

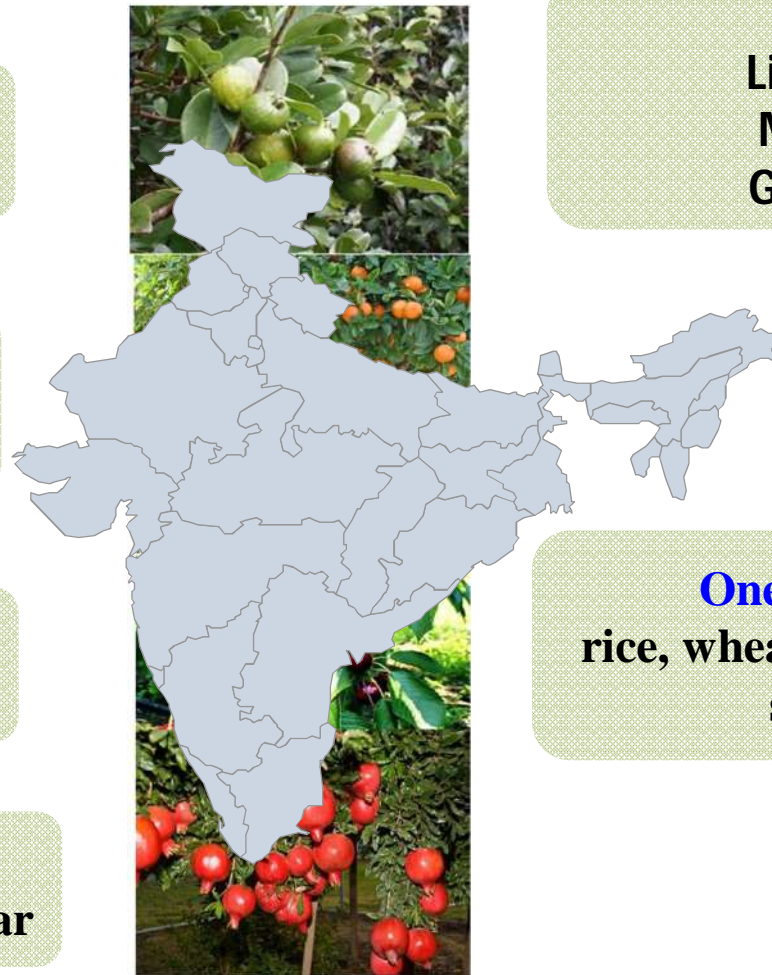
VALUE ADDITION TO AGRICULTURE THROUGH FOOD PROCESSING: SCIENCE, TECHNOLOGY, BENEFITS

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Indian "A-A-A" sectors at a glance

"Agriculture, Animal husbandry, & Aquatic (AAA)" sectors – key drivers for national growth – resulting in self sufficiency in food production



Availability of arable land
52% v/s 11% global average

Varied Climatic Zones
All the 5 v/s a few in most nations
20 agri-climatic regions

Different Soil Types
46 out of 60 in the world

Diurnal changes
suitable for cultivation through the year

Largest
Live stock population (300m)
Milk production (167 MMT)
Grain production (285 MMT)

Second-largest
fruits & vegetable (305 MMT)
Aquaculture production (6.8 MMT)

One of the Top SIX Producers of
rice, wheat, groundnuts, tea, coffee, tobacco,
spices, sugar and oilseeds.

Agro-Food Revolutions
GREEN, WHITE & BLUE, P

Growth Trends in Agro-Food Production

Commodities	2000 (MMT)	2017(MMT)	Growth* (%)
Agriculture			
Grains – Ce, Pu & Os	199.00	285.00	43
Horticulture – FV, Sp,	127.00	304.00	139
Animal Husbandry			
Beef	5.00	7.83	57
Sheeps & Goats			
Poultry			
Milk	72.00	165.00	129
Eggs	29.00b	88.00b	203
Aquatic			
Capture	5.30	10.90	106
Culture			

