induced hurdles. This is disconcerting considering the fact that agriculture sector employs 80% of all economically active women in India. With growing rural to urban migration by men, there is 'feminisation' of agriculture sector. About 60-80% of food is produced by rural women. So if this largest section of work force in agriculture is under looked and sidelined, India's agriculture is undoubtedly at perils and doomed to fail.

Empowering and mainstreaming women workforce in agriculture can bring about a paradigm shift in agriculture. It will enhance India's food and nutrition security and alleviate poverty and hunger. By helping women access new technology, knowledge, market and subsidies, we are inadvertently helping Indian agriculture to prosper and develop. Agri machinery segment should work on gender neutral equipment and machines that are women friendly as I am once again stating the fact that there is an increasing feminisation in agriculture.

Women should be equally compensated. They have the added responsibilities of taking care of their family and farm. Most of them, being from economically disadvantaged groups, may not have adequate support at home. Both their on-farm and in-family chores are equally important, as if one suffers, the other will be affected. So in my opinion they need to be compensated more.

Women in any social strata are bound by familial responsibilities and conditioned upbringing. To break free would be a societal heresy, even now! Conditions have improved, but there is yet a gaping divide that holds them back from assuming leadership positions. Women should break free from the shackles of this self-induced restriction and embrace the wider realm of power and knowledge. Societal acceptance and support will follow suit in time.



Anjana



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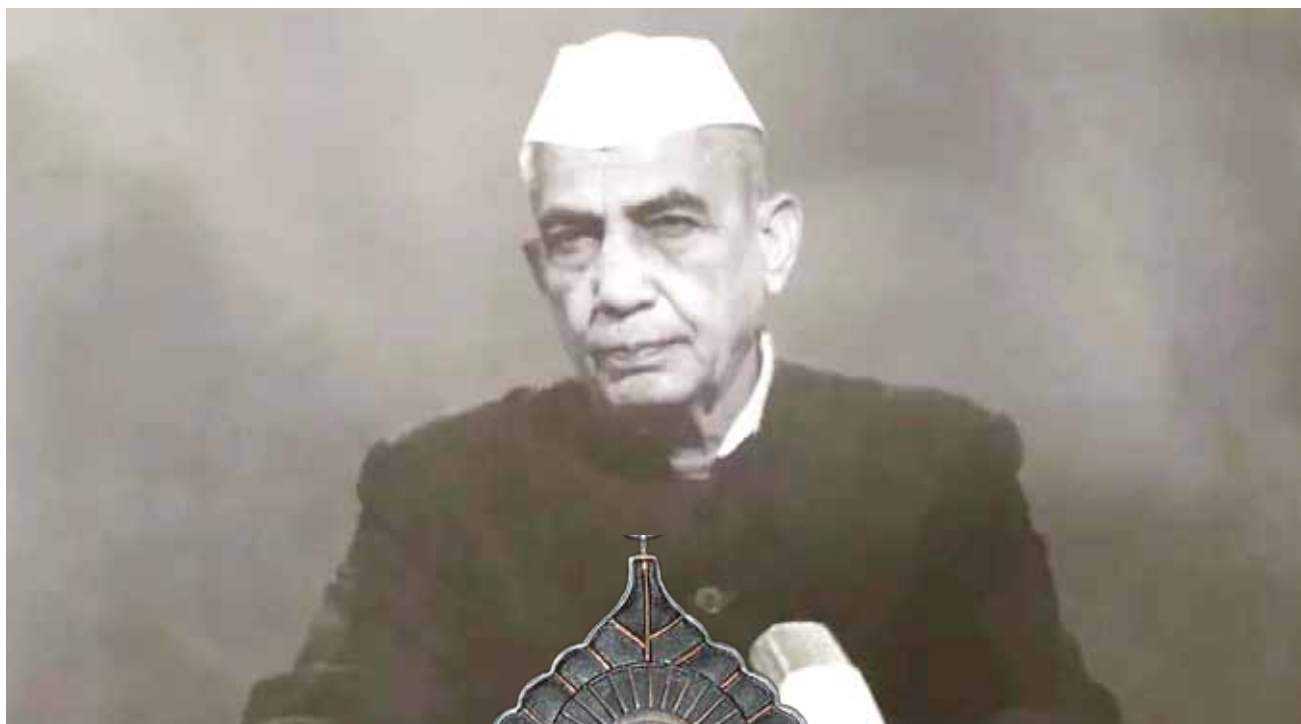
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Chaudhary Charan Singh

Messiah of Indian Farmers



Chaudhary Charan Singh, the Champion of Farmers is renowned for his deep commitment to the welfare of farmers. Honouring him with Bharat Ratna has made the Indian farming community jubilant as finally a great leader gets his due recognition.

Early Life

Born to Smt. Netra Kaur and Chaudhary Meer Singh on 23 December 1902 in Nurpur village in United Provinces of Agra and Oudh, he had his primary education in his native village school at Jani Khurd, and passed his matriculation from the Government High School, Meerut. He graduated in Science from Agra College in 1923, did his M.A. in History from Agra University, passed the L.L.B. examination in 1927 and got himself enrolled as an advocate in Ghaziabad.



In February 1970, Chaudhary Charan Singh became the Chief Minister of the State for a second time. His tenures as Chief Minister have been described by many as golden chapters in the history of the state of U.P.

Chaudhary Charan Singh's strong social conscience was quite evident in his youth itself. The ideas and teachings of Swami Dayanand Saraswati, the founder of Arya Samaj had a deep influence on him. Inspired by Mahatma Gandhi and Sardar Patel, Chaudhary Charan Singh joined the freedom movement.

Political Career

Chaudhary Charan Singh was elected to the Legislative Assembly of the United Provinces from Chaprauli in Meerut District in 1937, and represented the constituency in 1946, 1952, 1962 and 1967. He became Parliamentary Secretary in Pandit Govind Ballabh Pant's Government in 1946 and worked in departments of Revenue, Medical and Public Health, Justice, Information etc. In June 1951, he was appointed Cabinet Minister in the State and given charge of the departments of Justice and Informa-

tion, and later, Revenue and Agriculture departments in 1952. He was Minister for Home and Agriculture (1960), Minister for Agriculture and Forests (1962-63). He gave up the Department of Agriculture in 1965 and took charge of the Local Self-government department in 1966.

Compelling Contributions

Chaudhary Charan Singh quit the Congress in 1967 and later was elected as leader of the Samyukta Vidhayak Dal and as the Chief Minister of Uttar Pradesh. In February 1970, Chaudhary Charan Singh became the Chief Minister of the State for a second time. His tenures as Chief Minister have been described by many as golden chapters in the history of the state of U.P.

Chaudhary Charan Singh's vision for social equity, and his ability to create political consensus on issues, resulted in important pieces of legislation in the State Assembly. Some of the notable achievements were the Debt Redemption Bill, 1939, the Consolidation of Holdings Act of 1953, and the Uttar Pradesh Zamindari and land Reforms Act, 1952, which resulted in the abolition of the Zamindari system throughout the State. The land reforms in the state empowered the tillers, provided the landless with ownership of land and thus created the enabling environment for their social and economic upliftment.

The Agricultural Produce Marketing Bill, which he introduced in the assembly in 1938, was passed in 1964, and helped improve the market linkages for the farmers. The consecutive years of drought in 1966-1967 led the Central government to consider procuring food grains directly from farmers at prices, which would have been highly unfavorable to them. Chaudhary Charan Singh modified the central government plan to the advantage of agriculturalists by offering them a much higher procurement price than the prevailing market rates. The infrastructure he put in place for this led in time to the Minimum Support Price mechanism, which has today become an integral part of government interventions to provide pricing stability to the agricultural producers.

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National Farmers' Day, also known as 'Kisan Diwas', is observed every year on December 23 to celebrate the hard work and determination of the farmers. This particular day was chosen to commemorate the occasion as it marks the birth anniversary of former prime minister Chaudhary Charan Singh

Into the National Politics

Chaudhary Charan Singh was elected to the Lok Sabha for the first time in 1977, and was Home Minister in the Janata party

Government. In January 1979, he was appointed Finance Minister and subsequently elevated to the post of Deputy Prime Minister. He was sworn in as the Prime Minister on 28 July 1979.

Chaudhary Charan Singh's interventions to reduce input costs for the farmers, rural electrification, his role in the creation of institutions like the NABARD, the Rural Development Ministry highlights his deep commitment to Indian farming community.

Publications

Chaudhary Charan Singh was a scholar of Indian economics. His books "India's Economic Policy - The Gandhian Blue-print" and "Economic Nightmare of India - Its Cause and Cure" are masterpieces on the subject. Some of his important publications include: Abolition of Zamindari, Co-operative Farming X-rayed, India's Poverty and its Solutions, Agrarian Revolution in Uttar Pradesh, and Land reforms in UP and the Kulaks. He wrote a unique book on Indian etiquette which was published with the title "Shishtachar".

MS Swaminathan

Architect of Food Secure India

Dr MS Swaminathan, the first World Food Prize Laureate has been felicitated by Bharat Ratna for his immense contributions to Indian food sovereignty. The chief architect of India's green revolution, MS Swaminathan spearheaded the introduction of high-yielding wheat and rice varieties in India.

Early Life

Born on 7th August 1925, to M. K. Sambasivan and Parvati Thangammal Sambasivan in Kumbakonam, Madras Presidency, he matriculated from Catholic Little Flower High School. His parents wanted him to pursue a medical profession and with that in mind, he started off his higher education with zoology. But when he witnessed the impacts of the Bengal famine of 1943 during the Second World War and shortages of rice throughout the sub-continent, he decided to devote his life to ensuring India had enough food.

He went on to finish his undergraduate degree in zoology at Maharaja's College in Trivandrum, Kerala. He then studied at University of Madras (Madras Agricultural College, now the Tamil Nadu Agricultural University) from 1940 to 1944 and earned a Bachelor of Science degree in Agricultural Science. In 1947 he moved to the Indian Agricultural Research Institute (IARI) in New Delhi to study genetics and plant breeding. He obtained a post-graduate degree with high distinction in cytogenetics in 1949. His research focused on the genus *Solanum*, with specific attention to the potato. He earned a Doctor of Philosophy degree in 1952 at the Plant Breeding Institute of the University of Cambridge School of Agriculture. He accepted

a post-doctoral research associateship at the University of Wisconsin's Laboratory of Genetics



to help set up a USDA potato research station.

Associating with Norman Borlaug

Dr. Swaminathan started his professional journey as an assistant botanist at Central

Rice Research Institute in Cuttack. Half a year later he joined Indian Agricultural Research Institute (IARI) in New Delhi in October 1954 as an assistant cytogeneticist.

Swaminathan and Norman Borlaug collaborated, with Borlaug touring India

Just before receiving his Nobel Prize in 1970, Norman Borlaug wrote to Swaminathan:

"The Green Revolution has been a team effort and much of the credit for its spectacular development must go to the Indian officials, organizations, scientists, and farmers. However, to you, Dr. Swaminathan, a great deal of the credit must go for first recognizing the potential value of the Mexican dwarfs. Had this not occurred, it is quite possible that there would not have been a Green Revolution in Asia".



and sending supplies for a range of Mexican dwarf varieties of wheat, which were to be bred with Japanese varieties. Initial testing in an experimental plot showed good results. The crop was high-yield, good quality, and disease free. There was hesitation by farmers to adopt the new variety but after following repeated requests by Swaminathan to demonstrate the new variety, he was given funding to plant small demonstration plots. A total of 150 demonstration plots on 1 hectare were planted. The results were promising and the anxieties of the farmers were reduced. The new wheat varieties were sown and in 1968 production went to 17 million tonnes, 5 million tonnes more than the last harvest.

In 1972, Swaminathan was appointed as the director-general of the Indian Council of Agricultural Research (ICAR) and a secretary to the Government of India. In 1979, he was made a principal secretary, a senior position in the Government of India. The next year, he was shifted to the Planning Commission.

Stellar Contributions

As director-general of ICAR, he pushed for technical literacy, setting up centres all over

India for this. Droughts during this period led him to form groups to watch weather and crop patterns, with the ultimate aim of protecting the poor from malnutrition. His shift to the Planning Commission for two years resulted in the introduction of women and environment with respect to development in India's five year plans for the first time.

In 1982, he was made the first Asian director general of the International Rice Research Institute (IRRI) in the Philippines. One of the contributions during his tenure there was conducting an international conference "Women in Rice Farming Systems". For this, the United States-based Association for Women in Development gave Swaminathan their first award for "outstanding contributions to the integration of women in development". As director general, he spread awareness among rice-growing families of making the value of each part of the rice crop. In 1984 he became the president and vice-president of the International Union for Conservation of Nature and World Wildlife Fund respectively.

First World Food Prize

In 1987 he was awarded the first World

Food Prize. He used the prize money to establish "M.S. Swaminathan Research Foundation." Swaminathan went on to chair the World Food Prize Selection Committee following Borlaug. Swaminathan mentored numerous Borlaug-Ruan interns, part of the Borlaug-Ruan International Internship.

Institution builder

Swaminathan established the Nuclear Research Laboratory at the IARI. He played a role in and promoting the setting up of the International Crop Research Institute for the Semi-Arid Tropics in India; the International Board for Plant Genetic Resources (now known as Bioversity International) in Italy and the International Council for Research in Agro-Forestry in Kenya. He helped to build and develop a number of institutions and provided research support in China, Vietnam, Myanmar, Thailand, Sri Lanka, Pakistan, Iran, and Cambodia.

Swaminathan co-chaired the United Nations Millennium Project on hunger from 2002 to 2005 and was head of the Pugwash Conferences on Science and World Affairs between 2002 and 2007. In 2005 Bruce Alberts, President of the U.S. National Academy of Sciences said of Swaminathan:

Swaminathan was the chair of the National Commission on Farmers constituted in 2004. In 2007, President A.P.J. Abdul Kalam nominated Swaminathan to the Rajya Sabha. Swaminathan introduced one bill during his tenure, The Women Farmers' Entitlements Bill 2011, which lapsed. One of the aims it proposed was recognising women farmers.

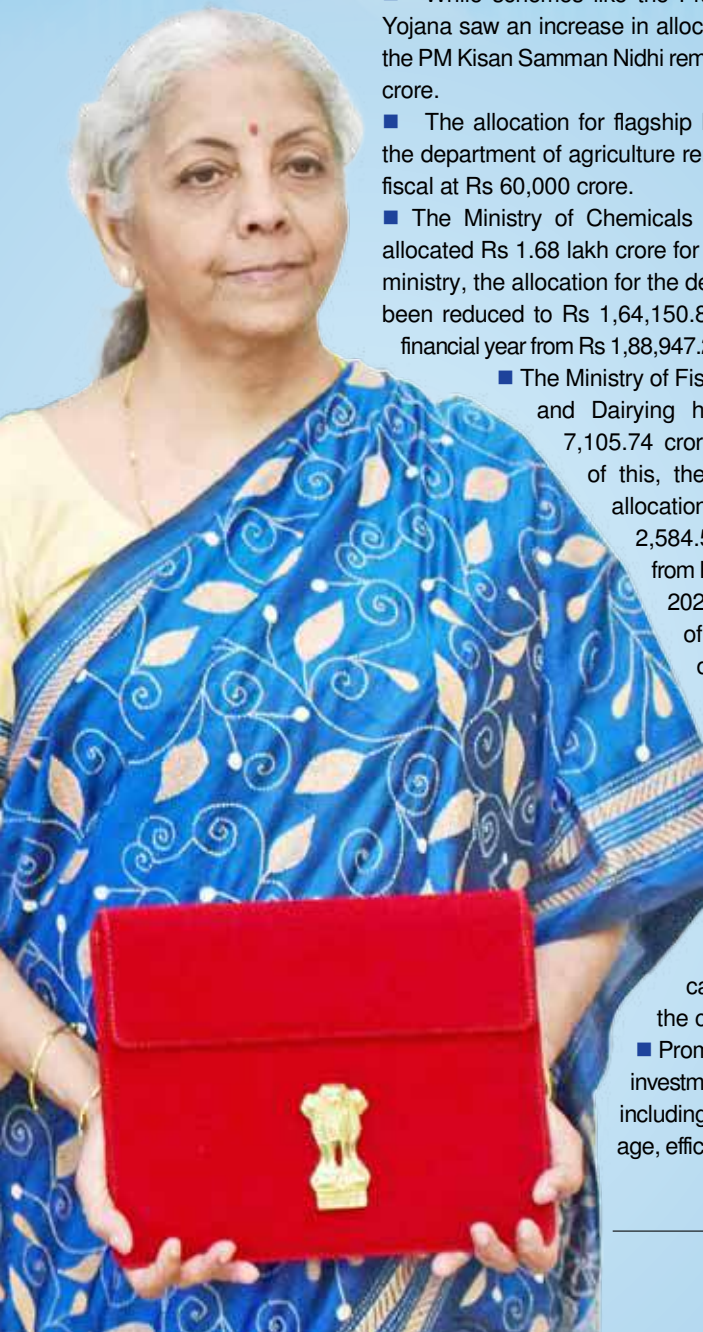
Evergreen Revolution

Swaminathan coined, 'Evergreen Revolution' which meant to address the exploitative nature of agriculture. Describing it as, "productivity with perpetuity", it aimed to address the continuous increase in sustainable productivity that mankind requires.

In his later years, he had also been part of initiatives related to bridging the digital divide, and bringing research to decision-makers in the field of hunger and nutrition.

INTERIM UNION BUDGET 2024

ALLOCATIONS TO AGRICULTURE



■ The allocation for the Agriculture Ministry is ₹1,17,528.79 crore, an increase of ₹1,997 crore when compared with the previous Budget. The allocation for the Ministry in the revised estimates was ₹1,16,788.96 crore while the actual expenditure in 2022-23 was ₹99,877.01 crore, while the Department of Agricultural Research and Education (DARE) gets Rs 9,941.09 crore.

■ While schemes like the Pradhan Mantri Fasal Bima Yojana saw an increase in allocation, the allocation under the PM Kisan Samman Nidhi remained the same at ₹60,000 crore.

■ The allocation for flagship PM-KISAN scheme under the department of agriculture remains unchanged for next fiscal at Rs 60,000 crore.

■ The Ministry of Chemicals and Fertilizers has been allocated Rs 1.68 lakh crore for 2024-25 fiscal. Under this ministry, the allocation for the department of fertilisers has been reduced to Rs 1,64,150.81 crore for the upcoming financial year from Rs 1,88,947.29 crore in the current fiscal.

■ The Ministry of Fisheries, Animal Husbandry and Dairying has been earmarked Rs 7,105.74 crore for the next fiscal. Out of this, the department of fisheries' allocation has been increased to Rs 2,584.50 crore in the next fiscal from Rs 1,701 crore in the current 2023-24 fiscal. The department of animal husbandry and dairying has been allocated Rs 4,521.24 crore in 2024-25 from Rs 3,913.93 crore in the current fiscal.

■ The allocation for the Ministry of Food Processing Industries has been slightly raised to Rs 3,290 crore next fiscal from Rs 2,911.95 crore in the current fiscal.

■ Promotion of private and public investment in post-harvest activities including aggregation, modern storage, efficient supply chains, primary

and secondary processing and marketing and branding for ensuring faster growth of the food processing sector ,

■ Expansion of application of Nano DAP on various crops in all agro-climatic zones.

■ Atmanirbhar Oil Seeds Abhiyan - Strategy will be formulated to achieve 'atmanirbharta' for oil seeds such as mustard, groundnut, sesame, soybean, and sunflower. This will cover research for high-yielding varieties, widespread adoption of modern farming techniques, market linkages, procurement, value addition, and crop insurance.

■ Formulation of a comprehensive programme for supporting dairy farmers. The programme will be built on the success of existing schemes such as Rashtriya Gokul Mission, National Livestock Mission, and Infrastructure Development Funds for dairy processing and animal husbandry.

■ Implementation of Pradhan Mantri Matsya Sampada Yojana (PMMSY) will be stepped up to enhance aquaculture productivity from existing 3 to 5 tons per hectare, double exports to Rs.1 lakh Crore and generate 55 lakh employment opportunities in near future.

■ Setting up 5 integrated Aquaparks

■ Emphasis on blue economy, with the announcement of a new scheme "for restoration and adaptation measures, coastal aquaculture, and mariculture with an integrated and multi-sectoral approach"

■ Launch of bio-manufacturing and bio-foundry. This will provide environment friendly alternatives such as biodegradable polymers, bio-plastics, bio-pharmaceuticals and bio-agri-inputs.

■ Blue Economy 2.0 - For promoting climate resilient activities for blue economy 2.0, a scheme for restoration and adaptation measures, and coastal aquaculture and mariculture with integrated and multi-sectoral approach will be launched.

Nadir Godrej, Chairman and MD, Godrej Industries Ltd.



The Interim Budget 2024 lays a strong foundation for building a prosperous and inclusive India, in line with the vision of 'Viksit Bharat'. We echo the sentiment of empowerment for every section of society, particularly the 'Garib', 'Mahilayen', 'Yuva', and 'Annadata'. Their progress is intertwined with the nation's advancement, and it's heartening to see the Government prioritize their needs and aspirations. The foresight outlined for the 'AmritKaal', anchored in 'Reform, Perform, and Transform', sets a promising trajectory for inclusive and sustainable growth. The emphasis on next-generation reforms, underscores a collective endeavor towards a prosperous future. We particularly welcome the emphasis on clean energy initiatives like bio-manufacturing and compressed biogas blending. These measures will not only address climate concerns but also create exciting new opportunities in the green sector. Overall, Budget

2024 strikes a positive balance between continuity and progress, laying down a roadmap towards development, fostering innovation, and nurturing a sustainable future for our nation by 2047.

Balram Singh Yadav, Managing Director, Godrej Agrovet Limited



The Interim Budget 2024-25 reiterates government's commitment to strengthening the 'Annadata' and backbone of our nation – our farmers. From direct financial assistance through PM-KISAN SAMMAN Yojana to expanding farmer-centric policies and promoting innovations, the budget paves the way for inclusive, sustainable growth in the agricultural sector. Initiatives such as e-NAM and PMMSY are empowering farmers with better market access and infrastructure, while the focus on enhancing adoption of Nano-DAP clearly showcase government's intent to handhold farmers amidst the continuously evolving weather conditions. The proposals to improve milk yields and aquaculture productivity in addition to achieving 'Atmanirbharta' for oilseeds, demonstrates the government's commitment to food security and livelihood of generation across diverse agricultural fields. Overall, today's Interim Budget 2024-25 offers a promising roadmap for empowering our farmers, ensuring food security, and propelling the agricultural sector towards a brighter future."

Simon Wiebusch, President of Bayer South Asia and VP, MD & CEO of Bayer CropScience Ltd



The Finance Minister's announcement, identifying women and farmers as key focus groups for powering India's growth, has set the stage for policies that can substantially boost development in rural areas. I am also happy to see the government's continued push to improve farmer incomes. Policies like the PM Kisan Sampada Yojana and the PM Fasal Bima Yojana, along with measures to promote private and public investment in post-harvest activities including modern storage, efficient supply chains, and marketing and branding will herald a transformative era in Agriculture. While the budget's focus on advancing sustainability initiatives across sectors, improving farmer incomes, and women empowerment will help fulfil the Prime Minister's vision of a 'Viksit Bharat', its proactive approach on women's health is a crucial step towards ensuring preventive healthcare for a large section of the population.

