

₹80/-

APRIL 2023

AGRICULTURE The National Agriculture Magazine TODAY

VOLUME XXVI | ISSUE 4

www.agriculturetoday.in

VALUE ADDITION *Incentivising Agriculture*





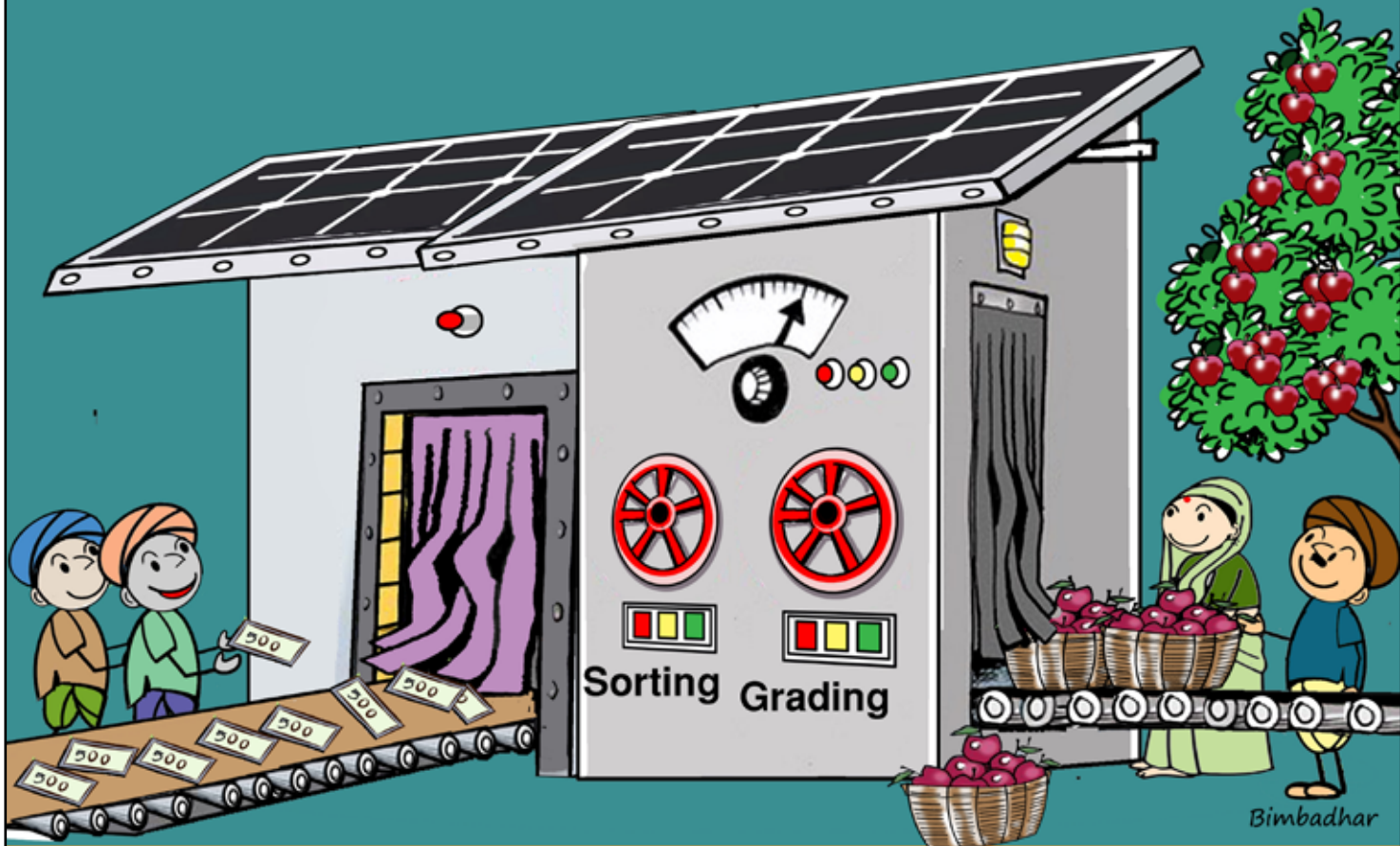
कृषि एवं किसान
कल्याण मंत्रालय
MINISTRY OF
AGRICULTURE AND
FARMERS WELFARE



AGRI INFRA FUND

Helping build
Value chains for
Agri n Horti
Produce

Click an AIF Loan Today



www.agriinfra.dac.gov.in

President

Dr. MJ Khan

Group Editor

Mrs Anjana Nair

Executive Editor

Rajni Shaleen Chopra

Editor, Agri News

Sanjay Kumar

Andhra Pradesh

Satish B Gadde

Assam

Jyoti Bikash Nath

Bihar

Girendra Narayan

Gujarat

Rakesh Jani

Haryana

Bijender Singh Dalal

Himachal Pradesh

Rakesh Kumar

Jammu and Kashmir

Affan Yesvi

Karnataka

Santosh Langer

Maharashtra

Pasha Patel

Madhya Pradesh

Rakesh Dubey

Punjab

Puneet Singh Thind

Rajasthan

Parvinder S Chauhan

Telangana

Jaipal Reddy

Tamil Nadu

Raju Narasimman

Uttar Pradesh

Umesh Shukla

Uttarakhand

Narendra Mehra

Admin & IT Head - Anil Kumar**IT Manager** - Ankit Kumar**Sr. Business Manager** - Vinita Singh**Assistant Editor** - Zaman Almas**Asst. Manager, Digi Mktg** - Tanya Kalra**Web Designer** - Mr Rahul Singh**Graphics** - Akash Bhargav**Subscription** - Mohd Aijaz**Circulation** - Rajkumar**Graphic Designer**

A. Rehman

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

Phone No. 011-23731129 Fax No.011- 23731130

E-mail: editor@agriculturetoday.in

info@agriculturetoday.in

No part of this magazine can be reproduced, imitated or transmitted in any form, including electronic, mechanical, photocopying, recording or any information stage retrieval system or extracted in any way without permission from the publishers. Views expressed in the magazine need not necessarily be those of the Editor / Publisher.

www.agriculturetoday.in

Page in the magazine: 60

TECHNOLOGY - A PREREQUISITE FOR VALUE ADDITION

Income generation in agriculture is a deciding factor for the continuation of agriculture as a profession. With commercial agriculture, profit motive became integrated into the farming arrangements, and producing more became a central objective. But for Indian farmers, producing more is never equivalent to earning more.

Adding value to agriculture products through food processing has guaranteed benefits of increased income and marketability. Besides enhancing the shelf life of the product & reducing food wastage, value addition leads to higher monetary return and better market. Higher export potential for such products augments the income potential.

The Indian food processing industry accounts for 32 per cent of the country's total food market, one of the largest industries in India. Indians are driving the demand for processed food in India. With this demand, demand for technologies is also increasing. Better technologies in packaging and creation of innovative products are being sought after. Packaging especially is a lesser explored area demanding new age solutions capitalizing on the need of easy handling, longer shelf life and better dispensing quality. Presenting conventional /traditional food in a variant with higher shelf and better taste also needs better technology. Ventures concentrating on automation based technologies and robotics will be forward looking.

Temperature controlled warehouses for the perishables, cold storage, appropriate logistics will also emerge as a prerequisite for the development of the sector. This area requires intensive efforts from the government and the corporates, as it is investment intensive. The only way of revolutionizing the food processing segment is by channelizing the capital to this niche area.

Today India's biggest weakness in agriculture segment is over production and the inability to timely channelize excess production to deficit areas. Food processing is the solution. If proper technologies are developed and made accessible at the farm level, we can address the issue of wastages and increase the income from agriculture.

Happy Reading!




CONTENT

VOLUME XXVI | ISSUE 4 | APRIL 2023



From The Group Editor's Desk	03
From the Executive Editor's Desk	06
NEW HORIZONS	
Food Processing - Opportunity & Responsibility	18
ENTREPRENEURIAL ECOSYSTEMS	
Transforming AUs	20
OUT OF THE BOX	
Rampur Poshan Kit	22
HEALTH HIGHWAY	
Poultry Products - Options for Improving Nutritional Values	24
FORWARD MARCH	
Cooperative Farming Is Key To Increasing Farmer Income	30
BUSINESS BUZZ	
Role of Food Processing	36
FUTURE WISE	
Millet Ecosystem - Branding and Farmgate Processing	38
FOOD SECURITY	
Incentivising Agri-Seed R&D	40
AGRI LEAD	
Absolute: Mission Farmer Prosperity	42
DATLINE ASSAM	
FPCs - Strengthening The Aggregation Ecosystem	46
PERSONAL ACCOUNT	
Challenges Faced By FPOs, FPCs	48
AGRI VISION	
Agri-Focused NBFCs, Fintechs - The Money Boost	54
FUTURE READY	
Food Processing, Value Addition	56

08

WIN WIN

DR TARUN SHRIDHAR



10

AATMANIRBHAR BHARAT

MR. MINHAJ ALAM

12

FAST FORWARD

MR RADHEY SHYAM DIXIT



14

AGRI VISION

DR AK TYAGI

16

QUEST FOR SUSTAINABILITY

DR MANINDER KAUR DWIVEDI



26

TÊTE-À-TÊTE WITH ANJANA

MR. RAJU KAPOOR

A PREMIER AGRIB SCHOOL CO-FOUNDED BY GBPUA&T PANTNAGAR, IIM AHMEDABAD ALUM

Recognized by DPIIT, Ministry of Commerce & Industry | UGC recognized 2 years MBA degree program in Delhi NCR

MBA-FOOD & AGRIBUSINESS

SPECIAL FEATURES OF MBA - FABM

- ❑ 100% Placement Record with avg. 6 LPA CTC
- ❑ 3+ Internship Options in Offline + Virtual Mode
- ❑ Faculties from IIM, IRMA, MANAGE alumni base
- ❑ 200 hrs classes on Spoken English, Business Analytics
- ❑ Foreign Visit at Israel, Singapore, Dubai etc.*
- ❑ 80+ Expert Talks & Exposure Visits

FINANCIAL SUPPORT BY ISAB

- ❑ INR 2.0 Lakh* FAME Scholarship on Merit & Defence
- ❑ INR 7.5 L Education Loan Support with PSU Banks



Maddu Raviteja

ISAB student of FABM 2022-24 Batch

*T&C apply - as per eligibility matrix

ADMISSION OPEN FOR MBA FABM - 2023

Imperial School of Agri Business (ISAB) www.isab.org.in

Call: 8319400485, 7440977485 Campus: Knowledge Park III, Greater Noida (Delhi NCR)

✦ ISAB received "India Agribusiness Award 2022" at 5th India Agribusiness Summit 2022 ✦

Esteemed Recruiters for MBA FABM Final Placement



100% Placement record for MBA FABM 2020-22

ISAB HAS SECURED 8TH RANK AMONG TOP AGRIBUSINESS COLLEGES IN INDIA

*As per CAGL survey published in Agriculture Today Magazine in 2021



RAJNI SHALEEN CHOPRA

Higher Demand For Millets Will Boost Production

It is one thing to start a national campaign. It is another thing to completely own it.

It is highly appreciable that the government headed by Prime Minister Shri Narendra Modi has completely owned the millets movement in the country. The goodness of millets answers so many challenges we face today. Nutritional security, water conservation, soil health, environmental concerns. It is totally in order that every government department should now push the demand for millets so that farmers produce them more and a happy and strong value chain is built.

Government canteens, whether at central or state level, can start serving at least one millet dish to begin with. Slowly, as there is higher capacity building, millets can be used for roti, more dishes and even desserts. The Army, the police and other para-military forces have extensive canteens for the workforce. Here too, the menu should have at least one millet dish in every meal.

Mid-day meals are a major government initiative across the country. A millet dish can be part of the mid-day meal. Perhaps there will be concerns that from where will such huge stocks of millets come to provide for such large demand. The stocks will come only if farmers produce them. Production will begin once farmers find an assured market.

The hostels in residential schools, in colleges and in universities can serve at least one dish made with millets. These were part of our regular diet till we got into the wheat-rice cycle and forgot all about them. It is time to give millets their rightful place on our food plates again.




Organised by



Uttar Pradesh AgroTech 2023

Expo | Business Meets | Seminars | Farmers' Events

 **29-31 May, 2023**

 **Indian Institute Sugarcane Research,
Lucknow**

**Register
Now**

Uttar Pradesh The Land of Infinite Opportunities

Expo | Business Meets | Seminars | Farmers' Events

Awaiting to assist your participation

LUCKNOW OFFICE

Mr. Tushar Sharma, Director

Mobile : +91 – 8874184076

Email : tushar.sharma@card.org.in

LUCKNOW OFFICE

Mr. Shobhit Srivastava, Regional Director - CARD

Mobile : +91 – 9621361577

Email : shobhit.card@gmail.com

VALUE ADDITION

FARMERS & CONSUMERS MUST GAIN

Tuna, per kilogram, can fetch a price ranging from US\$ 7 to 7000 in Japan. In India the range tends to be Rs 100 to 5000 per kilogram. The explanation is simple: Value-addition.

Tuna or any other such like fish which meets the requirements of Sashimi commands a higher price. Better the quality of Sashimi grade Tuna, higher the price. A single Tuna weighing slightly above 200 kilos got auctioned in Japan for an equivalent of Rs 2 crore a couple of years back. Later, when the highest bid for a single Tuna dropped down to Rs 1.20 crore, people cried recession.

What kind of Value-addition does it take to convert the ordinary marine Tuna fish to Sashimi grade to fetch such an insanely high price? If we go by the definition of Value-addition in agriculture and/or food, the simple answer would be: None. After all, Sashimi is nothing more than raw and fresh. A further quality would be the degree of rawness and freshness that keeps any possibility of food contamination at bay.

A Tuna caught today and packed raw and fresh could very likely carry a label "Best before March 2025". For two long years one of the most perishable food items is maintained fresh in its raw form. The consumer is willing to pay through his nose for a fish caught two years back.

Benefits For Stakeholders

Value-addition is transformation of raw agricultural product into a new and economically more beneficial product through the means of packaging, processing etc.

If we view agriculture as a Food Production System and then define value addition, there will be some legitimate questions. What about the quality of the food? Who benefits from the addition to the

economic value of the produce? How are the economic gains of value addition shared across the value chain? Does the primary producer, the farmer, derive proportionate share of the financial benefits of value addition? Does the consumer get a product superior or more gratifying?

Also, food has a rich societal and cultural connotation. In India where consumers want fresh

About the AUTHOR

Dr Tarun Shridhar is former Secretary, Ministry of Fisheries, Animal Husbandry and Dairying, GOI





and raw agriculture products, the best value addition is maintaining freshness. For livestock products, freshness is the dominant determinant of the value of the product. Preserving freshness is a bigger challenge than converting the raw produce into another product and calling it value-added.

Does The Producer Gain?

Unfortunately, value addition in agriculture does not add value to the earnings of the farmer. We seem to have forgotten that agriculture is essentially a food production system. Therefore value-addition should fundamentally be in relation to the produce i.e. food.

Added value to food could only mean greater safety, hygiene, quality, and most importantly nutrition. Equally important is greater value for the primary producer of our food, the farmer. Unfortunately the concept of value addition has been restricted to only processing the primary raw product into a different and new product. Its merit is determined by its commercial value. Who benefits from this approach to value addition? Only the one who processes the primary product and the ancillaries of packaging etc., besides the trader who gets wider margins.

Agriculture has given us not only food but civilization. True value addition in food, the produce of agriculture, would be meaningless if the primary producer, the farmer and the end customer, the consumer are not among beneficiaries.

How does the producer of food benefit? After all, primary and real value has been created by him. Subsequent players in the supply and value chain who add to this are as important but then their addition somehow appropriates the entire value. The consumer pays more, as he should for a

**fun
FACT**



Dr Shridhar loves good poetry in both English and Hindi, and Urdu shayari

value added product. Is the added value he gets just a trustworthy brand or a mere better packaging or a tastier commodity or overall a better food product giving more nutrition? Now what percentage of the end price he pays gets shared by the entities across the value chain? And how equitable is it? Do either the producer or the consumer get the value of their effort or money's worth?

Value Addition Influenced By Fads

There used to be atta and refined atta. Now there are plenty. The journey of our daily staple atta has been cyclical, from coarse grains to refined wheat to whole wheat and now again to a flour tampered with coarse grains – which in the past were considered suitable only for the livestock.

