YOJANA SUMMARY

FOOD PROCESSING

JULY 2024

IMPACT OF FOOD PROCESSING ON EMPLOYMENT GENERATION AND SKILL DEVELOPMENT

- Over the past five decades, India has transitioned from food scarcity to surplus due to the Green Revolution, achieving high agricultural output and ranking first in pulses and milk, second in vegetables, fruits, wheat, and rice, and third in cereals and eggs globally.
- Despite this success, India processes less than 10% of its agricultural output, highlighting significant opportunities for growth in food processing.
- With around 70% of Indian households reliant on agriculture, this sector holds substantial potential for employment generation.
- As a result, the food processing sector has been recognized as a **"sunrise sector"** and a key focus of the "Make in India" initiative.

Status and Role of the Food Processing Sector in India

- **Contribution to GDP**
  - Over the five years ending in 2020-21, the food processing sector experienced an average annual growth rate of approximately 8.38%.
  - In 2020-21, it contributed 10.54% to the Gross Value Added (GVA) in the manufacturing sector and 11.57% in the agriculture sector at 2011-12 prices. However, the food processing industry's share of overall GVA was only 1.88%, compared to 17.86% for manufacturing and 16.26% for agriculture.
- **Employment Generation**
  - As per the latest Annual Survey of Industries (ASI) for 2019-20, the total number of persons engaged in the registered food processing sector was 20.32 lakhs.
  - Moreover, the unregistered food processing sector supported employment for 51.11 lakh workers as per the NSSO 73rd Round, 2015-16, and constituted 14.18% of employment in the unregistered manufacturing sector.

Steps Taken by the Govt

- **Pradhan Mantri Kisan Sampada Yojana (PMKSY)**
  - The Ministry of Food Processing Industries (MoFPI) has been implementing the Pradhan Mantri Kisan Sampada Yojana (PMKSY).
  - The aim is to develop modern infrastructure and efficient supply chain management in the food processing sector from farm gate to retail outlet.
  - This scheme has led to industry growth by creating employment, reducing agricultural waste, increasing processing levels, and boosting exports of processed foods.
- **Pradhan Mantri Formalisation of Micro Food Processing Enterprises (PMFME) scheme**
  - Additionally, under the Atmanirbhar Abhiyaan, MoFPI launched the PMFME scheme in June 2020, with a budget of ₹10,000 crore for 2020-2025.
  - The scheme aims to enhance the competitiveness of micro-enterprises in the unorganised food processing sector and promote formalisation.
  - It supports 2 lakh enterprises with credit-linked subsidies and follows the ***'One District One Product'*** approach, encouraging the 'Vocal for Local' initiative.
  - This is the first government scheme specifically for micro food processing enterprises.
- **Skill Development Initiatives**
  - The Ministry of Food Processing Industries (MoFPI) collaborates closely with the Food Industry Capacity and Skill Initiative (FICSI), the Sector Skill Council (SSC), and the National Institute of Food Technology Entrepreneurship and Management (NIFTEM) to achieve its objectives.

- The government supports the development of course curricula through NIFTEM to further this collaboration.

Role of NABARD in Food Processing and Storage Infrastructure

- Currently, NABARD manages two important funds - the **Food Processing Fund (FPF) and Warehouse Infrastructure Fund** - for supporting the food processing sector and the creation of warehouse infrastructure for scientific storage of food grains in the country.
- **Food Processing Fund**
  - In 2014-15, the Government of India established the Food Processing Fund (FPF) in NABARD with a corpus of ₹2,000 crore to provide affordable credit for the development of Designated Food Parks (DFPs) and food processing units.
  - This initiative aims to develop 1,370.03 acres across 14 Mega Food Parks (MFPs), 3 Industrial Parks, and 9 Agro Processing Clusters (APCs), serving as Central Processing Centres (CPCs).
    - These CPCs will be supported by 45 Primary Processing Centres (PPCs) and several Collection Centres (CCs) in the catchment zones.
  - Government has approved the Production Linked Incentive (PLI) scheme for 10 key sectors, including the food processing sector, with a budgetary outlay of ₹10,900 crore spread over a period of six years (FY 2021-22 to FY 2026-27).
  - Food Processing Units established in Designated Food Park (DFP) would be able to avail benefit of such schemes.
- **Warehouse Infrastructure Fund**
  - The Government of India announced a dedicated Warehouse Infrastructure Fund (WIF) with a corpus of ₹ 5,000 crore in 2013-14.
    - The WIF corpus was augmented with a further allocation of ₹5,000 crore in 2014-15.
  - The creation of storage infrastructure in APMCs was later included as an eligible activity for support under WIF.
  - The Fund envisages financing State governments, State government undertakings and the private sector for establishing dry warehouses, cold storage facilities, and cold chain infrastructure.
  - As of date, A total of 8,161 projects have been sanctioned across India to create a storage capacity of 13.74 million metric tons (MT), with 9.96 million MT of scientific storage capacity already established.
  - The southern and western regions account for most decentralized storage, while the northern region, a major procurement area, has large-sized storage structures.
  - Small-sized storage structures have been sanctioned at the village level in Gujarat, Odisha, and Tamil Nadu.