Agro-Foods - Production, Processing Levels

Commodities	Production (mmt)	Processing, %
Agriculture		
Grains – Ce, Pu & Os	285.00	1.00
Horticulture – FV, Sp,	304.00	2.20
Animal Husbandry		
Beef	7.83	21.00
Sheeps & Goats		
Poultry		
Milk	165.00	37.00
Eggs	88.00	--
Aquatic		
Capture	3.90	27
Culture	7.00	

Food Losses & Waste in Food Supply Chain

Commodity	Agri Prod.	PH, Storage & Handling	Processing & packaging	Distribu- tion	Consump- tion	Total (As per FAO)	PH Loss % (CIPHET)
Cereals	6	7	4	2	3	22	4.5-6
Onion & Potato	6	19	10	11	3	49	7.3-8.2
Oilseeds & Pulses	7	12	8	2	1	30	3-10
Fruits & Vegetables	15	9	25	10	7	66	6.7-15.99
Milk							0.92
Meat (Goat & Sheep)							2.71
Poultry							6
Fish							11

KEY FINDINGS OF INDIA FOOD REPORT 2018

Food consumption is on a consistent rise.

Growing at CAGR of 11.6%

(Rs. 25,81,279 crore (US \$403.3 billion[^] during 2015-16)

In 2017 – Food Retail market (excluding non-food grocery) is estimated at 35,38,282 crore (US \$552.86 billion[^])

**Consumption in FG segment a CAGR of 12.1 – 90%
and in FS segment at 7.2-10%**

2020: Growing at a CAGR of 14.4%

Market will grow to a size of Rs 53,05,488 crore (US \$828.98 billion[^]) in 20

ORGANIZED FOOD SERVICE RETAIL

Large metro-cities only of Delhi and Mumbai together are estimated to have over 20%

Six metros of Pune, Ahmedabad, Bengaluru, Hyderabad, Chennai and Kolkata, together 20%

A balance share being contributed by other Tier I & II cities spread across country

Eating out culture as a way of life in India, huge scope for Multiple cuisines and related services

Innovative concepts and formats

Food Losses & Waste in Food Supply Chain

India suffers from heavy loss of Rs 92,000 Crores annually

A report in CSR journal says “Indians waste as much food as the whole of UK consumes