Value addition is influenced by fads. Eggs aplenty are available but the price determinants are the character and habits of the hens that lay them. Some hens are fed only tulsi. Their eggs cost more than twice as much. Is it value addition? Do we get eggs that are healthier and more nutritious? Or does it imply merely a wider profit margin for the clever marketeer.

Invention and evolution of agriculture is nothing but a journey of continuous value addition. Cultivating the soil, growing crops and raising livestock for food, which the science of agriculture in essence is, has undoubtedly been the biggest of all value additions in human life and civilization.

Converting the agriculture crop into an edible form amounts to adding value. Thereafter, cooking is the great value addition. It satiates beyond the requirement of calories and nutrition by appetising the taste buds. We are now made to believe that processed and packaged is better. Maybe, but retaining freshness is the true value addition.

Agriculture has given us not only food but civilization. True value addition in food, the produce of agriculture, would be meaningless if the primary producer, the farmer and the end customer, the consumer are not among beneficiaries.

Robust Growth

SUPPORT TO MICRO FOOD PROCESSING INDUSTRIES

India's food economy, in many respects, mirrors the country's rich regional, cultural, and agricultural diversity. From sweets to cereals, from vegetables to fruits, from pickles to herbs, from traditional confectionaries to local drinks, from meat and poultry to aquatic products, the national food map of India reflects the country's rich civilizational history.

Glimpse of The Food Processing Sector

During the last 5 years ending 2019-20, the Food Processing sector has been growing at an AAGR of around 11.18 percent. The sector constituted as much as 9.87 percent and 11.38 percent of GVA in the Manufacturing and Agriculture sectors respectively in 2019-20.

The unorganized food processing



sector comprising nearly 25 lakh units contributes to 74% of employment in the food processing sector. Nearly 66% of these units are located in rural areas. About 80% of them are family-based enterprises, supporting livelihood in rural households and minimizing migration.

dian economy in terms of its contribution to GDP, employment, and investment.

PMFME SCHEME FIRST SCHEME EXCLUSIVELY TO SUPPORT MICRO-ENTERPRISES IN FOOD PROCESSING SECTOR

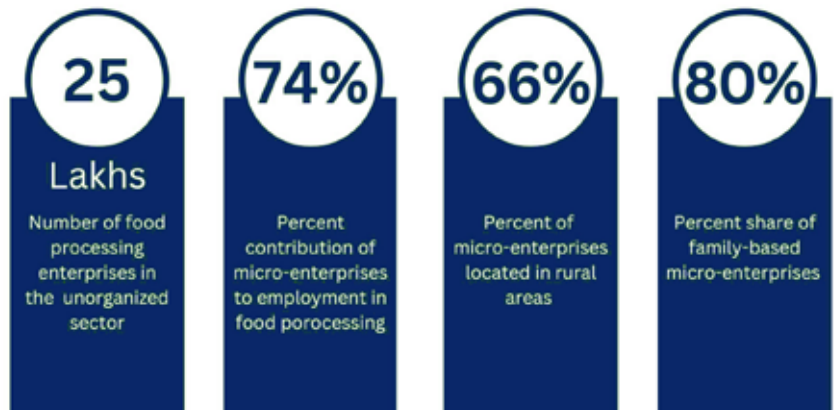
Pradhan Mantri Formalisation of Micro food processing Enterprises (PMFME) Scheme was launched on 29th June, 2020 by the Ministry of Food Processing Industries, GOI under the Aatmanirbhar Bharat Abhiyan. It is to be implemented for a period of five years from 2020-21

A Boon for the Nation

This sector is capable of addressing critical issues of food security, food inflation, and providing wholesome, nutritious food to the masses. Food processing sector is one of the important segments of the In-

About the AUTHOR

Mr Minhaj Alam is Joint Secretary, Ministry of Food Processing Industries, GOI



to 2024-25 with an outlay of Rs. 10,000 Crore. The scheme seeks to support micro food processing enterprises through a package of support and services. These include:

1. Financial support for setting up a new food processing unit or upgradation of an existing unit
2. Subsidy available under the scheme may be clubbed with interest subvention/non-overlapping components of other GOI schemes or top-up provided by various state governments
3. Training & capacity building support
4. Support to FPOs, SHGs and Producers Cooperatives along their entire value chain
5. Support for transition of existing enterprises into formal framework for registration under regulatory framework and compliance
6. Marketing support for their integration with the organized supply chain

1. Support to Individual Micro Enterprises

PMFME Scheme offers a credit linked subsidy @35% of eligible project cost with a maximum ceiling of Rs 10 lakh for eligible projects to Individual Enterprises, Partnership Firms, Proprietorship firms, Farmer Producer Organizations, Self Help Group, NGOs, Cooperatives, Private Limited Companies. An applicant is also eligible for Interest Subvention and Top Up Convergence with other relevant GOI sponsored schemes. Applicant/enterprise is eligible for a bank loan under the Scheme, even if he/she has availed bank loan in other Subsidy Linked Schemes of the government.

2. Support for Common Infrastructure

The PMFME Scheme offers credit linked capital subsidy @35% of eligible project cost with a maximum ceiling of Rs 3 Crore to FPOs, SHGs, Producer Cooperatives and government agencies for creation of common infrastructure including for processing facility, incubation centre, laboratory, warehouse, cold storage, etc.



For these projects, the total eligible project cost should not exceed Rs 10 Crore.

3. Seed Capital for Self Help Group Members

One of the key aims of the PMFME Scheme is to support women engaged in food processing at the micro level. It envisages the provision of Seed Capital @Rs. 40,000 per member of SHGs engaged in food processing for working capital and purchase of small tools.

4. Branding and Marketing Support

One of the key aspects of the entire food processing spectrum is to establish linkages between the enterprise and the market. PMFME Scheme provides Branding and Marketing Support to FPOs/SHGs/Cooperatives or an SPV (Special Purpose Vehicle) of micro food processing enterprises. This is part of the cluster approach for developing a common packaging & branding with provision for quality control, standardization and adhering to food safety parameters for consumer retail sale. Support for branding and marketing would be limited to 50% of the total expenditure with a maximum limit as prescribed.

5. Training & Capacity Building Support

It is extremely important to empower micro food processing enterprises with knowledge and training to make them self-sufficient to handle the technicalities

of the food processing framework. For this purpose, under the Capacity Building Component of the PMFME Scheme, the beneficiaries are being trained for the Entrepreneurship Development Program and Food Product Processing. The focus is on establishing micro enterprises, essential functions of enterprise operations, inventory and financial management, legal compliance i.e registration, Udyog Aadhar, GST Registration, FSSAI safety and hygiene standards, packaging and labelling, branding and marketing etc.

One District One Product (ODOP) Approach

The Scheme adopts One District One Product (ODOP) approach to reap the benefit of scale in terms of procurement of inputs, availing common services and marketing of products. Presently, 713 districts of 35 States/UTs in the country have selected ODOPs consisting of 137 unique products ranging from fruits and vegetables, makhana, moringa, milk products, bakery items, jaggery, pickles, papad, millets, etc.

Under the PMFME Scheme, the Ministry has empowered more than 1,00,000 beneficiaries by supporting micro units and providing seed capital to SHG members. The Ministry strives to support the Micro Food Processing Enterprises, SHGs, FPOs and Producer Cooperatives and aims to fulfil the vision of Hon'ble Prime Minister Shri Narendra Modi of Aatmanirbhar Bharat.

FOOD PROCESSING

THE GROWTH ENGINE



With people becoming health-conscious, the demand for certain variants like high-protein or low-fat food is also there.

Traditional methods for processing the food are insufficient to satisfy the demands of the Indian market. The agricultural biodiversity of India can be conducive to the food processing industry. It is necessary to have processes that can add value to the products.

For Food And Nutrition Security

Primary processing of food is unlikely to ensure that we have food and nutrition security. There is a need to introduce the latest technology in processing, packaging and distribution to ensure that food products remain fresh for a longer time.

Benefits of livestock products like camel milk or goat milk can be realized if we know how to increase their shelf life. Ananda Dairy uses state-of-the-art cream separators to prepare different grades of milk at its pro-

The agricultural biodiversity of India can be conducive to the food processing industry. It is necessary to have processes that can add value to the products

cessing plants. Skimmed milk produced by Ananda Dairy can be consumed by the health-conscious because of its low-fat content. In addition to this, Ananda Dairy also produces A2 milk which has digestible proteins making it ideal for children and the elderly.

The latest technology in storage, packaging and distribution will add value to the food product. Ananda Dairy is using multivac packing for paneer to ensure that they have a longer shelf-life. In an initiative to implement the best practices in food processing, Ananda Dairy has announced an invest-

ment of Rs 650 crores in the UP Investors Summit event.

In the process, however, we cannot afford to ignore the environmental impact of these technologies. The whole idea of having the latest technologies is to use the resources optimally. While the consumption of water and power cannot be done away with, they should optimally use these resources.

Employment Generator

Food processing industries can address the problem of disguised unemployment in the rural economy. The marginal productivity can be increased by involving surplus labour in food processing. The GDP of the economy is also going to increase in this way.

The processing plants set up by Ananda Dairy have helped in providing a stable income to three lakh dairy farmers. We are procuring milk from 6000 villages. The payments are made digitally into their bank accounts by Ananda Dairy.

Export Of Processed Food: Opportunities For Food Processing Industry

Opportunities abound in the food processing industry for entrepreneurs. Realizing the true export potential of India's biodiversity will require the value-addition of dairy products. As one of the growing dairy product manufacturers, we are exporting certain items produced in our state-of-the-art plants. The processing plant of Ananda Dairy in Pilakhuwa is exporting several dairy products.

Government Initiatives That Will Help In Value Addition

In order to add value to food products, an entrepreneur needs support from the government. With government schemes like PMKSY, PMFME, PLI, etc., attempts have been made to boost the food processing industries. Under PMKSY or Pradhan Mantri Kisan Sampada Yojna, food processors are being given financial assistance. Pradhan Mantri Formalization of Micro Food Processing Processing Enterprises (PMFME) is supporting the food processing units that add value to food products.

Under the PLI scheme, incentives are being given by the government to micro and large food processing industries. With an outlay of Rs. 10,900 crores, the scheme has focused on four segments: Ready to Cook/Read to Eat (RTC/RTE) foods, millets-based products, processed fruits & vegetables, marine products and mozzarella cheese. Ananda Dairy is benefitting from the initiative as it has made investments in the ready to cook segment.

Various initiatives have been taken by the government to ensure that wastage is reduced in food processing. Capital investment in the creation of modern storage capacity has been made eligible for the Viability Gap Funding scheme of the Finance Ministry.

41 projects of Mega Food Parks are underway. As we know that the food processing industry requires cold chains and collection centres, setting up mega food parks could transform the sector. To incentivize the setting up of Mega Food Parks, a special food processing fund of Rs. 2000 Cr has been set up in NABARD.

Challenges Faced By Food Processing Sector

We should recognize the opportunities that exist in the international market for Indian food products. Exporting our products will improve the balance of payments and bring foreign exchange. But, for that, we must ensure that the required value-addition is done.

Ananda Dairy wants to expand its footprint across the world. While we follow FSSAI norms that help in ensuring the quality of the end products, meeting the stringent quality standards for the export of dairy products will be required.

Better backward and forward linkages will connect the producers with the manufacturers. Bridging the logistical gaps to connect the farmer and the market is also required. To manufacture value-added products, we require raw materials of good quality. Therefore, we require the infrastructure for setting up processing plants in rural parts where we can access the raw materials easily.

Food testing laboratories and R&D in the food processing industry are areas that will require a thrust. If we need to become self-sufficient and make sustainability our goal, an adequate cold chain infrastructure should be set up to ensure less wastage of food. Last but not least, the government should focus on establishing food processing training centres, academic institutions, and entrepreneurship development programs that will expose future leaders to the best practices followed worldwide for value addition and introduce new technologies of packaging and processing.

**fun
FACT**



Ananda Group has created one of the most innovative animated advertisement campaigns of the food sector, featuring Mr Dixit as himself

About the AUTHOR

**Mr Radhey Shyam Dixit is
Founder and Chairman,
Ananda Group**



FOOD INDUSTRY IN INDIA & EXPORTS

Currently 35% of the Food Processing Industry is organized. The remaining 65% consists of either small scale organizations or unorganized food providers.

India's food market is ranked 5th in the world, with 70% of sales and 4th in production, consumption, and export. India exports 13% of its overall manufacturing

The Food Processing Industry is expected to provide employment to 9 million people by 2024. This number can be much higher if the industry grows at a faster pace

output and 6% of its industrial investment. Manufacturing and agriculture contribute 8.80 percent and 8.39 percent, respectively, to Gross Value Addition. The industry has grown by about 11% in the past decade and is expected to reach \$535 Billion by 2025.

Trends In Food Processing

The Food Processing sector in India has a quintessential role in linking Indian farmers to consumers in the domestic and international markets. The Ministry of Food Processing Industries (MoFPI) is making all efforts to encourage investments across the value chain. The food processing industry has a share of 12.38% (at 3-digit of NIC classification) in the employment generated in all Registered Factory sector engaging approximately 1.93 Mn people. Unregistered food processing sector supports employment to 5.1 Mn workers as per the NSSO 73rd Round report. Major sectors constituting the food processing industry in India are grains, sugar, edible oils, beverages, and dairy products.



About the AUTHOR

Dr AK Tyagi is Executive Director, Haldiram Snacks Private Limited



people who struggle to meet nutritional requirements.

- **Availability Round The Year** – As opposed to seasonal fresh food, nutritious packaged food is available throughout of the year.

Opportunities For Accelerating Growth Of This Sector

Expansion of the food processing industry is key to reducing a lot of the problems currently plaguing our agricultural sector. However, several measures need to be undertaken to fuel this expansion.

- **Convenient for the Farmers** - The more convenient and accessible it is for farmers to connect with companies, the better it is for the food processing industry.
- **Removal of Middlemen** – Middlemen eat into the margins of farmers. Direct connection of farmers and companies is beneficial for both.
- **Improvement in practices** - Sorting and other practices at farms have to be improved if we are to meet standards for exports which can be a big driver for growth.
- **Education of Farmers** – Education of farmers in terms of best practices and modern know-how is required if practices are to be improved.

Govt Support With Respect To Policies

Expansion of the food processing industry is key to reducing a lot of the problems currently plaguing our agricultural sector. However, several measures need to be undertaken to fuel this expansion.

- **Supportive Policies for Farmers** - Continuation & expansion of current government policies that support farmers is required to drive participation.
- **Incentives for Companies** – Incentives offered to companies for food processing can act as a big catalyst and can help grow the industry tremendously.
- **Cold chains** - Extensive cold chains are required to sustain growth of the industry, they are especially important for processed dairy products.
- **Warehouses** – Advanced and hi-tech warehouses are key to avoiding wastage and stabilizing supply.

Key facts

- Total Horticulture production in 2021-22 is estimated to be 341.63 MT.
- India ranks 1st in milk production and contributes 23% to global milk production growing at a CAGR of about 6.2% to reach 209.96 MT in 2020-21
- India ranks 3rd in global egg production and produced at least 122.11 Bn nos. in 2020-21 with per capita availability of egg at 91 eggs per annum in 2020-21.
- In 2021-22, the country's fish production has reached an all-time high of 16.24 MMT, showing 10.34 % growth.
- Online grocery retail in India has seen a CAGR of over 50% and projected to grow to \$10 Bn to 12 Bn by 2025.
- The marine products exports from India touched \$7,740 Mn during 2021-22 despite the heavy odds faced by the sector. It observed 30% higher growth as compared to 2020-21. The USA, China, and Japan are the top 3 favorite destinations of Indian marine exports. Exports to these three countries contributed 63% of exports.
- The export of other cereals increased from 102 MT in 2019-20 to 521 MT in 2020-21.
- India ranks 8th in meat production in the world. Meat production in the country has increased from 6.69 MT in 2014-15 to 8.80 MT in 2020-21 (Provisional).
- As per 4th advance estimates,

the estimated production of rice is 130.29 Mn Tonnes, Wheat is 106.84 Mn Tonnes, and Nutri/Coarse cereals is 50.90 Mn Tonnes for the year 2021-22.