Estimated Investment Potential in Food Processing Sector

- The Indian food processing market reached ₹28,027.5 billion in 2023 and is projected to grow to ₹61,327.5 billion by 2032, making it one of the largest in the world.
- New initiatives have significantly boosted the sector. These initiatives include:
  - the **National Infrastructure Pipeline** (NIP) with planned spending of approximately ₹100 lakh crore,
  - the PMKSY with a budget of ₹4,600 crore until FY 2025-2026, and
  - the PMFME with ₹10,000 crore over five years until FY 2024-25.
- The Government has introduced policies like:
  - exempting processed food items from licensing under the Industries (Development and Regulation) Act, 1951;

- allowing **100% Foreign Direct Investment (FDI) through an automatic route**;
  - The sector attracted $6.18 billion in FDI equity inflow between April 2014 and March 2023 and is expected to continue growing in the future.
- reducing GST for raw and processed products; and
- placing over 71.7% of food products under lower tax slabs of 0% and 5%.

Future Outlook

- To achieve the goal of making India a developed country by 2047, the contribution of the food processing sector to the overall Gross Value Added (GVA) needs to quadruple to approximately 7.2%. This requires a growth target of 10.4% CAGR by 2047.
- Strategies should focus on making India's processed food exports globally competitive and aim to position India as a market leader in global trade for five key value chains.
- These five key value chains include - processed fruits and vegetables, processed fish and seafood, meat, dairy products, and poultry and eggs.
- Additionally, it is essential to nurture a skilled workforce for the food processing sector and address current skill gaps between the workforce and the industry.

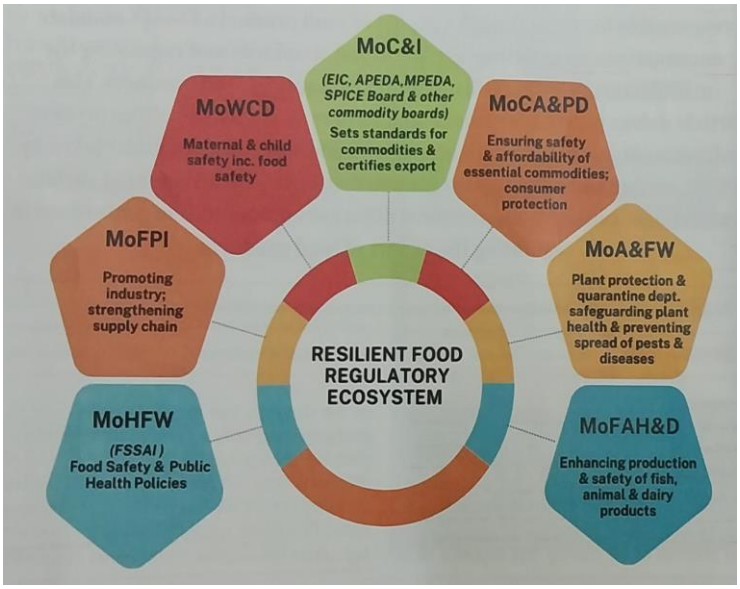
INDIA'S FOOD REGULATORY LANDSCAPE: TRANSITIONING TOWARDS A ROBUST AND CONTEMPORARY SYSTEM

- The Food and Agriculture Organization (FAO) defines the primary objectives of a national food control system as the following:
  - protecting public health by reducing the risk of food-borne illness;
  - protecting consumers from unsanitary, mislabelled, or adulterated food;
  - contributing to economic development by maintaining consumer confidence in the food system and providing a sound regulatory foundation for domestic and international trade in food.
- The standards may differ both across countries and across products within the same country.