Deepak Shah Chairman CCFI



Indian agrochemical industry has resilience and demonstrated its potential in indigenous manufacturing both in terms of production and quality. Exports alone to the tune of Rs. 45000 Crore, majorly by our members to 152 countries, makes us confident that government should work towards making India a manufacturing hub. However in order to focus on “MAKE IN INDIA”, there is an imperative need to increase customs duty on import of agrochemicals, both technical and formulations, for “ATMANIRBHAR Bharat” & “MAKE IN INDIA” to happen. Hence, the customs duty must be increased both on technical & formulations from existing 10% which is a disincentive for Indian manufacturers (favourable to importing lobby) and draining our valuable foreign exchange & hence Chinese imports are not forced/dumped in India & our own grass root manufacturing industries suffer as only less than 45-50% manufacturing capacity is utilised currently. It would be pertinent to share that we have already made heavy investment in R&D & manufacturing. CCFI has reiterated the long pending demand of the Indian agrochemical industry and strongly recommends enhancing custom duty on Technical to 20% and 30% on import of all formulations OR at least maintain a delta of 10% between the two to minimize import of formulations which has no value addition, and quality of technical used is questionable as majority of imports are from China.

KC Ravi, Chief Sustainability Officer, Syngenta India Pvt Ltd and Chairman Crop Life India

The robust physical-digital-social infrastructure, developed in the last decade has given the economy a good foundation for a Viksit Bharat by 2047. Digital infrastructure and infusion of technology is imperative to not only sustain the momentum but also to take the agriculture growth story to its logical conclusion. The focus on self-reliance in edible oils and investment in post-harvest activities are some of the measures that can make this happen. The full Budget has to address some pending reforms needed to further boost the impressive growth of India's agrochemical sector. An enabling predictable science based policy environment is absolutely essential to provide farmers cutting edge technologies to fight against climate threats besides the ever increasing complex pests and diseases threatening crop yields. It is important that the industry is encouraged to invest in R&D for bringing newer molecules and technologies complemented by AI and digital technologies. Rationalising GST on agrochemicals to 12% (from current 16%) and allocating sufficient budgetary resources to introduce performance-linked incentives (PLI) will go a long way in consolidating and strengthening the agrochemical sector. Strategic policy decisions will propel India towards this growth, ultimately leading to a significant positive impact on further enhancing farmers' income. These would give a decisive push for to making Atmanirbhar Bharat.



Durgesh Chandra, Secretary General, CropLife India



While the interim budget has focused on the growth done towards the promotion of technologies and innovation in agriculture; the full Budget 2024-25 should look at reforms for augmenting the farmers' income and overall growth of the sector. Indian farmers need newer & greener crop protection products. Formulation import of new for-India single molecules or their different combinations helps the farmers in combating resistance, climate change, and new invasive pests and in improving the competitiveness of Indian agricultural produce internationally. Once these new solutions get adopted by the farmers, local manufacturing commences and supports 'Make in India'. Formulation imports are then converted to the manufacture of formulation and then to the manufacturing of the technical in India.

Simon George, President, Cargill India and Managing Director, Cargill Food Business, South Asia


The interim Budget is a vision pathway to create a "Viksit Bharat" by 2047. Intent to achieve atmanirbharta in oilseeds production, increased focus on dairy and fisheries farming and private and public investment in post-harvest activities like modern storage, efficient supply chains, and marketing, signal a transformative chapter in agriculture. I laud the Government's intent to create an inclusive Bharat with a strong emphasis on youth, women, farmers, and marginalized communities. The Finance Minister's announcement spotlighting women and farmers as pivotal drivers of India's development, and paves the way for policies that are poised to significantly enhance rural progress. These foundational policies are primed to ignite fresh opportunities, spur demand, and trigger economic growth.

Narinder Mittal, Country Manager & MD – Agriculture Business, CNH India & SAARC


The Interim Budget has reinforced the upliftment of farmers with the continuation of PM Kisan Samman Yojana, which annually extends direct financial assistance to a substantial 11.8 crore farmers. The focus on oilseed production and processing marks a significant stride in reducing import dependency while creating new avenues for the growth of the agricultural community. Additionally, the expansion of the crop insurance scheme to benefit 40 million farmers will enhance resilience against unforeseen risks. Moreover, the allocation of financial assistance to support the procurement of biomass aggregation is a commendable move. Encouraging farmers to participate in the bioenergy supply chain not only promotes sustainable agricultural waste management but also opens up new opportunities for income generation. This will catalyze the demand for cutting-edge farm machinery and crop management solutions, facilitating the adoption of modern farming practices powered by cutting-edge technologies. The decision to further promote private and public investment in post-harvest activities will help the agricultural ecosystem in India

to flourish, encompassing every stage of the value chain, from production to market. Overall, we believe these initiatives will play a pivotal role in driving the agricultural sector towards prosperity and resilience.

Kami Viswanathan, President – MEISA, FedEx Express

The 2024 interim budget's increased capital expenditure for infrastructure development is a strategic and commendable move. It promises to accelerate economic growth and positively impact the logistics sector. The emphasis on expanding air connectivity, along with the development of existing airports and the establishment of new ones, is a pivotal step that aligns with our advocacy for efficient multimodal logistics. The government's commitment to the PM Gati Shakti National Master Plan, is encouraging. These initiatives aim to enhance logistics efficiency and reduce costs, aligning with our objectives of service excellence and innovation in logistics. Additionally, the 'AmritKaal' initiative, which focuses on empowering MSMEs and boosting their global competitiveness, is set to benefit the broader logistics sector. FedEx welcomes the forward-looking approach of the 2024 interim budget, reflective of the 'Viksit Bharat' vision. We remain committed to actively contributing to India's growth journey, aligning our efforts with the government's vision for a smarter and more sustainable logistics infrastructure in India."


**Davinder Sandhu
Co-Founder & Chairman,
Primus Partners**

Identification of logistics corridors aligned to specific commodity flows is an excellent measure to bring synergy across infrastructure planning and building. This will leverage India's Gati Shakti platform to lower costs and enhance logistics efficiency. Suryodaya Yojana will bring democratization of rooftop solar to India's rural housing as an effective step for affordable and sustainable electric power.



Rampraveen Swaminathan, Managing Director and CEO of Mahindra Logistics Ltd.



The Union Budget 2024's pivotal focus on infrastructure development, aligns seamlessly with our vision for enhanced logistics efficiency. The government's commendable commitment to supporting EV manufacturing and charging infrastructure is a significant stride towards sustainable mobility. We appreciate and commend the government's efforts towards Green Energy, aligned with the Nation's commitment for 'net-zero' by 2070. The announcement of three major economic railway corridor programs, spanning energy, mineral, and cement corridors, port connectivity corridors, and high-traffic density corridors under the PM Gati Shakti initiative, is poised to be transformative. These corridors not only promise to decongest high-traffic areas but also elevate the safety and speed of passenger trains. The integration of dedicated freight corridors is poised to catalyze GDP growth and significantly reduce logistics costs. With an increased outlay in FY25 and the expedited development of various infrastructure projects, the government's proactive approach is set to spur economic growth. The India Middle East Europe Economic Corridor announcement

is particularly game-changing, strategically positioning India on the global trade map. We at Mahindra Logistics, eagerly anticipates actively participating in and benefiting from these initiatives, ushering in positive transformations in the logistics and transportation sector.

Puneet Vidyarthi, Head of Marketing & Business Development – India & Saarc, Case Construction Equipment & President, Rural Marketing Association of India

This year's budget is a people-centric budget with a solemn assurance of collective prosperity and inclusive development. The Direct Benefit Transfer provided by the government to farmers is a strong step that benefits over 11 crore farmers every year. The continued support in providing 'pakka houses' in rural India through the



PM AwasYojana is a step in the right direction. Moreover, the Deen Dayal Upadhyaya Grameen Kasuhalya Yojana guarantees high quality skill training opportunities for the rural poor to secure a better future. India is home to over 200 million artisans and the sector is the second largest rural employer after agriculture. The continuity of this Yojana not only benefits the artisan community but is also a continuum of Bharat's rich art and craft culture.

CA Aditya Sesh, Founder and Managing Director, Basiz Fund Service Private Limited.

This is a budget with no dramatic announcement - it said what has been achieved and it gives a very clear vision for going forward. No frills. The achievements in a national agricultural markets in linking 1361 mandis with an average transaction of more than three and half crores for the year which is an amazing development. It has given an option to the farmers that they don't the necessity have to go to the physical mandi instead they make the sale and go to mandi for delivery. It is giving the chance for the farmers to sell atMRP rather than MSP meaning that they become B2C oriented rather than B2B. Eventually agriculture has become an industry rather than a profession.



Kumar Ranjan, CEO & Co-Founder, eFeed

The Indian Budget 2024's focus on integrating advanced technologies like AI, ML, and IoT into agriculture marks a transformative era for the sector. These technologies will enable precision agriculture and livestock management, significantly enhancing farmer productivity and ROI. The proposed tax incentives for adopting these technologies will catalyze innovation, driving a more efficient, sustainable future in farming. Additionally, the use of AI, ML, and IoT will improve the quality of produce, aligning with the global standards of agricultural excellence.



**Shreeram Bagla, MD,
Annapurna Swadisht**


Highlighting the need to focus on four major pillars - poor, women, youth and annadatas (farmers), Union Finance Minister Nirmala Sitharaman, in her Interim Budget speech said that their empowerment and wellbeing will drive the country forward. The government is set to step up efforts for value addition in the agricultural sector with a view to boosting farmers' income. This apart, for ensuring faster growth of the sector, the government plans to promote private and public investment in post-harvest activities including aggregation, modern storage, efficient supply chains, primary and secondary processing and marketing and branding. All these measures are likely to augur well for the country's rural economy, boosting productivity and leading to an increase in income levels of farmers. The government has further increased the outlay on infrastructure development by 11.1 per cent at Rs 11.11 lakh crore accounting for nearly 3.4 per cent of the country's GDP. The enhanced spending on infrastructure sector will lead to better roads and connectivity thereby improving access to rural hinterlands, which will go a long way in ramping up distribution and thereby increased sales for companies. We expect a good recovery in demand from rural and semi urban markets in FY-25 backed by anticipated increase in farmers' income and increased spend on infrastructure sector. There is a huge untapped potential in the rural and semi urban markets of India and the increasing income levels is expected to spur consumption in these markets leading to higher sales for FMCG companies moving forward.

Soumyak Biswas, Partner, Management Consulting, BDO India

The interim budget 2024 seems to be a pragmatic one, as it clearly focuses on transformational shifts in the agriculture sector which include areas on productivity improvement and value addition, sustainable agriculture, reduction of import dependence, fast-tracking development in allied sectors such as dairy and fisheries and rural employment through creation of micro enterprises. Encouraging Public Private Partnerships (PPP) is expected not only to infuse investments in the sector but also bring in the much-needed expertise in enabling a large majority of farmers who are small and marginal in moving up the value chain. Increased allocation towards PM-Formalization of Micro Food Processing Enterprises Scheme and focus on Aspirational Districts Programme is expected to give a boost to rural job creation opportunities which in turn can boost rural demand. The AtmaNirbhar Oilseeds Abhiyan is expected to bring down the dependence on imports of edible oil by focusing on improving yields in states which have high acreage but lower productivity, increasing acreage in non-traditional



areas, developing new varieties, resource efficiency, providing timely inputs and training to farmers. Given the changing dietary patterns and income generation potential, increased outlay for dairy and fisheries sector (Blue Revolution and PM- Matsaya Sampada Yojana) is expected to not only meet the increased demand for nutrition in domestic markets, but also give a boost to the exports from the country. Setting up of the integrated aquaparks will help in infrastructure upgradation and enhancing aquaculture productivity which will positively impact the livelihoods of millions of fishers/ fish farmers.

Nishant Kanodia, Chairman, Matix Fertilisers & Chemicals Ltd


The Interim Budget focusses on Viksit Bharat by 2047, outlining a clear and practical road map for India's growth. We remain a beacon of growth to the global economy, and measures supporting equitable and sustainable growth will promote progress. This budget promotes harmony with nature, incentivises modernisation of infrastructure, and opportunity for all. It outlines a clear strategy that strongly backs agriculture through farmer-friendly policies such as PM Kisan Samman Yojana and PM Fasal Bima Yojana. One of the key factors of inclusive growth is economic empowerment. It is heartening to learn that the Pradhan Mantri Kisan Sampada Yojana has created 10 lakh employment and assisted 38 lakh farmers so far. The government's comprehensive approach strengthens our nation's food security while heralding a future where progress is synonymous with environmental and socio-economic inclusivity.

Ashvin Patil, Founder and Director of Biofuels Junction



A significant challenge addressed in the budget is the large-scale collection of stubble, particularly the capital-intensive process involving balers. Annually, India witnesses the generation of approximately 500 million tonnes of agricultural residue, offering a substantial business opportunity estimated at around Rs 50,000 crore. Unfortunately, nearly 200 million tonnes of this resource remain unused, often leading to environmentally detrimental burning practices. This underscores the untapped potential for converting agricultural residues into biofuels. The recent budget announcement by the Finance Minister emphasizing measures such as financial assistance for biomass aggregation machinery outlines a crucial initiative to address this issue and unlock the economic and environmental benefits of converting agricultural residues into biofuels. The focus on transforming agri-waste into biofuels not only contributes to sustainable waste management but also aligns with the larger vision of promoting green growth and reducing carbon emissions in the country. It will also help farmers generate income on agri-waste

and boost and support the rural economy and communities and promote rural entrepreneurship. The mandated blending of CBG in CNG and PNG represents a proactive step towards fostering a cleaner and greener energy ecosystem, aligning with the broader goals of sustainable development and reducing carbon emissions in the transportation and domestic sectors.

Shashi Singh, Partner - Agriculture, PwC India



The primacy of agriculture in the interim budget highlights the fact that the sector remains a priority for Viksit Bharat. The government's consistent push to farmer-centric schemes and income support further consolidates their position. The focus on Aatmanirbhar Oilseeds Mission to achieve self-reliance in production and reduce imports is a big positive. However, a strong integrated oilseed value chain supported by a calibrated policy ecosystem is crucial to unlock the full potential.

By empowering women through the Lakhpati Didi scheme and encouraging startups, the Government has emphasised their potential to bring about transformative change. The focus on dairy, fisheries and post-harvest infrastructure is a positive move towards enabling reforms at the state level. All in all, this pre-election budget will help in keeping the wheels of growth in motion.

Anand Ramanathan, Partner and Consumer, Products and Retail sector Leader, Deloitte India

The budget continues to support growth and productivity in agriculture through interventions in crop insurance, encouraging use of nano fertilizers, promoting self-sufficiency in oilseed production, and increasing investments in micro food processing. Also, from a protein standpoint - boosting dairy productivity and supporting sea food exports are some of the big areas of focus. These announcements will provide employment opportunities for the rural economy.



SK Chaudhary, Founder Director, Safex Chemicals



The decision to step up value addition in the agriculture sector, reduce post-harvest losses and boost farmers' incomes by improving productivity is commendable. We believe that the move to help micro food processing enterprises via 2.4 lakh SHGs and individuals through credit linkages and promoting of public and private investment in a range of post-harvest storage solutions will not only give a fillip to faster growth but will also benefit domestic agri players. Further, formulation of a strategy to achieve self-reliance in oilseeds is laudable since this will be backed by research on high-yielding varieties, value addition, deployment of modern farming practices, crop insurance and other measures.

Dinesh Patidar, Chairman, Shakti Pumps (India) Ltd.



The government initiatives outlined well for sustainable growth, especially in the solar and agriculture sectors. The focus of the Budget on providing power supply to all masses and supporting farmers through schemes like Pradhan Mantri Kustum Yojana and Pradhan Mantri Suryodaya Yojana strengthens the Government's commitment to solar energy and the welfare of our farmers. The scheme to provide free solar electricity to 1 cr households is in line with our commitment to increase renewable energy and meet the energy needs of rural communities. By taking advantage of rooftop solar energy, households benefit from significant savings annually, while also contributing to environmental protection. It emphasizes entrepreneurship opportunities in solar supply and installation and opens up avenues for rural economic empowerment at the grassroots level. This will also meet the power needs of our electric vehicles. The government's approach to focus on private and public investment in the agriculture sector, modernizing agricultural infrastructure, and increasing the income of farmers is commendable. I am hopeful that all the initiatives

highlighted in the Budget will have a positive economic impact on both the solar and agriculture sectors in India in the coming months. Shakti Pump remains committed as always to extending the benefits of both these schemes to all people.



Rajamanohar Somasundaram, Founder & CEO - Aquaconnect

We are pleased to see that the government has identified gaps in seafood production, technology intervention, financing, post-harvest infrastructure, traceability, and sustainability and is actively addressing them through policy intervention and budgetary allocation. We welcome the new sub-scheme under the PMMSY that has been announced with an investment of Rs. 6,000 crore to support the activities of fish vendors, fishermen, and micro and small enterprises. This investment aims to improve value chain efficiencies and expand the market, contributing significantly to the promotion of domestic market consumption. The establishment of aquaparks will play an important role in promoting the development of value-added seafood products in India. This will ultimately enhance the value realization of Indian seafood and act as a catalyst for generating



employment opportunities among coastal communities. We have been witnessing a consistent effort to improve the fisheries sector in consecutive budgets. This is an encouraging trend, and we hope to see it continue for the betterment of fishermen, aquaculture farmers, and other stakeholders in the seafood value chain.

Anshul Garg, CEO and Director of Aroma Agrotech



Aroma Agrotech finds enormous inspiration in the ingenious and insightful evaluation in the interim budget 2024-25. The sentiment regarding the government's commitment to the farmers, our 'Annadata' is evident throughout the budget. The PM-Kisan Samman Yojana and PM Fasal Bima Yojana sounds like the highlight of the Agricultural budget and Aroma will extend its unwavering support to implement the scheme effectively. We feel that this budget extends farmer-centric policies, support of income, risk coverage and the encouragement of developing technologies and innovative ideas through Agritech, which aligns perfectly with our core values and we are enthusiastic about building on the sector's fast-paced growth by assisting these policies.

ROUND TABLE CONFERENCE

Budget 2024

Implications on Agriculture

Union Budget 2024 was presented by Union Finance Minister, Smt. Nirmala Sitharaman on 1st February 2024. A Round table conference was organised by Agriculture Today Group on 2nd February 2024 to analyse the Union Budget. The conference was attended by Dr. Praveen Malik, CEO, Agriinnovate; Mr. Ajai Rana, MD, Savannah Seeds; Mr. Raju Kapoor, Director, FMC Corporation; Mr. Utsav Mishra, Director, Ernst & Young; Dr. Anup Kalra, Former Director, Ayurvet and Director QCS Herbals Pvt Limited; Mr. Saurabh Khanna, MD, NERL; Mr. Karan Sharma, Director, Grant Thornton; Ms. Rina Soni, Executive Director, Heifer India; Mr. RS Dixit, CMD, Ananda Dairy; Dr. Nutan Kaushik, Director General, Amity Food & Agriculture Foundation; Dr. Deepti Rai, Senior Research Associate, Mobius Foundation; Dr. MJ Khan, Chairman, Indian Chamber of Food & Agriculture; Ms. Anjana Nair, Group Editor, Agriculture Today Group; Mr. Arindam Singha Roy, Executive Director, CARD; Ms. Vinita Singh, Senior Manager, Agriculture Today Group and Ms. Zaman Almas, Business Manager, Agriculture Today Group.

Ms. Anjana Nair welcomed the panelists and initiated the budget discussions. She observed that being the interim budget, there weren't many new schemes or programmes that were launched. However, the thrust on infrastructure was palpable. The PPP model for post harvest infrastructure and a new scheme, Atmanirbhar Oil Seed Abhiyan for increasing oil seeds production were a much needed interventions. She also noted that the government has



also given adequate emphasis on research and development, and may open up doors for more research oriented institutions and programmes in the upcoming budget. The thrust on fisheries, dairy and promotion of green growth were other important areas in the budget.

Dr. MJ Khan, stated that the finance minister has taken pathbreaking steps to rejuvenate the agriculture sector and address the strains in the rural economy caused by patchy monsoons and a decline in agriculture production. A budget with a bold agriculture thrust, it provides support for the development of much-needed agri infrastructure by promoting public and private investments in post-harvest activities. Farmers would benefit from aggregation, modern storage, efficient supply chains, primary and secondary processing and marketing and branding. The provision for increased value addition under existing PM-SAMPADA and PMFME, atmanirbhar oilseed abhiyan and reducing post-harvest

losses are expected to improve farmer income, stated Dr. Khan. He expressed the hope that the vision enunciated in the interim budget would be followed up by concrete steps to boost agriculture productivity and augment farmer income when the regular budget is presented sometime in July.

Dr. Praveen Malik talked about the grand challenges ahead of Indian agriculture. He believed that the government is already playing a stellar role in promoting transgenomics and promoting women's role in agriculture. The thrust on solar power infrastructure and investment opportunities are long term strategies. He was also impressed with the overall R&D support and summed up it as a very promising budget.

Dr. Nutan Kaushik noted the emphasis given on oil seeds, R&D for varietal development and food processing. Post harvest sector had scope for more improvement. Fisheries sector has also received good support in this budget. She noted that the stress on sea weed will be good

for coastal farmers and was happy at the continued support to SHGs and micro-processing units.

Mr. Utsav Mishra observed that Niti Aayog has been pushing climate adaptive agriculture, and India should look forward to climate resilient agriculture. He noted that it is a farmer's budget and was delighted at the increased allocation to animal husbandry sector. But he pointed out that he wanted to see livestock insurance to be extended to small ruminants as well. He was delighted to see increased allocation to PMFS and welcomed measures for indigenous seaweed cultivation, and thrust on blue economy. He wanted extension of Kisan credit cards and was optimistic about the July budget.

Mr. Sourabh Khanna was satisfied by the budget as he saw that agriculture and allied sectors were equally concentrated. He was particularly delighted to see the reference to post production in the budget and remarked that provisions for it may arise out of Agri infrastructure fund. He was looking forward to a reduction in TDS for the income from online platform which is as high as 1% compared to farmgate level trading where it is just 0.1%.

Mr. Raju Kapoor said that it was a balanced budget. He observed that the productivity of oil seeds was low and applauded the fact that budget for irrigation was going up and women oriented schemes were getting a push. However, he noted that not much focus was placed on crop Insurance. He recommended rationalization of GST of pesticides and it should be 12% in line with the agriculture commodities. Besides that tax breaks for good agriculture practices and Research and Development can project India's image of being more innovation oriented.

Dr. Anup Kalra posed a question as to how do reduce imports. Government is trying to promote R&D and technology to develop more skilling and entrepreneurship. It also needs to be seen how to connect youth with livestock. He was also of the view that productivity of animals in India was low and indigenous breeds were getting focus. He proposed that the government also address the fact that cost of feed



RECOMMENDATIONS FOR THE JULY BUDGET

- More Research Oriented Programmes and Institutes
- Emphasis on Genetic Engineering in Plants
- Initiatives for climate resilient agriculture
- Livestock insurance to be extended to small ruminants
- Extension of Kisan credit cards
- A reduction in TDS for the income generated from online platform of trade of agri commodities from current 1%
- More emphasis on Crop insurance
- Rationalization of GST of pesticides
- Tax breaks for good agriculture practices and Research and Development
- Reducing the cost of feed
- Introduction of new technology in Cotton
- Develop crop acreage planning
- More Schemes for Small and Marginal Farmers
- Emphasis on backyard poultry
- A separate fund for climate resilient agriculture
- promotion of less water intensive crops

was going up. Overall, he saw lot of interventions in positive direction.