According to FAO, 1/3rd of total global food production is wasted annually

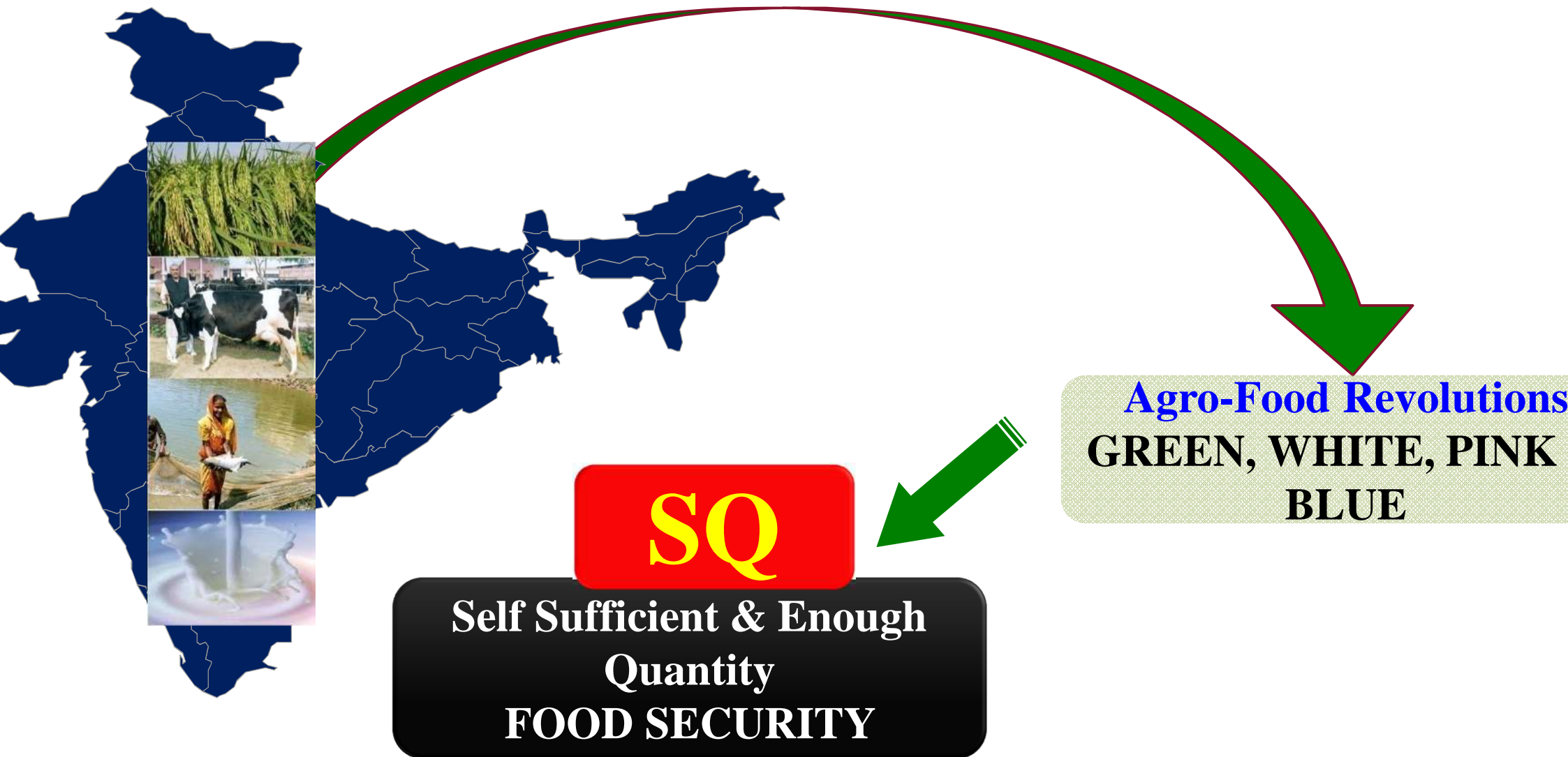
Globally 1.4 billion hectares of land is devoted to producing food that is ultimately

One out of every nine people in the world is starving

Food wastage is a significant contributor to malnourishment and hunger

***Wasting a kilogram of rice and wheat - draining 3500 & 1500
of freshwater that goes into their production***

India's case of sustainable AAA for Food Security



Food Security v/s Nutritional Security – India's case

Consider these as against Food Security achieved over a few decades.....

Despite rapid economic growth & Food Security, hunger and poverty still persist

India houses 25% hungry & poor of the world!!

Enough food availability does not translate to access of sufficient nutrition

>70% of Indian population consume <50% of the RDA of micronutrient

~6000 children die due to malnutrition and lack of micronutrients

Malnutrition problems are more prominent in rural populations

38 % of children below five years (urban: 31%, rural: 41%) are **stunted (low height for age)**

21% (urban: 20%, rural: 22%) **are wasted (low weight for height)**

36% (urban: 29%, rural: 38%) **are underweight (low weight for age)**

2% were **overweight (above normal weight for height)**

58 % of children aged between 6 and 59 months (urban: 56%, rural: 59%) are **anaemic**

The need is to move from **SQ to **2S2Q**.**

The need – Movement from SQ to 2S2Q

Agro-Food Revolutions
GREEN, WHITE, BLUE & PINK

Food Safety Solutions
Safe Agricultural Produce

SQ

Sufficient & Enough Quantity
FOOD SECURITY

2S-2Q

Sufficient Quantity & Safe Quality
FOOD & NUTRITIONAL SECURITY

SQ to 2S2Q – What are the challenges?