A Resilient Food Regulatory Ecosystem: A Whole of Government Approach

1. Regulatory Institutions

- The **Food Safety and Standards Authority of India (FSSAI)**, established in 2006 under the Ministry of Health and Family Welfare, is a key regulatory body in India's food safety ecosystem.
- FSSAI sets comprehensive science-based standards for food products and oversees their production, storage, distribution, and import to safeguard public health and ensure consumer safety.
- Meanwhile, the Department of Commerce, through autonomous organizations like the Export Inspection Council, APEDA, MPEDA, Spices Board, and Tea Board, regulates the export of food products.



2. **National Food Control System**

- **The Food Safety and Standards Act, 2006** consolidates various acts and orders that had earlier handled food related issues in various ministries and departments.
- It also regulates the manufacturing, storage, distribution, import, and sale of food products and establishes an integrated food safety surveillance system.

3. **Standard Setting Process and Harmonisation**

- FSSAI emphasises harmonising Indian food standards with international guidelines, particularly those established by the Codex Alimentarius Commission.
- This harmonisation ensures alignment with global best practices, facilitates international trade, and promotes higher levels of food safety.
- The Food Authority establishes science-based standards for food articles with the support of its subsidiary bodies, including the Scientific Panels (SPs) and the Scientific Committee (SC), created under Sections 13 and 14 of the FSS Act.
    - Additionally, working groups may be set up by the Scientific Committee as needed.

4. **Enforcement Machinery and Regulatory Oversight**

- Food safety in India is a shared responsibility, with state authorities playing a key role in ensuring compliance.
- Nearly 6 million Food Business Operators (FBOs) are part of the food safety network, which is managed through the Food Safety Compliance System (FoSCOS), an integrated online platform for licensing, registration, and monitoring FBOs' capacity and compliance.
- At the ground level, Food Safety Officers (FSOs) from State Food Safety Departments and FSSAI Regional Offices conduct inspections, collect samples, and investigate complaints.
- FSSAI has implemented a Risk-Based Inspection System (RBIS) that targets FBOs based on risk matrices to optimize regulatory efforts.
- The inspection process is supported by the **Food Safety and Compliance Risk Assessment System (FoSCORiS)** mobile application, which enables real-time monitoring, data collection, and analysis.
    - It also promotes transparency through features like randomization of inspection allocations, geo-tagging, and time-stamping of photographs.

5. **Capacity Building and Promoting a Culture of Self-Compliance**

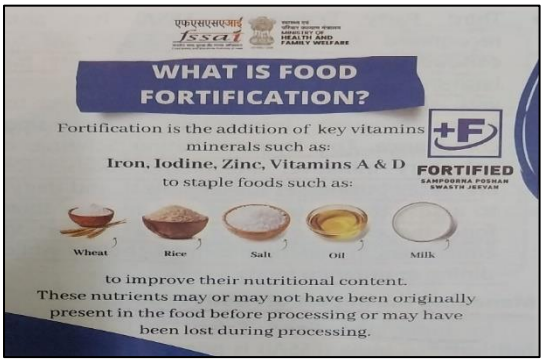
- FSSAI has introduced various programmes and initiatives. They are:
    - **Food Safety Training and Certification (FoSTaC)** programme - it aims to build the capacity of food handlers and ensure the presence of trained Food Safety Supervisors in food establishments.
        - One food safety supervisor for up to 25 food handlers ensures that safe food handling practices are effectively implemented in the food premises.
    - **Third Party Ecosystem**: FSSAI has also recognised third-party auditing agencies to conduct mandatory food safety audits for high-risk food categories.
    - **The Hygiene Rating Scheme** is a voluntary initiative that encourages foodservice and retail businesses, such as bakeries, meat shops, and dairies, to assess and improve their food hygiene and safety levels.
        - This scheme helps consumers make informed choices when dining out or ordering food.

6. **Managing the Import of Food Products**

- In India, the FSSAI is responsible for regulating domestic and imported food safety.

- The Food Import Clearance System (FICS) ensures that imported food products meet safety and quality standards and is integrated with the customs ICE-GATE for quick scrutiny and faster approvals.
- The Risk Management System (RMS) categorizes food items based on risk levels to streamline the clearance process.
- Additionally, the Animal Quarantine Certification Services and Plant Quarantine Inspection Services, under the Ministry of Fisheries, Animal Husbandry & Dairying, and the Ministry of Agriculture & Farmers Welfare, respectively, oversee food import control related to animal and plant health.