Mr. Ajai Rana believed that the emphasis on infrastructure is good and he wished to see long term policies. The focus on oilseeds was something the country was in

dire need. From the next budget, he expected policies for climate resilient agriculture. He also noticed that there is a policy paralysis in cotton and the sector has not seen introduction of any new technology for a long time. The seed sector in India is a very small segment and India like other countries need to have crop acreage planning.

Ms. Rina Soni said that production by masses should be given importance. Backyard poultry is also another sector which has the potential to not only improve the country's productivity but also rural livelihoods and nutrition.

Ms. Deepti Rai talked about e-Nam and how its trade volume has increased over the years. She was also happy about the focus on green energy. However, she felt that there should be a separate fund for climate resilient agriculture. She advocated the promotion of less water intensive crops, practices to improve soil fertility and women empowerment.

Mr. Karan Sharma said that the interim budget was more of a performance oriented budget. He also noticed the thrust on women empowerment and drones. However, he observed that 5 aqua was a small number compared to the huge coastal line of India. He also recommended establishment of export oriented clusters of SHGs.

Mr. Arindam Singha Roy was more emphatic on the development that needs to improve the status of small and marginal farmers and hoped to see more interventions in the upcoming budget in July.

ACHIEVING 'ATMANIRBHARTA' IN EDIBLE OIL

STRATEGY AND WAY FORWARD

Oilseeds, basically energy-rich crops are grown under energy-starved condition, mostly in drylands by resource poor smallholders without applying essential fertilizers containing calcium, sulphur, resulting in low productivity.

The timely availability of quality seeds of improved, climate resilient varieties of two major oilseeds namely groundnut and soybean together grown in 20 million hectares annually is the major bottleneck in realizing higher yields. Though 7 annual oilseed crops are covered under MSP, hardly 5% of the total oilseeds (36 million tons) are procured resulting in distress sale and making oilseeds cultivation uneconomical.

Oilseeds in India grown in 29 million hectares are primarily rain-dependent, and in case of excess production, there is hardly any mechanism to procure the produce at a remunerative price, create buffer stock and make use in lean seasons, mitigating shortages.

The Dichotomy

India, the largest producer of oilseeds is also one of the biggest importers of edible oil. The high quality, heart-healthy oils and oilseeds namely groundnut, sesame, etc. are exported, whereas unhealthy palm oil in large quantity is imported on regular

India, the largest producer of oilseeds is also one of the biggest importers of edible oil.

basis.

Similarly, while India has been suffering from acute malnutrition, country's most nourishing food, groundnut is being exported to South-East Asian countries, mostly as bird feed.

Most importantly, India, an agricultural country with diverse agro-ecological situations does not have state specific 'Balance Crop Production Plan' to produce important agri commodities indigenously based on annual requirements and become 'Atmanirbhar'.

The Way Forward

Policy Support

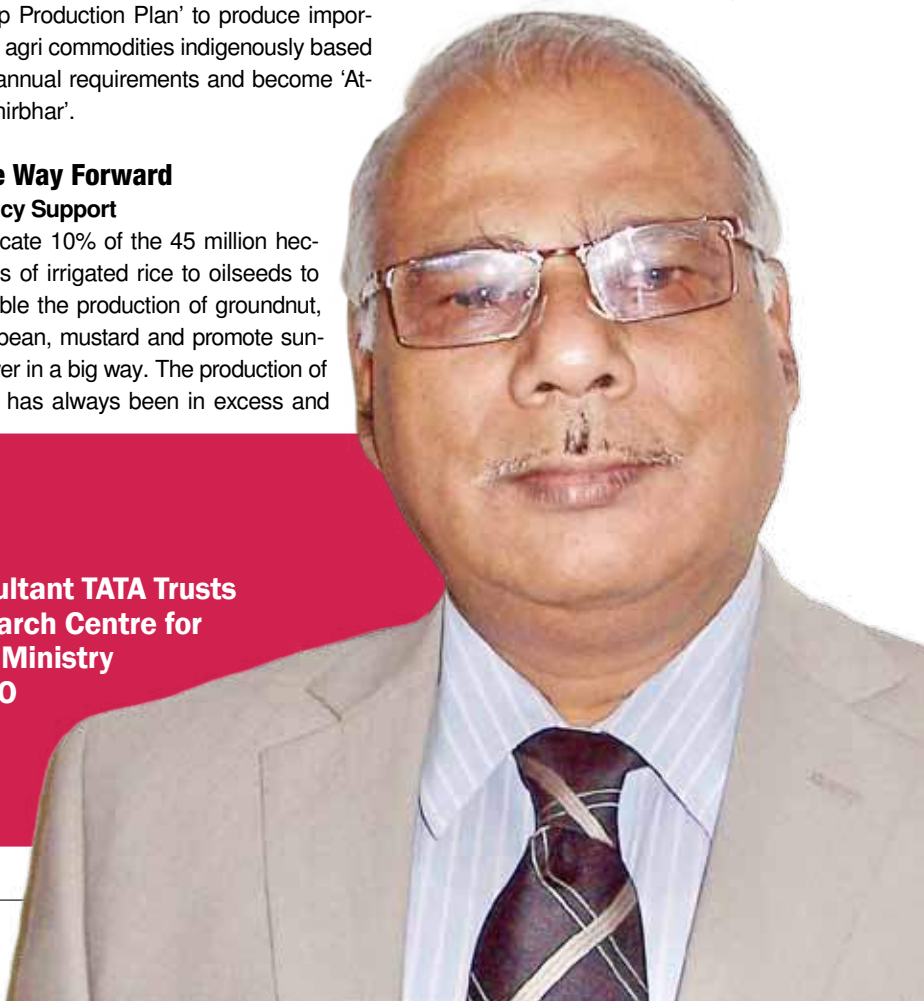
Allocate 10% of the 45 million hectares of irrigated rice to oilseeds to double the production of groundnut, soybean, mustard and promote sunflower in a big way. The production of rice has always been in excess and

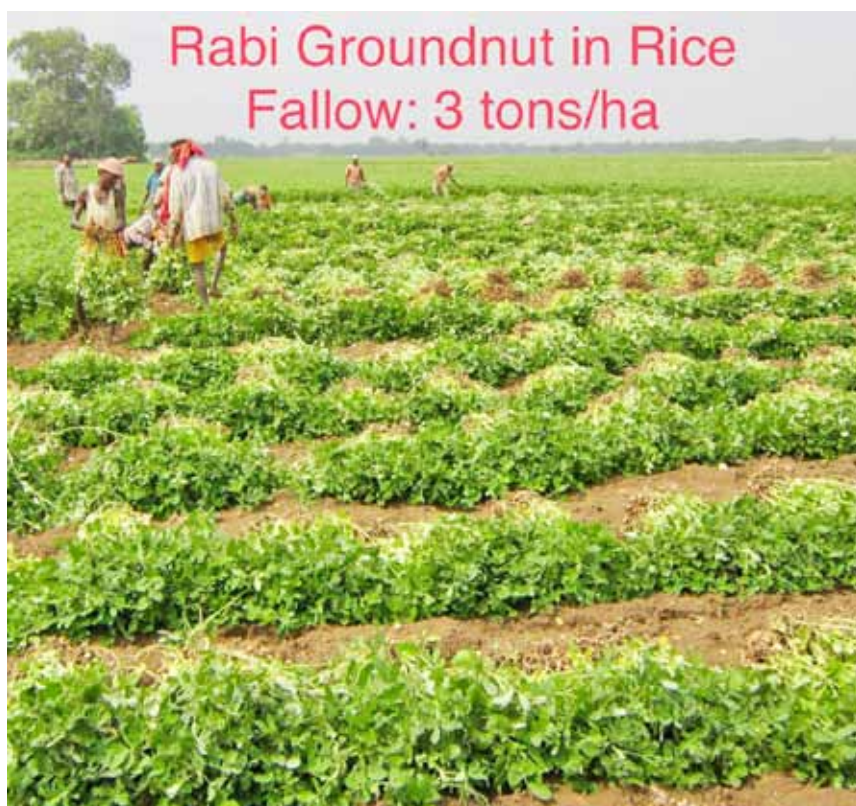
often subject to rotting besides export of broken rice at a throwaway price. However, to keep the total production of rice at the present level, scope remains to bring more area under hybrid rice.

Capitalize the strength of Rabi groundnut in rice-fallow residual moisture/ minimal irrigation situation, which yields anywhere between 3-4 tonnes per hectare. Bring at least 1 million hectare under groundnut, dispensing second rice (Boro) in the states of Odisha, West Bengal, Assam, Kerala, etc. Such an intervention will help in realizing minimum 3 million tonnes additional groundnut production in 115 days. Similar emphasis may be given to grow groundnut in spring season after harvest of potato, mustard, maize in the states of Punjab, Uttar Pradesh, Haryana, Bihar, etc. and harvest same level of yields.

About the AUTHOR

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MD SBSF Consultancy and Consultant TATA Trusts
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Most importantly, India, an agricultural country with diverse agro-ecological situations does not have state specific 'Balance Crop Production Plan' to produce important agri commodities indigenously based on annual requirements and become 'Atmanirbhar'.

groundnut from 1.8 lakh hectares with a productivity of 3.0 tons/hectare.

Intensification of Rabi soybean in Maharashtra and other southern states following the available technologies will help to generate sizable production both for commercial as well as seed purposes.

High yielding rapeseed-mustard hybrids developed and released so far, may be promoted in a big way in the areas of relevance to double the present level of production. Revive safflower cultivation by introducing hybrids and high yielding varieties in major states, almost disappeared from traditional areas of Maharashtra, Andhra Pradesh, Karnataka, and Chhattisgarh. Intensification of sesamum production following improved production technologies in states of Gujarat, Rajasthan, Tamil Nadu, and West Bengal. Expand production areas of Niger (Ram til) in the states of Madhya Pradesh, Chhattisgarh, and Eastern Ghats of Odisha.

Tap the untapped potential of rice-bran oil to full capacity in a country of 45 million hectares under rice. Introduce and expand Olive cultivation in India, more eco-friendly than Oil palm in the areas of relevance as identified using CropLocator. To provide quality seed to seed-hungry states namely Odisha and West Bengal growing groundnut during Kharif and Rabi, the following scheme may be supported by the Ministry of Agriculture, Govt. of India involving National Level Agencies for seed production and supply.

Intensify summer groundnut production in irrigated areas in the states of Rajasthan, Karnataka, Tamil Nadu, Maharashtra, Gujarat, etc., targeting 2 million hectares to a net production of 4 million tonnes.

Technical Intervention

Raised bed and Furrow method of planting contributes to higher pod yields (12-18%) as demonstrated in major groundnut growing states during the Technology Mission on Oilseeds (1987-1988). Similarly, paired-row planting of groundnut in flatbed in rain-shadow areas helped in harvesting better yields. Such a low-cost, no-cost technologies just by altering planting geometry helps in achieving higher yields.

Promotion of acid soil tolerant groundnut varieties in the states of Manipur, Meghalaya, Nagaland, Mizoram, and Tripura will be a good move. The variety,

ICGS-76 identified as tolerant to acid soils yielded 2.5-3.0 tonnes per hectare in 5.0-5.5 pH without liming. There are many such special feature varie-



ties for various situations.

Use short duration, high partitioning efficient groundnut, soybean varieties as intercrop with wide range of field crops (Cotton, Cassava, Pigeon pea, Sugarcane, Maize, etc.) as well as horticultural crops (Coconut, Arecanut, Cashew, etc.).

Application of mulch technology as demonstrated in strategic locations/situations may help in realizing 5.4 lakh tonnes

GENE CORRECTION FOR CROP IMPROVEMENT

The Centre for Genetic Manipulation of Crop Plants of Delhi University, in 2002 bred DMH-11, a transgenic hybrid of mustard deploying the barnase-barster system by transferring genes from a soil bacterium *Bacillus amyloliquefaciens* shortening the process of hybridization. Another bar gene introduced from *Streptomyces hygroscopicus* functions to impart tolerance to glufosinate ammonium, a chemical which is used to kill weeds. But it received tough resistance from different quarters rising environmental, bio- and food safety issues, being an edible crop. After 20 years of its development, in October 2022, the Genetic Engineering Appraisal Committee (GEAC) of Ministry of Environment and Forest and Climate Change (MoEF&CC), once again gave its approval for environmental release for hybrid seed production pushing the matter in the arena of the Supreme Court by some activists of Research Foundation for Science and Technology and Food Security and an NGO 'Gene Campaign' which is opposed to the introduction of edible GM (genetically modified) crops in India. It has brought up once again in to lime light the controversy which has been the agenda of several committees and a part of the nationwide debate on commercial cultivation of edible GM crops.

The importance of release of the mustard GM hybrid is in fact not limited to its yield performance but it is much beyond that since it will open up gates for cultivation and consumption of edible GM crops in the country which so far is restricted to single GM non edible crop.

Committee Observations

Most important among these are the recommendations of the Technical Expert Committee (TEC) constituted by the Supreme Court in 2012. Highlighting the shortcomings in its 2013 report, the TEC's recommendations were for not conducting the field trials till the gap in the regulatory system are met with. Then asking for a ten year moratorium, on conducting field trials and meanwhile improving the bio-safety and quality regulations of GM crops, it echoed that "Based on safety dossiers, the TEC has found in unambiguous terms that at present the regulatory system has major gaps and these

will require rethinking, investment and re-learning to fix. A deeper understanding of the process of risk assessment is needed within the regulatory system for it to meet the needs of a proper bio-safety evaluation. This is not available in the country at present. It is therefore recommended that the requisite understanding be developed through consultation, collaboration and capacity building". Earlier in 2012, a Parliamentary Standing Committee too had unanimously recommended that "regulatory, monitoring, oversight surveillance and other structures should be established".

About the AUTHOR

Dr. S. S. Chahal, Former Vice Chancellor, Maharana Pratap University of Agriculture and Technology, Udaipur



This is what the apex court has intended to ascertain whether this has been 'made available in the country' or not but the government's reply expressing the autonomous nature of the GEAC in the process of executing these directions may not meet the expectations to the satisfaction for many who are concerned. It is time to assess that how far these assertions have been met with, because while emphasising the need of genetic modification of crop plants to meet food security, it is equally important to establish a robust system for scrutinising environmental and bio-safety necessities.



Contesting Claims

DMH 11 has primarily been pushed up due to its 28 % higher yielding capacity than the existing varieties at the time of its development and testing and that it will be of great use to fulfil the mustard oil demands of the country indigenously. However, this has been contested with the claim that there are other currently available non GM high yielding hybrids and varieties with equal or more yield potential against which DMH 11 has not been tested so far. Mustard scientists also express that DMH 11 should be tested for yield performance in field trials according to the set procedures of national level multi location testing as well as System of Mustard Intensification (SMI) practised by farmers to verify its claimed higher yield potential. Presence of bar gene for herbicide resistance is another pain point for not getting acceptance.

Bt Predecessors

The importance of release of the mustard GM hybrid is in fact not limited to its yield performance, but it is much beyond that since it will open up gates for cultivation and consumption of edible GM crops in the country which so far is restricted to single GM non edible crop.

Transgenesis or GM technology developed in early 1970 involving insertion of DNA from another organism is being used by 27 countries world over, after its first commercialisation for virus resistant GM tobacco plants, by China in 1992. India adopted this technology, in 2002, in

cotton production with cultivation of bollworm resistant Bt (*Bacillus thuringiensis*) GM hybrid. This cash GM crop is the only one allowed in India, so far, with persistent hesitation from allowing edible GM crops despite some serious scientific attempts like Bt Brinjal which could not find its way in the country. Currently, Bt Cotton is grappling with problem of developing resistance against pink bollworm causing considerable decline in area under the crop in recent years.

Opposition to Bt

The expansion of GM technology has consistently been obstructed by opposition from protests, vandalism, referendums, legislations, court actions and scientific disputes by consumers and environmentalist groups, regulatory hurdles and insufficient political support. After substantial increase in initial years, the world over total area under GM crop cover has almost reached plateau with negative growth during 2015, 2018 and 2019 by reduction happened in developed countries. As many as 38 countries have banned cultivation of GM crops, 19 of them falling in Europe which is regulated by European Union. Significant environmental concerns include cross breeding with related crops and developing of super weeds. Such controversies on GM technology involving transferring of genes from other species led to focus attention on development of technologies involving tweaking of own genes of a species and thus producing plants with desirable traits.

Promising Alternatives

In 2013 one such Nobel Prize winning path breaking CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) gene editing (GE) technique was reported which has immeasurable potential to improve farm productivity and at the same time meeting expostulations because of transgenic (GM) technology. This powerful tool has advantage over other similar techniques like Zinc Finger Nucleases (ZFNs) and Transcription Activator-Like Effector Nucleases (TALENs) due to the fact that it is easier to design and implement, has higher success rate, and is more versatile and less expensive. Using this technique rice strains tolerant to drought and salinity have been developed and higher resistance to fungal and bacterial diseases has successfully been achieved in various crop species like rice, wheat, tomato and citrus. Such new advancements need to be pushed for better food production by harnessing advantages of the provisions made by the Department of Biotechnology, Govt, under the recently issued 'Guidelines for Safety Assessment of Genetic Edited Plants' in 2022. These provisions exempt those genome edited plants from bio-safety assessment which are produced through ZFNs, TALENs and CRISPR techniques and are free from exogenous introduction of DNA. It is immensely pertinent to promote the utility of promising alternatives like safe gene correction techniques rather than depending upon the controversial transgenic GM technology.

NANO FERTILISERS IS THE WAY FORWARD

Indian agriculture is at crossroads with declining factor productivity of agri-inputs. Fertilisers are essential for food and nutritional security, but they require energy and resource intensive production process along with regular raw material supplies. Fertiliser consumption is skewed and NPK ratio is distorted with over application of nitrogenous fertilisers like Urea. This discrepancy in usage of fertilisers entails environmental footprints and socio-economical-geographical anomalies. This, 'Business as usual' approach for bulk fertilisers is counter-productive and unsustainable in the long run.

Globally, thrust is now to enhance the Nitrogen use Efficiency (NUE), save fertiliser cost, reduce losses, crop residue load and improve quality of crop produce. NUE of 30-40 % ; 15-20 % for Phosphorus; 2-5 % for micronutrients and 10-12 % for Sulphur implies that majority of costly fertilizers ends up polluting our soil, air and water. Measures like balanced fertilization, residue management; enriched manures; biofertilisers, organo-mineral fertilisers, biostimulants, nanofertilisers etc. are required for maintaining equilibrium of our agri production systems.

Nano-fertilizers have emerged as one of the informed choices to address the prevailing challenges. They have benefits in terms of application and small requirement, slow release mechanism, reduction in transportation and application cost, and cause comparatively low salt accumulation in soil vis-à-vis conventional fertilizers. It effectively meets crop nutrient requirement with increased bioavailability of nutrients.

Nanofertilisers like Nano Urea, Nano DAP have unique properties and co-benefits over the conventional bulk fertilisers as they have high surface area to

volume size ratio. Precision and targeted application of Nano Urea provides nitrogen for chlorophyll, enzymes and other cellular organelles and it enhances NUE of crops during the process. This leads to optimized reduction in N doses (25 %, 34 %, 50 %) and can effectively meet the nitrogen requirement of the crop in our intensive agriculture production systems.

Nanofertiliser fertiliser production plants too have advantage over a conventional urea plant in terms of energy consumption and less carbon dioxide emission. Nanofertilisers essentially meet the Bioefficacy- biosafety and bio toxicity guidelines stipulated by regulatory agencies. It has ignited the research ecosystem of the country.

First Nano Urea (liquid) plant with a production capacity of 50 million bottles (500 mL) of Nano Urea per annum at IFFCO Kalol, Gujarat was dedicated to the nation by Hon'ble Prime Minister of India. Scenario and scope of nanofertilisers has been further enhanced with new plants coming up and other manufacturers entering into nanofertilisers business. Nano Urea is reaching offshores to other countries and is thus, a perfect example of "Make in India – Made for the World".

Extensive efforts are being taken for rural outreach and to rationalise consumption of conventional urea by adopting Nano Urea (liquid). PM-PRANAM scheme has been launched by GoI to incentivize states

/ UTs to promote alternate fertilizers and balanced use of chemical fertilizers. Drone spraying ecosystem has been created for ease in the application of nanofertilisers.

Nanofertilizers are our step in the direction of self-reliance in terms of 'ATMANIRBHAR BHARAT' and 'AT-MANIRBHAR KRISHI'. With availability of complete package of nano fertilisers viz. Nano DAP, Nano NPK, Nano Zinc, Nano Copper, Nano Boron, Nano Sulphur etc, in tandem with 4'R principle; day is not far when eco-friendly sustainable agriculture will be a reality.



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NANO FERTILIZERS CAN WAIT!

Nano fertilizers utilize nanoscale porous domains on plant surfaces to enhance nutrient delivery and minimize environmental losses. It is easy on the pocket of farmers and will be effective in increasing farmers' income. It will also significantly bring down the cost of logistics and warehousing.

Despite the potential benefits, challenges exist in the widespread adoption of nano fertilizers. High production costs make them unaffordable for small farm-

ers. The production of nano-fertilizers requires strict quality control measures to ensure their effectiveness and safety. However, the lack of standardized regulations for their production and distribution has resulted in poor quality control and inconsistent results.

It has been observed that the continuous spray of Fe₃O₄-NPs (100 ppm) had a negative impact on maize physiology in the second generation. The negative impact of stress is plant-associated with phenological and biochemical changes in the plant system which resulted in abnormal function. Stress potentially reduces the productive capacity of plant systems, with yield reduction in different crops up to 70% related to the stress especially abiotic stress.

The worrisome fact about the use of NFs is the nano-toxicity, which needs to be reviewed properly. Several studies pointed out that the toxicity of NFs is dose driven, type of host plant, and environmental conditions. Studies highlight concerns regarding nano fertilizers' toxicity and their environmental fate. Nano materials may pose risks to human health and ecosystems, with studies indicating potential DNA damage and oxidative stress. Seedlings of Rice if exposed to AgNPs, increase hydrogen peroxidase formation, lipid per-

oxidation, proline accumulation and decrease sugar content in shoot and root. High dose of AgNPs increase reactive oxygen species generation which cause cytotoxicity and decrease mitochondrial membrane potential.

There is no doubt that plant nutrients are supplied to the soil in a controlled and precise manner by nano fertilizers; however, little information is available about the fate of these nanomaterials in the soil. Nanomaterials can form aggregates in soil, and the behaviour of NPs in these aggregates is largely affected by the soil porosity, the soil granularity, the organic content of the soil, the soil biota, the pH, and other soil conditions. The accumulation of large-sized aggregates over time may hinder the movement of nutrients and minerals, affecting their stability. In addition, nano-toxicity may also arise in the soil and harm the plants in the long run.

It needs safety measures during its handling. So, it needs experts during its application. It also has an ill-effect on the plant system, it may plug the stomatal pore, forming a toxic layer upon the stigmatic surface, which further prevent pollen tube penetration, it may enter vascular tissue and impair translocation of water, minerals and photosynthesis.