- During SS 2021-22, India exported 110 LMT sugar and became second largest exporter of sugar in the world and earned about INR 40,000 Cr worth of foreign exchange for the country.
- As per the latest Annual Survey of Industries 2019-20, food processing sector contributed 12.22% of total persons engaged in the registered manufacturing sector.
- Non-Basmati Rice has emerged as India's top export item among the many agricultural and processed food product exports under APEDA basket, with the export of \$4,663 Mn in nine months of 2022-23.

Benefits of Food Processing

India is one of the largest producers of food in the world, yet we process only around 10% of the food we grow. Increasing this percentage will provide a lot of benefits to farmers and the general public alike.

- **Opportunities for Work** - Expansion of the food processing industry will provide employment to a lot of currently unemployed youth.
- **Potential of Employment For 9 Million by 2024** – The Food Processing Industry is expected to provide employment to 9 million people by 2024. This number can be much higher if the industry grows at a faster pace.
- **Nutritional Enhancement of Food** - Practices such as fortification can help in making nutrition more accessible to



MILLETS *Magic*

About the AUTHOR

Dr Maninder Kaur Dwivedi is an IAS officer of the 1995 batch, currently posted as MD, Small Farmers Agribusiness Consortium



2023 is international year of the millets (#IYM2023), so the logo and the tagline are everywhere, from advertisements in papers, to food wrappers to railway tickets. There are 'millet meals' and suddenly everything from noodles to biscuits are labelled 'millets'. Are they all healthy? Are they all good for the planet? Let's unravel the myth from the millet facts.

What are millets?

Millets is a term used for varied crops that are small grained annual cereals, mostly from the 'grass family' Paniceae, but also others. They are grown primarily in tropics and semi tropical regions of Africa and Asia, and were the indigenous grains before white rice, maize and wheat became popular across the world.

All millets are annual and drought resistant, with nutritive value better or equivalent to the common staples. People may not understand 'millets', but recognize the local names for the various foods in

the category- bajra, jowar, kodo, nachni, ragi etc.

Are all millets healthy?

So far as being free of pesticide, herbicide and other noxious chemical are concerned, all millets are good news. Since all millets are resilient crops, unlike other staples like wheat and rice, they are not overdosed with fertilizers and such. They are a safer food option from this perspective. Compared to conventional grains, millets are a rich source of minerals-phosphorous, magnesium and calcium. The high dietary fiber aids digestion and keeps the gut happy.

Millets are all gluten free, so can be safely eaten by someone allergic to gluten. Not all millets are diabetic friendly foods. Kodo and barnyard millets have lowest glycemic index. Foxtail, little, finger and pearl millet have moderate glycemic index 54-68, so are a safe diet for diabetics. Ragi and jowar have higher glycemic index, so should be consumed in moderation. Millets when consumed whole or as flour are less likely to be heavily processed and are more close to their natural form.

How To Incorporate Millets In Diet?

The simpler the cooling process, the more likely that millets will stay in the diet. For breakfast, the easiest is using flakes for porridge- replace corn flakes, oats or quinoa. Millet flakes- sorghum, fox tail, pearl millet, proso millet or ragi flakes are the simplest. Those need to be cooked for 5 minutes in milk and topped with honey, fruits or nuts as desired. All whole millet grains can be cooked as porridge too. Soaking overnight and discarding the water, before cooking in milk or water shortens the cooking time. In traditional cooked breakfast, idlis and dosa can be made using millet flour instead of rice. Ragi dosas can be cooked instantly using ragi flour, without fermentation. For parathas and puris, part substitution of wheat flour with any millet flour can be done without the fussy eater being able to discern.



Millet Options

For lunch and dinner options, all millets cooked whole (steamed in pressure cooker) can be added to salads, much like quinoa and couscous. Bajra Raab is a simple to make warming soup for the winters. For novice cooks, kichri of millets with pulses and vegetables is something that simply cannot go wrong. Whole kodo or proso millet can be cooked as a replacement for rice in any rice based recipe like pulao or biryani. Bajra and jowar rotis need hot water to knead and may require a bit of practice.

Flours of all millets are great in desserts - as halwa or thickeners for custards or flour in cakes. A bajra jalebi sweetened in jaggery syrup from Rajasthan was absolutely mind blowing.

Then of course, the ready to eat snacks- homemade ragi laddos, khakras, bajra tikkis, khatais are there as well as packeted puffs, cookies, namkeens etc.

How Not To Eat Millets?

Millets can be a superfood if eaten right. Unless one likes the taste, the switch is pointless if it's dunked in oils and sugar- so the principles of healthy cooking will apply. For instance, a deep fried tikki made of millets will not be a health food because of the millet as an ingredient, since it is deep fried.

Packaged food labelled as millet pasta or biscuits or any other form, the devil is in the detail - how much millet? What is the binding agent? What is the oil in it? The labels often mislead. Either no information may be there on the proportion or the millet content maybe so miniscule to render any claimed benefits ineffective.

Where To Source Pure Millets?

Most people would not be able to identify whole grains of all the millets that grow in India. Ragi and bajra are the easiest to identify, so can be bought loose or packed, online or from the nearest store. These as flour may be hard to assess for purity. So, the safest bet is to source directly from local farmers or farmer producer organizations (FPOs). There are numerous local farmer markets, else fpokisanbazar.com or mystore.in. Both have produce and products direct from farmers.

With #IYM2023, there is ample opportunity to discover the millet that suits you and the food that nourishes the body and satiates the taste buds.

fun FACT

Dr Maninder is fond of reading, gardening and dogs



FOOD PROCESSING

OPPORTUNITY & RESPONSIBILITY



Food processing and value addition play a crucial role in improving the nutritional value of food products and enhancing the food system.

These processes involve various techniques, such as cooking, canning, drying, packaging, and fortification, among others. They help to increase the shelf life of food products, improve their taste and texture, and enhance their nutritional value.

One of the primary benefits of food processing is that it can help to increase the availability of nutritious foods. Food

processing can help to preserve fruits and vegetables, making them available to consumers even when they are out of season. This is especially important in regions where fresh produce may not be readily available. Additionally, value-addition processes, such as fortification, can help to improve the nutritional quality of food products, making them more accessible to consumers.

Enhancing Safety

Food processing and value addition also play a critical role in improving the safety of food products. Proper process-

About the **AUTHOR**

Mr. Ishank Mikhail Gorla is the Programme Lead at GAIN steering the Commercialisation of Biofortified Crops Programme. Ishank champions nutrition by previously managing a community-based management programme for severe acute malnutrition, and is now leading on strategy development, programme implementation and exploring innovative solutions for commercialisation of nutrient-dense crops through partnerships in six countries in Asia and Africa.

ing and packaging can help to prevent foodborne illnesses and reduce the risk of contamination. This is especially important in developing countries, where poor food safety practices can lead to widespread illness and even death. By improving food safety, food processing and value addition can help to improve the health and well-being of individuals and communities.

Efficient food processing techniques can also help to reduce food waste. By preserving and packaging food products, processors can help to extend their shelf life, reducing the amount of food that goes to waste. This is important in a world where an estimated one-third of all food produced is wasted each year. Reducing food waste can help to conserve resources and reduce the environmental impact of food production.

Rapidly Growing Industry

Food processing is a rapidly growing industry that plays a crucial role in providing nutritious and safe food products to consumers. With increasing awareness about the importance of good nutrition, there is a growing demand for processed foods that are both convenient and healthy. The growing demand for nutritious processed foods presents many opportunities for food processors.

One of the key opportunities is the development of new products that meet the needs of specific consumer groups, such as athletes, children, and seniors. By understanding the unique nutritional needs of these groups, food processors can develop products that provide targeted nutritional benefits.

Development Of Personalized Nutrition Products

The scope of food processing for nutritious foods is vast and encompasses a wide range of products and processes. Some of the key areas of focus include the development of new processing technologies, the use of sustainable and locally sourced ingredients, and the development of functional foods. One area of particular interest is the development of



By embracing new technologies, developing innovative products, and addressing the unique needs of different consumer groups, food processors can help to create a more sustainable and healthy food system for all

personalized nutrition products.

These are products that are tailored to the specific nutritional needs of an individual consumer. This can be achieved through the use of data analytics and other technologies that allow food processors to develop products that meet the unique nutritional needs of each consumer.

Another area of scope in the industry is the development of products that address specific health concerns, such as obesity, diabetes, and heart disease. By developing products that are specifically designed to address these health concerns, food processors can provide products that not only taste good but also provide specific health benefits to consumers.

Promotion Of Economic Development

Taking a more holistic viewpoint, Food processing plays a crucial role in promoting economic development. The food in-

dustry is a significant contributor to many national economies, providing employment opportunities and generating income. By adding value to food products, processors can create new markets and increase the value of agricultural commodities. This can help to support local farmers and communities, leading to increased economic growth and development.

Furthermore, the food processing industry, backed by government policies, can help to improve food security. By increasing the availability of nutritious and safe food products, processors can help to ensure that individuals and communities have access to the food they need to maintain good health. This is especially important in regions where food insecurity is a major issue.

In conclusion, the food processing industry has a tremendous opportunity, rather, a responsibility, to provide nutritious and safe food products to consumers. By embracing new technologies, developing innovative products, and addressing the unique needs of different consumer groups, food processors can help to create a more sustainable and healthy food system for all. However, the industry must also address the many challenges it faces, including the need to balance safety and nutrition, meet changing consumer demands, and ensure the efficiency and profitability of its operations.

Transforming AUs

NURTURING INDUSTRY-ACADEMIA LINKAGES

Higher agricultural education in many countries has typically focused on the training of public sector employees. In the present age of privatization, the emphasis is increasingly being questioned. ICAR, the nodal agency of curriculum design for various professional courses in agricultural sciences in the country, has taken note of this transition and reoriented the curriculum by periodically appointing Deans' Committees.

Some of the recent initiatives by AUs like integrating one year Student READY (Rural and Entrepreneurship Awareness Development Yojana) program and other training programs, in the course curricula of undergraduate students in agricultural sciences emphasize the importance of entrepreneurial skills, including actual experience in planning and operating a productive enterprise. Student READY program needs to be supplemented with provision of loans and risk-financing to enable graduates to engage in successful self-employment ventures.



organisations and relevant industry and develop highly skilled manpower in a specific enterprise. This program will help to promote better linkages between academia and industries, enhance collaboration through pilot projects and also translate innovations leading to better career development and employability. The industries are also required to make timely forecast about the manpower requirements and the curricula for which the students need to be trained in a systematic manner by the Universities.

Entrepreneurial focus: Aligning agriculture curricula with emerging needs

In Postgraduate Agricultural education, an optional internship/in-plant training (called as IDEA) has also been included in lieu of thesis research work in order to provide the students an opportunity to have a real time hands-on experience in the industry.

It is envisaged that it would enhance the interaction between academic or-

Skills Gap, New Challenges

Technology is changing industries at a rapid pace and the labour market is therefore entering a period of uncertainty. The problem is fuelled by the consistent change in the type skill set requirement need of the employers and the skill set imparted by the educational institutions. Managing this transition is a stupendous challenge, as is preparing a blueprint for the future beyond an expected increase in automation.

Agricultural innovation and entrepreneurial efforts would benefit from not only



About the AUTHORS

Prof Arvind Kumar is former Vice-chancellor, RLBCAU, Jhansi & DDG (Education), ICAR, New Delhi
Prof Kusumakar Sharma is Professor Emeritus, Sharda University, Greater Noida & Former ADG (HRD), ICAR, New Delhi



facilitating the adoption or enhancement of sustainable practices but also strategically building future human capital resources required by various stake holders in agricultural supply chain and associated industries.

In India, higher agricultural institutions and agricultural extensions have to play pivotal key roles in education, dissemination, and feedback. For example, developing data-intensive AI-based techniques for agricultural applications may have limited value until rural broadband availability and local network distribution can be introduced widely across various ecological regions in the country.

Talent Engine, Entrepreneurial Catalyst

There are several challenges in development of a viable framework to nurture a regular Industry-Academia interface. Some of these challenges include:

- Lack of information about what is on offer from AUs,
- Quality of information/ innovation provided by universities once contact made...,
- Poor engagement with AUs as partners,
- Mismatches in terms of relevance, time horizons and expectations...
- Policy intervention in relation to innovation and higher education is supported but not one size fits all.
- Different regions need to work on different dimensions

One of the greatest long-term challenges to the agricultural industry is the low number of young people becoming farmers, which will have long-term negative ramifications for supporting agricultural innovation and sustainable food systems. Research has shown that young farmers often have fresh perspectives on agricultural innovation compared to more experienced farmers and display high levels of entrepreneurship.

To address this demographic challenge, ICAR developed policy initiatives to attract farmers such as launch of Project ARYA, which aims to attract and empower rural youth by involving them

FOCUS AREAS

- Development of University Technology Transfer Units (TTU)/ Incubation Centres as a focal point to connect students, faculty, alumni, entrepreneurs, investors, and industry with each other,
- Strategic partnership with relevant companies, offering internships and externships & sharing facilities with startups,
- Creating venture funds and incentive programs funded by industries to drive increased innovation and product development,
- Developing a platform for frequent consultations and knowledge sharing with budding entrepreneurs on business models and technical issues.

fun FACT
Prof Arvind Kumar loves to read success stories

in agricultural development, generate employment and support in setting up network groups to take up resources and capital-intensive activities like value addition, processing and marketing. The ongoing COVID-19 pandemic has brought renewed investor attention to agricultural technology and its importance for food safety and security.

Although the conceptual development of mission-oriented agricultural



entrepreneurial innovation ecosystems continues to evolve, ideas such as cross-sector collaborations with industry and multifunctionality have to play important roles in the implementation of following policy initiatives for nurturing regular Industry- Academia interaction.

- Focus on improving R & D wings of AUs to play dominant role as the engine of scientific discovery & technological innovation,
- Participation of industry and potential employers in administrative and academic bodies of AUs,
- Public-Private initiative to launch faculty/student development programs in leading institutions of higher learning with focus on more outcome-based research,
- Due recognition and incentives for enterprising faculty by integrating entrepreneurship into the faculty tenure and selection process,
- Encouraging faculty and business partners through externships, consultancies, mobilizing resources and providing guidance for creating startups.

Moving Forward

National Agricultural Research and Education System (NARES) must support current and future farmers as they adapt to the evolving food system landscape while also rethinking how to advance and nurture the entrepreneurial potential of farmers in the age of modern agriculture, AUs must strive to promote and improve its services.

RAMPUR POSHAN KIT

SUCCESS STORY IN COMBATING MALNUTRITION



Rampur, an ancient city in Uttar Pradesh, is famous for its centuries-old fort and a library which boasts of about 12,000 rare manuscripts and a fine collection of Mughal miniature paintings. Recently, Rampur hit the headlines once again for the Poshan Kit developed by the Rampur district administration as part of its dedicated campaign called Mission Sanvardhan to fight malnutrition.

The Poshan Kit is being hugely appreciated. UP government is considering the kit as a key tool to deal with 'malnutrition among children under five years of age', regarded as a key indicator of development and a crucial sustainable development goal.

The Poshan Kit is packed with highly nutritious traditional Indian food like millets, black wheat, mushroom, sesame, deshi ghee and moringa. It is remarkable that the Poshan Kit enabled the district to restore the health of 94% of 1,916 listed severely malnourished children.

Replicating The Rampur Model

Enthusied by the success of the initiative, the UP Chief Secretary asked the district administration to brand the Rampur Poshan Kit, so that other districts can adopt it. Statistics reveal that one in four children in UP suffers from malnutrition, and about 7% are severely malnourished (weight for height), according to the fifth National Family Health Survey.

The Poshan Kit initiative and Mission Sanvardhan is the

brainchild of District Magistrate Rampur Mr Ravindra Kumar Mander. Speaking about the initiative, Mr Mander said medical research has established that small changes in diet can effectively address malnutrition. The project also aims to achieve the objectives of PM Poshan Abhiyan. The Poshan Kit initiative has accomplished both roles successfully.

Vocal For Local

Mr Mander said that products which grow in and around Rampur district were chosen to prepare the kit. He stated that malnutrition is caused by low socio-economic status, poor diet and poor maternal health. Hence it was decided that if local resources are used, there is likelihood that the initiative is sustained.

Mr Mander informed that each product that went into the kit was researched by experts. The combination of millets, moringa and flax seed daliya was included because it provides Omega 3,6,9, magnesium and protein. Amla triphala juice was included since it is a very rich source of vitamin a and c. Organic honey was included because it provides potassium and sodium. Sesame cookies were included since they are a rich sources of calcium.