7. **Food Testing Ecosystem and Surveillance**



- FSSAI has established a network of primary laboratories, referral laboratories, and **National Reference Laboratories (NRL)** to support food analysis and surveillance activities.
- These facilities are equipped with **Rapid Analytic Food Testing (RAFT) kits** and equipment for on-site testing, helping to reduce the cost of food testing.
- FSSAI has also developed public tools like the **Detect Adulteration with Rapid Test (DART)** book and the Food Safety Magic Box, allowing consumers to test for common adulterants at home or in school laboratories.
- Additionally, FSSAI conducts regular pan-India surveillance programs to identify hotspots of non-compliance and adulteration.

Role of Different Autonomous Organisations in Export Trade in India

- **Export Inspection Council (EIC)**
  - EIC is the official export certification body of India that ensures the safety of products exported from India.
  - EIC provides mandatory certification for selected food items, including fish and fishery products, basmati rice, dairy products, honey, egg products, meat and meat products, poultry meat products, animal casing, gelatin, ossein, and crushed bones, as well as feed additives and pre-mixtures.
  - Other food and non-food products are certified on a voluntary basis.
- **Agricultural and Processed Food Products Export Development Authority (APEDA)**
  - APEDA is an export promotion organisation under the Ministry of Commerce and Industries.
  - It is mandated with the responsibility of promoting and developing the export of its scheduled products, including organic food products.
- **Marine Products Export Development Authority (MPEDA)**
  - MPEDA was set up by an Act of Parliament in 1972.
  - It was set up with a mandate to promote the marine products industry, with special reference to exports from the country.
  - MPEDA's focus is mainly on market promotion, capture fisheries, culture fisheries, processing infrastructure and value addition, quality control, research and development.
- **Tea Board**
  - The Tea Board of India was established to promote the cultivation, processing, and domestic trade as well as the export of tea from India.
  - Export certification from the Tea Board is mandatory for exports to take place.

- **Coffee Board**
  - Export certification from the Coffee Board is mandatory for exports to take place.
- **Spices Board**
  - The Spices Board is the Indian government's regulatory and export promotion agency for Indian spices.
  - It has the responsibility of maintaining and monitoring the quality of exports, registration, licensing of spice exporters, and export promotion of 52 spices shown in the schedule of the Act.
  - A mandatory quality check is required for the export of chilli or chilli products or food products containing chilli products in any form and shipment is permitted by Customs only on the basis of a cleared analytical report from the Spices Board.
- **Coconut Development Board**
  - The Coconut Development Board is a statutory body established by Ministry of Agriculture & Farmers Welfare.
- **CAPEXIL**
  - CAPEXIL was set up by promote the export of chemical and allied products from India. It is the competent authority for the exports of crushed bones, ossein and gelatin.
- **SHEFEXIL**
  - The Shellac Export Promotion Council (SEPC) was established by the government.
- **IOPEPC**
  - The Indian Oilseed and Produce Export Promotion Council (IOPEPC) is concerned with the promotion of various oilseeds and oils.

Conclusion

- India has implemented a 'Whole of Government' approach in its national food control system, involving multiple ministries and state governments.
- Key principles guiding this system include transparency, predictability, cohesiveness, and a risk-based approach to setting and enforcing standards.
- India boasts a strong and expanding food testing infrastructure nationwide, supported by continuous efforts and innovative strategies led by FSSAI.
- These initiatives aim to enhance food safety and align with global standards, fostering a safer and healthier food environment across the country.

PROCESSED FOODS: RISING DEMAND FOR HEALTHIER FOOD OPTIONS

- The National Agricultural Cooperative Marketing Federation of India (NAFED), which is an agriculture-based cooperative, has expanded its business towards coming out with healthy food initiatives like Millets, Bharat Atta, Bharat Dal, and Bharat Chawal.
- These initiatives align with NAFED's dedication to promoting healthy eating at affordable prices.

Millets: Healthier food option

- **About**
  - Millets are highly nutritious grains that offer numerous health benefits. These are rich sources of protein, fibre, and essential vitamins and minerals, including phosphorus, magnesium, and iron.
  - Millets are particularly beneficial for those with diabetes, as they have a low glycemic index and help manage blood sugar levels.