While nano fertilizers hold promise in addressing agricultural challenges, their widespread adoption requires addressing cost barriers, ensuring quality control, and mitigating potential environmental and health risks. Further research and regulatory efforts are essential to maximize the benefits of nanotechnology in agriculture while minimizing its adverse impacts.



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SHE REAPS, SHE LEADS

Women of Amritkaal

For generations, the fertile plains and terraced hills of India have witnessed the tireless hands of women tilling the soil, sowing seeds, and nurturing crops.

Yet, their contributions, often invisible and undervalued, have long remained unsung. However, the past decade has ushered in a glimmer of hope, a slow but steady shift towards recognizing and empowering women in Indian agriculture.

Women's Share

Globally, the rate of participation of women in agriculture has been pegged at 42% as of 2010, where as in India over 60% of women are engaged in agriculture (ICAR-CIWA). In rural communities, agriculture and allied sector is the primary source of livelihood that includes 80 percent of all economically active women. Among them, about 33 percent work as agricul-

Aligned with the Prime Minister's AatmaNirbhar Bharat vision, the Indian government has prioritized the objective of "Gender Mainstreaming in Agriculture."

tural labourers, while 48 percent are self-employed farmers. Women in rural areas participate in various farm operations, including production, pre-harvest activities, post-harvest processing, packaging, and marketing, all aimed at enhancing agricultural productivity. According to Pingali et al. (2019), the proportion of women working in the agricultural sector relative to men has been rising over time, leading to a greater contribution to GDP per capita. According to the Agriculture Census 2015-16, the share of operational holdings cultivated by women also has increased to 13.9% in 2015-16 from 11.7% in 2005-06 (PIB, 2021).

Thorns on the Path

Land ownership disparity continues to be a

major hurdle, with patriarchal norms deeply entrenched in rural communities. This restricts women's access to credit, subsidies, and decision-making power, effectively limiting their ability to fully participate in and benefit from agricultural activities.

The gender pay gap in agriculture is another stark reality. Women agricultural labourers, despite playing critical roles, often earn significantly less than their male counterparts, highlighting the persistent undervaluing of their work and contributing to economic disenfranchisement.

Limited access to resources further impedes their progress. Women farmers often face difficulties in procuring quality inputs, extension services, and market linkages, hindering their productivity and income-generating potential. This lack of access pushes them towards exploitative informal lenders, adding another layer of financial burden.

Socio-cultural barriers remain deeply embedded, acting as invisible shackles. Deep-rooted patriarchal norms restrict women's mobility, decision-making authority, and land inheritance rights, confining them to traditional roles and hindering their potential for growth and leadership.



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Schemes of Progress

The progress of New India under the leadership of Prime Minister Narendra Modi has propelled our nation into a new era. "Sab Ka Saath, Sab Ka Vikas" isn't merely a government slogan but a guiding principle embedded within their core policies. The Modi government places significant emphasis on women-led development.

Aligned with the Prime Minister's AatmaNirbhar Bharat vision, the Indian government has prioritized the objective of "Gender Mainstreaming in Agriculture." This initiative aims to provide rural women engaged in agriculture and allied sectors with access to resources and schemes. The Department of Agriculture and Farmers' Welfare implements unique beneficiary-oriented programmes to mainstream the involvement of rural women. These specialized schemes mandate that states and other implementing agencies allocate a minimum of 30 percent of their expenditure towards women farmers.

Government schemes like Mahila Kisan Sashaktikaran Pariyojana (MKSP) and Mission Shakti have played a crucial role in bringing women to the forefront, fostering their visibility and leadership. The empowerment of women through Women Self-Help Groups (WSHGs) under Mission Shakti stands as a flagship program of the Government, highlighting its commitment to advancing women's socio-economic status and autonomy.

To acquaint women with the latest agricultural and allied sector techniques, training programs are underway as part of initiatives by the Department of Agriculture and Farmers' Welfare (DA&FW) and the Deendayal Antyodaya Yojana - National Rural Livelihoods Mission (DAY-NRLM). These initiatives include the Support to State Extension Programmes for Extension Reforms (ATMA) under the Sub-Mission on Agricultural Extension (SMAE). Moreover, Krishi Vigyan Kendras deliver training to farmers, including women, covering diverse aspects of agriculture and allied sectors.

The number of women trained under the various Central Schemes in agriculture sector implemented by the Ministry of Ag-

riculture & Farmers Welfare and Ministry of Rural Development during the last five year and current year (2023-24) is more than 4 crores.

The Central Sector Scheme 'Namo Drone Didi' has been introduced to provide drones to Women Self-Help Groups (SHGs). The scheme's objective is to equip 15,000 selected Women SHGs with drones to offer rental services to farmers for agricultural purposes, specifically for the application of fertilizers and pesticides. PM-GATI provide women farmers with access to mobile technology, connecting them to real-time weather updates, market information, and expert advice.

PMGATI provide women farmers with access to mobile technology, connecting them to real-time weather updates, market information, and expert advice.

Start up Revolution

Furthermore, the rise of women-led start-ups is a heartening development. Agri-preneurship is gaining traction, with women spearheading innovative ventures in organic farming, sustainable practices, and value-added products. These pioneering women are not only paving the way for themselves but also inspiring others to challenge the status quo and embrace entrepreneurial opportunities.

In allied sectors, National Beekeeping & Honey Mission (NBHM) is also focused on promoting and developing scientific beekeeping across India. Under the scheme, three Mini Missions (MMs) are implemented, with a key emphasis on raising awareness, providing capacity building and training opportunities, and empowering women through beekeeping. By prioritizing women's involvement and empowerment in beekeeping activities, NBHM aims to

contribute to the overall goal of achieving a "Sweet Revolution" in the country, aligning with the AatmaNirbhar Bharat Announcement.

Even in schemes where direct funds are not specifically allocated to women, states were advised to allocate at least 30% of their expenditure towards initiatives that benefit women farmers.

The Way Forward

Strengthening Land Ownership Rights

Implementing joint titling initiatives and facilitating inheritance for daughters are crucial steps to ensure women have a stake in the land they cultivate. This approach offers women a stronger incentive to enhance production, contributing to overall agricultural advancement.

Improving Food Security, Child Nutrition, and Health

Some studies indicate that enhancing women's income, in contrast to men's, is significantly more effective in enhancing household food security, improving children's health, and enhancing children's nutrition.

Bridging the Skill Gap

Tailored training programs focusing on technology, financial literacy, and market negotiation skills can empower women to make informed decisions, access better opportunities, and compete effectively in the market.

Investing in women yields greater marginal returns

Studies have estimated that agricultural productivity could rise by as much as 20 percent if women had equal access to resources such as land, seeds, and fertilizer compared to men (DFID, London, 2005).

Empowering women in Indian agriculture is not just a moral imperative, but also an economic necessity. By addressing the challenges they face and building on the positive developments of the past decade, we can unlock the full potential of women in the agricultural sector, paving the way for a more equitable and prosperous future for rural India.

EMPOWERING WOMEN THROUGH ODISHA MILLETS MISSION

Odisha is home to 62 Scheduled Tribes and 13 particularly vulnerable tribal groups. The Scheduled Tribes of Odisha account for 22.85% of the total population of Odisha. For years, tribal communities have been sustaining their livelihood through subsistence rain fed farming mostly in the hilly terrain and mountain slopes where they cultivate traditional crops like millet, pulses, cereals, tubers, and roots under a mixed system of farming. Tribal women play a crucial role in supporting their household income where they play a significant role along with their male counterparts in agricultural work like sowing, weeding, harvesting and processing the produce.

Traditionally, the nutritious millets formed a substantial part of the traditional diets and cropping system in the tribal areas of Odisha. Millets are climate-resilient crops as they can withstand extreme climatic conditions, and require less agro inputs and resources. It also attracts fewer pests. Odisha has been trying to revive the ancient grain, keeping its benefits in view and through its efforts, it has emerged as the forerunner in comprehensively promoting the millet ecosystem, women being the cornerstone in this programme.

Odisha Millets Mission

The Department of Agriculture and Farmers' Empowerment launched the Odisha Millets Mission (OMM) in 2017-18 to revive millets on farms and food plates through end-to-end value chain interventions. The programme is a uniquely designed multi-stakeholder government-led sustainable food system intervention with a focus on millets to ensure nutritional security to at



least 5 million households of vulnerable and indigenous communities in Odisha. The state government procures finger millet from farmers, most of whom are women, at the minimum support price and distributes it among the people under public distribution entitlements. In the initial year of 2017-18, the Odisha Millets Mission was successfully implemented in 30 blocks of 7 districts. Subsequently, in the year 2022-23, OMM was extended to 142 blocks in 19 districts for implementation of the programme. Currently, the programme is being implemented in 177 blocks in all 30 districts of Odisha.

Objectives of OMM

The objectives of the programme aim to significantly improve various aspects of

millet production and consumption in Odisha. A key goal is to increase household consumption of millet by 25% from baseline levels (2016) by revalorising millet food cultures in both urban and rural communities. Another focus is on the conservation and promotion of landraces through community-based seed systems to preserve millet diversity. The objectives also include the promotion of post-harvest and primary processing enterprises involving millet to



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improve the productivity of millet-based cropping systems.

The objectives seek to encourage millet value-addition businesses in rural and urban areas alike. An additional target is facilitating the inclusion of millets in public distribution systems, nutrition programmes, midday meals, welfare hostels and other schemes. Also, the programme aims to facilitate millet markets and exports of millet-based products from Odisha to expand opportunities for farmers and entrepreneurs. This programme has an additional objective of promoting equity alongside its central goal which aims to provide substantial incentives to farmers in tribal areas, as many other schemes lack this component in supporting tribal communities. The incentives aim to help address the inequality often faced by tribal area farmers. Women have been the centre of the objectives of the mission.

Inclusivity, Equity and Justice

OMM has been a beacon of hope for upland tillers by creating a sense of cohesiveness, and equitableness and enabling justice to them. OMM incentive support of Rs. 26,500/- and Rs. 19,500/- is being provided to the farmers towards adoption of improved agronomic practices such as system of millet intensification and line transplanting / line sowing respectively for a period of 5 years in a reduced manner through the DBT mechanism. WSHGs and FPOs facilitate the Ragi procurement through MPAS, which ensures the payments within 72 hours, besides the integration of ragi into PDS and ICDS provides an additional layer of support thereby enhancing the nutritional security of the tribal communities.

Partnership

The Odisha Millets Mission and the Mission Shakti Department have partnered to promote millet cultivation and empower women's self-help groups (WSHGs) in Odisha. The Mission Shakti Department works to organise women into SHGs and federations to foster socio-economic development. Under the collaboration, WSHG members are being encouraged to take

Odisha Millets Mission of Agriculture & FE Dept. and Mission Shakti Dept. have been empowering women through the promotion of millet production, processing, and value addition across Odisha.

up millet cultivation, as many women traditionally engage in this farming activity. The OMM is providing training to WSHG members on improved practices for millet farming through demonstrations and workshops. This covers sowing methods, intercropping, using biofertilisers, plant protection and mechanised harvesting. WSHG federations are involved in activities like supplying quality seeds to women farmers, organising millet procurement through mandis, and linking WSHGs to government nutrition programmes as suppliers of millet products. SHG women are also being trained to operate small millet processing units and millet-based enterprises.

By promoting millet cultivation and value-addition activities among SHG women, the partnership aims to increase women's income, ensure nutrition security, and revive India's traditional millet crops. The model can potentially be scaled to benefit millions of small and marginal women farmers engaged in millet farming across India. Apart from this, the collaboration has created the Millet Shakti brand to promote millet-based food enterprises among members WSHGs.

Enterprises promoted

There are different types of enterprises which have been promoted under the OMM in partnership with the Mission Shakti Department through women self-help groups. These include custom hiring centre (262 nos.), community-managed seed centre (242 nos.), millets-on-wheels (5 nos.), millet outlet (7 nos.), millet tiffin centre (176 nos.), minor millet-integrated-cleaner-grader-destoner (1 no), minor millet dehuller unit (9 nos), millet cafe (7 nos),

pulverizer unit (932 nos.), thresher unit (660 nos), three-deck 2-3 qtl/hr Ragi cleaner-grader-destoner (7 nos.), three-deck 10-12 qtl/hr Ragi cleaner-grader-destoner (2 nos.), two-deck Ragi cleaner-grader-destoner (24 nos.) and take-home-ration units under ICDS (59 nos.). These enterprises have provided new opportunities for more than 1800 WSHGs to engage in business activities and foster growth and it is growing.

A Powerful Tool for Women's Empowerment

The OMM has emerged as a powerful tool for women's empowerment, showcasing how women have taken the lead in millet production, processing, and value addition. Through this mission, lakhs of women have benefited, and they have advanced this program through their work. Self-Help Group (SHG) women from Sundargarh, Ganjam, and Bhubaneswar who operate millet-based food processing units participated in an exhibition in Paris. Two tribal women from Koraput and Mayurbhanj attended the G20 Summit 2023 in New Delhi. There were many other such platforms where women represented the mission and spread its impact. A large number of SHG women participated in the International Convention on Millets and Krushi Odisha events, organised by the Department of Agriculture and Farmers' Department.

Gender barriers and gender discrimination have narrowed down in the community sphere. Women have been participating in an integral decisive principle to save and guard the financial and social well-being of the community at large. The Legacy of gender has been aborted to a large extent by freeing them from the age-old male-dominating shackle to the mainstream of agriculture domain. Women's participation, engagement and promotion have been spearheaded in the millet ecosystem in Odisha for gender parity and access to resources. The success of OMM has spread leaps and bounds beyond State & National boundaries. The OMM model has been widely acclaimed as a global model to be up scaled at similar landscapes across national and international scenarios.

Torchbearers of Social, Economic and Environmental Transformation

As Government & Industry Affairs Director at Corteva Agriscience, Anuja Kadian works with governments and policy shapers across the region to advocate for science based solutions that enhance food security, protect biodiversity and address climate change. The Director of FSII, Anuja has more than 18 years of experience in non market strategy, and help global companies and startups navigate complex policy environment, mitigate risks and create social impact across highly regulated sectors. In an interview with Anjana Nair, Group Editor, Agriculture Today, Anuja discusses the terrain of agriculture vis-à-vis, women. She believes that empowering and mainstreaming rural women in agriculture can bring about a paradigm shift towards economic growth.

Excerpts from the conversation

In farming, women play a formidable role in India. However there seems to be a disparity in terms of pay, title and benefits from government schemes. How can the Indian women farmers be empowered?

Providing Indian women farmers with equal access to resources such as land, credit, seeds, and agricultural inputs is crucial for their empowerment. Government schemes and programs should prioritize women's participation and ensure that they have equitable access to these resources. Investing in education and training programs tailored to the needs of women farmers can enhance their agricultural knowledge and skills. These programs should cover modern farming techniques, financial management, and leadership development, empowering women to make informed decisions and actively participate in farm management. Facilitating financial inclusion for women farmers through access to credit, savings, and insurance services can enhance their economic independence and resilience. This includes promoting women's membership in self-help groups, cooperatives, and farmer producer organizations (FPOs) to access collective



resources and market opportunities. Promoting the adoption of agricultural technologies and innovations tailored to the needs of women farmers can enhance their productivity and efficiency. This includes providing access to appropriate tools, equipment, and information and communication technologies (ICTs) to overcome barriers to technology adoption. Enacting policies and regulations that promote gender equality and women's empowerment in agriculture is essential. This includes mainstreaming gender considerations in agricultural policies, ensuring the representation of women in decision-making bodies, and implementing gender-sensitive agricultural extension services.

Beyond agriculture, mainstreaming women in the rural economy involves recognizing and valuing their contributions across various sectors, including livestock rearing, food processing, handicrafts, and non-farm enterprises. This requires creating an enabling environment that supports women's economic activities, enhances their access to markets and value chains, and promotes entrepreneurship and skill development.

We don't see many women assume leadership position in

Most often women participate in farm activities along with their household duties, both of which are unnoticed and unpaid/underpaid. How can we remove this disparity from the equation?

The 'care economy' plays a pivotal yet often overlooked role in rural agriculture, particularly concerning women in India. Women in rural areas are not only actively engaged in agricultural production but also bear the primary responsibility for unpaid care work within households. Furthermore, women often contribute to farm activities themselves, balancing their agricultural responsibilities with caregiving duties. However, the heavy burden of unpaid care work can limit women's participation in income-generating activities outside the household, hindering their economic empowerment and exacerbating gender disparities in rural areas. Recognizing and valuing the care economy in rural agriculture is essential for promoting gender equality, enhancing women's economic opportunities, and fostering sustainable development in rural India.

Empowering Indian women farmers requires a multifaceted approach that addresses the structural barriers they face and recognizes their diverse roles and contributions in the rural economy. By promoting gender equality, enhancing access to resources and opportunities, and valuing the care economy, India can unlock the full potential of women farmers and create more inclusive and sustainable rural communities.

tête-à-tête with Anjana



agriculture private sector. There are very few CEOs or VPs or MDs. Why do we see this gender gap?

The underrepresentation of women in leadership positions within the private sector, including the agriculture sector, is a complex issue influenced by various factors. Societal norms and historical gender roles have traditionally positioned men as primary decision-makers, perpetuating the notion that leadership qualities align more closely with masculine traits. Gender stereotypes and biases further reinforce these perceptions, hindering women's advancement into top leadership roles. Additionally, systemic barriers such as limited access to education, training, and networking opportunities, coupled with work-life balance challenges, contribute to the disparity. Unconscious biases in hiring and promotion

processes often favour candidates who fit traditional leadership stereotypes, further perpetuating gender imbalances. Organizational cultures that lack diversity and inclusion initiatives exacerbate the problem, as the absence of female role models in leadership positions reinforces the perception that such roles are unattainable for women.

Addressing the gender gap in leadership requires a holistic approach, involving changes in organizational policies, cultural norms, and societal attitudes. Initiatives such as mentorship programs, diversity and inclusion training, flexible work policies, and advocacy for equal opportunities can contribute to fostering a more equitable environment for women in leadership positions. By addressing systemic barriers and biases, organizations can promote gender diversity and unlock the full potential of women leaders in the private sector, including agriculture. It is a slow process that'll require consistent effort, regular reminders and conscious approach towards debiasing ourselves.

Having worked in the industry for close to two decades, do you think if women occupy positions of prominence, it can help bring about a transformational change in the concerned sector, especially agriculture?

Yes. Women make up approximately 80% of economically active individuals in Indian agriculture, encounter significant barriers across the entire value chain. Despite contributing to 60% of total food production, their access to land ownership is limited

to a mere 13%, reflecting a stark disparity in decision-making power. Women bring unique perspectives, skills, and insights to leadership roles, which can lead to more inclusive decision-making processes and innovative approaches to addressing complex challenges.

Efforts to empower women in agriculture must extend beyond addressing challenges at the grassroots level. While strides have been made to uplift women farmers, their underrepresentation in decision-making roles persists as a persistent issue. Despite a significant rise in the number of women obtaining degrees in agriculture, the translation of this education into leadership positions remains disappointingly low, with less than 20% entering research and development roles. Efforts to empower women must involve a holistic approach, fortifying aggregation models like Farmer Producer Organizations (FPOs) and Self-Help Groups (SHGs). Access to knowledge, comprehensive training, institutional support, and adequate credit facilities are vital components of overcoming prevailing barriers and ushering in a transformative era for women in agriculture.

Is the current policy regime favourable for enhanced participation of women in agriculture? What changes would you like to suggest?

India has implemented various initiatives to enhance women's participation in agriculture, including the Mahila Kisan Sashaktikaran Pariyojana (MKSP) and the National Policy for Farmers (2020), emphasizing gender mainstreaming. Financial support programs like the Rashtriya Mahila Kosh (RMK) and the National Rural Livelihood Mission (NRLM) provide credit facilities. While these initiatives demonstrate a commitment to fostering gender inclusivity in agriculture, there are areas where improvements could be made.

Firstly, policies promoting women's land ownership and secure land tenure rights should be strengthened and rigorously enforced to ensure equal access to

In the broader context, rural women emerge as torchbearers for social, economic, and environmental transformation. Empowering and mainstreaming rural women in agriculture becomes a strategic imperative for achieving Sustainable Development Goals by 2030, leading to enhanced food security, poverty alleviation, and a paradigm shift towards economic growth.

agricultural resources. Financial inclusion for women in agriculture could be further enhanced by expanding credit facilities and implementing targeted financial literacy programs. To address the skill gap and promote technological adoption, there is a need for increased investment in training programs specifically tailored for women in agriculture. These programs should cover modern farming techniques, technology usage, and business management skills. Encouraging the adoption of technology in agriculture by women is crucial, necessitating comprehensive training and support for the use of modern tools and equipment. In terms of market access, initiatives should be developed to create platforms for direct selling, establish cooperatives, and provide market information to empower women farmers. Measures ensuring the health and safety of women engaged in agricultural activities, considering the physical demands of certain tasks, should be implemented.

Additionally, awareness campaigns challenging social norms and stereotypes that may hinder women's active participation in agriculture could contribute to a more inclusive environment. Collecting gender-disaggregated data is imperative to gain insights into the specific challenges faced by women in agriculture. This data can inform evidence-based policymaking, facilitating the creation of targeted interventions. Investing in rural infrastructure to improve connectivity, transportation, and storage facilities is essential to benefit women engaged in agriculture. Lastly, fostering partnerships and collaboration between government

agencies, NGOs, and local communities is crucial for a holistic and coordinated approach to women's empowerment in the agricultural sector.

How optimistic are you about the future? Will be seeing more women leaders step up the ladder of success?

I am optimistic about the future, especially when it comes to seeing more women take on leadership roles in agriculture, which is warranted considering the strides made through various policies and initiatives in India. The emphasis on empowering women through knowledge, skills, and financial support is a fantastic step forward. We're seeing tailored training programs addressing specific skill gaps, efforts to secure land tenure rights, and initiatives promoting market access and safety measures. All of these create a more supportive environment for women to step into leadership roles.

Sure, there are still challenges ahead, but with comprehensive data collection and ongoing investment in rural infrastructure, the path forward looks promising. I truly believe that as we continue to enhance policies and support women's development, we'll see more and more women taking the helm in agriculture, driving positive change and innovation in the sector. The groundwork laid by current initiatives sets a positive trajectory, fostering a more inclusive and empowered community of women leaders in the agricultural landscape.

What is your message for the women on the occasion of Women's day?

On Women's Day, my message is one of optimism and empowerment for all the incredible women. Believe in your abilities, stay optimistic, and never underestimate the power of your resilience. Your journey is a testament to your strength, and as we celebrate Women's Day, let's collectively inspire and uplift each other towards a future where every woman can thrive and succeed.

RENUKA'S JOURNEY

Empowering Women in Agriculture Through Bioprime

The extraordinary story of Renuka, the CEO of Bioprime AgriSolutions Pvt Ltd, epitomizes resilience, determination, and a commitment to revolutionizing agriculture. From her early influences of strong women to her ground breaking work in building Bioprime, Renuka's journey serves as a beacon of inspiration for women in the agricultural sector.

Early Influences and Love for Agriculture:

Renuka's journey in agriculture was shaped by the strong women in her life, particularly her grandmother, who managed the family fields with grace and determination. Witnessing her grandmother's unwavering commitment to farming instilled in Renuka a deep respect for the profession and a desire to make a difference in the agricultural sector. Additionally, Renuka's father instilled in her a sense of financial independence from a young age, laying the foundation for her future endeavors.