Ensuring Doorstep Delivery

The district administration ensured that the Poshan Kit reached the 101 children in the district who were suffering from SAM (severe acute malnutrition). Before providing the kit to the fam-

ily, the body mass index parameters of the children were recorded. The district administration involved the health department, anganwadi workers and village heads, self-help groups and other panchayati raj system functionaries to maximize the outreach and awareness for the Poshan Kit initiative.

It is most creditable that after three months, 94 children came out of the SAM category. Thereafter, the adoption of Poshan Kit was scaled up across the district. It was extended to all the listed 1916 SAM kids of the district. The DM revealed that at present, more than 5,300 underweight children are being covered under Mission Sanvardhan.

Vatsalya App, Poshan War Room

Under the leadership of Mr Mander, the district administration developed the Vatsalya app to ensure effective implementation of the campaign. The district administration has set up a poshan war room to address grievances related to the project, ensure prompt service delivery and streamline the feedback mechanism. Third-party verification of the campaign was undertaken.

Scaling Up The Campaign

The district administration decided to include adolescent girls, pregnant women and lactating mothers in the campaign in order to break the cycle of ill health formed by poor maternal status. It is noteworthy that all the women and girls benefitted within one month of using the kit. "Out of the 301 adolescent girls included in the first phase, improvement was recorded in 101 girls. In the lactating mothers' category, the health of 102 out of 278 registered improved. Among pregnant women, 133 out of 381 recorded better health one month after using the kit," said Mr Mander.

Increasing diversity with Farmer Prosperity

Since the Poshan Kit is based on local produce, farmers of the area have immensely benefited from renewed channels of demand. The district administra-



Rampur's 'poshan kits' to tackle malnutrition in UP

Madhya Shiksha
@mshikshaup

Lucknow: The UP government is planning to introduce the "Rampur model" in battling malnutrition among children under five years of age.

A Poshan Kit developed by the Rampur district administration under its campaign called "Mission Samant" has been found to be highly effective in its officials. Containing the goodness of traditional Indian food like sesame, dal, rice, pulses and vegetables, the kit enabled the district to reduce the health of 94% of SAM listed severely malnourished children.

The state government is now considering implementing the model in other districts as well. Earlier, the chief secretary had instructed officials concerned to explore the opportunity of bringing the Ramesh model and making the kits available in other districts.

Talking to TOI, District Magistrate of Rampur, Ravindra Kumar Mander said, "A group of medical officers has concluded that small changes in the diet can go a long way in reducing malnutrition. Accordingly, it is obligatory for us to explore the objectives of the PM Poshan Abhiyan being upheld by the state government as well."

Widespread success
Officials said that the kits were developed in accordance with the guidelines issued. First, malnutrition is a circumstantial disease of factors like low socio-economic status, poor quality of diet and poor maternal health. Second, using available resources was the key to containing an intervention. Therefore, focus was laid on and around the district's own resources to make the kit. "The nutritional benefits of such ingredients was well researched to fit the help of experts before inclusion in the kit," Mander said.

Down-to-earth delivery
The campaign began by listing 1916 SAM (severely malnourished) children in the district and providing them with the kit. "After three months, 94% of the malnourished children were covered under the mission," Mander said.

Success scaled up
To break the cycle of SAM, the kits were prepared by poor seasonal status, the administration included adolescent girls, pregnant women and lactating mothers in the campaign. "After one month, out of the 301 adolescent girls included in the first phase, improvement was recorded in 101, whereas in the lactating mothers' category, the health of 102 out of 278 registered improved. Among pregnant women, 133 out of 381 got better," the DM said.

Farmer's income up by 25-70%
The administration linked SAM with some SHGs through a farmer producer's organization. "In a few months, the demand for kits went up and so did the price of the produce of which the farmers' income increased significantly. In fact, the income of over 16% farmers included in the FPOs increased more than 100% due to the kits. In districts like Sambhal, Kanpur, Mahoba and Sitabdi, the kits were dispatched there to Maharashtra (1,000) and Telangana (500). As many as 100 such kits were sent to Uzbekistan as well on demand," said Mander.



Under the leadership of DM Mr Ravindra Kumar Mander, the district administration developed the Vatsalya app to ensure effective implementation of the campaign, and set up a poshan war room to address grievances related to the project

achieved success in increasing biodiversity and also increasing the water level in the area.

Today Rampur Krishak FPC has made more than 22 FPCs of Uttar Pradesh and Maharashtra self-reliant. Together with the administration, the farmers have lent their full support in nourishing the malnourished children.

The district administration involved about 350 farmers in the campaign with the help of FPOs. Mr Mander stated that with more orders being received for Poshan Kit, farmer income in the area has increased. Income of over 16% farmers has doubled as the Rampur krishak FPC's supplied more than 10,000 kits to districts like Sambhal, Kanpur, Moradabad and Bulandshahr. The FPOs also supplied these kits to Maharashtra (1000) and Telangana (500). As many as 100 such kits were sent to Uzbekistan on demand, informed Mr Mander.

POULTRY PRODUCTS

OPTIONS FOR IMPROVING NUTRITIONAL VALUES

While there is limited consumer acceptance in processed meat and egg products in India due to concern regarding cold chain, demand for enriched fresh chicken meat and egg are expected to grow by leaps and bounds. Ongoing

research and integration of the poultry industry have held down the cost of poultry meat and eggs. This has given poultry a competitive edge over other animal products as a source of critical nutrients.

Reducing fat and cholesterol in chicken products

In the case of chicken meat consumers see fat or its cholesterol content as a waste or health risk. Producing chickens with less fat or cholesterol would be seen as better value. There are multiple ways of doing this. There appeared to be little variation in cholesterol content of eggs from hens fed the usual commercial diets. However, increasing amount of dietary protein fed to chickens and reducing fat can reduce fat content in chicken meat.

Restriction of energy in feed shortly before marketing may also be effective. Addition of feather meal to diet for the 14-day period before marketing has also been shown to be effective. Another new approach can be through genome editing for reduced fat and cholesterol. However, such a technology will take time for large scale validation and regulatory approval before

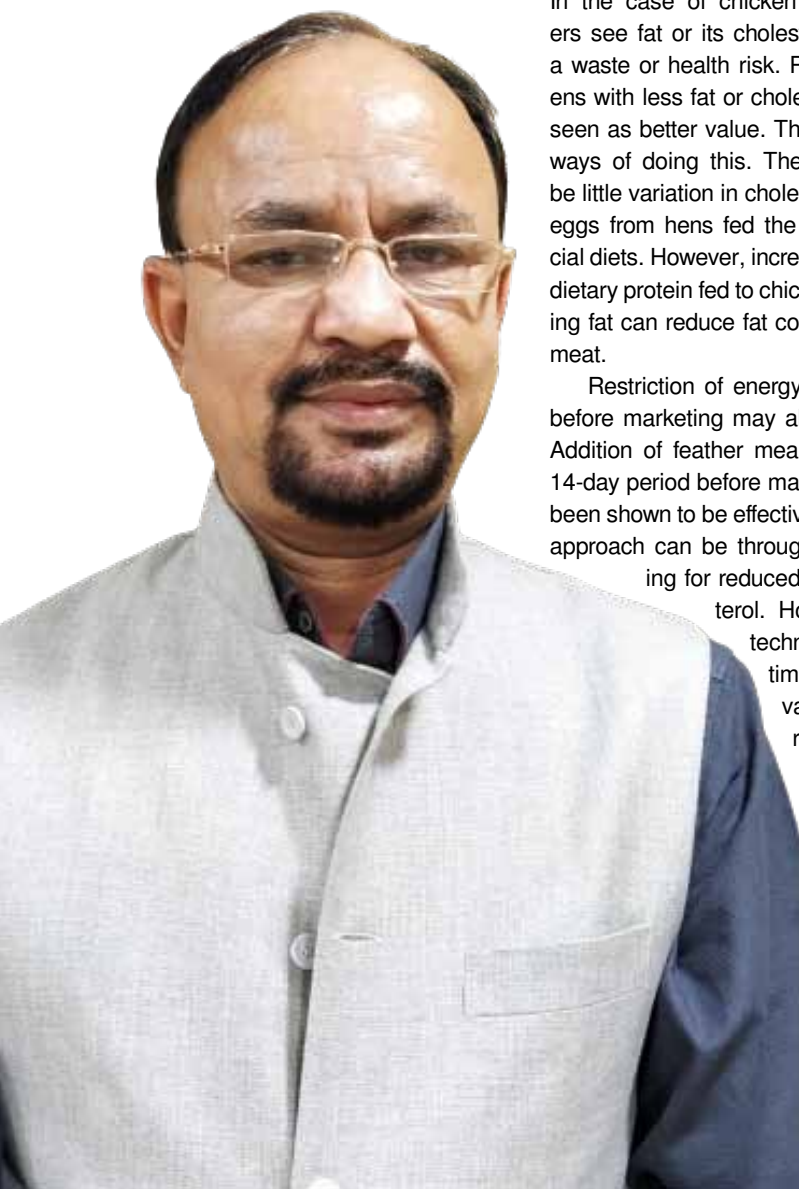
coming into use. As an interim measure, poultry breeding organizations should pursue family selection against abdominal fat and very low density lipoproteins in breeder lines along with improvement in feed efficiency.

Omega-3 fatty acid enriched chicken

In studies carried out at ICAR-DPR and elsewhere feeding of flaxseed or its oil to poultry improved omega-3 fat content in egg. Poultry diets typically have omega-6 to omega-3 ratio of 10-25:1, a healthy ratio is 4:1. Polyunsaturated fatty acids like omega-3 are considered as better for human health and hence omega-3 enriched eggs can fetch premium price.

In a study carried out at ICAR-DPR, supplementation of flax seed oil upto 6% in layer diet resulted in higher (150%) α -linolenic acid and n3 fatty acids (4.612% in flax seed oil group vs 1.893% in control group) in eggs. The additional cost per egg was Rs 1.30- thus to offset the increased cost and to have some profit such eggs would need to sell about 2.5 Rs higher than ordinary eggs.

In another study carried out at Canada indicated that to get omega-3 level in chicken meat to above 300 mg per 100g of breast meat flax seed feeding at 17% in diet required 12 d whereas at



About the **AUTHORS**

Dr Rudra Nath Chatterjee is Director, ICAR-Directorate of Poultry Research, Hyderabad
With Dr SS Paul, ICAR-Directorate of Poultry Research



Vitamin D and Vitamin B 12 are the most commonly reported deficient micronutrients in humans. Hence their enrichment in egg makes sense

10% in diet required 12d. The study also indicated that the thigh meat reached the desired level of omega-3 fatty acid in only 4 d. The downside of feeding flax was higher production cost, reduced growth and feed efficiency.

Soy isoflavone enriched egg

Soy isoflavones are considered as a gene methylation modifier. One study indicated that increased intake of isoflavones result in a 29% reduction in breast cancer and another study showed that high doses of soy isoflavones (126 mg/d/human) improved bone density.

On feeding of genistein to chickens level of isoflavone increased in egg yolk in high correlation with dietary level with no change in egg production or feed efficiency. Thus eggs can be enriched for higher beneficial phytochemicals to reduce risk of chronic diseases and such

designer eggs can offer good value addition.

Organically produced free range chicken eggs are being marketed with higher price tags than their commercial counterparts.

Mineral Enriched Egg

Considering high occurrence of deficiency of critical trace minerals in human especially in pregnant women and growing children, enrichment of egg can be a very good delivery vehicle to mitigate such deficiencies.

In a study carried out at ICAR-DPR, supplementing laying hen with higher than normal required dose of iron (150 ppm) along with higher levels of zinc (70 ppm) and Copper (25 ppm) can increase iron level in egg from 1.88 mg per 100g to 2.75 mg /100g egg without any adverse

effect on performance of laying hens. In another study carried out at ICAR-DPR indicated that increasing level of dietary zinc in layers increased zinc level in egg by 27 to 31% over control without affecting feed efficiency or performance of birds.

The mineral (Fe or Zn) supplementation may increase production cost by 5 to 10 paise per egg. Similarly, it is possible to increase the levels of selenium in the egg by increasing dietary level of inorganic selenite as well as organic selenium.

Vitamin Enriched Egg

Vitamin A content of egg yolk can be increased when levels in the diet are increased. However, the levels of increase in the egg were much less in proportion to those in the feed due to storage in the liver, but in case of vitamin D, the quantities of the vitamin increased in the egg yolk in proportion to increases in the feed.

Among water soluble vitamins only the vitamin B12 content of the eggs may be significantly increased by feeding the vitamin at higher than the normal required level. However, considering the fact that Vitamin D and Vitamin B 12 are the most commonly reported deficient micronutrients in humans, their enrichment in egg makes sense.



**fun
FACT**

Dr Chatterjee:
I love listening to songs

TALENT INCLUSION TO BRING VALUE ADDITION IN AGRICULTURE



Mr. Raju Kapoor, Director-Industry & Public Affairs with FMC India, a global agricultural sciences company, has more than three decades of diverse and deep experience in the agriculture industry across various verticals and functions such as Crop protection, Fertilizers, PGRs, Seeds, Animal Nutrition and Health products. He has led Profit Centers of various renowned corporates over the years and has built, grown and turned around various businesses over his career.

A keen contributor to the sustainability of food systems, Mr. Kapoor has been actively involved in the areas of public policy, communication, marketing, supply chain management and general business management in his career. Prior to FMC India, he worked with Corteva Agriscience, a major American agricultural chemical and seed company, managing corporate affairs of the group for South Asia. With a bachelor's degree in Agriculture and Animal husbandry from GB Pant University and an MBA in Marketing, Mr Kapoor likes to define himself as a Photographer, Spiritualist and Philanthropist.

In conversation with AT Group Editor Ms Anjana Nair, he takes his conversation to women in agriculture.

How are women perceived in corporate sector?

In every industry, the number of women leaders has been on an upward trajectory over the past few decades. This trend has reached a new crescendo in 2023 when for the first time in history, over 10% of Fortune 500 companies have women CEOs. All indicators point to more leadership positions being assumed by women in

A more diverse workforce will lead to the creation of new ideas and spur innovation. These are powerful reasons why the agricultural sector needs more women employees



tête-à-tête with Anjana

Awards and Recognitions

- Fellow, National Academy of Sciences, India
- All India Biotech Association (AIBA) award, 1998
- Kamal Kumari National Award for Science and Technology ,1998
- Biotech Product and Process Development and Commercialization Award, 2000.
- Women Leadership Agriculture Award 2016
- Indian Women Achievers Sammaan 2017

the coming years.

Consider that in the US today, there is a 15-percentage point gap in favour of women getting college degrees, whereas back in 1972, there was a 12-percentage point gap in favour of men getting college degrees! In India too, the gross enrolment rate of women in higher education at 27.3 percent is higher than the rate for men, which stands at 26.9 percent.

FMC Corporation is committed to harnessing the creative potential of women and to creating a more diverse workforce. The company is well on its way to

achieving a 50/50 gender balance across all regions and job levels by 2027. Women already make up 30% of FMC's global workforce and the company's successes with diversity are being emulated by other firms in the agricultural sector - paving the way for more women being employed in the sector.

There is every reason to believe that having more women in the agriculture sector will add value to the sector and therefore the need for the same is growing; however, the progress made by women in the agricultural sector has so

far been underwhelming for several reasons. While the challenge of inclusion in Indian agriculture is considered more difficult due to historical reasons, our experience with inclusion, including at the leadership levels, has been rather satisfactory and encouraging.

How significant are women in agriculture?

Historically, farming has been perceived as an occupation for men. Consider that when Indian children are asked to draw a picture of a farmer, they always draw a man. This is even today when nearly 80% of rural women are employed in agriculture and 10 million farmers in India are women.

In addition to stereotypes, other factors also keep women from working in agriculture. One is the gender bias which is built into the agricultural industries' ecosystems. Also, as agriculture is a rural industry and farms are spread across vast areas and distances from each other, working in the industry entails considerable travel, early mornings to late evenings. Women are considered 'unsuited' for such fieldwork.

Other reasons include the traditional farming societies in India being averse



to having women in key decision-making roles and concerns about the safety and security of women who work in these industries. In addition, many women professionals opt not to join the industry as other sectors offer better career prospects and compensation.

However, there is every reason to believe that just as other industries that were once considered male bastions now have an increasing participation from women, the agricultural sector will also realise the potential and emerge as more inclusive space for women.