Role of Science and Novel Technologies in food processing and bene

. Cold plasma technology

. Pulsed electrified field and Ohmic heating

. Bio-fortification

. Irradiation: Few studies have observed increased vitamin C content of irradiated citrus fruits

. Hydrolysis of bio-waste/protein rich foods

. High-pressure (HP) processing, high-pressure homogenization (HPH), ultrasonica

. Three-dimensional printing (3DP) process

Role of Science and Novel Technologies in food processing and bene

GM/GE foods

Value addition: Farm to Fork, Organic, Minimal Processing, Frozen, Ready to Eat and similar Technologies, Extrusion Technology, Ready to Eat Foods

9. Traditional foods in packed form

10. Improved Packaging as an asset to the business with value and not just the cost

11. Health & Wellness - Food fortification to improve the nutritional value of diet

12. Use of fortified flour, fat, milk, and sugar, etc


13. Fortifying bakery products with micronutrient and bioactive compounds leads to more consumer acceptability

NOTABLE TRENDS IN THE INDIAN FOOD PROCESSING

- Changing consumer tastes**
- Entry of international companies**
- Rising demand on Indian product in international market**
- Higher consumption of horticulture crop**
- Emphasis on healthier ingredient**
- Packaging as purchase influencer and communicator**
- A shift from usefulness in processing to usefulness to consumer**
- Frozen and processed goodness**
- Sensible snacking**
- Product innovation as the key to expansion**
- Strengthening procurement *Vis* direct farmer-firm linkages**

Reasons to Invest

- . India ranked 6th in the World in exports of agri products in 2013**
- . Major industries in processing sector: grain milling, sugar, edible oils, beverages, fruits & vegetables and dairy products**
- . Share of food processing sector in GDP of manufacturing sector: 9.8% in 2012-13**
- . The number of registered food processing units has increased from 36,881 in 2011-12 to 37,175 in 2012-13**
- . One of the major employment intensive segments: 13.04% of employment generated in Registered Factory sector in 2012-13**
- . Food is the biggest expense share of 38.5% and 48.6% of the total expenditure of households in rural and urban India, respectively**



Empowered Learning
 to Maximize the value
 of your waste
 going resources

**Zero Waste
 India App**
 To Maximize
 Community Participation
 in Learning & Action




Resource Recovery Centers
 with
 Innovative Waste
 Management
 Technological
 Services.

Assessment



Comprehensive Waste Audit
 Services to Assess
 Your Progress Chart

**Zero Waste
 India Vision
 2030**
DELIVERABLES




Infrastructural Development
 for Composting;
 Briquetting &
 Pellatization.