Educational Pursuits and Accidental Entrepreneurship

Driven by her passion for agriculture, Renuka pursued a degree in Plant Sciences and subsequently earned a Ph.D. in Plant Biotechnology. It was during her academic pursuits that Renuka discovered her calling to merge her scientific knowledge with entrepreneurial endeavours. The turning point came in 2016 when Renuka witnessed the devastating impact of El Niño-induced crop losses on farmers' livelihoods. Determined to make a difference, Renuka founded Bioprime with the vision of developing cutting-edge biological solutions to mitigate the effects of climate variability on agriculture.

Through strategic partnerships, research collaborations, and a relentless commitment to innovation, Renuka transformed Bioprime into India's fastest-growing biologicals company.

Building Bioprime: Overcoming Challenges with Resilience

Building Bioprime from the ground up was not without its challenges. Renuka faced skepticism and resistance, particularly as a woman in a male-dominated industry. However, her unwavering determination and resilience enabled her to overcome these obstacles and garner support for her vision. Through strategic partnerships, research collaborations, and a relentless commitment to innovation, Renuka transformed Bioprime into India's fastest-growing biologicals company.

Empowering Women in Agriculture

As Renuka reflects on her journey, she is committed to empowering women in agriculture and creating opportunities for them to thrive. At Bioprime, Renuka makes a conscious effort to include as many women in leadership positions as possible, recognizing the importance of diversity and inclusivity in driving innovation. However, she also emphasizes the importance of women not limiting themselves and working equally hard to

achieve their goals.

Transformative Power of Women in Agriculture

Renuka's journey is a testament to the transformative power of women in agriculture and their ability to effect change in the industry. Through her passion, resilience, and commitment to innovation, Renuka has not only built Bioprime into a pioneering force in the agricultural sector but has also inspired countless women to pursue their dreams and break barriers in traditionally male-dominated fields. As we celebrate International Women's Day, let us draw inspiration from Renuka's journey and continue to empower women in agriculture to create a more sustainable and equitable future.



BUILDING RESILIENCE IN SMALL WOMEN FARMER

Almost 93% of the workforce in India belongs to the informal sector. SEWA, a member based organisation of poor informal sector workers in India has a membership of 2.9 million women workers across 18 states of India. Agriculture, is the main occupation of the rural membership of SEWA. The pandemic, increased input costs and the increasing climate shocks has made agriculture unsustainable. In spite of being in agriculture, the farmer remains hungry. SEWA's agriculture campaign works to find answer to this question.

Clean Skies Campaign

On the occasion of SEWA's 50 years' celebration, SEWA members resolved to work for the next 50 years on the clean skies campaign. To keep land, water and air clean, prevent pollution, have green villages, green employment. Agriculture is an integral part of this campaign.

To build resilience of the small women farmers in agriculture against the climate shocks, SEWA's approach has been to treat farm as an enterprise so that agriculture moves from subsistence to becoming viable and profitable. SEWA has been promoting use of natural fertilisers and pesticides as one of the main thrusts to not only protect the fragile environment from over use of chemical fertilisers and pesticides, but also minimise effect of such chemical uses on the overall health. At present fertiliser is one the major cost heads under production. So, a transition from chemical to natural way of cultivation will help farmers take care of their land, their health and also help bring down production costs.

Natural Farming offers a solution to

To build resilience of the small women farmers in agriculture against the climate shocks, SEWA's approach has been to treat farm as an enterprise so that agriculture moves from subsistence to becoming viable and profitable.

various problems, such as food insecurity, farmers' distress, and health problems arising due to pesticide and fertilizer residue in food and water, global warming, climate change and natural calamities. It also has the potential to generate employment, thereby stemming the migration of rural youth.

Niruben's Smart Farming

Niruben, village Rasnol, District Anand, is

a SEWA member and a farmer. The primary crop that she cultivates is Chilli. She also grows flowers and sells them at the local market. She also has eight cows, and sells the milk produced at the local dairy. The family income is close to Rs. 10,000. Water supply in the village is healthy, but extraction of ground water is expensive due to high cost of energy. Earlier, they used to irrigate with flood irrigation, which was not only expensive but also occurred at inconvenient times.

Niruben, with the support of SEWA began using a biogas plant to cook their meals. She also installed a precision irrigation pump. Earlier, the irrigated land measured 2428.5 square meters, the cropping cycle lasted 142 days from sowing to harvest, the farm produced 2300 kilograms (about 5070.63 lb) of goods, and the earnings from the harvest totalled nearly Rs 55,000 while the costs totalled nearly Rs 41,000; the net income was only Rs 14,000.

After the precision irrigation pump,

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Niruben was able to modify her agricultural practices through the use of latest technologies, both of which would contribute to the reduction of pollutants emitted into the environment. Now, other women in Rasnol look up to Niruben as an example for how to improve the quality of land, tackle climate change, make the transition towards green energy and move towards sustainable farming practices

Niruben switched to smart farming, which involved an irrigated land area of 809.5 square meters, a cropping cycle of 142 days from sowing to harvesting that yielded 1987 kg (about 4380.58 lb) of output and earning that was nearly Rs 45,500, cost incurred in farming that was just Rs 16000, and net income of Rs 29500 which was more than double. The output production per unit of land also increased. The use of precision irrigation pumps ensured that crops received all the nutrients they need while conserving water. The use of solar pumps has resulted in elimination of the costs associated with power and diesel. Another problem Niruben faced was entry of wild animals in the farm land, which used to destroy the crops on field. Due to this Niruben had to suffer huge loss. She got the solar fencing done in the farmland which restricted the entry of wild animals. Solar traps were installed

It is important to look at agriculture in a holistic way and it can help in bringing women out of poverty and at the same time improve their carbon footprint.

to eradicate the pest.

Bebi Ben's Natural Farming

Bebi ben who is from Golwadi block of Aurangabad attended a meeting in her village where she got to know about using natural farming practices instead of chemical fertilizers. She was impressed by the fact that small and marginal farmer like her can decrease their production costs and at the same time, improve soil health and environment. Through trainings from SEWA, she learnt how to manufacture natural fertilizers and pesticides using locally available raw materials like cow dung, cow urine, jaggery, coconut water, neem seeds etc.

During the initial year, she made fertilisers, vermicompost, neem pesticides for her own use. In the first year itself her total costs saving from 1 Bigha (0.6 acre) of land was around Rs 10,000- Rs 15,000 and there was also increase in production

by around 10%. This inspired her and she started training other sisters in manufacturing and use of natural pesticides and fertilisers. She also started her own agri-input centre in 2022 and sells the same to other women in the village.

Thus it can be seen that with awareness, trainings and access to knowledge and use of renewable energy, women in agriculture have been able to improve the production, soil quality, earnings, health.



It is important to look at agriculture in a holistic way and it can help in bringing women out of poverty and at the same time improve their carbon footprint. This needs to be linked with green credit so that the farmers can benefit from it. Also the farmers need access to a livelihood recovery and resilience building fund which can support them during the climate shocks and help to cover their expenses. Also it can support them in the process of transition to natural farming.

We at SEWA call it Building an Economy of nurturance, through local decentralized supply chains owned and managed by women small farm holders.



BREAKING GROUND

WOMEN'S EMPOWERMENT AND PATH TO SUSTAINABLE GROWTH



Agriculture remains the centre of India's economic system, functioning as a lifeline for tens of millions of human beings and playing a multifaceted role within the country's improvement trajectory. India is one of the essential players within the agriculture sector worldwide and is the number one supply of livelihood for 55% of India's population. In India, Agriculture employs about 80 percent of rural women. Empowering and mainstreaming rural women workforce in agriculture can bring a paradigm shift and help us in achieving Sustainable Development Goals by 2030.

Investing in women's empowerment becomes a linchpin, addressing not only poverty and food security but also fostering economic growth and battling climate change.

Unfortunately today also when we talk about a farmer the picture that we create in our mind is always of a man, while Women farmers in India perform most of the big farming jobs, from sowing to harvesting, yet their access to resources is less than their male counterparts. Closing this gender gap is essential in or-



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der to accelerate the pace of growth in the agriculture sector. These voices need to be heard at both the policy and implementation levels if we are to realize the dream of empowering women farmers in India.

Evolving Role of Women in Agriculture

Despite the indispensable contributions of women in agriculture, their journey is not without its hurdles. Empowering rural women is not just a moral duty; it's a strategic imperative for achieving Sustainable Development Goals (SDGs). When women have equal access to education, healthcare, and economic opportunities, they become powerful catalysts for change. Investing in women's empowerment becomes a linchpin, addressing not only poverty and food security but also fostering economic growth and battling climate change.

Opportunities

Looking ahead, India's agricultural sector is positioned to significantly boost the nation's GDP by an estimated \$600 billion by

The principles of inclusivity, development and collective effort, embodied in the ethos of "Sabka Saath, Sabka Vikas, Sabka Vishwas, and Sabka Prayas," resonate throughout the interim budget's vision.

2030, marking a remarkable 50% increase from its 2020 contribution. But to get there, India must unlock growth and productivity for the sector. The principles of inclusivity, development and collective effort, embodied in the ethos of "Sabka Saath, Sabka Vikas, Sabka Vishwas, and Sabka Prayas," resonate throughout the interim budget's vision. The increased allocation for the agriculture ministry in 2024–25 to Rs1.27 lakh crore, reflecting a rise from the previous year's revised estimates of

Rs1.16 lakh crore in 2023–24 and the budget estimates of Rs1.15 lakh crore for the same period showcase a commitment to intensifying initiatives aimed at enhancing value addition in the agricultural sector, empowering women, and augmenting farmers' incomes.

For women navigating the market terrain, the challenges are substantial. Limited mobility, lack of information, and gender-based discrimination create obstacles. Yet, within these challenges lies the potential for economic growth, guided by access to markets and market information.

AgTech & Economic Growth

To enhance women's involvement in higher-value activities within agri-value chains, leveraging technology becomes crucial. Existing studies emphasize that encouraging technology adoption among women farmers can lead to increased economic benefits at the grassroots level and foster significant social inclusion.

Sustainable agriculture technologies, while offering potential benefits for both men and women, can significantly empower women in the agricultural sector. Increased income, enhanced decision-making power, and improved food security emerge as key pathways through which these technologies contribute to women's empowerment, underlining their pivotal role in promoting gender equality.

Converting Challenges into Opportunities

In conclusion, valuing the role of women in agriculture is essential for achieving inclusive and sustainable agricultural systems. We can unlock their potential and enhance their productivity by addressing their challenges. The power of agtech in empowering women, moving from challenges and converting it into opportunities, and stimulating sustainable development in Indian agriculture is a narrative that deserves attention. Embracing technology and creating an inclusive environment can not only secure the future of our agricultural sector in India but can also pave the way for a better, equitable, and sustainable future for all.

Nutrition for Her

EMPOWERING WOMEN'S HEALTH WORLDWIDE

March 8th marks International Women's Day, a celebration of the achievements and contributions of women globally. As we honour this day, it's imperative to shine a spotlight on a fundamental aspect of women's well-being: nutrition. Beyond just fueling the body, proper nutrition is the cornerstone of women's health, vitality, and overall well-being. From bustling metropolises to remote villages, women are embracing the power of nutrition to lead healthier and more fulfilling lives. In every corner of the globe, women are the backbone of families, communities, and economies. However, societal norms and cultural expectations often place women at the forefront of caregiving, leaving little time for self-care. Yet, it is precisely in these moments that the transformative power of nutrition shines brightest.

Understanding the Nutritional Landscape

Addressing Deficiencies

The research published in the Lancet Global Health reveals shocking statistics that two in three women worldwide suffer from preventable micronutrient deficiencies, with as many as nine in

ten women in certain regions of South Asia and Sub-Saharan Africa affected by at least one deficiency. A staggering 69 per cent of non-pregnant women aged 15 to 49 globally experience deficiencies in vital nutrients such as iron, zinc, and folate, or a combination thereof. These deficiencies manifest in symptoms like fatigue, weakness, and impaired cognitive and immune function, significantly hindering women's daily lives and productivity.

Impact of Good Nutrition on Women's Health

Maternal Health

Adequate nutrition before, during, and after pregnancy significantly reduces the risk of maternal mortality, childbirth complications, and low birth weight babies (UNICEF, 2023). Proper nutrition supports the health of both the mother and the developing fetus, ensuring a safe and healthy pregnancy and reducing the likelihood of maternal and neonatal deaths.

Child Development

Good maternal nutrition positively influences children's cognitive development, immunity, and overall health (World Bank, 2020). Nutrient-rich diets during pregnancy and lactation lay the foundation for optimal growth and development in children, shaping their future health outcomes and reducing the risk of stunting, wasting, and developmental delays.

Chronic Diseases

Balanced diets mitigate the risk of chronic diseases such as diabetes, heart disease, and certain cancers, prevalent globally (WHO, 2023). By promoting healthy eating habits, women can reduce their susceptibility to these debilitating conditions, enhancing their overall well-being and longevity.

Economic Productivity

Improved nutritional status enhances women's physical and mental well-being, fostering increased workforce participation and higher economic productivity (World Bank, 2021). Investing in women's nutrition not only benefits individual women but also contributes to the economic growth and prosperity of entire communities by reducing healthcare costs, absenteeism, and disability.

Why Nutrition Matters: Addressing Key Challenges

Combating Gender Inequality

Women and girls often encounter unequal access to food and resources, exacerbating their nutritional deficiencies. Socio-cultural factors, discriminatory practices, and limited economic opportunities further compound these challenges, perpetuating cycles of poverty and malnutrition. Gender disparities in education, em-

Investing in women's nutrition not only benefits individual women but also contributes to the economic growth and prosperity of entire communities by reducing healthcare costs, absenteeism, and disability.

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ployment, and decision-making exacerbate women's vulnerability to malnutrition, limiting their ability to access nutritious food, healthcare, and opportunities for economic empowerment.

Addressing Vulnerability

Nutritional inadequacies inflict severe consequences on pregnant women, young children, and individuals with specific health conditions. Pregnant women and infants are particularly vulnerable to the adverse effects of malnutrition, including stunted growth, cognitive impairments, and increased susceptibility to infections. Maternal malnutrition increases the risk of complications during pregnancy and childbirth, leading to higher rates of maternal and neonatal mortality and morbidity. Young children who experience malnutrition in the first 1,000 days of life are at increased risk of impaired growth, cognitive development, and long-term health problems, perpetuating the cycle of poverty and malnutrition across generations. Women with chronic diseases such as

Investing in nutrition-specific interventions such as biofortification, dietary diversity, and nutrition education can yield significant returns in terms of improved health outcomes, reduced healthcare costs, and enhanced human capital development.



diabetes, hypertension, and HIV/AIDS are also more vulnerable to malnutrition due to increased nutrient requirements, metabolic disturbances, and socio-economic barriers to accessing nutritious food and healthcare

services.

Promoting Sustainable Development

Tackling malnutrition among women is pivotal for achieving Sustainable Development Goals (SDGs) related to poverty alleviation, health, and gender equality. By prioritizing women's nutrition, governments, organizations, and communities can foster healthier, more resilient societies, laying the groundwork for sustainable development and inclusive growth. Investing in nutrition-specific interventions such as biofortification, dietary diversity, and nutrition education can yield significant returns in terms of improved health outcomes, reduced healthcare costs, and enhanced human capital development. Additionally, integrating nutrition-sensitive approaches into agriculture, education, and social protection programs can address the underlying determinants of malnutrition, including poverty, food insecurity, and gender inequality, thereby breaking the intergenerational cycle of malnutrition and poverty. Empowering women as agents of change and investing in their nutrition is not only a matter of social justice but also a strategic imperative for achieving sustainable development and building a brighter future for all.

Inspiring Initiatives

In the quest for improved nutrition among women, numerous initiatives stand out as beacons of hope and progress. One such initiative is Harvest Plus Nigeria's Smart Mother Platform, a transformative endeavor aimed at educating and empowering mothers to prioritize nutrition for themselves and their families. Through community sensitization programs and hands-on guidance on the cultivation and consumption of biofortified crops, Smart Mothers are effecting tangible changes in their communities, promoting not just health but also economic stability. In rural India, a similar narrative of transformation unfolds, driven by women affectionately known as "Didis". The "Lakhpati Didi" scheme, with an enhanced target of 3 crore women, signifies a concerted effort towards women's empowerment through entrepreneurship and improved livelihoods. Under the leadership of the National Rural Livelihood Mission (NRLM), 83 lakh Self-Help Groups comprising nine crore didis are not only assuming roles as cultivators and entrepreneurs but also making significant contributions to the productivity and sustainability of the agricultural sector.

Continuing the spirit of innovation, Fakrun Nahar, a Soil Science expert in Bangladesh founded the Voluntary Rural Development Society (VRDS) and ventured into supplying biofortified zinc rice seed to farmers. Starting with 600 kg, Nahar's business quickly expanded, selling 14 metric tons in 2019. Using lead farmers for distribution, Nahar established a sales force of 30 women in Dhaka. Nutri-preneurs like Fakrun Nahar not only generates income and support local economies but also raises awareness about biofortified rice, enhancing community nutrition.

Another groundbreaking initiative designed to help farmers earn a living income is Cargill's Hatching Hope. The program is active in India, Kenya and Mexico and equips farmers with the tools and expertise they need to start and grow poultry businesses. It aims to reach 100 million farmers by 2030, connecting producers to markets so they can increase their incomes, while also promoting the nutritional value of eggs and meat within communities especially women, building sustainable markets for the future.

Celebrating Women through Nutrition

On this Women's Day, let us reaffirm our commitment to ensuring access to good nutrition for women worldwide. By addressing nutritional deficiencies and promoting healthy eating habits, we not only enhance women's health but also empower them to lead fulfilling lives. Let's celebrate women by prioritizing their well-being and advocating for policies and initiatives that promote nutrition equity for all. Together, we can create a world where every woman thrives.

GENDER RESPONSIVENESS CAN MAKE CLIMATE-SMART AGRICULTURE EVEN SMARTER!

The impact of climate change on agriculture is undeniable, and it poses a significant threat to global food security. While climate-smart agriculture (CSA) is gaining momentum as a solution, its success depends on its ability to ensure inclusivity and not leave anyone behind. By harnessing the engagement of women in agriculture and simultaneously empowering women, we can not only mitigate negative effects of climate change but also foster sustainable, resilient, and equitable food systems through CSA.

Persistent Gender Divide in Agriculture

For centuries, women have been the backbone of agriculture contributing significantly to crop production, livestock management, and food processing. As per the 2021-22 report of Periodic Labour Force Survey (PLFS), about 70% of the agricultural labour in India is performed by women. Despite their engagement, women and their role in agriculture is largely ignored when it comes to the evolving landscape of Climate Smart Agriculture. For the longest time, CSA's technocratic agenda has remained divorced from gender issues, which has critically slowed down its adoption. Research-generated evidence suggests that systemic barriers emanating from the gender differences affect the rate of CSA adoption and continued engagement. In many places, women farmers were the frontrunners in initiating the transitions towards CSA practices. However, their engagement couldn't be sustained in the long run. Persisting challenges of limited decision-making authority, access to land, financial resources, advisory services, education, technology, and Climate Information Services (CIS) underlie these patterns. Based on this evidence, it won't be wrong to interpret that CSA can only be effectively



and widely implemented if gender goals are better integrated and problems at the household and community levels are well recognised and targeted. Without these steps, we would be otherwise stuck in the loop of creating more technologies but failing at making them work.

Research-generated evidence suggests that systemic barriers emanating from the gender differences affect the rate of CSA adoption and continued engagement.

Why does gender matter for CSA?

Climate-smart agriculture addresses the interlinked challenges of food security and climate change by integrating them with planning and implementation of sustainable practices. Focusing on triple-win outcomes (FAO, 2013) that include increased productivity, enhanced resilience and reduced emissions, CSA includes an array of practices like precision farming, adoption of stress tolerant crop varieties, organic methods of cultivation, efficient irrigation systems, just to name a few. Adoption of these methods is highly contingent on the existing gender norms that vary across communities and contexts. Men and women perform diverse on-farm roles and activities and have unequal access to and control over resources influencing how

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CSA is translated into action. Evidence points towards the success of those CSA interventions that not only provide information and build capacities but also induce a behaviour change targeting oppressive gender norms and other barriers to adoption (Singh & Puskur, 2023). Gender based inequities predominantly result from the long-standing socio-cultural norms and behaviours that hamper the outcome of multiple CSA interventions.

Exemplifying a triple bottom line approach (Puskur, 2017), Gender-responsive CSA emphasizes the need to align social, economic and environmental goals. It stresses on the fact that women, who play significant roles in agriculture yet face disproportionate vulnerabilities, should derive benefits from altering their practices. And this would not happen automatically, rather, need deliberate and intentional efforts.

Making CSA work for women

Realising the transformative power of gender-inclusive climate-smart agriculture, several programs and projects around the world have already initiated a step in this direction. Organizations like FAO and CGIAR along with multiple national and grassroots organizations are unceasingly working on the programs to establish that when women thrive, communities thrive. Women play a determining role in adopting and innovating climate-smart practices and effectively contribute towards adaptation and mitigation strategies. Global review of evidence shows that women are more likely to adopt sustainable CSA practices and show willingness to engage and work towards efficient food systems using a combination of intimate knowledge of local ecosystems and modern agricultural practices. However, deep rooted gender differences continue to stagnate this progress. To target the root cause, participatory approaches, capacity building, and video mediated information sharing interventions are found to perform better in equipping women farmers for transitions towards CSA (Saran & Puskur, 2023). The interventions that thoughtfully create equitable spaces for men and women to participate and



Gender based inequities predominantly result from the long-standing socio-cultural norms and behaviours that hamper the outcome of multiple CSA interventions.

recognise the context specific gender dynamics result in accelerated social change creating a fertile ground for push towards CSA. Designing such interventions thus, should be the top priority of the governments, NGOs and private players who are positioning CSA as a solution for climate resilient and sustainable agriculture.

Designing Interventions

Targeted CSA investment at the hotspots, where women are most vulnerable, is important to maximise the returns on such investments. Hotspots are geographical areas where enhanced risks of climate hazards, large concentrations of women participating in agriculture and high vulnerability due to gender inequalities converge (Lecoutere et al., 2023). Multi-stakeholder and cross-sectoral initiatives should become the order of the day. Women's em-

powerment through CSA is achievable if the existing and persistent gender-related barriers including the unequal access to land, credit, technology, and tokenistic participation in decision-making processes are addressed. Favorable policies and their implementation, investment in women's education and training, and the creation of support networks for collective action can help break down some of these barriers. Eventually, it is the little changes at the grassroots and household level that can lead to big transformations in food systems that we desire to see.

Women – Key Agents of Change

Climate-smart agriculture is not only about adapting to and mitigating climate change; it's also about fostering a future where women are key agents of change in agriculture. It is vital to reiterate that when women are given the tools and knowledge to implement CSA practices, they can become the champions of sustainable agri-food systems favourable for achieving multiple SDGs in one go. As we work towards building sustainable and resilient food systems, let us remember that gender equality isn't just a goal—it's a powerful tool in the fight against climate change, making our agricultural practices smarter and more inclusive.

Drone Didi

A NEW CAREER CHOICE FOR RURAL WOMEN

In recent years, the agricultural sector has witnessed a technological revolution, with drones emerging as a game-changer in farming practices. Alongside this innovation, the integration of nanotechnology Fertilizers like Nano Urea, Nano DAP into agriculture has opened new avenues for enhancing crop productivity and sustainability. Previously spraying of liquid agriculture inputs with drone was too expensive for farmers which cost around Rs. 600-800/ acre.