How can agriculture be made more 'women friendly'?

With farms being disbursed across vast distances, travelling to and from them can be a challenge for women. However, with the creation of women friendly infrastructure, particularly at the last mile, the challenge of traversing such terrain can be mitigated considerably.

Women who work in the field may be equipped with a pre-planned route such that travel time and distances are kept to a minimum. Also, farmers who're supportive of women should be identified and their efforts working alongside women should be highlighted and used to set an example for others in the community.

At the product demonstration and meeting sessions with farmers held in rural settings, private agricultural players may sensitise farmers to the requirements of women field workers through trainings. Farmers will also be shown what part they can play to make the field more inclusive for women fieldworkers and labourers. It may also be desirable to have more women from the rural background into the field teams, so they can navigate the challenge better but also become inspiration for other girls and their parents in the villages.

Why does agriculture activity need more women?

Having more women in the agricultural industry presents a huge untapped opportunity. An inclusive and diverse salesforce will more easily understand

Scholarship programs for women pursuing higher education and project Madhu Shakti are some examples that highlight that women can play a greater part in agriculture at every level - from the grassroots to sales and entrepreneurship as well as in research and development.

the requirements of women farmers and labourers. Consequently, meeting such requirements through the right products and services will become easier. Also, a more diverse workforce will lead to the creation of new ideas and spur innovation. These are powerful reasons why the agricultural sector needs more women employees.

There are already many initiatives underway to encourage more women to join the agricultural sector.

How FMC inspired women towards agriculture

Perhaps one of the most effective ways to build capacity in agriculture is to encourage women to join the agricultural sector by making higher education in agriculture more attractive and accessible.

FMC through its multi-year program awards scholarships to women who pursue PhDs or MSc studies in agriculture, thereby making these fields more attractive to them. Such initiatives are already underway in partnership with leading universities, including G.B. Pant University of Agriculture and Technology, Punjab Agricultural University, Tamil Nadu Agricultural University (TNAU), and Professor Jayashankar Telangana State Agricultural University, to name a few.

Similarly, its Project Madhu Shakti, has successfully trained 75 rural women to be entrepreneurs who also promote biodiversity. These women have now become master trainer beekeepers who manage their hives, sell the honey produced by the hive and in turn, enrich the flora surrounding their homes in Uttarakhand - at the foothills of the Himalayas. These women are likely to inspire a large number of other rural women to be empow-

ered. The project has been undertaken in partnership with GB Pant University of Agriculture and Technology, Pantnagar and will complete a year in April 2023.

FMC has also commenced a new awareness campaign among potential women talents to join the agricultural input industry through knowledge and experience sharing sessions by its existing women leaders under Project Annapurna.

How bright is the future for women in agriculture ?

The scholarship programs for women pursuing higher education and project Madhu Shakti are some examples that highlight that women can play a greater part in agriculture at every level - from the grassroots to sales and entrepreneurship as well as in research and development.

Active participation from more women in agriculture will increase productivity and innovation. For instance, it's estimated that if women farmers had access to the same resources as their male counterparts, their farm's output would increase by as much as 20%-30%. Having more women across all levels in the agricultural sector will play a huge part in taking agricultural sector in India to the next level.

In the largest economy in the world, young women are already far outpacing men on college campuses and in India women are ahead in this regard as well, albeit by a smaller margin. All indicators point to more women stepping into leadership roles in every sector. FMC's efforts will play a part in bringing this about sooner rather than later in the agricultural industry. The result will be a greater diversity of thought and higher productivity. A win-win for everyone!



**BioAg
INDIA
2023**

CONFERENCE | EXHIBITION | AWARDS

Thursday, 27 April 2023
Holiday Inn @ Aerocity, New Delhi



**BOOK
YOUR
SPACE
NOW**

“Towards Ecological and Sustainable Agriculture”
Innovations | Regulations | Technology | Business

Awaiting to assist your participation

Ms. Vinita Singh
Senior Manager
Mobile : +91 - 7290031468
vinita.singh@agriculturetoday.in

Ms. Zaman Almas
Business Manager
Mobile : +91 - 7290088228
zaman.almas@agriculturetoday.in

COOPERATIVE FARMING IS KEY TO INCREASING FARMER INCOME

DR WILLIAM DAR

Dr Dar has often spoken about 'science with a human face', which he says is a constant reminder that our science must have a purpose. Agricultural science is focused on research and development, and equally on farmer prosperity and ensuring the best for consumers worldwide.

Dr Dar believes that inclusive development is not just including farmers in creating solutions but including other actors in the value chain.

Increasing productivity, driven by demand and instituting competitiveness for them will only come from innovations.

Speaking to Rajni Shaleen Chopra, Executive Editor, Agriculture Today, Dr Dar said that in most countries, agriculture employs a significantly high percentage of the labour force. It is a very important sector for the economy as a sizable section of the rural population is engaged in farming.

Dr Dar highlighted that there is need to train farmers in suitable agricultural practices for increasing production and achieving higher income. The three major goals, he said, are increasing productivity, increasing farmer income and sustaining the environment.

Given below are the nuggets of wisdom shared by Dr Dar.

We need to have more farmers improve their productivity. There are many power mechanisms to employ in order to ensure this. We need to engage the farmers in cooperative groups. We need to strengthen policy interventions to sup-



port small farmers. There are also other mechanisms. It is important to focus on the initiatives which can transform the agriculture sector.

Farm clustering and consolidation towards cooperative farming

This can play a major role in achieving the desired national objectives. It can significantly help to upscale the farm economy. We need to integrate the small farmers through cooperatives. And then these farmer cooperatives can partner with big businesses.

Big businesses have the management knowhow, the technology, the capi-

tal and the market. Hence both sectors shall complement each other.

The second pillar to transform agriculture is modernization

We must use the relevant technologies to increase productivity. There is need to mechanize agriculture. All aspects of modernization must be adopted in order to ensure higher productivity, environment sustainability and also increase farmer income.

We have to work towards green industrialization, value addition

We have to work upon increasing the



“

Young members of a farmer's family should be involved in the training process. In this way, the change shall be seeded

”



products in our export basket. If this is achieved, big businesses shall be able to partner with farmer cooperatives.

It is good if farmers are partners in the value chain. Value addition must be done for local consumption and export. Also, we need enough plantations which can

Dr William Dar is one of the most distinguished agricultural scientists globally. He served as Director General, ICRISAT from 2000 to 2014. In his role as Secretary of Agriculture, Philippines, Dr Dar initiated major government campaigns to augment farmer income and address the diverse challenges faced by the agricultural sector.



meet with the needs of the industry. This will mean enough volume of production and plantation over sufficient hectares.

We need focus on human capital involved in agriculture

There has to be professionalization of the sector. The capacity and knowledge of farmers needs to be enhanced. We need the younger generation to be engaged in agri businesses.

Digitalization of agriculture is important. All these are related to increasing the knowledge and capacity of the human capital engaged in farming.

These are the policy directions that can help agriculture.

Nutrition Security As Important As Food Security

It is a necessity to consider nutrition security equally important as that of food

security. That is how Philippines is now looking at it. Nutritional security needs

“

We need the youth to head agri-businesses. We need to expose the youth to the challenges in rural development. We can have a contest of ideas for the best start-ups to address problems in the agricultural sector

”

the same level of support. It is important to produce enough food and equally important to produce quality food.

Hidden hunger is impacting young children, mothers. We need to address the problem of hidden hunger to have good citizens in the future. Abundant and nutritious diet for the mother is necessary.

Let me cite an example of how this can be assisted by technology. We are the first country to promote and commercialize golden rice. This is a genetically modified, bio-fortified crop, with higher nutritional value. Golden Rice helps us minimize problems the problems related to lack of Vitamin A.

As Secretary of Agriculture, I introduced and institutionalized a policy direction called the Balance Fertilization Strategy. This promotes the use of organic fertilizers and bio-stimulants or bio fertilizers. It is being pushed forward by the government. The steep hike in the price of fertilizers following the Russia-Ukraine war has further revealed the necessity of greater use of organic fertilizers.

Integrated Pest Management Is Necessary

Natural control measures and bio-fertilizers are important. Chemical pesticides are the last resort. IPM is a process. We started it for rice, and it took us a long time.

Farmers in developing countries always look for quick fix solutions. But it is not sustainable or environmentally viable. Hence it is highly important to educate farmers. When we bring in the younger generation into farming, they become the intermediaries for adopting sustainable ways of farming.

Family-Oriented Approach For Modernizing Agriculture

Farmers should be involved in the training process along with some members of their family. In this way, the young members of the family will become the change agents. The change shall be seeded. We need to systematically involve the younger generation.

Even during meals, they can dis-





cuss the new processes. If the farmer is alone in the training, he has no one to discuss it with at home who is equally informed.

In Philippines, we are starting this. We have reoriented agriculture training programs. They are now agri-business oriented and are looking at sustainability in a higher plane by engaging the younger generation.

Natural Farming, Organic Farming

It will take time for natural farming and organic farming to produce enough food for the whole country. We can do this slowly but surely.

Organic or natural farming can demand higher prices, but only the rich shall be able to afford it. How shall the poor benefit? Hence balance is essential. We know we have to move towards regenerative farming, agro-ecological based farming. There are three focus areas.

- * We need to enrich soil resources
- * We need to protect water resources
- * We need to increase plant and animal bio-diversity

These are the three critical areas in pursuing regenerative agriculture. This shall lead to healthier soils. That in turn

shall make the crops more resistant to climate change forced by global warming. It shall also lead to higher yields. There shall be better use of water resources, and higher productivity, more income for farmers.

Then bio-diversity, aquaculture, agro-forestry, environment protection with bio-diverse systems – all these are facilitated.

Farmers have been able to increase their income manifold by adopting digital technology. That is why involving the younger generation is even more important. They can make the leap forward.

We need to simplify technology for use of farmers. There is need to monitor pests, monitor water regimes, adopt more solutions created by digital technologies. We need to open up and embrace digital technology – everyone must be part of the revolution so that they can be impacted to achieve higher productivity, pursue agri-business for good income.

Climate Change Is A Major Challenge

Building resilience is a must every step of the way, since everyone shall be impacted. Molecular science or gene revolution can help in building resilient

technologies.

Involving The Young Generation Is Imperative

We need the youth in farming. We need the youth to head agri-businesses. We need to expose the youth to the challenges in rural development. We can have a contest of ideas for the best start-ups to address problems in the agricultural sector.

We can have agri-business credit programs for the youth. The interest rate for agri credit for small farmers must remain low. When I was DG IC-RISAT in 2014, I was mesmerized that India had only 6 per cent interest rate for farmers. In Philippines it was much higher at that time. Learning from India, we reduced it.

We need higher investment in R&D. We need to continue to look at challenges and opportunities, how we can have more disruptive technologies to help agriculture.

We also need greater professionalization of the sector. Even the bureaucracy associated with agriculture must be professionalized. These are some of the key solutions for transforming the agriculture sector and empowering the farmers.

Chemistry

Packaging

Bio-Efficacy

We till **Concept** till Harvest

Concept Agrotech Consultants Limited

Toxicology

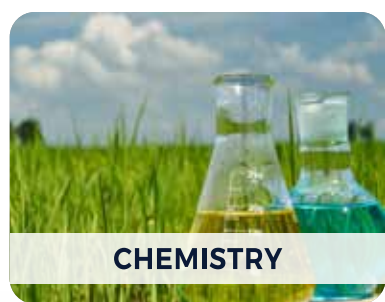
Bio-Efficacy

One Stop Solution for all your Regulatory Services Requirements

Data Generation | Registration | Product Services

DRS DATA AND REGULATORY SERVICES

Agrochemicals | Bio-Stimulants | Bio-Inputs



CHEMISTRY



TOXICOLOGY



BIO-EFFICACY



RESIDUE



LEGAL



PRODUCT SERVICES

To know more, please contact

Satender Routela, Manager - DRS | Mob : +91 7290010849
Email : satender.routela@cacl.in

Visit our website

www.agriregulatoryservices.com





A Unit Of **CACL**
Engage-n-Expert
Agri Expert and Consulting Service

“AGRI ADVISORY AND CONSULTING SERVICE”

ENGAGE AN EXPERT

ABOUT US :

Engage-n-Expert is ready to offer exciting experience to the clients. Please connect with us and allow us to serve you. We look forward to making the client-expert experience even more enriching.



ASK



CHOOSE



START

OUR EXPERTS ARE DEDICATED TO HELPING YOU EXCEL

Visit our Website :

www.agriexpertise.com >

To know more, please Contact :
ishita.srivastava@cacl.in

ROLE OF FOOD PROCESSING

CHALLENGES AND OPPORTUNITIES

The past few years have significantly shifted how we see food and perceive nutrition. It has shifted our focus to healthier lifestyles. One of the key drivers of this shift has been a growing awareness of the link between nutrition and overall health, and the role that diet plays in supporting immune function and reducing the risk of chronic diseases such as heart disease, diabetes, and obesity.

Food processing can help us make food safer, healthier and more accessible to consumers. In fact, many processed

foods can provide essential nutrients and contribute to a healthy diet when consumed in moderation as part of a balanced diet.

Benefits

Food processing plays a crucial role in the food industry, as it allows for the creation of a wide range of products enjoyed by people worldwide. Some forms of food processing, such as canning or freezing, can help to preserve the nutrient content of foods by minimizing losses due to spoilage or degradation. Other processing techniques, such as fortification with

vitamins and minerals, can help to address nutrient deficiencies in populations that may not have access to a diverse range of foods.

Food processing is especially beneficial to make certain foods more accessible to consumers, particularly in areas where fresh produce may be less readily available or more expensive. For example, canned or frozen fruits and vegetables can provide a convenient and cost-effective way for people to meet their daily recommended intake of fruits and vegetables. Not just that, it allows for access to global flavours and novel combinations that catch the interest of the consumer.

This idea has also seen a surge in Nutraceuticals, dietary supplements that contain health-promoting properties beyond basic nutritional value, in recent times. The term "nutraceutical" is derived from "nutrition" and "pharmaceutical," reflecting the fact that these products are believed to provide health benefits similar to those of pharmaceutical drugs. These could include probiotics, herbal supplements, supplements that contain essential vitamins and minerals, Omega-3 fatty acids, etc.

The Popularity Of Plant-Based Products

Plant-based products have gained popularity in recent years due to their numerous health benefits, ethical and environmental concerns, and increasing demand from consumers. We are looking at a growing market for plant-based meat alternatives, such as veggie burgers, meatless sausages, and plant-based chicken nuggets. There are dairy alternatives for consumers who are lactose intolerant, vegan, or looking for a healthier and more sustainable alternatives, plant-based protein powders, plant-based



About the AUTHOR

Mr Anand Chandra is Co-Founder & Executive Director, Arya.ag

sweeteners, and gluten-free products.

Labels on the food packaging enable us to make informed choices about the food we consume, from the list of ingredients, nutritional or allergen information, and in some cases, provide traceability of the food product throughout the supply chain. These labels help prevent food fraud and misrepresentation of food products and standardise information for specialized food products, organic foods, and genetically modified foods.

Food processing can contribute significantly to sustainability in the food industry by reducing waste, improving efficiency, and promoting the use of sustainable materials and practices. Food processing enables new uses for by-products and waste materials generated during the processing of food. By processing food closer to the source of production and improving efficiency in the food supply chain, we can make impact carbon emissions and reduce the environmental impact of transporting and storing food.

Challenges

While there has been significant growth in this sector over the past few years, there are still several challenges that need to be addressed in order to realize the full potential of the industry.

The food processing industry in India is often hindered by a lack of infrastructure, particularly in terms of cold storage facilities and transportation. The fragmented nature of the industry, with many small-scale producers and processors operating independently, results in supply chain inefficiencies and delays. The industry relies on a complex network of suppliers, distributors, and retailers, which can be challenging to manage. This challenge can be addressed by leveraging technology to improve supply chain visibility, traceability, and transparency.

Food safety is a significant challenge in the food processing industry. The lack of quality control issues, particularly in terms of hygiene and safety standards, has also raised concerns about the safe-

The Way Forward

With over 15 agro-climatic zones, we can produce anything and everything as a country. We have the raw materials required and a large consumer base; the opportunity in India is immense.