- Recognising the nutritional benefits of millets and their potential to improve food security, NAFED has been encouraging their cultivation and utilisation as part of a diversified and sustainable food system.
- Millets, known for their resilience to adverse weather conditions and rich nutritional profile, offer a promising alternative to traditional staple grains.

- **Steps Taken by NAFED to Promote Millets**
  - NAFED embarked on a comprehensive journey to promote millets as a dietary staple and foster their growth across India during 2022-2023.
  - This included the establishment of the **Millets Experience Centre**, affectionately named ***Shree Anna***, at Dilli Haat, New Delhi, aiming at showcasing the nutritional benefits and culinary versatility to people of all ages.
  - Shree Anna products were displayed on the sidelines of the Millets Luncheon hosted by the Ministry of Agriculture at the Parliament of India on 20 December 2022 to mark preparedness for the International Year of Millets-2023 (Shree Anna).
  - The introduction of exclusive Millet Corners within NAFED Bazaar stores further amplified the promotion and availability of millet-based products,
  - Through strategic partnerships with the Ministry of Agriculture & Farmers Welfare, NAFED deployed 'Millet Vending Machines' across the Delhi-NCR region.
  - NAFED curated custom millet-centred gift hampers for the G20 Meetings, showcasing millets as a symbol of India's commitment to healthy living and sustainable agriculture.

Other Steps by NAFED towards Healthy Food Initiatives

- **Bharat Atta**
  - 'Bharat Atta' is a premium whole wheat flour introduced under the Government's Open Market Sale Scheme (OMSS) by the Department of Food and Public Distribution to make high-quality, nutritious flour more affordable.
  - Priced at ₹27.50/kg, Bharat Atta is rich in dietary fibers, vitamins, and minerals, catering to health-conscious consumers.
  - NAFED has been instrumental in quickly lifting allocated wheat stocks and promoting agriculture in India for over 60 years.
- **Bharat Chawal**
  - In addition to Bharat Atta, NAFED has launched Bharat Chawal to provide high-quality, nutritious, and affordable rice varieties.
  - NAFED is also actively promoting pulses through its Bharat Dal initiative to support healthier diets and sustainability.
  - Pulses like Tur Dal and Masoor Dal are rich in complex carbohydrates, vitamins, and minerals, and they require less water to grow, enhancing soil fertility and promoting sustainability.
- **Bharat Dal**
  - In line with the Government's vision of achieving self-sufficiency in pulse production, NAFED has also been actively promoting the cultivation and consumption of pulses through its Bharat Dal initiative.
  - NAFED's commitment to promoting healthier food options extends beyond flour to pulses like Tur Dal and Masoor Dal.
  - To address shortages in pulses, the government supports farmers through schemes like the Price Support Scheme (PSS) and Price Stabilisation Fund (PSF), ensuring fair prices and an adequate food supply.

- This emphasis on healthier and sustainable food choices is crucial for addressing global challenges like climate change and food security, empowering consumers to contribute to a nutritious and environmentally responsible food landscape.

EXPORT POTENTIAL AND GLOBAL COMPETITIVENESS OF INDIAN PROCESSED FOODS

Food processing sector involves a large number of SMEs (Small and Medium-sized Enterprises) and is a substantial contributor to creating additional employment opportunities as well as ensuring higher income for our farmers.

India's Performance in Export Sector – Statistics

- India's share in global merchandise exports is around 1.8%, ranking it as the 18th largest exporter worldwide.
- Although the Indian economy is not primarily export-driven, exports contribute approximately 23% of the GDP, which is significant compared to larger economies like the US (12%), Japan (19%), and China (21%).
- While India's exports showed a strong recovery post-COVID-19, the growth slowed in the last fiscal year, with merchandise exports slightly declining to USD 437 billion in 2023-24.
- Additionally, despite being the second-largest agricultural producer, India's share in global imports and exports of processed food remains low compared to its potential.

India's Export Capabilities and Challenges

- India exports a wide array of items over 10,000 tariff lines. Within this vast export basket, food and agricultural products constitute approximately 11% of our total exports.
- The export landscape is dominated by a few key items such as rice, spices, buffalo meat, sugar, and oil meals.

VALORIZATION

It refers to the process of converting waste materials or by-products generated by food processing industries into valuable products or resources.