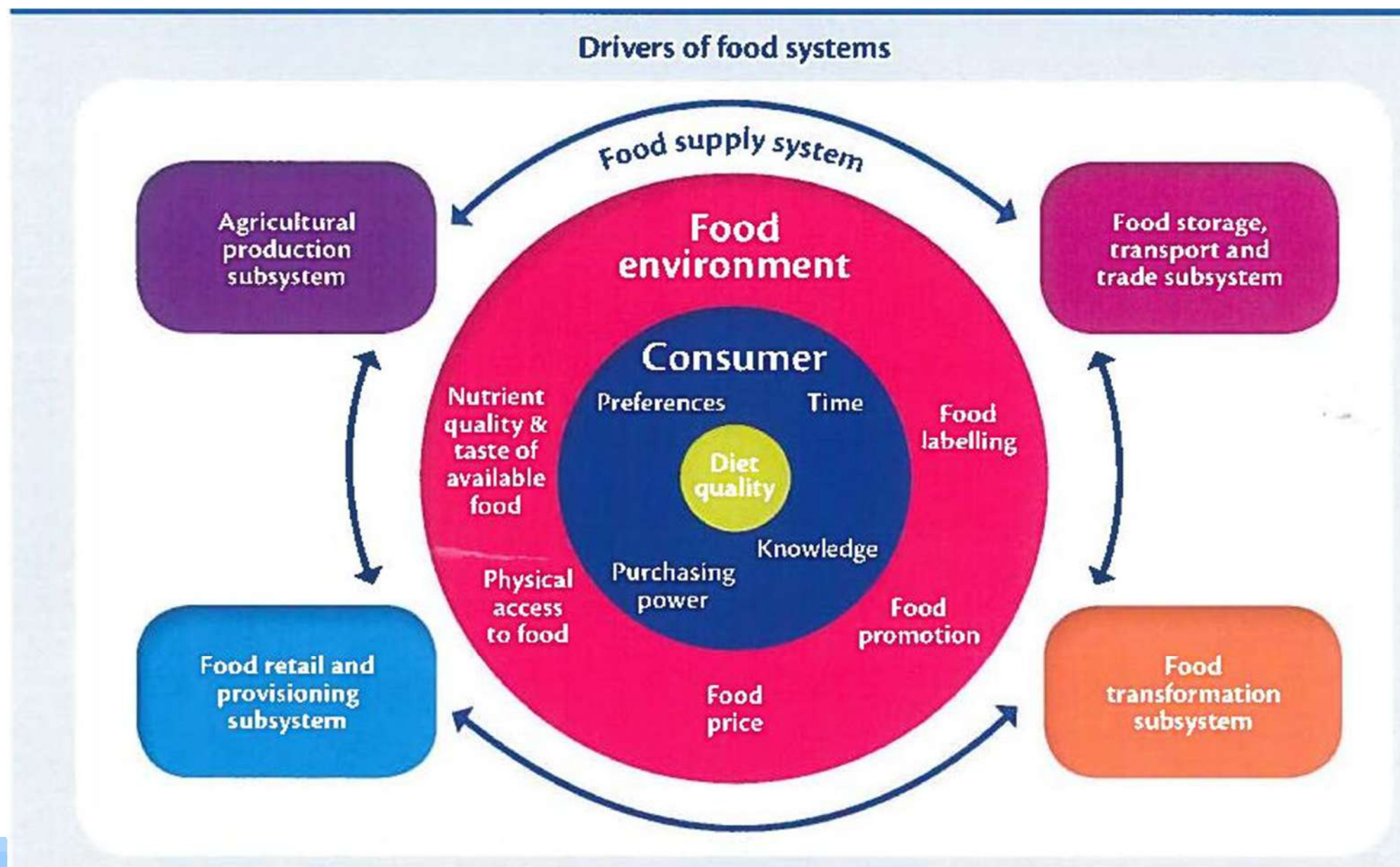


**Zero Waste
 Consultancy Services**
 Achieve Your Zero Waste
 Goals with us



**Sustainable
 Waste Management
 Services**
 Collection; Transportation
 & Disposal Solutions

Linkages between food systems, food environment & diet quality



Future Smart Food

Millets	Pulses	Fruits	Vegetables	Cerials
Finger millet	Green gram	Banana	Lentil	Black Wheat
Fox tail millet	Black gram	Jack fruit	Sword bean	Quinoa
Pearl millet	redgram	Dragon fruit	Drumstic	Speciality rice
Khodo millet	Rice bean	Gauva	Mushroom	
Sorghum	cowpea	Pears	Sweet potato	
	soybean	Apple	Taro	
	Grass pea	Mango	Bitter guard	
	Peanut	Bael	Elephant foot ham	
			Pumpkin	
			Snake guard	

Challenges on the path

- 1 • **Organizing marginalized & unorganized farm sectors – towards ensuring production of safe produce**
- 2 • **Providing Safe & Nutritious Food to 1.5 bn by 2020 – to address food disease burden, malnutrition & nutritional deficiencies – Hunger free**
- 3 • **Education – innovation – outreach through Science & Technology Convergence with digital revolution to further food & nutritional security**
- 4 • **Technology & Policy interventions – Infrastructure & Financial, Food Safety Regulations, Hand holding sectors and skill Development**

Initiatives to address these challenges.....

TO MODERNIZE SUCH A LARGE MARKET NEED

- **Suitable policy support**
- **Improved supply chain**
- **Food quality standards**
- **Innovations**
- **Entrepreneurship Development**
- **Adoption of technology**
- **Skilled and trained manpower**

Policy interventions – Food Processing

Sops to private sector participation

100% FDI under automatic route. Investment in April 2000- March 2016 stood at US\$ 6.82 bn

Promoting rationalization of tariff and duties

Setting up of National Mission on Food Processing

Foreign Trade Policy 2015-2020

NEW SANCTIONS: CREATE AWARENESS, PROMOTE INVESTMENT

- 1. Agro Processing Clusters**
- 2. Creation/ Expansion of Processing/ Preservation Capacity**
- 3. Creation of Backward and Forward Linkages.**
- 4. Integrated Cold Chain & Value Addition Infrastructure**
- 5. Quality Assurance Infrastructure**