Drone Didi

IFFCO has embarked on a mission to provide DGCA approved 300 agricultural drones and Electric vehicles to NRLM SHG women entrepreneurs across the country after proper training. A total of 300 Women NRLM SHGs in various states have been selected to receive drones for providing rental services to farmers for agricultural purposes. Members of Women SHGs will undergo a 15-day training program in Remote Pilot Training Organization (RPTO), with a mandatory 10-day drone pilot training and additional 5-day training for agriculture purposes, including nutrient and other spray application. By engaging NRLM SHG the benefits from Drone will

Dr Uday Shankar Awasthi, Managing Director, IFFCO envisioned a complete robust spraying solution for the farmers so that nano fertilisers like Nano Urea and Nano DAP can be adopted by the farmers at a faster pace. In a landmark move aimed at revolutionizing agricultural practices and empowering farmers with cutting-edge AI based technology, the Indian Farmers Fertilizer Cooperative Limited (IFFCO) has announced to provide DGCA approved 2500 agricultural drones and Electric vehicles to identified rural entrepreneurs free of cost to enable them to spray Nano Fertilizers and other Liquid fertilizers efficiently and provide rental services to farmers for agricultural purposes at Rs. 300/ acre or 25% less than the prevailing rate of spray services rendered through knapsack sprayers in that area.

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not only remain with one women but it reaches all the women members of SHG thus empowering a cluster of women from that area. This move marks a significant step towards leveraging cutting-edge technology to enhance the participation and productivity of women in the agricultural sector by providing Spray Solution to the farmers through Drone by becoming the Drone Didi in that area.

Multiple Benefits of Agricultural Drones

Agricultural drones, equipped with advanced sensors offer a multitude of benefits to farmers, including precise crop monitoring. Drones have the capability to follow the crop terrain by maintaining the



same distance with crop canopy to avoid any loss to crops during spray. Also, Drone are enabled to come back to launch place if the water tank become empty and incase battery get discharged without harming the drone. Drones sense any obstacle like wire/pole and change its route of its own which actually minimizes any sort of accident during drone sorties.

Financial Empowerment

Along with drone, an electric vehicle will be provided to the selected women entrepreneurs along with 5 sets of lithium-based battery, battery charger, DG set, space for storage of Nano Urea, Nano DAP, Sagrika Liquid and water-Soluble fertilizers and to carry clean water with a capacity of 100 liters. The Electric Vehicle can travel approx. 100 Kms after one time charge to carry the Drone and other accessories from one place to another place.

Once charged, the drone can fly for 22 minutes and cover around 20 acres per day. In a year with the help of Drone, women entrepreneurs can spray minimum 200 days covering about 4000 acres. Total Gross earning of a woman entrepreneur would be Rs. 12 lakhs per annum and she can spend Rs. 6 Lakhs for hiring an as-



Sl. No	State Name	No of Women Entrepreneurs
1	Andhra Pradesh	12
2	Assam	9
3	Bihar	5
4	Chhattisgarh	12
5	Gujarat	18
6	Haryana	22
7	Himachal Pradesh	4
8	Jharkhand	1
9	Karnataka	31
10	Kerala	2
11	Madhya Pradesh	34
12	Maharashtra	30
13	Odisha	12
14	Punjab	23
15	Rajasthan	19
16	Tamil Nadu	17
17	Telangana	7
18	Uttar Pradesh	33
19	Uttarakhand	3
20	West Bengal	6
TOTAL		300



In a visionary move aimed at revolutionizing Indian agriculture and empowering women in rural areas, Prime Minister Narendra Modi has unveiled the Namo Didi Drone Yojana

sistant and other maintenance purposes. Envisaging sustainable business and livelihood support, the small initiative of IFFCO, will enable 300 Women to earn an additional income of at least Rs. 6 lakhs per annum. This income boost is expected to create a positive economic impact on the lives of the participating women.

Namo Didi Drone Yojana

IFFCO aims to distribute drones to women entrepreneurs through NRLM SHG, thereby not only recognizing the invaluable contribution of women to agriculture but also empowering them with cutting-edge technology to enhance their productivity and livelihoods. By specifically targeting women entrepreneurs, the IFFCO Kisan Drone Schemes aligns with Namo Didi Drone Yojana seamlessly with the government's focus on women's empowerment and gender equality, ensuring that the benefits of agricultural innovation are accessible to all segments of society.

In a visionary move aimed at revolutionizing Indian agriculture and empowering women in rural areas, Prime Minister Narendra Modi has unveiled the Namo Didi Drone Yojana. This ambitious scheme, launched under the leadership of hon'ble Prime Minister and Indian Farmers Fertilizer Cooperative Limited (IFFCO) has taken a significant step towards achieving the Prime Minister's vision of leveraging technology to transform agriculture and uplift the lives of women farmers across the country.

ENHANCING WOMEN POWER IN AGRICULTURE

Last century saw advancement of intensive production system stimulated by consumption driven economics that has led to deep social and ecological consequences. Success in Agriculture triggered a deterministic transformation of agricultural landscape and many initiatives shaping the agricultural sector and reinforcing the green revolution pathway.

However one significant thing that went unnoticed is the woman's significant contribution to agriculture in rural India. It is known that 78 percent of India's employed women work in agriculture. As per the Annual Periodic Labour Force Survey, 2021-2022, Agriculture has the highest estimated female labour participation of 62.9 percent.

To begin with, agriculture is increasingly becoming a female activity. To meet the sustainable development goals of 2030 i.e., removing gender inequality, a better understanding of women in agriculture is of paramount important. Empowering women in Agriculture shall uplift the society as a whole and women plays a pivotal role both in agriculture and rural family households.



Agrifood Systems - A Key Source of Employment

Globally, 36 percent of working women and 38 percent of working men work in agrifood systems as of 2019. Agrifood systems are a very important source of livelihood for women than for men in many countries across globally. In sub-Saharan Africa, 66 percent of women's employment is in agrifood systems, compared with 60 percent of men's. In Southern Asia, women participation is higher work in agrifood systems (71 percent of women, versus 47 percent of men), although fewer women than men are in the labour force. Agrifood systems are a key source of employment for young women, especially those aged 15–24.

Lower Levels of Economic Development

In general, women account for an increased share of agricultural employment at lower levels of economic development, due to inadequate education, limited access to basic infrastructure and markets, high unpaid-work burden and poor rural employment

opportunities outside agriculture.

The gender gap in land productivity between female- and male-managed farms of the same size is 24 percent.

Globally, 22 percent of women lost their jobs in the off-farm segment of agrifood systems in the first year of the COVID-19 pandemic, compared with only 2 percent of men

Women are seen less as entrepreneurs and independent farmers and are engaged in the production of less lucrative crops. Often, women are unpaid family workers or casual workers in agriculture. Societal norms are also one of the constraints for women from producing crops and participating in activities dominated by men.

Gender Gap and Farm Productivity

Policies, programmes and investments should be intentionally designed to tackle the multidimensional and interrelated challenges that women face.

FAO estimates that closing the gender gap in farm productivity and the wage gap in agrifood-system employment would increase global gross domestic product by 1 percent (or nearly by USD 1 trillion). This would reduce global food insecurity by about 2 percentage points, reducing the number of food-insecure people by 45 million.

FAO estimates that if half of small-scale producers benefited from development interventions that focused on empowering

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women, it would significantly raise the incomes of an additional 58 million people and increase the resilience of an additional 235 million people.

Challenges and Opportunities for Women in Agriculture

Women in Small Farms

Women in small farms are the backbone of sustainable agriculture. Women perform numerous tasks in small farms, including sowing of seeds, weeding, harvesting, selling the produce etc. However, they do not have access to resources such as land, water, and seeds, which limit their productivity and income. Moreover, women face socio economic barriers that prevent them from owning land and participating in decision-making processes.

Women in Big Farms

Women in big farms play a critical role in the global food supply chain. They work in various advanced sectors of agriculture, including production, processing, and marketing. However, women in big farms also face challenges such as inequality in pay, less access to education and training, less land tenure, and social discrimination. Moreover, women in big farms often have to balance work with household chores and childcare which can be overwhelming and lead to burnout.

Gender Equity and Empowerment

Empowering women in agriculture is critical for achieving sustainable development and food security. To meet the sustainable development goals, empowerment involves increasing women's access to resources such as land, water, and seeds, and providing them with education and training. It also involves promoting gender equity and reproductive rights, reducing gender-based violence, and increasing women's participation in decision-making processes. Gender equity is critical for achieving sustainable development goals and ensuring the well-being of women and their families.

Leadership and Innovation

Leadership and innovation are very much required for promoting gender equity

Approaches for empowering women in agriculture

- ❖ Providing education and training in agricultural practices, financial management, and entrepreneurship.
- ❖ Removing gender inequality and addressing gender-based violence in agricultural settings.
- ❖ Enhancing secure land tenure and legal protection for women's land rights.
- ❖ Providing financial services tailored to women's needs and promoting the use of appropriate technologies.
- ❖ Promoting access to markets and market information.

FAO estimates that closing the gender gap in farm productivity and the wage gap in agrifood-system employment would increase global gross domestic product by 1 percent (or nearly by USD 1 trillion).

in agriculture. Women's leadership in agriculture can help in reducing the gender inequality, promote innovative sustainable agriculture practices, and increase productivity and income to a larger extent. Moreover, financial and technological innovation can lead women to overcome the barriers they face in agriculture, such as limited access to credit and markets.

Access to Education

Education is a key factor in improving women's productivity and economic status in agriculture. However, many women in rural areas do not have access to quality education due to cultural, social, and economic barriers. Providing education and training in agricultural practices, financial management, and entrepreneurship can help women increase their productivity, income, and leadership skills.

Land Ownership

Land is a critical asset for agricultural production, yet women often face significant barriers to land ownership and control. In many countries, cultural and legal norms prioritize male inheritance and ownership, leaving women without access

to land. Addressing these barriers and providing women with secure land tenure can improve their productivity, income, and decision-making power in agricultural production.

Finance and Technology

Women in agriculture often lack access to finance and technology, which limits their ability to invest in their farms and adopt sustainable practices. Providing financial services tailored to women's needs and promoting the use of appropriate technologies can increase women's productivity, reduce their workload, and improve their resilience to climate change.

Markets

Women in agriculture often face barriers to accessing markets due to limited mobility, lack of information, and gender-based discrimination. Providing access to markets and market information can help women increase their income, reduce their dependence on subsistence farming, and contribute to economic growth.

Women's contribution to agriculture is critical for sustaining life on the planet. Empowering women in agriculture, promoting gender equity, and increasing women's leadership and innovation in the sector are crucial for achieving sustainable development and food security. Addressing gender inequality in agriculture requires a global and local approach, involving policymakers, private sector, civil society, and women themselves. Promoting gender equity in agriculture can lead to decarbonisation, poverty reduction, and human rights advancement.

EMPOWERED WOMEN, EMPOWER WOMEN!

Women's empowerment extends beyond mere awareness of fundamental rights, encompassing the acknowledgment of women's capacities to make autonomous choices and instilling the conviction that they can shape their destinies. Genuine empowerment involves cultivating a societal framework where women are afforded respect and rights equal to those of all individuals.

Trends in Female Workforce

Despite the remarkable tenfold growth in the Indian economy since 1990, female workforce participation has declined from 30% to 19% as of 2021, according to World Bank data. This trend indicates that, despite overall economic prosperity in India, there is a concerning departure of women from the workforce.

In a heartening turn of events, recent years have witnessed a transformative shift in the landscape of women emerging as business leaders and founders.

This surge in women's leadership positions signifies a noteworthy transformation in the business landscape,

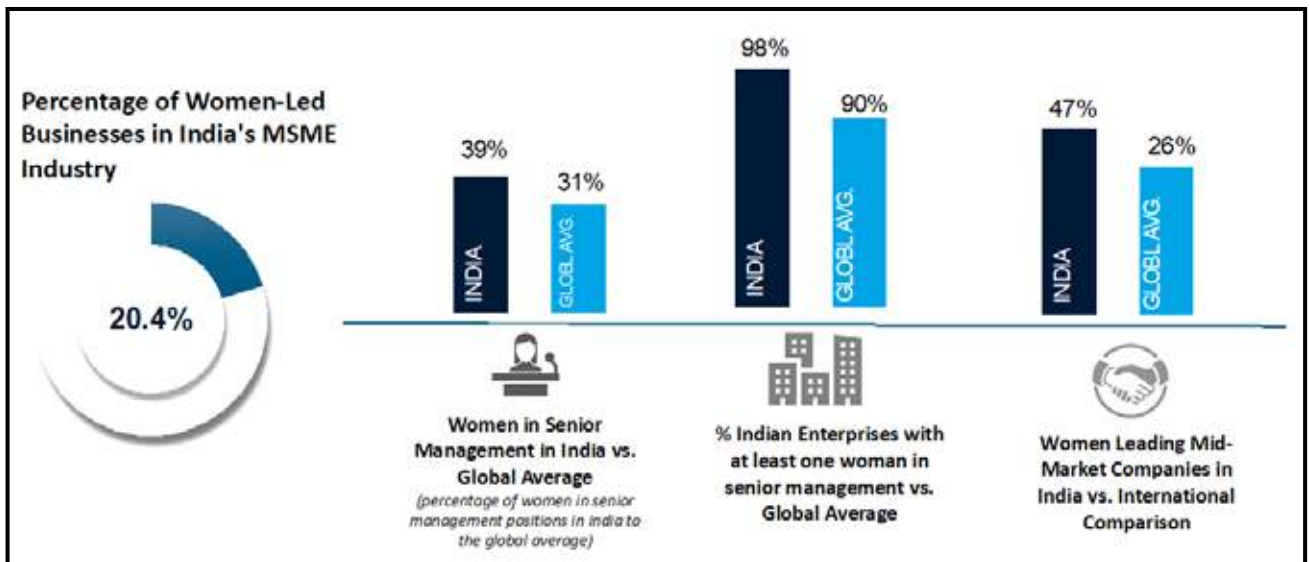
Data reveals some startling facts about women in corporate India

A 2022 NHFS report reveals a significant gender gap in employment, with only 32% of married women (15-49 years) working compared to 98% of married men in the same age group. Reports consistently show women facing pay disparities and being overlooked for promotions and salary increases relative to men.

According to LinkedIn, 85% of employed married women actively make joint decisions with their husbands regarding the utilization of their earnings.



**Dr. Mukta Sirohi, COO; Ms. Priyanka Mallick, MD
and Dr. Megha Joshi, AVP
Q & Q Research Insights**



both nationally and globally.

Q&Q Research Insights- Women Owned and Women Led Organization

Q&Q Research Insights is a 100% Women Owned and Women Led Agriculture Market research and data analytics firm operating in this sector in the last 20 years. Q&Q Research Insights serves as a vital resource for the agriculture sector, offering indispensable insights and data crucial for informed decision-making.

We have actively fostered a corporate environment conducive to the growth and success of women. As a 100% women-owned and women-run organization our core team, passionately advocate for women's inclusion across all facets of our work. Whether it's data collection and engaging with farmers in the remote rural regions of India or delivering strategic presentations to clients, we actively encourage and promote women to partake in every aspect of our operations, fostering an environment where their talents and contributions thrive.

Equal Opportunities for Women Adds Value

McKinsey Global Institute estimates that by 2025, equal opportunities for women in India could add \$700 billion to the economy.

Our initiatives have yielded significant results:

- Over 90% of women on maternity leave successfully resume full-time work, showcasing the effectiveness of our supportive policies.
- More than 60% of women returning from maternity leave rejoin the workforce within 3 months, a testament to the success of our flexible, inclusive, and compassionate policies.
- The average tenure of women in our company stands at an impressive 7.5 years, underscoring the positive impact of our initiatives on long-term employee engagement and satisfaction.

For achieving this, we believe it is very important women recognize that their self-worth is intrinsic and does not need validation from external sources, including parents, spouse, children, family or even your boss. Cultivate self-confidence, acknowledging personal achievements, and finding fulfillment from within.

Financial Independence is the most crucial aspect of personal empowerment. Actively pursue opportunities for education, skill development, and career advancement, and earn your own money. This will give women a sense of security, freedom, and the ability to make independent life choices.

Despite the remarkable tenfold growth in the Indian economy since 1990, female workforce participation has declined from 30% to 19% as of 2021, according to World Bank data

Women should learn about money and financial management and take control of your own money. Understanding your strengths and knowing what you bring to the table allows you to assume a more impactful role in any situation. Embrace the confidence to assertively seek what you deserve—be it a well-deserved pay increase, a promotion that reflects your contributions, or equal opportunities that align with your abilities, ensuring your professional trajectory aligns with your merit rather than gender norms.

By implementing these recommendations, women can cultivate a strong sense of self-worth, achieve financial independence, and thrive both personally and professionally. Empowering women in these aspects contributes not only to their individual growth but also to the overall advancement of society.

Enabling Women Empowerment through FPOs

Women are the backbone of Indian Agriculture. Agriculture employs around 80% of the rural women. The Annual Periodic Labour Force Survey for 2021-2022 highlights agriculture as having the highest female labour force participation rate, reaching around 62.9 percent. Predominantly, these women are engaged in rural areas, with a significant proportion working in farming. In fact, 8 out of 10 employed women are somehow involved in agricultural activities, either as farmers or farm labourers. Particularly in rural India, farming serves as the primary source of income for most of the working women.

Shanti's Problem

Shanti Devi (name changed), a women farmer and shareholder of Dharavats Bio Energy Farmer Producer Company Ltd (DBEFPCL), one of the partner FPO with GFSI, highlights a story of change. Shanti's story exemplifies how female shareholders can transform into successful agri-entrepreneurs and boost their annual income through innovative and low-cost agricultural practices like vermicomposting in their fields.

Shanti Devi, a 30-year-old women farmer from Gauhaniya village in Prayagraj, Uttar Pradesh had been growing various crops, ranging from wheat and paddy to flowers and vegetables, but the income was just not enough for her family of five.

Her farm is too small to give her good margins. Her 1.5 bigha (3,763 square meters) holding is less than half the size of a FIFA football field, defined as 105m x 68m or 6,825 sqm. Such small holdings do not yield enough to give the farmer selling power or economies of scale in buying inputs.

Vermicomposting Saga

Dharavats trains its farmer members to



The Annual Periodic Labour Force Survey for 2021-2022 highlights agriculture as having the highest female labour force participation rate, reaching around 62.9 percent.

About the AUTHOR

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Shanti is not unique

85% of India's farmers are labelled "small and marginal". A farmer, renter, or sharecropper cultivating less than one hectare is "marginal", and those with 1-2 ha are "small". Shanti is one of the millions of "marginal" farmers, who account for 65% of India's farmers. But things changed when Shanti, became a shareholder of Dharavats Bio Energy Farmer Producer Company Ltd in July 2020, during the second "unlock" period that followed the lockdowns of the COVID-19 pandemic.

produce and use vermicompost, which is a mix of decomposing vegetable and food waste, bedding materials, worm castings, worm humus, worm manure, or worm faeces. The farmers use vermicompost in their fields and sell the extra to Dharavats at Rs 5 a kg. Vermicompost is good for the soil as well as the crops.

In November 2020, Dharavats gave Shanti a polyethylene vermicompost bed and 3kg of earthworms. Shanti then used cow dung from her cattle, vegetable peels and green waste from her kitchen, and the straw and leaves from her field as biomass.

Shanti's story not only underscores the importance of low-cost and climate friendly interventions like vermicomposting but also highlights the crucial role of gender-inclusive initiatives in enabling women in agriculture.

It took her (the worms, actually) two to three months to produce 300kg of vermicompost. As she became proficient, she was soon producing nearly 800kg of vermicompost a year, across three to four cycles. She used most of the vermicompost for her crops. It took some time for Shanti to get used to handling the masses of wriggling worms that are the key to the process, but she learned all the tricks of the trade.

She does it all by herself: digging a pit, lining it with a plastic sheet, dumping organic matter, introducing the worms, and covering this with moist jute sacks. The jute sacks help keep the bed warm and moist.

Women Empowerment

Now, Shanti has around 50 kg of worms (from the 3kg that Dharavats had given her). In 2021, she added a vermicompost bed, and now produces nearly 1,200 kg of vermicompost a year. She uses 400-500 kg in her field and sells 700-800 kg to Dharavats. That's Rs 4,000 as extra income.

Shanti says her crop yields have gone up and she no longer spends money on fertilizers such as urea and DAP.

Shanti's story not only underscores the importance of low-cost and climate friendly interventions like vermicomposting but also highlights the crucial role of gender-inclusive initiatives in enabling women in agriculture. As Shanti's story echoes, women like her have the potential to not only contribute significantly to agricultural productivity but also to drive socio-economic transformation in rural communities.

In the context of Viksit Bharat, aligning with the government's foremost priority to modernize the rural economy and empower farmers through FPOs, it is crucial to enable more women farmers through FPOs to provide them with better agency and decision-making power.



Recognizing the importance of enhancing the income and resilience of farmers, especially those belonging to the small and marginal categories, the government has been actively promoting the establishment of Farmer Producer Organizations (FPOs). These institutions not only harness the collective strength of farmers but also provide them with improved market opportunities. However, in the current context where the perception of a "farmer" remains largely male-centric, it is crucial to create a platform for "women farmers" to recognise their identities as farmers and incentivize their contribution in agriculture. This is where organizations like Grameen Foundation for Social Impact (GFSI) play a crucial role. GFSI is focused on helping small farmers, especially women, to produce more and better crops using technology and data. GFSI is also working to make sure women have a say and take leadership roles in these farming groups by constantly practicing gender dialogues at the ground level, ultimately focussed on improving the agency and decision making of women in the FPOs.

ENHANCING FOOD SECURITY

IN THE FACE OF CLIMATE CHANGE THROUGH CROP PROTECTION

According to the latest United Nations projections India's population has reached 1.4 billion people. India being an agrarian country, farmers face the challenges to ensure that production systems are efficient, environmentally friendly, and above all, optimizing the output to ensure the supply meets the demand. Farmers are facing increasing challenges due to the adverse effects of climate change, such as extreme weather events and unpredictable weather patterns. These challenges have the potential to devastate Indian agriculture, making it imperative to acknowledge the impact of the climate crisis on crop production and its protection.

With El Nino changing the atmospheric circulation patterns which results in drier weather conditions, climate scientists warn of the unpredictability of weather patterns which can potentially have devastating effects on Indian farmers as El Nino effect will have significant impact on the agriculture sector. According to the research conducted as part of the World Weather Attribution initiative, the heat waves which used to occur once in a century are now expected once in five years in South Asia.



Given the current scenario, it becomes necessary to acknowledge the impact of climate crisis on crop production and take proactive measures to help farmers mitigate and adapt to sustain and ensure food security of the nation.

Crop Protection in a Changing Climate

Recent FAO study states that climate

change will also increase the risk of pests spreading in agricultural and forestry ecosystems, especially in temperate and sub-tropical regions.

For example, pests, like fall armyworm (which feeds on a growing number of crops, including maize, sorghum, millet) have already spread due to extended warmer climate. This is going to require rethinking the fundamentals of farming, types of the resources used to manage the pest where it appears and its basic relationship with nature.