Steps Taken

- **Dedicated Agricultural Export Policy**
  - The introduction of a dedicated agricultural export policy in 2018 with an ambitious vision to take it to USD 100 billion and to create a more conducive environment for agricultural exports through various supportive measures.
- **Production Linked Incentive Scheme for Food Processing Industry (PLISFPI)**
  - Another critical policy intervention is the Production Linked Incentive Scheme for Food Processing Industry (PLISFPI), approved on 31 March 2021.
    - This scheme aims to diversify India's export portfolio by focusing on value-added segments and incentivising manufacturing in four specific food product segments.
    - These segments include - ready-to-cook/ready-to-eat foods, processed fruits and vegetables, marine products, and mozzarella cheese.
    - Another integral component of this PLI (Production Linked Incentive) is the global promotion of 'Brand India' through branding and marketing support.

IRRADIATION

It is the process by which an object is exposed to radiation. An irradiator is a device used to expose an object to radiation, notably gamma radiation for a variety of purposes.

Uses:

1. Sterilisation of army rations and other shelf stable foods.

2. Extension of shelf life of various foods to be distributed and stored at refrigerated temperatures, eg. fresh fish, meats, milk, eggs.

3. Inhibition of sprouting in onions and potatoes, and delay in ripening of fruits.

- **Pradhan Mantri Kisan Sampada Yojana (PMKSY)**
  - The Pradhan Mantri Kisan Sampada Yojana (PMKSY) addresses the need for infrastructure modernization and R&D in the food processing sector.
  - It focuses on overcoming infrastructure challenges faced by SMEs by promoting technology adoption and establishing cold chains and other processing facilities.
  - These efforts aim to enhance the supply chain and storage capabilities within the food processing sector.
- **Mega Food Parks**
  - The Government has recently launched initiatives specifically designed to boost food exports through Mega Food Parks.
    - Improved infrastructure reduces spoilage and extends shelf life, making exports more viable through higher value addition.
  - Programmes within the MoFPI offer grant-in-aid to approved food processing units, incentivising them to set up units within Mega Food Parks.

HIGH PRESSURE PROCESSING

It is a novel method for non-thermal processing of food. The food is subjected to elevated pressures (upto 900 MPa) with or without the addition of heat to achieve microbial inactivation or to alter the food attributes in order to achieve desired qualities.

Way Forward

- Data-driven policies are crucial for identifying and maximizing export potential in the food processing industry.
  - The MoFPI defines food processing broadly, including all agricultural produce in any form under ITC Chapters 2-23.
  - Aligning these categories at the 8-digit HS (Harmonized System) level could provide clearer insights into value-added processed food exports.
  - Countries like Singapore have implemented separate HS codes for processed food, a practice India could adopt to better track and promote its exports.
  - India has already taken similar steps in sectors like Ayush and technical textiles by identifying specific tariff lines.
- Food products face stringent standards in major international markets, each with unique demands and regulatory environments.
  - The **WTO's SPS (Sanitary and Phytosanitary Measures) agreement** encourages harmonizing standards among member countries while allowing them to exceed these standards for food safety and quality.
  - Compliance with these standards is essential for accessing international markets.
  - However, emerging national and private standards present challenges for smaller SMEs, as there is no single repository for all standards, complicating compliance efforts.
  - This makes it difficult for SMEs to comply with the varied requirements, highlighting the need for a centralised repository of standards that SMEs can refer to for compliance.
- India is actively negotiating FTAs with several countries, emphasizing the need to include Mutual Recognition Agreements (MRA) between certifying and testing agencies.
  - This would streamline certification processes for products certified locally, reducing the need for additional certifications.

Extrusion

It is the process of making a product (an extrudate) by forcing a material through an orifice or die to form a shape.

- The quality of finished products depends significantly on raw materials.
    - The government's initiative to promote 10,000 Farmer Producer Organisations (FPOs) aims to ensure a consistent supply of high-quality raw materials, crucial for maintaining export standards in processed food products.
    - Enhancing linkages between FPOs and processing units is essential.
- Skill development is vital for the food processing sector.
    - Capacity-building programs and training, particularly in food processing clusters, are necessary to align local manpower with export requirements.
    - Training in food safety and HACCP certification is essential, alongside professional courses in food technology, science, engineering, and packaging.
- Efficient logistics, including cold chains and temperature-controlled facilities, are critical for the food and agriculture sectors.
    - These infrastructures support the storage and transport of perishable goods, enhancing competitiveness.
- Enhanced marketing efforts are crucial for boosting exports.
    - Participation in global trade fairs facilitates exposure for Indian processed food exporters to international buyers, highlighting India's capabilities.
    - Government support for such initiatives would further promote India's presence and competitiveness in global processed food markets.