Addressing these challenges will require coordinated effort from industry stakeholders, policymakers, and regulators. Improving infrastructure, supply chain management, and quality control while investing in education and training programs and expanding access to finance are essential steps toward realizing the potential of India's food processing industry. Favourable government policies in recent times are already a push in this direction.



ty and quality of processed foods, particularly with small-scale operations. The implementation of food safety regulations and quality control measures is essential to address this challenge.

Access to finance for small-scale food processors limits their ability to invest in equipment and technology that could improve their operations. The food processing industry is under pressure to adopt sustainable practices to reduce its impact on the environment.

Another challenge is the cost of building awareness on an improved package of practices on safety, nutrition, quality control, efficiency, and sustainability with a focus on reducing environmental impact and promoting a circular economy. The cost of experimentation toward these goals and the shortage of skilled workers is often detrimental to the scaling up of these processes, quality, and productivity. Technology could solve for this, and investments in upskilling existing employees could benefit the industry.

fun FACT

Mr Chandra enjoys playing and watching sports. He is also an avid reader



Millet Ecosystem

BRANDING AND FARMGATE PROCESSING

Nutri-cereals are making a strong comeback across the countries and in India after the announcement of IYOM-2023 by the UN. India is the largest producer of millets in the world with a share of 41 percent in 2020.

The nutri-rich millets are reducing the rising incidences of malnutrition, metabolic disorders and can enhance the nutrition and food

security of the country. Though millets provide a wide range of nutritional benefits, the Indian population has not consumed them in substantial quantities due to various factors like lack of proper knowledge on processing technologies, low investments and remuneration, increased rice and wheat production, poor government policies, rapid urbanization, poor demand and supply chain, and following traditional harvest-



About the **AUTHORS**

Dr Vilas Tonapi is Former Director, ICAR-Indian Institute of Millets Research, Hyderabad and Technical Consultant, Advanta Seeds Hyderabad
Dr Sangappa is Principal Scientist, ICAR-Indian Institute of Millets Research, Hyderabad



ing techniques.

The objective of the study was to create awareness on millet processing techniques to millet farmers and thereby establish the primary processing unit at farm gate. There is strong pressing need and fine tuning of primary processing machinery of small millets for higher efficiency and creating awareness on usage of machinery to the farmers for establishing the more primary processing unit of millets at farm gate and which in turn promotes the consumption of millets and thereby creating the more demand to millets.

Overview on Millets Primary Processing Machinery

Primary processing of millets is a vital step to convert the grain into edible form and thereby enhancing its quality. Although processing millets without husk (naked grains) i.e., sorghum, pearl and finger millets are easy whereas processing of millets with husk i.e., little, proso, kodo, barnyard and foxtail millets is difficult. These have an inedible husk, which needs to be removed through processing. The major challenges in processing of small millets are:

Various Steps Involved in Primary Processing of Millets

- Cleaning – Procured grains from farmers comes as a mixture of Grains, Stones, Dust, Grasses etc. So, the first step will be to get rid of all these impurities. Destoner Cum Grader Cum Aspirator is the machine used for this work.
- Dehulling – Cleaned raw grains are then subjected to dehulling, “which is the procedure to remove outer indigestible husk layer from the grains, thus improving its overall digestibility”
- Separation – Output from the dehuller is a mixture of dehulled grains, unhulled grains and brokens. In this step each constituent of the mixture is separated.

Destoner cum Grader cum Aspirator

Conventionally impurities confined along with grains such as stones, muds, grasses were separated by winnowing. The

Need For Higher Mechanization

In order to increase millet consumption, there is a strong need in development of prototypes for mechanization of millet production, processing and value-added technologies through proper designing, fabrication, testing and ease in handling of machinery to farmers. Millets are known as the harbingers of Food and Nutritional Security i.e., called Nutri-cereals. However, our country has been witnessing the continuous decline of area and production in the past six decades despite research and development efforts attempts. There is also a pressing need and fine tuning of primary processing machinery of small millets for higher efficiency and creating awareness on usage of machinery to the farmers and establishing the more primary processing unit of millets at farm gate and which in turn promotes the consumption of millets and thereby creating the more demand to millets.



stones are collected on back side and cleaned grains to the front, and lighter particles by the air. Destoner Cum Grader Cum Aspirator is based on conventional principle and aims at easing out the burden some, by providing benefits such as higher efficiency, high working capacity, lower labour requirement, efficient segregation based on size and many more.

Dehuller

Dehullers are the machinery employed to perform dehulling and works on various principle such as shear abrasion, centrifugal impact (single time), centrifugal impact (double time), roller mills etc. In small millets, dehulling is an imperative concern as the grain's sizes are very small and their cohesiveness with outer husk is greater, which makes it very difficult to dehull with higher recovery. In current scenario, many manufacturers are just adapting machinery already existing and retrofitting it to suit millets necessi-

ties, but there is a need to have a deeper derive to as understand the dehulling needs of each millet so as to make whole primary processing more economical, efficient and less time consuming.

De-husking

It is the process of removing the outer layer of the millets. Jowar, Pearl Millet and Finger Millet can be processed in order to remove the light outer layer. Whereas, the hard coated millets such as Barnyard, Brown Top, Kodo and Proso Millet requires husk conditioning/scratching/softening.

Small Millet Polisher

It is used for polishing of small millets along with ragi and houses a hopper of 5Kg capacity, wherein the grains are fed. It works on abrasive action and make use of a rotary conical abrasive stone and a stationary peripheral stone. Grains from hopper passes down between these stones and are abraded.

Upon completion of required time, the outlet gate is opened and polished grains flows out through it, while abraded grain powder passes down the sieve provided at the bottom of rotary conical abrasive stone and is collected at side outlet. Some drawback associated includes grain jamming, periodic dressing of abrasive stones and a lower working capacity.

Though there exists many millet primary processing equipment, Perfura, Nabhitha enterprises and Dhan foundation are best in operation, effective in performance and nominally priced.

Incentivising AGRI-SEED R&D



A robust seed system for agriculture is of fundamental importance to the health of the nation. Multilateral organizations have been discussing the potential threats from a national security perspective, wherein they seek to help mitigate through collaborative mechanisms. Yet, this calls to questions the notion of national & scientific sovereignty in food and agriculture, especially with seeds and planting material, which is currently the mainframe of the prevalent doctrine of Atmanirbhar Bharat. Furthermore, due to the focus on building resilience and Prime Minister Shri Narendra Modi's focus on being self-reliant, stakeholders in India are seeking to establish solutions to mitigate these threats and grow opportunities domestically in developing seeds that could strengthen the Indian agricultural value chain.

Focus On High-Quality Seeds

In this context, over multiple engagements undertaken through the Policy Advocacy Research Centre (PARC), it was understood that work needs to begin with increased research and focused development of high-quality seeds. Crop Improvement research is driven in some crop by public research but the importance of private sector in seed research has grown manifold in the last two dec-

ades. Hence the need to incentivize private sector to invest more in this space has never been greater.

Globally, the average expenditure by private sector seed companies on research & development (R&D) ranged between 10-12% of revenue, whereas in India it amounted to approximately 3%. Given India's ambitions of becoming a global super-power and agriculture being a fundamental element of the global



About the **AUTHORS**

Mr Vikram Sankaranarayanan is Executive Director, Policy Advocacy Research Centre (PARC). Ms Banisha Begum Shaikh is the lead economist for the PARC study on this subject



economy, incentivizing R&D with a thrust given to the Indian private seed sector, could yield socio-economic multiplier effects, while mitigating emerging risks to the food chain.

Challenges Faced By The Sector

Subsidies supporting private sector R&D for seeds are currently not viable, given the strains of national finances. Furthermore, multiple factors have laid pressure on the exchequer to control food price inflation with productivity & planning often at stake due to the factors mentioned earlier. Poor yields and failing crops due to disease, pests or climate change are an indicator of the challenges that need to be addressed on war footing.

Through primary research undertaken by PARC, the study shows that incentivisation mechanisms through increasing tax rebates for expenses incurred by seed companies on R&D expenses would encourage enterprises to commit more resources. Furthermore, when engaging with MSME enterprises, who focus more on undertaking R&D activities of indigenous & region-specific seed crops, most respondents opined that their growth & survival depended on differentiation, achievable only through more R&D.

Between 2016 & 2020, tax rebates on R&D for seeds (biotechnology) fell from 200% to 150% and currently stands at 100%. Research in seeds often carries tremendous risk as the outcomes desired are not always achieved, but should not be discouraged. Furthermore, it is a lengthy & time-consuming process which usually takes up to 7 years wherein the testing protocols have to be devised across the diverse agro-climatic zones prevalent across India.

Given the thrust needed to encourage investments in R&D and the current situation when subsidized research is not financially viable, the PARC study suggests that a reinstatement of 200% tax rebate on R&D expenses incurred by seed companies would ensure required cash flows to increase their investments in R&D.



The Indian seed industry is valued at approximately INR 22,000 crore and registering growth year-on-year, yet this accounts for a dismal 5% share of the global seed market

Need For Better Quality Seeds

To ensure that the Indian seed sector maintains parity with their global & regional counterparts, most of whom have access to institutionalised foreign investment in R&D coupled with technology transfers, the reinstatement of 200% tax rebate on R&D for Indian private seed sector companies would offer incentives for further increasing investments.

As opined by the Federation of Seed Industry of India (FSII), the Indian seed industry is valued at approximately INR 22,000 crore and registering growth year-on-year, yet this accounts for a dismal 5% share of the global seed market. With the falling share in seeds production by the Indian public seed sector from 42.72% in 2017-18 to 35.54% in 2020-21, the private seed sector share increased from 57.28% to 64.46% in the same period.

With multiple submissions on the need to develop seeds during deliberations prior to multiple state agriculture budgets across India during February & March 23 for the fiscal year 2023-24, farmer bodies & other concerned stakeholders have voiced concerns for better quality seeds that help them address

their productivity, the resilience to climate change, amongst other factors. Beyond this, multiple debates and dialogues have been emerging with growing fervour amidst stakeholders within the bureaucracy, the political establishment, the agriculture value chain, policy makers and the wider public at large.

Unless we bring strong fiscal incentives for R&D, our study suggests that India's competitiveness at the global stage would be lagging and Indian private seed companies, some of whom have prominent global operations, would commit more resources should they enjoy targeted incentives for investing in research to develop better seed varieties. Fiscal incentives supporting R&D would assist the private seed sector for further modernizing labs at par with their advanced economy counterparts.

Fiscal Incentivisation Of R&D

In view of India's ambitions of being competitive through building self-reliance & resilience coupled with ensuring future food & nutrition security, fiscal incentivisation of R&D through the reinstatement of 200% tax rebate would be a progressive & affordable measure to undertake. This should be backed by a strong regulatory framework which will govern the processes for gaining access to the rebate in a transparent and auditable manner. It is also worth considering funding large scale PPP projects between public and private research organizations on crops of national importance like Oilseeds and Pulses where the historical investments have been low.

INITIATIVE INSPIRED BY FORMER PRESIDENT DR ABDUL KALAM

ABSOLUTE: MISSION FARMER PROSPERITY

Absolute started with an idea of a shared future where both People & Planet win together. In 2015, we started as a research initiative to study microscopic details of nature's molecular building blocks that impact agricultural yield & quality. The company's idea was inspired by Dr. APJ Abdul Kalam's (11th President of India & World-renowned scientist) call for the next big revolution in agriculture; which he also expressed in two of his books; Target three billion and Beyond 2020.

One day at his residence in 2012, Dr. Kalam presented 2 simple & profound thoughts to me -

- How to build a World where all stakeholders win while solving humanity's grandest & most fundamental challenges-clean air, clear water, and clean food?
- Once upon a time all of the



About the AUTHOR

Mr Agam Khare is
the CEO & Founder of
Absolute

world was natural, then what happened! What kind of world will we leave behind?

Dr. Kalam's arguments presented the opportunity to solve these grand challenges by radically improving agricultural performance to potentially impact farmer livelihoods, consumer health, and environmental sustainability. And, that gave rise to the seed we call Absolute.

Our Vision

Our Vision is to to build a better future - for people, for planet by harnessing the power of Nature, Science & exponential Innovations.

We are a bioscience company leveraging billions of years of nature's evolutionary intelligence to solve humanity's greatest challenges, starting with safe

Using IoT sensors and other monitoring technologies like Earth Observatory, Upaj collects data on factors such as soil moisture, nutrient levels, biotic and abiotic stresses etc to help farmers make informed decisions



and sustainable agritech products & solutions with research interests in Bio-materials and Biocare. We have 3 core business lines - Universal AgCloud business (a fullstack ecosystem for farmers & enterprises), Bioabled Farm Input Business & a Global Trade business across 16 countries. All this powered by cutting edge research in biology we do at Xenesis Research Institute & captured on our Nature Intelligence Platform.

Agritech – Our Role With Growers

We offer full stack solutions to growers. Our first service is our proprietary farm inputs products which have come out after 7+ yrs of deep R&D - pathbreaking bio-abled fertilizers, bio-abled pesticides and bio-abled stimulants. The range of our bio-abled farm inputs is called Inera and will soon be launched commercially. These inputs have undergone extensive field trials across 50 lac sq. ft. of farms in different climatic zones.

Then we offer a universal AgCloud Ecosystem, Upaj, where we offer farm insurance services, financial products, soil testing, biomarking services & precision advisory across a range of farms - open farms, greenhouses & vertical farms. Today, Upaj is trusted by over 1 million farmers for practically everything they need to grow better.

Our third key offering is the Global trade platform, Silkroute, operating across 16+ countries where we enable growers to gain better incomes by getting into better markets.

At the heart, what we're really trying to do is transform agriculture into a bio-abled process; in a way that goes back to being how nature intended it to be.

Making Farms Profitable, Increasing Yield And Efficiency

True breakthrough in agriculture can only come from an unparalleled understanding of why nature and plants behave the way they do, by understanding their choices and preferences and then marrying that science with the latest in technology to build sustainable products and services that impact at scale. Only when nature's intelligence and artificial intelligence are married together, will an exponential shift be seen- substantially increased farmer income, environmental sustainability, and better consumer health.

In the absence of the right advisory and precise know-how, farmers usually end up spending more resources than they need to. Similarly, there are several unpredictabilities at play like biotic/abiotic stresses, irrigation stress, biomarking level activity in the soil, etc. which can harm the yield and quality of the produce.

We have combined our 7+ years of deep R&D in plant science, microbiology, epigenetics, genomics & molecular biology with IoT, Satellite Data, AI & ML to build the most efficient agri tech stack in the world which we capture on our Nature Intelligence Platform.

Our revolutionary farm inputs & our precision insights to growers help them increase their yield and quality of produce while massively reducing their dependence on harmful chemicals and pesticides. We have seen these results across almost every major agri zone in the country.

Challenges In Adoption Of Precision Farming

I see two key reasons-

1. Lack of one cohesive solution that can provide farmers with everything that they need to grow better - a true full-stack solution from innovative proprietary farm inputs to insurance & financial products to access to global markets.
2. Absence of a true agri-tech solution deeply rooted in Ag Life Sciences that perform despite the need of farmers switching their current routine patterns while reducing their dependence on harmful chemicals & irrigation needs.

In fact, that is the driving reason behind our pursuit to build a mechanism



rooted in agriculture, bioscience & technology which increases farmer profitability, environmental sustainability & consumer health.

Advise for farmers: Experiment and believe what you see. The key here is to experiment with new products and services and not shy away from testing promising innovations.

Do you think farmers who fail to integrate technology into their work processes will be pushed out of the market? How can the government help farmers to become tech-savvy?

If we don't achieve it, it will be a failure of us as citizens of India & as innovators. It is design's & technology's prime responsibility to build solutions that benefit the masses and are easily adaptable by them. We have firmly believed in it and all our products and services can be easily leveraged by the growers. The whole purpose we built this company was to uplift the lives of people. Of course, the

Advise for farmers: Experiment and believe what you see. The key here is to experiment with new products and services and not shy away from testing promising innovations

government has a large role to play but I believe the key lies with young innovators and startups.

Status Of Precision Farming In India

There has been considerable growth in the adoption of precision farming in India in recent years. For example, the use of sensors to address biotic & abiotic stress has increased in some key farming belts of the country. There has also been some adoption of drones for tasks such as crop mapping and pest detection. The adoption of precision farming

in India continues to grow in the coming years as awareness of these technologies increases and their cost decreases. Internet Penetration is also a key factor behind the growth of precision ag in India.