But in calling out climate change, environmental, and resource challenges, we also need to recognize the potential for agricultural innovation to improve food security by strengthening food system resilience. Sustainable and science-based crop protection technologies can help farmers maximize crop yields while minimizing resource inputs and help farms and farmers to better manage climate change by reducing the need for excessive water, fertilizers, and pesticides, which can save costs and minimize environmental impact, potentially reversing the downward trend in food security.

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Sustainable Crop Protection Solutions

Crop protection plays a crucial role in ensuring the sustainability and resilience of agriculture in the face of climate change, which destabilizes agricultural practices and leads to an increased incidence of invasive pests. Meeting the growing demands of the world's population requires self-sufficiency in food production and ensuring the quality of the food.

What's essential now are effective seed and crop protection products demanded by the current market and solutions that will enhance long-term profitability by meeting the above. Prioritizing sustainable crop protection solutions within a regulatory framework is crucial for environmentally friendly and effective food production that optimizes output. Addressing climate change necessitates rethinking our production and consumption practices. Fortunately, agriculture solutions shall be made available by innovative way to assist us in both combating climate change and boosting production.

Building a sustainable agricultural ecosystem

Integrated Pest Management (IPM) is an effective and environmentally sensitive approach to pest management. It involves monitoring of pest populations by predictive models and preventing them from growing to unprecedented, damaging levels without causing irreversible soil and environmental harm. It comprises an integrated approach wherein the use of nonchemical tools and digital technologies along with crop protection products are used. IPM encourages the use of natural management methods. This causes the least harm to the environment and contributing to minimization of water and air pollution ultimately, eliminating land contamination and boosting soil fertility.

Mechanical and physical controls like traps for rodents kill a pest directly, block pests out, or make the environment unsuitable for it. Physical controls include mulches for weed management, steam/solar sterilization of the soil for disease management, or barriers such as screens

With global population on the rise and increased pressure on land usage, it is critical to work smarter on existing land and transform the food and agriculture system in the country so that we can continue to provide nutritious food to our people and export to the world.

to keep birds or insects out. Agronomic practices like altering the planting season will help to minimize few of the pest and diseases, thereby ease the crop protection aspects.

Biologicals for the Future

However, because of IPM's more focus on natural pest control mechanisms, the demand for biological crop protection solutions is on the rise. Over the last two decades, the growth in biologicals (or biopesticides) has outpaced that of overall crop protection chemicals. These innovative solutions offer environmentally friendly and effective alternatives, contributing to sustainable agricultural practices.

Innovative solutions for a better future

Agri-tech innovations have revolutionized the way farmers address crop protection and climate change challenges. Precision agriculture technologies, including remote sensing, drones, and sensor-based monitoring systems, enable farmers to gather accurate, real-time data about their fields. This data empowers them to make informed decisions regarding the application of fertilizers, water, and crop protection products at critical times, leading to optimized resource usage and reduced environmental impact. Agri-tech solutions also aid in early detection of pest and disease outbreaks by forewarning, enabling prompt and targeted responses to prevent potential crop losses. By adopting these sustainable agri-tech solutions, farmers can effectively manage their crops, minimize resource waste, and reduce the overall environmental footprint of agricultural practices.

Crop protection companies are invest-

ing in research and development to develop innovative and sustainable chemical solutions that are more targeted, environmentally friendly, and effective. These advancements result in novel mode of action, lower application rates, reduced residue levels, and increased efficacy, contributing to sustainable agricultural practices. Furthermore, companies are prioritizing education and training programs to ensure farmers understand proper handling, application techniques, and safety precautions associated with agrochemicals. By promoting responsible use, crop protection companies minimize the environmental impact of agrochemicals while maximizing their benefits in ensuring food security.

Policy-led growth for collaboration

At the ground level, addressing the complex challenges of climate change and food security requires collaboration among various stakeholders. Through these collaborative efforts, stakeholders collectively develop strategies to effectively mitigate the impact of climate change and ensure long-term food security. This approach empowers farmers with access to the latest advancements in crop protection technologies and techniques.

With global population on the rise and increased pressure on land usage, it is critical to work smarter on existing land and transform the food and agriculture system in the country so that we can continue to provide nutritious food to our people and export to the world. By embracing sustainable and innovative technological techniques and a multi-stakeholder approach, we can address the challenges faced by the agriculture sector in India and the world.

GANGA NARSU'S TRYST WITH SUSTAINABLE RICE CULTIVATION

In the heart of Jakranpally Mandal, nestled amidst the serene landscapes of Telangana's Nizamabad district, Ganga Narsu's journey unfolds as a beacon of hope and transformation. Born into a world where access to education was scarce, and agriculture was the lifeline for survival, Ganga's story epitomizes the power of resilience and the potential for change.

Sustainable Rice Initiative

For generations, Ganga's family had treaded the path of traditional farming practices, relying on age-old methods handed down through the years. Change was a foreign concept in their tight-knit community, where tradition held sway over innovation. But as

The Sustainable Rice Initiative (SRI) is the pilot project of Kakatiya Sandbox, Deshpande Foundation. With SRI method of rice production aims to increase productivity while reducing the use of inputs such as seeds, water, and chemical fertilizers. SRI is a pilot project to generate incremental income for paddy farmers in the Nizamabad district. The farmers grow rice using minimum natural resources and maintain soil biodiversity through alternative wetting and drying systems.'

time passed, whispers of new possibilities began to permeate the air, carried by the winds of progress and the tireless efforts of organizations like Kakatiya Sandbox (KS).

It was in September 2020 when Ganga's life took a decisive turn. Encouraged by the murmurs of transformation and armed with newfound courage, she made the bold decision to enroll in the Sustainable Rice Initiative (SRI) training program offered by Kakatiya Sandbox. Little did she know that this decision would mark the be-



Armed with her own success story as evidence, she embarked on a mission to spread awareness and empower her fellow farmers with the tools and knowledge they needed to thrive.

ginning of a remarkable journey of growth and empowerment.

Fruits of Labour

Under the guidance and support of the SRI field assistant, Ganga embarked on the path of change, implementing the SRI methodology on her land. The transition was not without its challenges. Stepping away from familiar practices required courage, patience, and unwavering determination. Yet, with each passing day, Ganga witnessed the fruits of her labour manifesting before her eyes.

The transformation was nothing short of astounding. What was once a modest yield of 23 quintals per acre blossomed into a

bountiful harvest of 33 quintals per acre, a testament to the efficacy of the SRI method and Ganga's unwavering commitment to change. Encouraged by these remarkable results, Ganga made the bold decision to expand the SRI method to her entire land, embracing innovation with open arms.

Birth of a Passionate Advocate

Gratitude filled Ganga's heart as she looked upon her flourishing fields, knowing that none of this would have been possible without the support and guidance of Kakatiya Sandbox. In them, she found not just mentors, but allies in her quest for a better future. Their tireless efforts had not only transformed her life but had ignited a spark of hope and possibility in the hearts of her fellow farmers.

Driven by a newfound sense of purpose, Ganga became a passionate advocate for the adoption of SRI in her community. Armed with her own success story as evidence, she embarked on a mission to spread awareness and empower her fellow farmers with the tools and knowledge they needed to thrive. Through her tireless efforts, the seeds of change began to take root, transforming the agricultural landscape of her village one farm at a time.

Transformative Power of Knowledge

Ganga's journey serves as a powerful reminder of the potential that lies within each of us to effect positive change. It is a testament to the transformative power of knowledge, innovation, and community collaboration in driving sustainable development in rural areas. As her story continues to inspire and uplift those around her, Ganga stands as a beacon of hope, illuminating the path towards a brighter, more prosperous future for all.

REDDY RAJAVVA'S SUSTAINABLE COTTON CULTIVATION

In the heart of NagrajPalli Village in Nangunnur Mandal, Siddipet District, resides a remarkable woman, Reddy Rajavva, whose story embodies resilience, learning, and transformation. Rajavva's journey as a farmer is not just about cultivating cotton; it's a narrative of overcoming challenges, embracing knowledge, and reaping the rewards of sustainable agriculture.

Oppressive Obstacles

Before she embarked on her journey with the Deshpande Foundation's Better Cotton Initiative (BCI) project in 2017-18, Rajavva faced daunting obstacles in her farming endeavors. Like many small-scale farmers, she grappled with pest infestations that ravaged her cotton crops, leading to substantial financial losses of Rs. 23000-25000. Her limited understanding of seed quality, fertilizers, and pesticides left her vulnerable to exploitation by dealers, who often supplied products without proper guidance. Without adequate precautions during pesticide application, Rajavva's health suffered, and the cost of cultivation soared as she resorted to inefficient practices like threshing, piling, and burning her crops before harvesting. Additionally, excessive plowing further burdened her expenses.

Better Cotton Initiative

Rajavva's narrative took a turn for the better when she joined the BCI project. En-

Better Cotton Initiative (BCI) from the Deshpande Foundation (DF) which is in collaboration with Better Cotton Initiative (BCI) and The Sustainable Trade Initiative (IDH), DF took the initiative to educate farmers on the best cotton cultivation practices and water management techniques.



thusiastically engaging in project meetings and training sessions, she embarked on a journey of learning and discovery. Through these sessions, Rajavva gained invaluable insights into a myriad of techniques designed to enhance cotton cultivation sustainably. Concepts like deep summer plowing, soil testing, and the selection of quality seeds, including NON-BT variants, became integral parts of her farming repertoire. Intercropping, border crops, refugia crops, and trap crops were no longer just jargon but practical strategies to bolster her yield and resilience against pests.

One significant revelation for Rajavva was the detrimental effects of Monocrotophos, a pesticide she had previously relied on due to its affordability and quick results. Armed with newfound knowledge, she made a conscientious decision to discontinue its use, opting instead for alternative chemicals endorsed by BCI field facilitators. Embracing a more vigilant approach, Rajavva diligently monitored her cotton crops, deploying pesticides only when necessary and utilizing tools like yellow cards and pheromone traps to identify pest activity accurately.

Rewarding Outcomes

The impact of Rajavva's participation in the

BCI project transcended mere agricultural practices; it transformed her economic and health outcomes. By adopting the techniques advocated by the project, Rajavva witnessed a remarkable surge in her net income, surpassing that of conventional farmers in her village by an impressive 25%. Intercropping emerged as a lucrative avenue, augmenting her earnings further. Moreover, prioritizing her well-being, Rajavva embraced the use of personal protective equipment (PPE) while spraying pesticides, safeguarding herself against potential health hazards.

Rajavva's success story underscores the profound impact of empowering farmers with knowledge and resources. Through the BCI project, she not only gained expertise in sustainable agricultural practices but also cultivated a sense of agency and confidence in her abilities as a farmer. Her journey exemplifies the transformative power of education and community support in catalyzing positive change at the grassroots level.

Collaborative Endeavors and Shared Learning

In a landscape often marred by challenges and uncertainties, Rajavva stands as a beacon of hope and inspiration. Her story serves as a testament to the potential of small-scale farmers to thrive in an era of sustainable agriculture. As we celebrate her achievements, let us also recognize the collective effort and commitment of initiatives like the Deshpande Foundation's Better Cotton Initiative in nurturing a more resilient and equitable agricultural sector. Through collaborative endeavors and shared learning, we can pave the way for a brighter, more sustainable future for farmers like Reddy Rajavva and communities worldwide.

WOMEN COLLECTIVES CATALYST TO WOMEN EMPOWERMENT

“Women's contributions to various farm activities, such as seed preparation and handling fertilizers and pesticides, often go unrecorded and undervalued, rendering them an 'invisible workforce' in agriculture,” says Geetanjali Solanki, Global Director of Values, Principles, and Governance, CottonConnect. In an exclusive interview with Agriculture Today, Geetanjali discusses how women collectives can bring about women empowerment.

How important is women's role in agriculture? Can more women in agriculture make it more productive?

Last year CottonConnect published “Women In Cotton: Addressing the Impact of Climate Change through Climate-friendly Practices. In researching this Report last year, we talked to over 100 women working in our agricultural improvement programmes. We know that women are the backbone of agriculture and in many smallholder growing communities, they play key roles in planting and harvesting that help determine the quantity, quality, and sustainability of cotton farming. It's important therefore to support their growth in skills, knowledge and resilience in order to secure a thriving future in agriculture.

Despite their important contributions and potential to do more, women face gender-specific limitations in accessing education,

By fostering self-reliance, facilitating skill development, and nurturing leadership, women's collectives play a pivotal role in driving sustainable transformations within communities.

training, credit, and land ownership. They also shoulder more of the domestic burden as primary homemakers and caregivers to the children and elderly. These constraints limit women's contributions to productivity of the crop and to community well-being.

Closing this gender gap is crucial, yielding significant benefits for the agriculture sector, society, individual farmers, and farming communities. We have observed that when more women receive training and resources, improvements in agricultural productivity, family security, and decision making are significant. The confidence that comes with training helps women grow in confidence and stature, encouraging them to share their skills with others and seek out diverse ways to improve farming. This empowerment elevates agricultural output and fuels overall advancement in farming communities.

At CottonConnect, we believe empowered women are key to combating climate change too. Our Women Climate Change Ambassadors' Programme and Women Entrepreneurship Programme are equipping participants with the skills and knowledge that improve understanding of and ability to address, the impact of extreme weather on crops and communities. These programmes not only impart crucial knowledge but also foster entrepreneurial skills and encourage the implementation of sustainable practices. Moreover, the Women Entrepreneurship Programme goes beyond by providing women with essential skills to diversify their income streams, serving as a buffer against potential agricultural losses due to climate-related disasters.



There is considerable disparity when it comes to wages in agriculture and title deeds to farmlands. Seventy-five years after independence, we are still dealing with gender inequality. What is your take on this?

India has achieved remarkable success in cotton agriculture and is the world's largest cotton producer and the second-largest cotton exporting country after China. However, even after seventy-five years of independence, the issue of gender inequality in agriculture remains a challenge. In cotton farming, along with their share of the farm work, women also bear the brunt of work associated with traditional gender roles.

Interviews with women farmers across our programme locations revealed a common sentiment of being overlooked and burdened as they solely juggle household responsibilities, care giving, and farm duties, shouldering immense workload, despite external challenges such as extreme and unpredictable weather. Additionally, women, often lack formal land titles, encounter difficulties accessing land for cultivation and obtaining government benefits related to farming. These benefits are typically registered in the name of the father-in-law or husband, who usually is the owner. Women's contributions to various farm activities, such as seed preparation and handling fertilizers and pesticides, often go unrecorded and undervalued, rendering them an 'invisible workforce' in agriculture. The lack of data to account for women's work is also one of the challenges. As a result, female farmers are often not considered the primary target group for training and awareness.

Addressing these issues, CottonConnect empowers women through comprehensive training programmes encompassing essential skills in agricultural techniques, financial management, and entrepreneurship. This not only elevates their individual capacities but also enhances the productivity and sustainability of their farms. CottonConnect's initiatives, such as Women in Cotton programme, have engaged over 300,000 (as of 2023) women in sustain-

Technology can empower women by providing them with tools to enhance their efficiency and productivity in farming practices, contributing to their economic independence.

able agri-skills, literacy, numeracy, rights, and healthcare. This improves their livelihoods, leading to greater opportunities in education and health for both the women and their families.

Today agriculture is leaning more towards technology and mechanization. For women, do you think it is a positive change?

There is increasing integration of technology including mobile applications providing market insights and weather forecasts, and increased adoption of mechanised tools such as small-scale planters and harvesters. This does represent a positive shift for women in agriculture since it offers opportunities to streamline labour-intensive tasks, reduce physical strain, and increase productivity. Technology can empower women by providing them with tools to enhance their efficiency and productivity in farming practices, contributing to their economic independence.

However, the use of machinery is traditionally seen as a man's job on the farm, especially when factors such as physical ability, social norms, and necessary training are considered. Operating spraying machines or tractors are viewed as tasks reserved for men. Agronomic training programmes tend to prioritise men. Women tend not to have access to mobile phone with data which also hinders access to information. For women to maximise the benefits of technology on the farm and overcome agricultural challenges, it is crucial

that they have equitable access to these technologies and adequate training to use them effectively.

In combating climate change, women have played a pivotal role. What makes them more sensitive to this issue?

Climate change impacts everyone, but its effects are greater among women due to existing structural inequalities and the gender gap in access to resources and opportunities. We know that extreme weather, exacerbated by climate change, negatively affects biodiversity, crop yield and pest control. We also know that women's health and well-being is adversely affected but that they still shoulder more of the domestic burden for the home and the family, regardless of their own health issues or time limitations and despite the challenge of dealing with extreme heat or rain.

How effective are women collectives?

Women collectives serve as catalysts for empowerment if guided in the right direction. Initiatives such as the Women Climate Ambassador Programme showcase the power of women's collectives by creating a closely-knit community of women equipped with climate-smart agricultural knowledge. These empowered women are not just individual success stories; they've become inspirational figures within their communities, actively involved in educating fellow farmers - particularly women - on resilient farming methods.

These collectives can have a significant impact, extending beyond personal empowerment to actively influence agricultural practices and contribute significantly to the overall well-being of the community. Being members of these collectives, women can leverage their collective strength to advocate for their rights, negotiate fair terms, obtain better prices for their produce, and access resources more effectively. By fostering self-reliance, facilitating skill development, and nurturing leadership, women's collectives play a pivotal role in driving sustainable transformations within communities.

FROM FARM TO TABLE

THE STORY OF AMYRA FARMS

Chikmagalur, where green hills roll and the air is rich with the scent of earth, there exists a special place called Amyra Farms.

Back to Basics

Sandeep Chaudhary, a 39-year-old visionary, is rewriting the narrative of success with his pioneering venture, Amyra Farms. Sandeep, who grew up surrounded by the sights and sounds of rural life in Faridabad, Haryana, felt a deep connection to the land since childhood, watching in awe as farmers worked their magic in the fields. Though he pursued a degree in Information Technology, Sandeep's heart always yearned for the simplicity and beauty of farm life.

Sandeep's formative years were shaped by the values instilled by his parents, Roop Singh and Veermati Chaudhary. After completing his schooling at St. Anthony's Secondary School and APJ, Sandeep pursued a Bachelor's degree in Information Technology from CITM, Manav Rachna, graduating in 2007. Despite the allure of a career in IT, Sandeep's roots in agriculture beckoned him, laying the foundation for his future endeavours.

Genesis of Amyra

With a leap of faith and a modest investment of 3 lakhs, Sandeep founded Amyra Farms in January 2022, with a dream of cultivating sustainably, and empowering local communities.

Situated on over 100 acres of land in Chikmagalur, Amyra Farms quickly became a haven for farmers and nature lovers alike. Instead of focusing on just one crop, Sandeep diversified the farm's offerings, growing everything from coffee and vanilla to pepper and clove. This diversity nurtured a collaborative environment where learning thrived, turning Amyra Farms into

Amyra Farms is a vocal advocate for eco-friendly agricultural practices that prioritize land health and biodiversity conservation.

a hub of innovation and community spirit, driving positive change in the region.

A Collaborative Effort

Supported by Sandeep's brothers Kuldeep and Nishant, both engineers, Sandeep attributes their collaborative efforts as instrumental to their success. Their combined expertise in IT and agriculture has enabled them to effectively manage diverse ventures, underscoring the strength of familial unity and shared vision.

Their commitment extends beyond land sales, aiming to demonstrate the profitability and sustainability of agriculture while providing ongoing support and knowledge sharing to clients. They advocate for cal-

culated risks in agriculture, emphasizing its potential for both financial returns and environmental stewardship.

Farmland Venture

Amyra Farms initiated its farmland venture on February 28, 2023, which is currently in operation. The venture encompasses cultivation activities spread over 300 acres in Chikmagalur and Sakleshpur regions. The crops grown include Arabica and Robusta coffee, pepper, vanilla, and clove, with a strong emphasis on employing organic and sustainable farming methods.

The dairy segment, launched on January 1, 2023, is also operational. This section integrates biogas plants to ensure sustainability. Apart from producing manure for the crops, the dairy farm also yields ghee for the market and generates electricity to power its operations. Additionally, the farm actively contributes to afforestation endeavours, thereby earning carbon credits.

Amyra Farms ventured into the retail sector with the establishment of cafes on October 18, 2023. These cafes serve as outlets for directly sourcing farm products,



thereby maximizing profit margins. The menu at these cafes features a diverse range of organic and farm-fresh food and beverages.

In the retail division, which commenced operations on June 1, 2022, Amyra Farms focuses on promoting organic farm products. These include speciality items such as turmeric for immunity, honey, coffee and tea catering to health-conscious consumers.

Sustainability at its Core

At the core of Amyra Farms lies its unwavering commitment to sustainability. Leveraging biogas plants for electricity generation and championing eco-friendly practices, the farm sets exemplary standards for land stewardship and environmental consciousness. From cultivation techniques to waste management, the farm prioritizes methods that minimize environmental impact and promote long-term ecological balance. This includes practices such as organic farming, water conservation measures, and the use of renewable energy sources like biogas for electricity generation.

Drawing upon his background in Information Technology, Sandeep introduced cutting-edge tools and techniques to optimize farming operations and increase productivity. From AI-driven crop management systems to chat-based customer engagement platforms, technology played a crucial role in Amyra Farms' journey towards sustainability.

Community Empowerment

Amyra Farms understands the importance of community engagement and empowerment in fostering a thriving agricultural ecosystem. The farm actively collaborates with local farmers and stakeholders, sharing knowledge, resources, and best practices to uplift the community. Through initiatives like training programs, workshops, and capacity-building exercises, Amyra Farms empowers individuals to enhance their agricultural skills, improve livelihoods, and contribute to the overall economic development of the region.

Amyra Farms values diversity in its team, with 6 men and 8 women working



From AI-driven crop management systems to chat-based customer engagement platforms, technology played a crucial role in Amyra Farms' journey towards sustainability.

as farmers. They believe in putting the community first when it comes to improving agriculture. By showing how well their farming model works, Amyra Farms hopes to inspire people and communities to adopt sustainable and profitable farming methods.

Commitment to Quality

Quality is non-negotiable at Amyra Farms. From seed selection to harvesting and



packaging, every step of the process is meticulously monitored to ensure that only the finest produce reaches the market. By adhering to strict quality standards and implementing rigorous quality control measures, the farm guarantees that its products consistently meet and exceed customer expectations in terms of taste, freshness, and nutritional value.

Eco-Friendly Methods

Amyra Farms is a vocal advocate for eco-friendly agricultural practices that prioritize land health and biodiversity conservation. By eschewing chemical fertilizers and pesticides in favour of natural alternatives, the farm minimizes soil degradation, reduces water pollution, and preserves the delicate balance of local ecosystems. Additionally, Amyra Farms actively promotes agroforestry, crop rotation, and other sustainable farming techniques that enrich soil fertility and enhance resilience to climate change.

Looking Ahead

Amyra Farms has ambitious goals for expansion, aiming to increase retail presence and participate in international events to promote its organically grown products. Simultaneously, there's a focus on cultivating 1000 acres of plants within the next five years, with 300 acres already achieved. By demonstrating the profitability and sustainability of their model, the farm seeks to inspire others to view agriculture as a viable business opportunity, fostering a community of successful and environmentally conscious farmers.

WOMEN'S PARTICIPATION AND IMPACT CREATION IN AGRICULTURE

Women's involvement in agriculture is an essential yet often overlooked aspect of global food production. Despite their significant contributions, women farmers face various challenges, including limited access to resources, land rights, and education.