Conclusion

India's processed food sector boasts immense potential for export growth. By capitalising on its rich agricultural base, investing in modern infrastructure like food parks, and prioritising food safety standards, India can become a globally competitive player.

PRODUCTION LINKED INCENTIVE SCHEME FOR FOOD PROCESSING INDUSTRY (PLISFPI)

- PLISFPI, approved by the Cabinet in March 2021 with an outlay of Rs 10,900 crores, spans from FY 2021-22 to FY 2026-27.
- It comprises three main components:
    - incentivizing manufacturing in key food segments (Ready-to-Cook/Ready-to-Eat foods, processed fruits and vegetables, marine products, and mozzarella cheese),
    - promoting innovation and organic products among SMEs, and
    - supporting branding and marketing abroad to enhance global visibility of Indian brands.

DIELECTRIC HEATING

When an insulating material is subjected to an alternating electric field, the atoms get stressed, and because of the inter-atomic friction, heat is produced. This heating process is known as dielectric heating.

- Additionally, a specific PLI Scheme for millet-based products was launched in FY 2022-23 with an outlay of ₹800 crore, using savings from the broader scheme.
- The PLISFPI aims to create approximately 2.5 lakh jobs, with Quarterly Review Reports indicating the creation of employment for 2,37,335 individuals as of September 2023.

Details of One District One Product Brands

- Under the Atmanirbhar Bharat Abhiyan, the MoFPI is implementing the 'PM Formalisation of Micro Food Processing Enterprises (PMFME) Scheme' to support micro food processing enterprises across India.

- This centrally sponsored scheme, operational from 2020-21 to 2024-25 with an outlay of Rs 10,000 crore, focuses on enhancing the competitiveness of small enterprises and promoting their formalisation within the food processing sector.
- Scheme primarily 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.
- It aims to build the capacity of micro enterprises by increasing access to credit, integrating them into organized supply chains, strengthening branding and marketing efforts etc.
- Institutional strengthening, research, and training in food processing are also prioritized objectives.
- As of now, credit-linked subsidies have been sanctioned to 12,024 micro food processing units based on ODOP categories.
- The scheme also supports FPOs, SHGs, cooperatives, and SPVs associated with ODOP-based enterprises through initiatives like market studies, product standardization, packaging, quality control, warehousing, storage, and marketing promotions.
- As of November 2023, 14 ODOP brands have been launched under the scheme, aiming to enhance visibility and market reach for these products nationally.

FOCUS PILLARS OF WORLD FOOD INDIA 2024

Food Irradiation: Ensuring Safety and Extending Shelf life

Plant-based proteins Innovations & Impact

Minimum Waste, Maximum Value

Sustainable Packaging in Food Processing Industries

Digitization in Food Value Chains

INNOVATIONS AND COLLABORATIONS TAKE CENTRE STAGE AT SUFALAM

- The Start Up Forum for Aspiring Leaders and Mentors (SUFALAM) 2024 concluded with a focus on innovations, collaborations, and advanced technologies as pivotal factors for transitioning startups in the food processing sector into established businesses.
- The forum served as a catalyst for transformative discussions, emphasizing innovation-driven growth and fostering partnerships among startups, industry players, and academia.

SMART FOOD PROCESSING IN INDIA: INNOVATION AND FUTURE PROSPECTS

- Smart food processing' refers to advanced techniques aimed at reducing the cost of preparing staple foods while enhancing their nutritional value.
- By employing innovative and biocompatible methods, this approach improves the functionality and nutrient density of grain- and pulse-based foods at affordable prices.
- These methods also facilitate unique combinations of ingredients like fruits, vegetables, meat, fish, dairy, and legumes within staple foods.

India is one of the world's top exporters of mango pulp, with Saudi Arabia. Netherlands, US, UK, and UAE being its top export markets.

- The concept transforms post-harvest processing from traditional roles like purification and grinding to a driver of health and nutrition.
- Inspired by 'Smart Cities,' 'Smart Food Processing' promotes creative and hygienic technologies that innovate traditional food processing for a healthier future.