POLICY INTERVENTIONS – FSSAI FOOD SAFETY FOOD SAFETY FRAMEWORK

“Inspiring trust – Ensuring safe food”



INDIA IN THE GLOBAL CONTEXT

- **Diversified, High growth and High profit sector**
- **Contributes to 32% of India's total food market**
- **India's grocery and food market ranks 6th in the world**
- **Contributes 8.8% of Gross Value Added in manufacturing sector**
- **Agro food processing Industry employs 18% of Country's industrial work force**
- **It accounts for 6% of total industrial investment**
- **Indian gourmet food market valued at \$1.3 billion and growing at CAGR of 20%**
- **Organic food business to increase by 3 times**

INTERNATIONAL INVESTMENTS

- As per DIPP data FP sector received US\$ 7.54 billion worth FDI during April 2000 to March 2017
- AS per CII, potential to attract US\$ 33 billion in next 10 years

Major investments taking place by

- The global e commerce giant Amazon
- US based food company Cargill aims to double its branded consumer business
- Mad Over Donuts (MoU)
- Danone SA plans nutrition business
- Parle Agro Pvt Ltd is launching Frooti Fizz
- Uber technologies plans launch Uber EATS



सत्यमेव जयते



"To be a centre of excellence which integrates all facets of food technology, entrepreneurship and management and be recognized as the focal point for catalyzing the growth of the Indian food processing industry in the global context."

ACADEMIC PROGRAMMES

B. Tech: Undergraduate Programme (180 each year)

- **Food Technology & Management**

M. Tech: Programme (18 in each stream)

- **Food Supply Chain Management**
- **Food Safety and Quality Management**
- **Food Process Engineering and Management**
- **Food Plant Operations Management**
- **Food Technology and Management**

M.B.A. (Dual Specialization) (30 each year)

- **Food Business Management**

Ph.D Programme (85 Ph.D. students in NIFTEM)

- **In all the five Departments**

SPECIALIZED CENTRES AND DIVISIONS

- 1. International Bakery Research and Training Centre (IBRTC)**
- 2. International Centre of Excellence for Food Safety and Quality (ICEFSQ)**
- 3. Centre for Entrepreneurship Development**
- 4. Skill Development Division**
- 5. Consultancy Division**
- 6. Corporate Resource Division**

Platinum Rating from Indian Green Building Council



Swachh Campus Award by MHRD 5th Rank



Solar Roof Top Project

NIFTEM Signed MoU with SECI for 1 Mega Watt Solar Roof Top Project



Agricultural Leadership Award



Ministry of Food Processing Industries
Government of India



सत्यमेव जयते



Agricultural Leadership Award in Entrepreneurship Development in Food Sector



निफ्टएम को मिला एग्रीकल्चर लीडरशिप अवार्ड

राष्ट्रीय खाद्य प्रसंस्करण उद्योग बौद्धिक सम्पदा एवं संचालन के कुशलपति डॉ. अरविंद कुमार को सम्मानित करते वीडियो गुरु मंत्री सम्मानित सिंह।

आज रात को, सोनीयत : निफ्टएम के गुरु मंत्री ने, कार्यक्रम को सम्मानित करने के लिए राष्ट्रीय स्तर पर सम्मानित किया। दिल्ली में 18 सितंबर को एग्रीकल्चर टुडे गुरु को और दो कार्यक्रमों निम्न सम्मान के निफ्टएम को कुशल क्षेत्र में उद्योगों को बढ़ावा देने के लिए, कुशल नेतृत्व पुरस्कार देकर सम्मानित किया गया। इसकी जूरी को सम्मानित प्रोफेसर समस्त सम्मानिताओं ने की तथा पुरस्कार केवीएम गुरुमंजी राज्यपाल द्वारा प्रदान किया गया। इस मौके पर देशभर की विशिष्ट इच्छितों मौजूद रही।



AGRICULTURE LEADERSHIP AWARD
2015

NATIONAL AND INTERNATIONAL COLLABORATIONS

International:

Netherlands: **Wageningen University**

USA: **Kansas State University, University of Nebraska
Lincoln IFSH, Chicago, Michigan State University,**