For example, through the use of IoT sensors and other monitoring technologies like Earth Observatory, Upaj collects data on factors such as soil moisture, nutrient levels, biotic & abiotic stresses, etc. This data is used to generate actionable insights that help farmers make informed decisions about things like irrigation, fertilization, and pest control.

Today, over 1.1 million farmers are using the Upaj ecosystem and shifting towards precision agriculture.

Where do you see the future of farming heading? How do you think climate change will impact farming?

We need to take a leaf from history and merge it with the leaps we have made in scientific understanding of how nature operates. At this intersection of nature & science, the future of agriculture rests.

Would you agree that agritech has become an attractive avenue for investors in India and beyond? Have you secured any funding?

Last year, we raised \$100 million across funding rounds from leading global investors. We have also received constant & committed support of key players in the BioAg ecosystem & the scientific community.

With the increasing global demand for healthier food and the growing recognition of the need for sustainable and efficient agriculture, agritech has in fact become an attractive avenue for investors. I believe that the next wave of innovations in agritech will be driven by biology & life sciences which will position agriculture at the heart of sustainability solutions - solving the greatest problems humanity faces today and will face in the generations to come.



About CACL

Concept Agrotech Consultants is a professionally managed private limited company, providing a wide range of consulting services in agriculture sector. Launched as a private limited company in 1994, CACL has come a long way in providing knowledge-based services to the agri-business sector. A dedicated team of qualified professionals with requisite experience, field network and extensive database of people associated with agriculture at various functional levels, the company is capable of accomplishing any assignment successfully. Over thirty agribusiness clients today acknowledge the company's quality and reliability of services.

BUSINESS SERVICES :

- Research and Studies
- Business Consulting
- Data & Regulatory Services
- Agro Ventures
- FarmIQ – IT Solutions

FARM SERVICES :

- AgroCert (GAP Certification)
- AgroSource (Produce Sourcing)
- FarmerConnect (Contract Farming)
- FarmSolutions (Farm Consultancy)
- Product Services (Marketing and Promotion)

To know more, please Contact :

Mr. Anupam Rai

Division Head – Business Services

Mob : +91 9311983204

Email : anupam.rai@cacl.in

Mr. Rahul Singh

Division Head – Farm Services

Mob : +91 7827947370

Email : rahul.singh@cacl.in

FPCs

STRENGTHENING THE
AGGREGATION ECOSYSTEM

We live under an increasingly globalized food and agricultural economy dominated by transforming agro-food supply chains, throwing immense market opportunities for the farm community in India.

With heavy dominance of small and marginal farmers cultivating in fragmented lands with underdeveloped infrastructures, challenges stand equally tall in the Indian farm space. The scale of production, technological adoption, marketable surplus, service accessibility and bargaining power in agriculture is significantly influenced by the size of operational holding. Collectivization of farmland of small and marginal farmers is the solution.

Farmer Producer Companies (FPCs)



for fostering collective and organized action by farmers through formal collaborations have been recognized as the viable new age measure to address these challenges. FPCs enable realization of economies of scale, offer better access to investment and technology to the members and hold better bargaining power in input and output markets.

FPCs Are The Right Choice

FPCs are hybrid entities owning the benevolent spirit of co-operative societies and the business acumen of limited companies. FPCs have emerged as the most promising legal embodiment of FPOs.

FPCs function under the Companies Act of 2013, wherein shareholding farmers pool resources for better market linkages and collaborative innovations. Most importantly, FPCs are meant to transform Indian farms to profit oriented agri-business firms.

As per NSO 77th round Situational Assessment Survey (SAS), the average monthly income of an agricultural household of Assam is Rs 10,675. This is less than half of what a farmer in Punjab or



About the AUTHORS

Dr Lisa Mariam Varkey is Senior Specialist Socio-Economics at International Rice Research Institute (IRRI).

Mr Jyoti Bikash Nath is Senior Specialist, Agriculture Extension and Communication at IRRI



Haryana earns. 85 % of Assam farmers are small and marginal farmers. 27.4 lakh farm families depend upon the agricultural sector for daily livelihoods. Hence ensuring better income for the producers through an organized effort has immense significance. Government of Assam has prioritized collectivization through FPC as one of the thrust areas to provide a modern outlook to Assam agriculture.

The Progress So Far

Till date in Assam, under the central sector scheme for the establishment of 10,000 FPOs, 135 FPOs have been formed through various implementing agencies such as SFAC, NABARD, NAFED, NCDC, NERAMAC and NDDDB. In this context, Assam Agribusiness & Rural Transformation Project (APART) funded by World Bank deserves special mention. The project was implemented with the primary objective to boost agribusiness in the state. It is specially focused on FPCs in strengthening the indigenous business habitat.

APART has engaged various organizations such as ICCOA, PwC, GT, SIMFED etc as FPC promoters and technical institutions such as International Rice Research Institute (IRRI), Directorate of Rapeseed and Mustard Research (DRMR), International Potato Centre (CIP), World fish, World Vegetable Center, ILRI etc as knowledge partners for providing mentoring support to FPCs and to the implementing agency of the project.

123 FPCs working in different primary production realms of agriculture such as crops, livestock, sericulture and fishery have been formed/supported under the project. These FPCs cover around 60,000 primary producers in the state. They are expected to integrate these small holders into modern supply networks.

Paddy Based FPCs And IRRI

Several product, process and technological innovative practices emanate in farming and food supply chain due to aggregation and the resulting collaboration. To enable realization of

The FPCs in Assam need handholding services for improving organizational and management dynamics, strengthened incubation support, assistance in better business planning and expanded credit and social security support

these benefits in the rice value chain, IRRI has been working with paddy based FPCs under APART.

To strengthen local seed supply and inspire local entrepreneurship in the seed business, 15 FPCs are being involved in the paddy seed production under APART/ASCL. Besides seed production, few FPCs have also come forward to establish Common service Centers (CSC) and Custom Hiring Centers (CHC) to improve value realization and machinery services.

Through delineation of marketing landscapes using geo-spatial technologies, IRRI will support 50 FPCs in planning their business operations.

With a view to understand the functional habitat, IRRI in 2022 conducted Focus group discussions with 15 selected FPCs located in 14 districts of Assam, which have paddy as their focus commodity. The study was primarily done with the objective of appreciating the benefits the farmer shareholders were able to realize because of their membership in these collectives.

Our interactions with the farmers indicated that much of these gains, as of now, were in terms of improved backward linkage which ensured better access to goods and services and thus minimized

**fun
FACT**



Mr Nath enjoys reading and writing stories, and hiking

transaction and o-ordination costs. Many concurred with the idea that FPC provided a better negotiating platform and helped them in realizing monetary gains, yet the feedback was not unanimous.

More importantly, these FPCs, yet in their nascent stage of operation, still needed much work in synchronizing the crop planning activities, building diversified business baskets and forging better forward linkages. Even so, it is to these collectives these small holders look up to, to bring industry and agriculture closer together for a better future.

Teamwork Is The Key

The cacophony has reduced. However, the symphony is still a distant dream for majority FPCs in Assam working in different production domains. They still need hand holding services in terms of improving organizational and management dynamics, strengthened incubation support, assistance in better business planning and expanded credit and social security support.

With a strong 53% workforce employed in the agriculture sector in Assam, policy thrust in building these institutions and forging a favorable policy environment for them will thus go a long way in improving the profitability and productivity of small and marginal farm holdings of the state.

**fun
FACT**



Dr Lisa is a diehard fan of crime novels and web series. She also loves role playing and acting

Challenges Faced By FPOs, FPCs

The Inside Story

If a corporate can adopt FPOs or FPCs as part of its Corporate Social Responsibility (CSR) initiative, then such FPOs can evolve to perform much better. All successful FPOs have one thing in common – strong backing, and a strong leader.

Farmers' Training

It is important to choose farmers who are progressive and are willing to contribute and work hard. By culture, farmers do not have a strong commercial orientation. Many times, they are found to be unwilling to learn the commercial aspects of marketing.

An outside management can help in market linkages. Everyone is made for a specific job or sector, so expecting farmers to do management work is wishful thinking, with some exceptions. This is possible only through protracted mentoring and handholding.

Making an FPC successful is hard

hard work on multiple fronts. The entire ecosystem has to come together for success. The FPC is just another name for a functional profit oriented corporate. It is not a pure social enterprise.

Building Volumes

FPOs tend to lack variety as most of them work in a cluster which gives a limited output of a specific crop. Markets want to work with such suppliers who can ensure round the year supply and have a broad base of products. This makes it easier for the buyer to coordinate and also to club smaller loads to make large loads.

The Challenges

FPOs need the right kind of professional management. The challenge is that team hiring for sales/marketing work would require a significant spend. But FPOs are short on capital to work like a full-fledged organization, specially with members unwilling to pool in resources.

It is often difficult to manage with a limited administrative team. Exploring

actively for higher number of farmers impacts the quality of farmers that get associated with FPOs. It is difficult if none of the farmers have a common vision or any interest in running FPOs. Many times, it is seen that farmers associate with multiple FPCs as they explore for subsidies.

In the working of many FPOs, it was found that farmer base existed only on papers. Wherever the base was active, infighting was frequent. This was a barrier in making any meaningful decision and drive for the FPC towards a common meaningful goal, especially commercially.

No Cross Learnings

FPOs mostly have all farmers belonging to same cluster. Here everyone follows the same agricultural practices. Often, there are no cross learnings on best practices as regards the crop or product. Nor are farmers willing to take a risk on trying different crops due to lack of knowledge and no live examples of success.

Ashish and his team, working from Sirmaur District in HP, thought of a very different business model for Aapka Fam-



About the AUTHORS

Mr Dinesh K Kapila retired as Chief General Manager, NABARD.
Mr Ashish Gupta, MBA from IIM Indore, is an entrepreneur and a former FPC Founder in Himachal Pradesh



ily Farmer. They adopted this model to eliminate the multiple blockers and try to run the FPO like a corporate organization.

Reasons To Opt For FPC

The team finalized the points as below as the core of their business models and started building the organization around this.

1. Instead of registering as a FPO as was common in HP, they opted for FPC as they wanted to join farmers across country which would ultimately help in learning of best practices and building a farmer base across the country which could also enable with more cross selling opportunities.

2. As Ashish says: We opted to chase quality farmers and target revenue rather than building on quantity. We wanted to be very careful while onboarding farmers and would like to judge them for at least for six months on their drive to work on something new and help the FPC in moving forward.

3. As a USP, they decided they would restrict the FPC to working only on natural/organic farming as they wanted to have a motto of chemical free living as a long-term vision. This would also provide a USP to ask for higher price in market negotiations.

4. We started to onboard five farmers

It is important to choose farmers who are progressive, are willing to contribute and work hard. Farmers do not have a strong commercial orientation. Many are found to be unwilling to learn the commercial aspects of marketing

from five different regions of district Sirmaur so that there was a variety of produce and we could harness the produce from different altitudes to provide supply for a longer duration to customers. For example, lower altitude crop will come early and higher altitude later. This will

help in prolonging supply to market and reduce the supply glut as well.

5. We decided to build upon the existing work done by the government (Agriculture / Horticulture Dept, KVK) to identify the first five progressive farmers. Using the government network would ensure credibility amongst the farming community since we were not from same village /community. At the same time, it would reduce the ground work to initiate. The chances of selecting farmers with a mismatched profile would be reduced.

6. We wanted to play on unique products produced in Himalayas as that would command a higher market price and demand especially in southern / western





Indian markets.

7. Interactions revealed that FPCs suffer from credibility issues. Markets and major buyers associate them with poor governance or lack of effective cohesion. To counter this, the FPC developed a proper educational catalogue of its products and developed a website to communicate that they were a genuine organization. Social media presence was ensured to increase visibility and target new markets.

8. The team decided to focus on the creation of a FPO/FPC with a deep insight and expertise on the market side. That is where all FPOs and FPCs are found lacking. Getting a premium to member farmers (15-20%) was the main intent.

Points of Success

1. Through govt intervention and support, the FPC was quick in establishing credibility amongst the farming community of different regions. Incidentally, the varied arms of the Government facilitated their working once assured about the concept.

2. We were one of the rare FPOs who had a broad supply range and had listed close to 50 products on the website and markets.

3. During the first financial year, the FPC did business of close to Rs 60 lakh after starting in September.

Outside management can help in market linkages. Expecting all farmers to be good at management work is wishful thinking. This is possible through protracted mentoring, handholding

4. We had more than 30 clients spread across all metros and the majority of business (more than 60%) coming from South India.

5. Payment clearance for members was on spot or took maximum 15-20 days.

6. We tried to keep a 15-30% margin for the FPC since we wanted it to become an independent entity and manage its own expense without relying on grants/subsidies. For this a corpus had to be built up.

7. All the in-transit damages were borne by the FPC. Farmers were paid as per the quantity brought from them.

8. The team diligently guided farmers on packaging/storage as per the requirements and specifications of the markets. They conducted training at the PAU Ludhiana on packaging of perishables and even made customized corrugated boxes for long distance packaging and to mini-

mize losses.

9. Cold storage expenses/material damage were borne by the FPC.

10. The FPC pushed for certifications of all farmers to build authenticity. They approached the SPNF department of Govt of HP to issue customized certificates. This was because all farmers were not covered under formal organic farming certification. Markets need proof to label the produce as natural/organic. Even after the FPC exited from the market, the farmers are using it as a base to sell their produce in far off markets. Farmers have understood the importance of such certificates.

11. We started a You Tube channel by the name of Aapka Family Farmer where we had uploaded a lot of videos to educate consumers on organic/natural produce. We also made the consumers aware of the production process and the sourcing.

12. Within three months of launching the FPC, we spread our farmer base from Sirmaur to Shimla and Kinnaur touching over 100 farmers. We didn't make them formally part of FPO as wanted to observe farmers for first six months and include genuine farmers only as a part of the FPC.

13. Even after our exit from market, we passed on all client information to

different farmers so that they can directly sell their produce and earn a premium.

Points of Failure

We could not sustain the momentum and exited the market after the second year due to multiple reasons. Some of the key issues we faced were as follows.

1. Having farmers from different areas / altitudes proved to be a boon. But we couldn't meet often. That created an issue of not being able to create unity amongst farmers and they could never truly feel part of FPO. Logistics, rather its cost, became a major concern.

2. Since we were operating with minimal manpower and the supply was from different areas of Himachal, we relied on the farmer's honesty to do a proper product qc and packaging before dispatch. This backfired. There were many quality complaints for some consignments. This led to huge losses.

3. Most of the schemes launched by the Govt were focused on having a minimum number of farmers. There was no deviation even if revenue was high for a FPC. We couldn't raise funds to sustain losses. The additional investment required on packaging/storage was not available.

4. There was lack of market related guidance. Whatever information the government's agencies were sharing was not

really actionable. The need was sorely felt for a mentor from corporates in related fields, retired or serving, or as a part of their CSR initiative. Then the FPO/FPC has a real chance of making it big in markets.

5. The team felt the FPO/FPC should be allowed to raise funds from market. In case it is already allowed, guidelines are not readily available.

6. Most of the schemes were available on paper. But the team ran pillar to post to avail the benefits of GOI schemes. For example, there is transportation subsidy on air freight for cherries, but nobody from the state or the Centre had clarity on implementation.

7. Speed in clarifications or information flow is vital. The commercial world penalizes delays heavily.

8. Organic is a very niche market and clients were not ordering in bulk. As a result, they could not lift the majority of the

produce from farmers. Low volumes led to increased transportation cost.

If the farmers had to sell the rest of the crop at the mandi, the commission agent treated them like individual farmers as regards the terms of trade.

9. The market norms regarding minimum quantity would often vary. This mismatch impacted sales of the additional produce.

10. Many farmers started to command an extra premium which made us uncompetitive in terms of pricing in the market.

11. The team found that in the initial days, every farmer cheated them with sub standard quality and over pricing. No government official could help in fair financial transactions with farmers, and in understanding whether prices are as per market. This led to huge losses as the FPC and the team had limited working capital and hence a limited capacity to bear losses.

12. There was no assurance or support from govt if a farmer deliberately cheats or defaults to the FPC in terms of quality. There was no assurance of insurance /support from the government for effective and quick dispute resolution mechanism, preferably at tehsil level. Basically, the farmer is never worried about the implication after supply of sub standard material. This was a reality check.