The role of women in agriculture is multifaceted and crucial to the sustainability and productivity of agricultural systems worldwide. Historically, women have been actively involved in various aspects of agriculture, though their contributions have often been undervalued or overlooked. However, their importance is increasingly recognized due to efforts in gender equality and sustainable development. Here are several key aspects of the role of women in agriculture:



The role of women in agriculture is multifaceted and crucial to the sustainability and productivity of agricultural systems worldwide.

Farm Management and Decision Making

Women are often responsible for managing household gardens, small farms, and livestock. They make decisions regarding crop selection, planting schedules, irrigation, pest control, and harvesting. In many regions, women manage the entire agricultural process, from seed to market.

Labour

Women contribute significantly to agricultural labour, engaging in activities such as planting, weeding, harvesting, and post-

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harvest processing. In subsistence farming contexts, women may perform the majority of labour-intensive tasks.

Seed Preservation and Propagation

Women play a critical role in seed preservation and selection, passing down traditional knowledge related to crop varieties and their characteristics. They are often the custodians of seeds and contribute to the conservation of agricultural biodiversity.

Post-harvest Processing and Food Preparation

Women are responsible for processing harvested crops, including cleaning, sorting, drying, and storing grains and vegetables. Additionally, they prepare meals for their families, utilizing agricultural produce to provide nourishment.

Income Generation and Economic Empowerment

Women contribute to household income through agricultural activities, either by selling surplus produce or by engaging in off-farm employment related to agriculture, such as food processing or handicrafts. Economic empowerment through agriculture can lead to increased decision-making power and improved social status for women.

Natural Resource Management

Women are often stewards of natural resources such as water, soil, and forests, playing a key role in sustainable agricultural practices. Their knowledge of local ecosystems and traditional farming methods contributes to conservation efforts and resilience to environmental challenges.

Education and Knowledge Transfer

Women pass on agricultural knowledge and skills to future generations, teaching their children and other community members about farming techniques, indigenous plants, and sustainable practices. They also participate in extension programs and agricultural training workshops.



Initiatives such as the National Rural Livelihood Mission (NRLM), Mahila Kisan Sashaktikaran Pariyojana (MKSP), and Rashtriya Mahila Kosh (RMK) aim to enhance women's participation in agriculture, provide access to financial services, and promote gender responsive agricultural development.

Community Development

Women contribute to community development initiatives related to agriculture, such as farmer cooperatives, microfinance groups, and women's self-help groups. Their participation in these organizations fosters collaboration, knowledge sharing, and collective decision-making.

Policy and Institutional Support

Recognizing the importance of women in

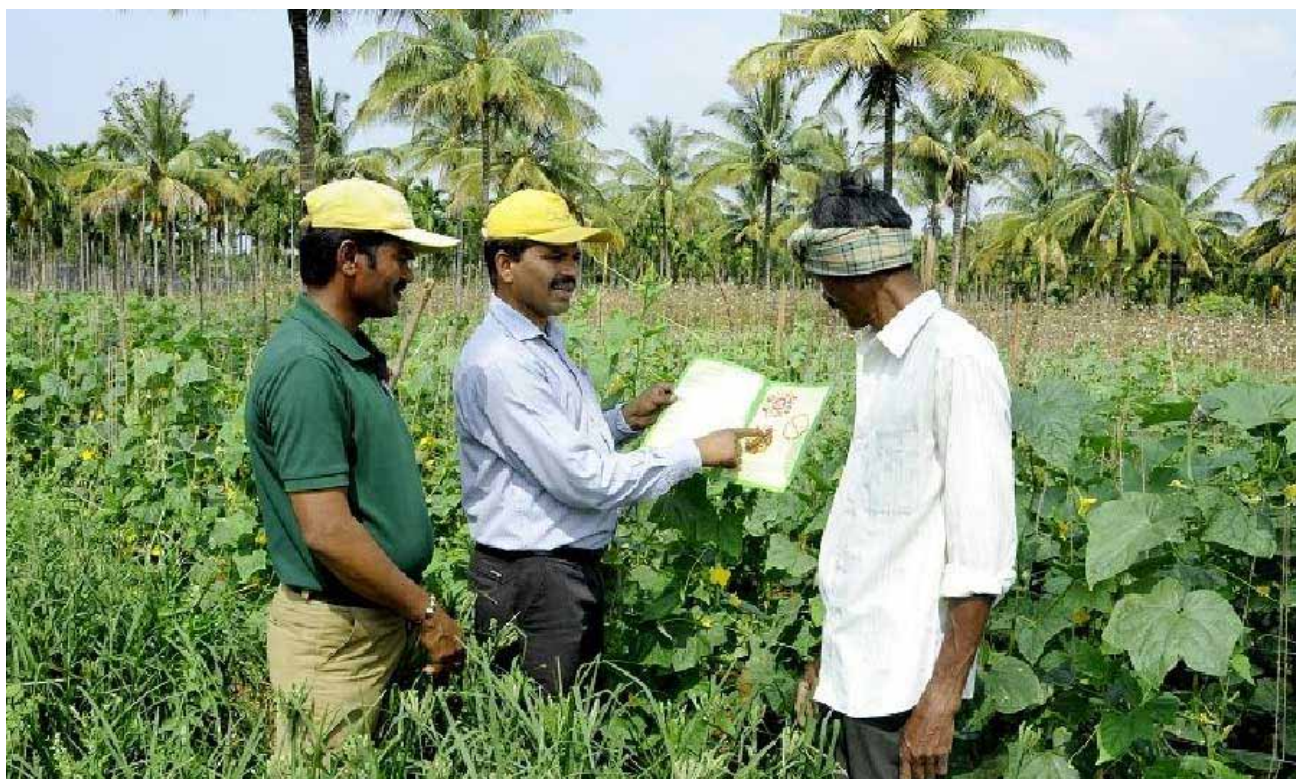
मित्राणि धनधान्यानि प्रजानां सम्मतानि ।
जननी जन्मभूमिश्च स्वर्गादपि गरीयसी ॥

Translation: "Friends, riches and grains are highly honoured in this world. (But) mother and motherland are superior even to heaven."

agriculture, the Indian government has implemented various policies and programs to support women farmers. Initiatives such as the National Rural Livelihood Mission (NRLM), Mahila Kisan Sashaktikaran Pariyojana (MKSP), and Rashtriya Mahila Kosh (RMK) aim to enhance women's participation in agriculture, provide access to financial services, and promote gender responsive agricultural development.

In conclusion, women play a multifaceted and indispensable role in Indian agriculture, contributing to food production, rural livelihoods, and sustainable development. Empowering women farmers through policy interventions, access to resources, and recognition of their contributions is essential for achieving inclusive and equitable agricultural growth in India.

PUBLIC PRIVATE PARTNERSHIPS (PPPs) FOR AGRI BUSINESS DEVELOPMENT



Agriculture plays a crucial role in India's economy, contributing significantly to the country's GDP and providing livelihoods for millions of people. However, the sector faces numerous challenges, including inadequate infrastructure, limited access to quality inputs, and the need for modernization. Public-Private Partnerships (PPPs) have emerged as a potential solution to these challenges, offering opportunities for leveraging private sector expertise and resources to address the gaps in the agricultural sector. In recent

Partnerships between the public and private sectors can facilitate the exchange of knowledge, fostering innovation and the adoption of new technologies in agriculture, which can lead to improved productivity and sustainability.

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Government Initiatives for Promoting PPPs

The "Strategy for New India @ 75" has come out with several measures to establish an enabling framework for PPPs by addressing concerns linked to the policy and regulatory environment.

Viability Gap Funding Scheme: The scheme provides financial support to PPPs for infrastructure projects in the form of grants, one-time or deferred to make them commercially viable.

India Infrastructure Project Development Fund (IIPDF): The main goal is to finance the development costs of potential PPP projects, including the fees for hiring consultants and transaction advisors to increase the number and quality of successful PPPs and enable the government to make well-informed decisions based on high-quality feasibility reports.

National Agriculture Infra-Financing Facility: This facility is created with One lakh crore as Agri Infrastructure Fund towards creating farm-gate infrastructure for farmers (Primary Agricultural Cooperative Societies, Farmers Producer Organizations, Agriculture entrepreneurs, Start-ups, etc.). The impetus was given for the development of a farm gate & aggregation point, an affordable and financially viable Post

Harvest Management infrastructure.

National Infrastructure Pipeline: It is a first-of-its-kind, government initiative to build top-notch infrastructure across India and raise everyone's standard of living. It aims to improve project planning, highlight investment prospects in India's infrastructure industry and draw foreign capital into the country.

The Niti Aayog has established a vertical mode on public-private partnerships that are aggressively trying to broaden the appeal of PPPs as the preferred method for carrying out infrastructure projects. It looks for to establish state of the art infrastructure and invite institutional capital in infrastructure. One of the verticals is the agriculture and allied sectors. This vertical focuses on agricultural policy design and analysis, research and knowledge exchange, policy advocacy, stakeholder consultations and working with states and ministries to transmute Indian agricultural landscape, led by invention for better nutrition and revenue of farmers, through sustainable as well as inclusive growth. The vertical has a partnership with several private and public institutions including Indian Agriculture Research Institute (IARI) and National Academy of Research Management (NAARM).

years, PPPs have been successfully implemented across various sectors in India, such as airports, ports, road transportation, energy and urban development. However, the agriculture sector has not yet fully embraced the PPP model, despite its potential to contribute to sustainable and inclusive agricultural development.

Advantages of PPPs in Agriculture Sector

Improved Agri-infrastructure

Leveraging private sector expertise and

PPP Project Areas in Agriculture

Sub Sector	Projects (%)
Food processing and additives	56.3
Horticulture	33.5
Post-harvest storage infrastructure	3.8
Terminal markets	2.3
Cold chain	2.0
Soil Testing Labs	1.8

resources can lead to the development of better infrastructure, such as wholesale markets, warehouses, cold storage facilities and irrigation systems. This can help in stabilizing prices, reducing post-harvest losses and improving overall agricultural productivity.

Enhanced agri-business development

PPPs can facilitate the growth of agro-processing industries and contribute to the development of value chains, providing farmers with better access to markets and

increasing the value of their produce.

Technology transfer and innovation

Partnerships between the public and private sectors can facilitate the exchange of knowledge, fostering innovation and the adoption of new technologies in agriculture, which can lead to improved productivity and sustainability. For example, the management of sensors in administering agricultural land, drones technology, artificial intelligence, machine learning, block chain technology, big data, Internet of Things (IoT) and cloud have become essential in future agriculture which provide farmers with access to better technology, improved inputs and modern farming practices, leading to increased agricultural productivity and efficiency.

Inclusion of smallholder farmers

PPPs have the potential to promote the inclusion of small holder farmers and small and medium Agri-enterprises (SMAEs) by encouraging collective action and reducing transaction costs.

Strengthening of agricultural extension services

PPPs can help revitalize agricultural extension services by involving the private sector in the provision of tailored advice and

The Ministry of Food Processing and Industries is committed to continued emphasis on the creation of world-class infrastructure for the growth of the food processing sector through Mega Food Parks and Integrated Cold Chains.

The time is apt that we evolve mechanisms to develop wholesale markets in PPP mode in a similar pattern of constructing and managing national highways using the BOT (built, operate and transfer) approach.

support to farmers, ultimately improving the efficiency and effectiveness of these services.

Creation of job opportunities

The development of Agri-infrastructure and agri-businesses through PPPs can generate new employment opportunities in rural

areas, contributing to poverty reduction and sustainable rural development.

The states like Maharashtra, Madhya Pradesh, Tamil Nadu, Uttar Pradesh and West Bengal, in that order, have the highest number of opportunities in the food processing and agriculture sectors. So, investments in agricultural sectors are limited to certain sectors and geographical locations. The key areas are food processing, horticulture, post-harvest storage including cold chain, terminal markets and establishment of labs such as soil testing laboratories.

Potential Areas for PPP in Agriculture

Wholesale market development

Existing marketing is characterized as inefficient, fragmented and unorganized. Limited marketplaces have been established during the last thirty years; maximum of these are clustered only in well-privileged areas. The time is apt that we evolve mechanisms to develop wholesale markets in PPP mode in a similar pattern of constructing and managing national highways using the BOT (built, operate and transfer) approach.

Warehouse and cold storage development

Warehouses and cold storages play an important role to stabilize prices and benefit farmers as well as consumers. The development of warehouses and cold storage offers enormous opportunities for public-private partnerships.

Agro-processing development

The Agro-processing, especially of perishable commodities, has huge opportunities as their demand in the domestic and global market is rising very fast. This sector must





be harnessed to meet future demands and reduce unaccounted losses of perishable commodities. The Ministry of Food Processing and Industries is committed to continued emphasis on the creation of world-class infrastructure for the growth of the food processing sector through Mega Food Parks and Integrated Cold Chains. PPP mode in attaining these purposes and developing dispensation plants and coupling them with micro, small and medium enterprises will strengthen the Agri-processing sector.

Canal irrigation development and management

Roughly 40 percent of all irrigated area is covered by canals. Over the years, the canal irrigation system in many parts of the country is reported to be under performing. The irrigation efficiency is mere 30 Percent through canal irrigation. This sector can be covered under PPP mode.

Extension of Agricultural systems

It has substantially aided to bringing the green revolution to the country. But the sector is now being questioned for its efficiency and effectiveness despite intro-

ducing various reforms. Some of the KVKs are also run by the private sector but the majority are with agricultural universities (AUs) and the Indian Council of Agricultural Research (ICAR). The private sector and public research system can also jointly undertake research for best practice demonstration purposes.

Crop/ Animal Insurance

Market inefficiencies, such as information asymmetries a lack of data infrastructure and constrained insurer access to reinsurance, frequently plague the agriculture insurance markets. To solve market inefficiencies, governments must take the initiative in large-scale crop insurance schemes, incorporating the private sector in activities like producing data, assuring outreach, risk financing, assisting with technical chores, building an enabling environment, etc.

Supply of quality inputs (seed, vaccine, etc.)

Most of the time farmers are facing problems in procuring quality seeds and are ending up with a loss of production. Especially, fodder production has been a major challenge. The huge lands available with

state agricultural universities can be used for the production of quality seeds involving the private sector. Often public institutions are deprived of funding despite their technological advancements. PPP is to be harnessed for the production of vaccines for improving the health status of livestock (e.g., Lumpy Skin Disease).

Promotion of Special Economic Zones (SEZs) in Agriculture

Government of India (GoI) has brought out a key policy on the establishment of Special Economic Zones to entice foreign direct investment, create employment prospects, improvement of infrastructure, and facilitate the transfer of technology and access to the global markets etc. There is a need to reinvigorate the SEZs, especially in the agricultural sector.

There is a pressing need to develop a structured approach for increasing the number of bankable agri-businesses and Agri-infrastructure projects through private sector participation for better quality and improved services. The partnership can merge as an important tool to induce investment and capitalize on the synergies of the public and private sectors.

ENHANCING FOOD SECURITY

IN THE FACE OF CLIMATE CHANGE THROUGH CROP PROTECTION

According to the latest United Nations projections, India's population has reached 1.4 billion people. India being an agrarian country, farmers face the challenges to ensure that production systems are efficient, environmentally friendly, and above all, optimizing the output to ensure the supply meets the demand. Farmers are facing increasing challenges due to the adverse effects of climate change, such as extreme weather events and unpredictable weather patterns. These challenges have the potential to devastate Indian agriculture, making it imperative to acknowledge the impact of the climate crisis on crop production and its protection.

With El Nino changing the atmospheric circulation patterns which results in drier weather conditions, climate scientists warn of the unpredictability of weather patterns which can potentially have devastating effects on Indian farmers as El Nino effect will have significant impact on the agriculture sector. According to the research conducted as part of the World Weather Attribution initiative, the heat waves which used to occur once in a century are now expected once in five years in South Asia.



Given the current scenario, it becomes necessary to acknowledge the impact of climate crisis on crop production and take proactive measures to help farmers mitigate and adapt to sustain and ensure food security of the nation.

Crop Protection in a Changing Climate

Recent FAO study states that climate

change will also increase the risk of pests spreading in agricultural and forestry ecosystems, especially in temperate and sub-tropical regions.

For example, pests, like fall armyworm (which feeds on a growing number of crops, including maize, sorghum, millet) have already spread due to extended warmer climate. This is going to require rethinking the fundamentals of farming, types of the resources used to manage the pest where it appears and its basic relationship with nature.

But in calling out climate change, environmental, and resource challenges, we also need to recognize the potential for agricultural innovation to improve food security by strengthening food system resilience. Sustainable and science-based crop protection technologies can help farmers maximize crop yields while minimizing resource inputs and help farms and farmers to better manage climate change by reducing the need for excessive water, fertilizers, and pesticides, which can save costs and minimize environmental impact, potentially reversing the downward trend in food security.

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Sustainable Crop Protection Solutions

Crop protection plays a crucial role in ensuring the sustainability and resilience of agriculture in the face of climate change, which destabilizes agricultural practices and leads to an increased incidence of invasive pests. Meeting the growing demands of the world's population requires self-sufficiency in food production and ensuring the quality of the food.

What's essential now are effective seed and crop protection products demanded by the current market and solutions that will enhance long-term profitability by meeting the above. Prioritizing sustainable crop protection solutions within a regulatory framework is crucial for environmentally friendly and effective food production that optimizes output. Addressing climate change necessitates rethinking our production and consumption practices. Fortunately, agriculture solutions shall be made available by innovative way to assist us in both combating climate change and boosting production.

Building a sustainable agricultural ecosystem

Integrated Pest Management (IPM) is an effective and environmentally sensitive approach to pest management. It involves monitoring of pest populations by predictive models and preventing them from growing to unprecedented, damaging levels without causing irreversible soil and environmental harm. It comprises an integrated approach wherein the use of nonchemical tools and digital technologies along with crop protection products are used. IPM encourages the use of natural management methods. This causes the least harm to the environment and contributing to minimization of water and air pollution ultimately, eliminating land contamination and boosting soil fertility.

Mechanical and physical controls like traps for rodents kill a pest directly, block pests out, or make the environment unsuitable for it. Physical controls include mulches for weed management, steam/solar sterilization of the soil for disease management, or barriers such as screens

With global population on the rise and increased pressure on land usage, it is critical to work smarter on existing land and transform the food and agriculture system in the country so that we can continue to provide nutritious food to our people and export to the world.

to keep birds or insects out. Agronomic practices like altering the planting season will help to minimize few of the pest and diseases, thereby ease the crop protection aspects.

Biologicals for the Future

However, because of IPM's more focus on natural pest control mechanisms, the demand for biological crop protection solutions is on the rise. Over the last two decades, the growth in biologicals (or biopesticides) has outpaced that of overall crop protection chemicals. These innovative solutions offer environmentally friendly and effective alternatives, contributing to sustainable agricultural practices.

Innovative solutions for a better future

Agri-tech innovations have revolutionized the way farmers address crop protection and climate change challenges. Precision agriculture technologies, including remote sensing, drones, and sensor-based monitoring systems, enable farmers to gather accurate, real-time data about their fields. This data empowers them to make informed decisions regarding the application of fertilizers, water, and crop protection products at critical times, leading to optimized resource usage and reduced environmental impact. Agri-tech solutions also aid in early detection of pest and disease outbreaks by forewarning, enabling prompt and targeted responses to prevent potential crop losses. By adopting these sustainable agri-tech solutions, farmers can effectively manage their crops, minimize resource waste, and reduce the overall environmental footprint of agricultural practices.

Crop protection companies are invest-

ing in research and development to develop innovative and sustainable chemical solutions that are more targeted, environmentally friendly, and effective. These advancements result in novel mode of action, lower application rates, reduced residue levels, and increased efficacy, contributing to sustainable agricultural practices. Furthermore, companies are prioritizing education and training programs to ensure farmers understand proper handling, application techniques, and safety precautions associated with agrochemicals. By promoting responsible use, crop protection companies minimize the environmental impact of agrochemicals while maximizing their benefits in ensuring food security.

Policy-led growth for collaboration

At the ground level, addressing the complex challenges of climate change and food security requires collaboration among various stakeholders. Through these collaborative efforts, stakeholders collectively develop strategies to effectively mitigate the impact of climate change and ensure long-term food security. This approach empowers farmers with access to the latest advancements in crop protection technologies and techniques.

With global population on the rise and increased pressure on land usage, it is critical to work smarter on existing land and transform the food and agriculture system in the country so that we can continue to provide nutritious food to our people and export to the world. By embracing sustainable and innovative technological techniques and a multi-stakeholder approach, we can address the challenges faced by the agriculture sector in India and the world.

EMPOWERED WOMEN CULTIVATE A NEW ERA IN AGRICULTURE

Although women represent 63% of the agriculture workforce in India, they face unequal access to training, technology, finance, and land. Making women-run farms more productive and successful, could help close this equity gap.

'Investing in Women to Strengthen Supply Chains Global Development Alliance (GDA)' was launched by PepsiCo in partnership with United States Agency for International Development (USAID) in 2020. This five-year, 20 million USD partnership that strategically invests in advancing gender inclusion in PepsiCo India's agricultural supply chains, is being executed in five focus countries, including India. GDA seeks to show how inclusion of women in agriculture supply chains can lead to greater growth, profitability, and sustainability.

During the visit AT identified one of their key interventions - their gender-smart farms which showcase access to technology, key resources and best agricultural practices. So far, 11 gender-smart farms have been established across Uttar Pradesh, providing training to women farmers, including on NDrip gravity micro-irrigation systems, a game-changing technology for crop irrigation.

Speaking about the program Ms. Neelu, Associate Director, PepsiCo India, said "PepsiCo and USAID collaboration through GDA is focused on enhancing gender equity, women economic conditions and farm productivity in the potato supply chain. As women are an important force in agriculture, enhancing their capacity and knowledge with the best practices will help ensure achieving sustainability. At the heart of this effort is the Gender Smart Farm initiative which introduces evidence based, on-farm approaches benefiting both men and women farmers. With the data and insights from this initiative, we are highlighting the significant benefits of empowering women economically, introduc-



Guddi Devi & Mudra Devi (Etah): Empowering Generations

In the heart of Etah (Uttar Pradesh), Guddi Devi and Mudra Devi, the mother and grandmother of Sachin, a contract farmer with PepsiCo India, have emerged as the bedrock of support for their household. The GDA program has provided them with a women-friendly sprayer machine and comprehensive training in farming and financial practices. Today, they not only actively engage in agricultural activities but also play pivotal roles in decision-making, ensuring a sustainable and prosperous livelihood for their family.



Dolly Singh (Bairamgarhi): Cultivating Equality in the Fields

Dolly, supported by the GDA program, has not only cultivated potatoes but also sowed the seeds of financial growth and self-confidence. Beyond the fields of profit, her journey unfolds as a narrative of newfound empowerment. The GDA program has equipped her with modern techniques, enabling her to navigate the agricultural landscape with confidence.



ing regenerative agriculture practices and improving livelihoods within our agriculture supply chains in India."

Further, in order to introduce newer job roles in farm activities for women, solar-powered wheel-based sprayers which are

lighter and easier to use than the conventional sprayers have been introduced as part of the program.

PepsiCo has been providing women farmers with regular trainings for their overall development and improvement of agricultural expertise. Over 700 farmers have been trained so far, out of which 314 are women farmers and 389 are men. With the help of the program, 204 PepsiCo India suppliers, family members and associates have been enrolled in different government schemes like Micro Irrigation subsidy, Ayushman card, Labour card, Post Matric scholarship and old age pension.

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