Canada: **University of Saskatchewan, McGill University**

Ireland: **Queens University**

National:

CFTRI (Mysore), **IARI** (Delhi), **GS1** India (Delhi), **NDRI** (Karnal),
NITIE (Mumbai), **EDI** (Ahmedabad), **APFPS** (Govt. of Andhra
Pradesh), **IIM** (Lucknow), **FICCI-FISCI**, **Central Warehousing
Corporation**, **FASSI**, **Aachi Masala Foods**, **Danfoss India**

NIFTEM INCUBATION FACILITY FOR TRAINING AND SKILL DEVELOPMENT

1

- **Fruits and Vegetable Processing**

2

- **Dairy and Dairy Product Processing**

3

- **Meat and Poultry Processing**

4

- **Ready to Eat and Traditional Foods**

5

- **Bakery**



FRUITS AND VEGETABLE



High temperature processing



LOW TEMPERATURE PROCESSING



MILK PROCESSING





Cream Processing, Butter and Ghee chhach and lassi section



DAHI/CHHACH/LASSI/PANEER & SHRIKHAND SECTION



Ice cream Section



READY TO EAT PILOT PLANT

- 1 • **Raw Material Receiving & storage Section**
- 2 • **Traditional ready to eat and ready to cook section**
- 3 • **Non-Traditional/Heath extruded snack foods**
- 4 • **Packing Unit & Storage Unit**







Meat & Poultry Processing



Meat & Poultry Processing



CEREAL AND GRAIN PROCESSING

- Mechanized harvesting
- Cleaning and Grading
- Drying and bagging
- Transportation
- Grain protection treatment and
- Storage in Silos or proper storage facility – PDS/ Internal consumption / APMCs
- Grinding and fortification
- Use for making Ready to eat / ready to cook product

BAKERY PROCESSING

- *Biscuits*
- *Bread*
- *Snacks including baked chips*
- *Roti (Chapati), Nuns, Kulchas and Pizzas*
- *Cakes and Pastries*

0 Sq M of area is used to set up bakery
ot plant



Food Testing Laboratory

For analysis of **physical, chemical and microbiological** parameters, residues of different **toxics, contaminants**

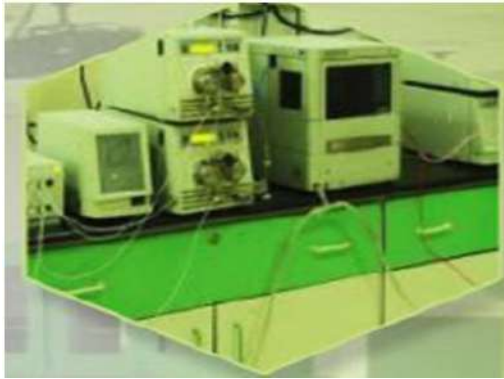
Laboratory Accredited as per ISO/ IEC 17025

NABL Accredited Lab

Aim: To be National Referral lab for quality certification of food products

Center for Risk Assessment studies (collaboration with FSSAI)





**NIFTEM Welcomes
All Stakeholders to
avail the facilities
available at FTL!!**



SKILL DEVELOPMENT

Provide the required skills in un-organized sector of Food Processing Industry

Design special modules of Training Programme to cater separate segment of people

To create networking among NGOs, Corporate sectors, SHG (Self Help Groups), ITI and other training institutions to cater the need of food processing Industry

Provide required trainings to the farmers/small scale entrepreneurs/middle and lower level workforce in FP Sector

FIFTEM – DANFOSS COLD CHAIN DEVELOPMENT SCHOOL



VILLAGE ADOPTION PROGRAMME THE CONCEPT AND THE TARGET

Credit based academic course – For B.Tech and M.Tech students

To connect students to the grass roots of the country and contribute in nation building

To train farmers and rural youth to become entrepreneurs in food processing, value addition, etc