13. Some of the farmers took loans from the FPC team once the engagement deepened, but never repaid the money. Even after protracted follow up, Rs two to three lakh is still stuck with farmers who have stopped picking up calls.

14. Multiple vendors also defaulted. The team was looking for some special legal assistance for FPCs where such cases can be resolved quickly, but there no such provisions within the law. Every lawyer suggested us to forego money as pursuing the case would have meant more wastage of time and further financial burden with no line of sight on recovering the money.

15. They were not able to build a capable team with financial constraints. For example, Rs 15,000 as salary (the norm

Making an FPC successful is hard work on multiple fronts. The entire ecosystem has to come together for success. FPC is just another name for a functional profit oriented corporate group. It is not a pure social enterprise



at that time) can only bring a clerk and not a motivated CEO to run an FPO.

Member farmers are not keen to invest additional amounts to the corpus. Also, there is no assistance on hiring further manpower. Since all the farmers were from different regions, nobody was willing to put their money at risk and invest more in terms of shareholding.

Farmers were willing to invest a maximum of Rs 5000- to Rs 10000 as shareholder money. This was not sufficient to run operations.

16. A considered suggestion after this experience by the team is that instead of giving set standard schemes for FPOs, GOI could consider to give an option with an upper budget cap to performing FPOs. The FPO can be asked to propose on how they would like to utilize the funds. For example – Ashish says we were getting a scheme to buy a display vehicle but there was no scheme or subsidy to purchase a transportation vehicle. Also, paper work is too complicated for most of the schemes. There is no fast track approval for good performing FPOs. Having a dedicated manpower just to follow up with govt on schemes is very difficult with limited funds.

17. Last but not the least, since Ashish was coming from a corporate background and staying all time with farmers and with no one else to discuss ideas, he sort of lost mental strength to carry on this FPO/FPC and make it successful.

A sense of loneliness started impacting decision making. From government side as well, people were listening but not able to solve problems. He really feels now that if he and his team would have got incubation programs from industry, maybe things would have been different now.

New Initiatives Need Real Solutions, Not Halos

As regards start ups or such clones, the reference point for pricing was the local Mandi rates with Re 1 to Rs 2 added to the price. The FPC has to build the linkages by itself or in coordination with other FPCs. Then they can manage better.



Let us not build a halo around building linkages with start-ups but rather focus on better margins between them and the FPOs. This should also include tie ups with processors. But a reality check is most start ups are themselves in losses. Get startups to listen to farmers! Do not solve the problem which they imagine but solve the ones that matter to FPOs and farmers.

We do see opportunity to grow and scale up for both start ups and FPCs. Start ups can identify potential group of customers or producers with a lower cost of acquisition. FPCs and its farmer members can get the benefit of collective bargaining for input cost and produce price points. Start ups can communicate and educate their vendors and consumers faster at a lower cost. The main sectors to enhance partnerships with start ups or corporate bodies could be Market Linkages, Input Supply, Credit and Credit Facilitation, Digitization, Advisory Services, Capacity Building, Accounting & Legal Services etc.

Commodity Specific FPOs Can Be A Solution

Ashish observed during the operational phase that farmers do incur losses at times in crops like onion, tomato and Potato etc. These crops are generally grown in cluster of farms having common linkages. But farmers regularly post a loss due to a glut in market in seasonal production. Commodity specific FPOs could be a way out.

The link between producers and the

end consumer is normally intermediaries, such as wholesalers, retailers, or brokers. The intermediaries can be natural persons or businesses. Distribution channels, well Ashish and his team realized they are not concerned with either farmers or consumers but actually revenues.

At present due to a limited understanding of forecasting for agriculture and the balancing of production, if prices are high in the market all the farmers take up the sowing next season. Maybe in future area wise crop cultivation may need to restrict varied commodities.

If a farmer is earning well from paddy, the whole community will run for it! This may be one of the reasons for the failure of a FPO. Why can't a FPC, essentially a small community of farmers decide to diversify the crops within their own area and keep rotating the crops with other farmers to maintain health for soil as well?

Regarding Government Loans

Another observation is that it would be interesting to learn how many FPCs have had success in getting loans sanctioned for 1) Working Capital under the Govt's Credit Guarantee Fund Scheme under NABSanrakshan and 2) Infrastructure Finance under Govt's Agri Infra Fund? This would be a first step towards understanding the challenges as regards credit and funding options and the issues or concerns as regards Banks.

One learning around the FPC is that there has been generally less focus and resources dedicated to building up the output crop/produce quality assessment and grading.

As a result, institutional commodity buyers (including large unorganized traders) rely on an additional set of middlemen to ensure reliability in supply and quality assessment.

Ashish has not withdrawn from the world of FPCs. To use the language of cricket, he is retired hurt, but would surely return fitter and more resolute. And no aspersions are there on any organization or institution. It is simply a sharing of a personal experience during an intense professional engagement.

Organized by



Supported by



**FOOD
WORLD
2023**
14 - 16 SEPTEMBER
INDIA INTERNATIONAL FOOD TRADE AND TECHNOLOGY FAIR 2023
INDIA EXPO CENTRE, GREATER NOIDA, DELHI NCR, INDIA

Meet 300+ Global Buyers. Grow Your Business Globally



BLOCK YOUR DATES NOW !!

“ Bringing The World Of Food Business At One Platform ”

Technologies and Processes | Processed Products and Ingredients | Logistics and Supply chain
Packaging and machinery | Organic Food and Millets | Research and Innovations

For more details, please contact :

Mr. Tushar Sharma , Director-ICFA

+91 - 8812859008

tushar.sharma@icfa.org.in

Mr. Simarjot Singh, DGM Marketing

+91 - 8448482489

simarjot.singh@icfa.org.in

Mr. Ankit Kumar ,Senior Manager

+91 - 7290088227

ankit.kumar@icfa.org.in

Follow us on    

visit our website

www.foodworldindia.in

AGRI-FOCUSED NBFCS, FINTECHS THE MONEY BOOST



Agriculture is a dominant sector of the Indian economy, with approximately 85 percent of farm holdings being less than 2 ha in size, still producing sufficient food and fiber for our large population of 1.41 billion. In addition, it generates some net export surplus. It would not have been possible without a massive credit infusion to farmers.

Access to adequate, timely, low-cost credit from institutional sources is es-

sential, especially for small and marginal farmers. The policymakers have initiated several measures to improve the accessibility of farmers to institutional sources of credit. These policies have emphasized progressive institutionalization for providing timely and adequate credit support to all farmers. Thus, focusing on enabling small and marginal farmers to improve agricultural practices.

NFBCs Have Played A Major Role

Even though the country has taken some proactive steps in heralding reforms in agri-credit to provide financial assistance to the farmer community, it is still behind compared to some neighboring nations. While the volume of credit has improved over the decades, its quality and impact on agriculture have only weakened. Agri-

About the AUTHOR

Mr Prabhat Chaturvedi is CEO, Netafim Agricultural Financing Agency Pvt. Ltd. (NAFA)

culture requires substantial capital commitment, as procurement of equipment remains a significant spend for most farmers. Still, most agricultural credit extended to farmers is of a working capital nature, thus stagnating more than 80 percent of farmers' income.

The analysis of Indian credit demand suggests that even though the banks and other financial institutions are aggressively increasing their reach to the farmer community under priority sector lending, the penetration continues to be low.

In this scenario, the Non-Banking Finance Companies (NBFC) sector focusing on Agriculture mechanization has scripted a remarkable success story. It is a testimony to the truly diverse and entrepreneurial spirit of India.

From large Agri infrastructure financing to small farmers' microfinance, these NBFCs have innovated over time and found ways to address the debt requirements of the farmer community as a whole. Over time, agri-focused NBFCs / Fintech's have evolved to be well regulated and, in many instances, adopted best practices in technology, innovation, risk management, and governance. Thus, act as conduits and have furthered the Government's agenda on Financial Inclusion.

Challenges For The Sector

The agri-focused NBFCs /Fintech's can meet the long-term credit needs of the farmers as most of them have high penetration in rural India, and the bulk of their credit disbursements are focused only on small and marginal farmers. Public domain data suggests that only 30 percent of total small and marginal farmers have access to banks and other formal credit channels. Some of the issues faced by banks in providing credit to the farmers are difficulty in reaching far-flung and remote areas and lack of critical technology.

Further, banking activity involving lending to small farmers is plagued by various limitations like higher acquisition and servicing costs for marginal farmers and a greater risk of loan default. There are other problems that banks have



The Non-Banking Finance Companies (NBFC) sector focusing on agriculture mechanization has scripted a remarkable success story. It is a testimony to the truly diverse and entrepreneurial spirit of India

faced, like difficulty in gathering farm-level data and getting information such as the cash flow and credit history of farmers. This is where the role of Agri-focused NBFCs /Fintech's becomes critical. They have leveraged technology to derive essential insights into the farm domain and individual farmers to give out loans seamlessly and fairly. They also quickly offer credit to the farmers through lower paperwork and documentation. Adopting advanced analytics and rural market intelligence helps them bring efficiencies in the lending mechanism and cut the time taken to disburse a loan.

Policy Support Is Critical

The various purposes for which agri-dedicated NBFCs lend money to the

farmer include loans for equipment and machinery, modern and efficient methods of irrigation, and various other components in the value chain of cultivation. They have also brought down the interest rate of loans to as low as 12-18 percent compared to 24-60 percent available in the informal credit system in the vast rural parts of India. The use of modern technology to draw estimates of loan demand, visibility of usage of credit, tracking irrigation facilities, etc., to come up with the exact products and offerings for the farmers are another set of distinct advantages these NBFCs offer.

It's time the policymakers support such NBFCs who are charged up to bring radical and profound changes to the formal farm financing. The major challenge these NBFCs are trying to tide over is inclusion under reforms that currently are limited to banks and their Agri credit business. The policymakers must ensure that agri-focused NBFCs/ Fintech's are included in effective programs such as the government subsidy schemes, a benefit hitherto available only to the Banks. It will enable them to lend efficiently, and mitigate farmers' credit requirements, thereby supporting their income growth. It will also go a long way in boosting agriculture financing and help India dominate global leadership of the agrarian economy.

FOOD PROCESSING, VALUE ADDITION

MAXIMISING PROFITS, MINIMISING WASTE

We are at a moment of truth. Our ability to achieve SDG Goals like Zero Hunger, food security, or sustainable agriculture demands introspection. This "moment of truth," as McKinsey terms it, needs leadership from CEOs and a transformational focus to harness the potential locked inside the food processing and value addition.

Agriculture has been the mainstay of the Indian economy. We are the world's largest producer of food, right after China. Yet, the sector faces alarming wastage along the value chain. Every year, India reels under a loss of INR 92,6512 crore in produce.

This staggering amount of waste is due to lack of proper handling or storage, lack of processing facilities and low



About the
AUTHOR
Mr Nishant Mishra is
CTO & Co-Founder,
Intello Labs

awareness regarding the need for maintaining quality and safety. For perishable items such as fruits and vegetables, wastage can be as high as 44.6%.

Food processing is a critical component to the solution of this problem.

India's processing level of perishable products is at around 10%, while developed countries like the US are at 80%.

What We Need

We need a quantum jump in food processing and value addition to create a much stronger pull for high-quality agricultural commodities and reduce waste. This shall mean better utilisation of agricultural surpluses, fewer rural joblessness and better farmer remuneration by making produce more marketable.

Challenges In Food Processing

Farmers are neither aware of nor un-

derstand the benefits of value addition, which can hinder the adoption of new technologies and processes.

Erratic power supply, credit availability, and the regulatory environment are other major concerns that need to be addressed to facilitate the food processing industry. However, the single most important problem is the lack of infrastructure and access to modern technologies.

*** Non-availability of core infrastructure:** Adequate cold chain storage, proper transportation, and grading and packaging units are essential for maintaining the quality of perishable food products. Its absence has led to an inefficient supply chain, where a large proportion of agricultural produce is wasted due to limited warehousing and integrated processing. Adding to the complexity is the scarcity of market infrastructure like weighing, auction platforms, and packaging.

*** Deficit of processing-worthy produce:** Indian agriculture is a production-driven market, not a market-driven production one. This gap in supply and demand, and inconsistency in the quality of produce, increases wastage and decreases food processing.

*** Poor market linkages:** The fragmented nature of the industry leads to inadequate forward integration. It limits the scale of operations and hinders growth. It results in suboptimal quality, lower prices, and high wastage of produce at the farm level. For small landholders, direct access to markets or the desired price for produce is still a stiff challenge.

*** Quality measures:** With no set quality control in place, processed products do not meet the increasingly rigorous quality standards demanded by export markets. This is exacerbated by a shortage of technical-grade manpower.

Transformation Mode: Opportunities In Food Processing

The food processing industry can become a powerful instrument for India's agricultural development. Not only because it creates a vital link with industry, but also because it urgently addresses the problem of food security.



Small and medium-sized enterprises (SMEs) have emerged as important players in the value addition space, creating a market for high-quality and specialised products such as spices, jams, pickles, and juices

GOI has taken several initiatives to promote the growth of the sector, such as the creation of special economic zones, food parks, and the implementation of various tax incentives and subsidies.

Pradhan Mantri Kisan Sampada Yojana aims to augment preservation and processing capacity to lessen post-harvest losses, create off-farm employment, enhance value addition, and promote exports of processed food products.

Industry leaders need to focus on a key measure: digitisation. The use of the latest technology can change the face of food processing by reducing physical and quality losses.

Digitising post-harvest handling practices:

Processes like grading, sorting, and packing must be more efficient. Automation will be a further saving grace as it can eliminate both the need for manpower and training them, which is another survival challenge the industry faces. At every stage of the food processing value chain, there is a staggering lack of sup-

port and technical know-how.

Newer methods, AI-driven equipment, and quality-enhancing machinery that require minimal human intervention and don't impact qualities like colour and texture are necessary. So are yield-increasing technologies like vacuum packaging, which helps to preserve food quality and make the value chain more efficient and sustainable.

Another scope in the sector is to establish backward linkages with the farmers to procure raw materials at reasonable prices. Think of an exchange platform for horticulture. It would not only benefit the farmers but also ensure the quality and quantity of raw materials for the industry.

Small and medium-sized enterprises (SMEs) have emerged as important players in the value addition space, creating a market for high-quality and specialised products such as spices, jams, pickles, and juices. The mango pulp industry in India, for instance, employs thousands and its export alone is worth Rs. 924.52 crores.

The Future: Embracing Advanced Technologies

With vast resources that span agriculture, horticulture, animal husbandry, and fisheries, India has all the ingredients necessary for a thriving food processing industry. We must embrace advanced technologies such as artificial intelligence, the internet of things, and big data. It is time to establish nutrition and food security for the country, and build resilient food ecosystems.

PRINT AND DIGITAL SUBSCRIPTION

SUBSCRIPTION TARIFF

S.No.	ONE YEAR 12 ISSUES	PRINT	DIGITAL
1.	Individual	800	400
2.	Student	500	250
3.	Organisation	1200	600
4.	Institute / Library	1200	600



FOR SUBSCRIPTION AND BUSINESS QUERIES

Please call in **+91 7290031468** or Email @ **vinita.singh@agriculturetoday.in**



visit our website

> www.agriculturetoday.in



Powering Agriculture Education

About Agri Campus

AgriCampus is India's leading educational consultancy. Promoted by Indian Chamber of Food and Agriculture, AgriCampus is specialised in assisting agri colleges and students in unleashing their potential through partnering, positioning and learning with expert guidance and digital tools.

OFFERINGS :

- ✓ College Digital Platform
- ✓ Admissions and Internships
- ✓ Digital Learning Tools
- ✓ Career Support Program
- ✓ Industry Faculty and Guest Faculty

- ✓ Skilling Courses and Live Projects
- ✓ Industry and International Collaborations
- ✓ Jobs Facilitation and Scholarship support
- ✓ Branding and Reputation Management

To know more, please contact :

Mob : +91 8448482486

Email : farheen.siddiqui@icfa.org.in

Visit Our Website :
www.agricampus.in

agripositions.com

A unit of **concept agrotech consultants limited**

LOOKING FOR A POSITION LOOK NO FURTHER

connect with agripositions

To know more, Please Contact :

Mr. Simarjot Singh Kochar

Business Head

M : +91 8448482489

Email : simarjot.singh@agripositions.com

An Unit of Concept Agrotech Consultant Limited



visit our website



www.agripositions.com