Technological Innovation in Smart Food Processing

- **Background**
  - Conveyors play a critical role in food processing units, ensuring a steady flow of raw and processed materials essential for operational efficiency.
  - Real-time processing of information is crucial for optimizing line speed, loader and unloader actions, joint motions, and product handling.
  - End-effectors are equally vital, ensuring precise packaging to maintain food safety standards.
  - These components act as the control unit of automated factory lines, requiring synchronized motion control for in-motion adjustments and adaptability.
  - The food processing industry is advancing through smart processing technologies, emphasizing precision and innovation.
  - Smart machines enable predictive capabilities, adaptive procedures, and real-time decision-making, enhancing health, operational efficiency, and contamination detection.
  - This approach transforms food processing into a healthcare-like service, prioritizing freshness, safety, and quality throughout the production process.
- **Internet of Things (IoT) in Food Processing**
  - Sensors in food processing can monitor, analyze, and report changes across devices, providing information on the position of farm products, storage status, and future approaches.
  - When changes are detected, manufacturers or overseas food service providers can offer transaction services to improve the item's properties and requirements.
  - Implementing IoT technologies enhances overall operational processes and supplies, leading to more efficient and effective food processing outcomes.
- **Artificial Intelligence (AI) Applications**
  - Today's supply chain faces challenges such as identifying the source of food production, which can be addressed by artificial intelligence (AI).
  - AI improves traceability and ensures local identity is preserved by recognizing the origin of food items.
  - In India, with its diverse food culture, post-harvest losses, food imports, and human-intervened operations, efforts are underway to liberalize the agriculture sector.
  - The post-liberalization era has seen a shift towards smart food processing and alternative agriculture methods, driven by new tools and technologies, including AI.
  - AI can significantly reduce post-harvest losses, enhancing economic quality assurance for India's diverse and valuable food production.
- **Robotics and Automation**
  - Robotics in food handling offers safer and more efficient outcomes than manual handling by reducing the risk of exposure to allergens and washing accidents.
  - Robotics ensures speed, continuous operation, and customized processing, particularly for non-uniform natural products.
  - With a shortage of unskilled labor in the food industry, economic needs and opportunities are driving the adoption of robotics.
  - Applications of robotics in food processing include material handling, cleaning, quality inspection, cutting, sorting, and packing, among others.

Challenges and Opportunities

- Agricultural processing involves using farm outputs for both food and non-food sectors, encompassing activities like packaging, canning, fermenting, freezing, drying, and more.
- In India, food processing companies transform primary agricultural products into new, safe products for consumers.
- This practice allows for the efficient and cost-effective conversion of perishable crops into products that retain nutritional value over time, reducing food security concerns and wastage while boosting export earnings.
- Food processing maximizes the use of crops in a hygienic manner without compromising quality.
- However, inadequate infrastructure poses a significant challenge in the food sector.
- This includes issues with storage, secondary infrastructure, hygiene and phytosanitary standards, and poor transport and logistics, which hinder the handling of perishable produce and access to national and international markets.

Regulatory Framework and Standards

- The Ministry of Food Processing Industries (MoFPI) was established in July 1988 to promote the development of India's food processing sector.
- The industry is governed by various laws and regulations, including the Fruit Product Order 1955, the Meat Food Products Order 1973, and the Vegetable Oil Product Order 1998.
- MoFPI also regulates 100% Export-Oriented Units (EOUs) related to food products.
- The Ministry oversees several subordinate organizations, such as the National Institute of Food Technology and Entrepreneurship Management (NIFTEM), an autonomous institute, and the Food Processing Industries Confederation (FPIC), an apex advisory body.
- Additionally, certain food products are reserved for small-scale industries according to the 8th Schedule of the Industries (Development & Regulation) Act, 1951.

Future Trends and Recommendations

- Strategies are needed to enhance competitiveness in production, design, packaging, distribution, and pricing, along with necessary technical support.
- Market forces should develop tools like collective brand promotion to build a market through credit, enabling environments, marketing, and extension services.
- With India's economy opening up, there are opportunities for economic growth through food exports.
- Both rural and urban development have resulted in reserves of high-quality fruits, vegetables, and processed foods, which can serve as important raw materials for food processing. However, much of this produce goes to waste. There is a need for systematic growth in both domestic and international markets.