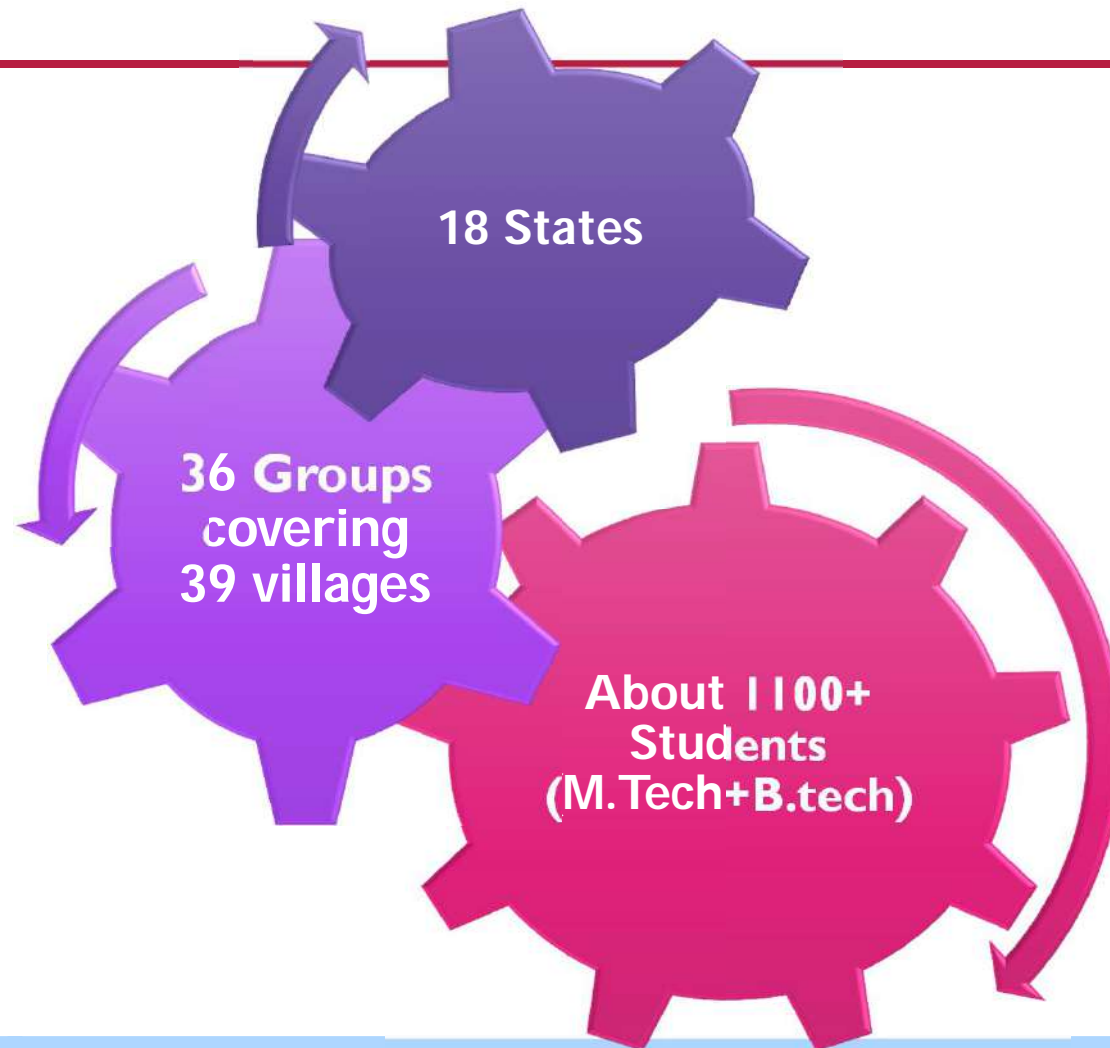
To take concept of value addition, preservation, reduction of wastages to rural masses for inclusive growth

To contribute towards Nation building by taking up all around development of villages

To inculcate scientific temperament in rural minds

Students - learn from farmers; understand post-harvest supply chain

COVERAGE OF VILLAGES UNDER VAP



Team NIFTEM with Rural Entrepreneurs at Rashtrapati Bhavan



Hon' ble President of India Shri Pranab Mukherjee, NIFTEM Team and partners of Smart Model Village Initiative of Rashtrapati Bhavan

Thank you

www.niftem.ac.in

*Admission 2019 are
now open!!*