



INDIA: WORLD'S EMERGING FOOD LEADER

Report by
technopak

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MESSAGE

I am glad to know that PHD Chamber of Commerce and Industry is organizing two days International Conference Cum Exhibition "India Farm 2 Fork 2014" on 28th -29th November, 2014 at PHD House, New Delhi.

In view of the abundant agricultural resource base in India, Indian Food Processing Industry has immense potential. The cold chain, innovations in R&D and international trade are important subjects that should be promoted to develop the Indian food processing sector.

There are great possibilities of exchange between India and the developed nations in these sectors. Such programs should be regular feature by organizations like PHD Chamber.

I am sure the program will benefit all the stakeholders. The initiative being taken by PHD Chamber in this area is commendable.

I extend my best wishes for success of the event.


(DR. SANJEEV KUMAR BALYAN)



सिराज हुसैन
सचिव

SIRAJ HUSSAIN
Secretary



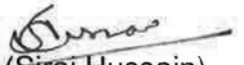
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MESSAGE

I am glad to know that PHD Chamber of Commerce and Industry is organizing India Farm 2 Fork 2014 – 2 Days International Conference Cum Exhibition on 28th-29th November, 2014 at PHD House, New Delhi. Lack of an efficient supply chain is one of the most important factors for higher level of wastages of agro and agri-products in India. I am sure the conference will provide a forum for sharing of experience of the various stakeholders which will help in improving the efficiency of our supply chain system and help in minimizing wastages. It gives me an added pleasure that a knowledge report is also being brought out on this occasion.

The efforts, made by the PHD Chamber from time to time, in organizing various conferences/exhibitions in the direction of promoting economic growth, are praiseworthy. I am sure that PHD Chamber would continue to strive hard to achieve this objective.

I wish this program a great success!!


(Siraj Hussain)



PROGRESS HARMONY DEVELOPMENT

Estd. - 1905



Mr. Sharad Jaipuria

President, PHD Chamber of Commerce and Industry

India is the world's second largest producer of food and has the potential of being the biggest, backed by its farm and food processing sector. The Indian food processing industry accounts for 32% of the country's total food market and the total food production in India is likely to double in the next 10 years with the country's domestic food processing sector estimated to reach US\$200 billion in 2015. The food processing sector accounts for 9% of manufacturing GDP, nearly 12.1% of India's exports, 6% to of India's industrial investments and 16.4% of FDI in 2013-14. Currently, Indian Food Processing Industry has been growing at an Average Annual Growth Rate (AAGR) of around 8.4%. For sustainable and inclusive growth of the sector collective efforts from all the stakeholders are required focusing whole value chain from farm to the fork.

In view of the abundant resources in India, the Indian Food Processing Industry has immense potential. To cater to the demands of the rising population, there is a dire need to develop this sector, reduce post harvest losses, develop innovative technologies and promote international trade.

Further, there is immense scope for collaborations and technological exchanges in view of new national program "Make in India" designed to transform India into a global manufacturing hub.

It is a matter of great pleasure to note that PHD Chamber of Commerce and Industry is organizing two days International Conference & Exhibition on India Farm 2 Fork 2014 on 28-29 November 2014 at PHD House, New Delhi.

Against this backdrop, PHD Chamber in association with Technopak is bringing out this Knowledge Paper presenting India as an emerging global leader. I sincerely hope that this report will benefit all the stakeholders.

The Chamber has always strived to take knowledge to the grassroots so as to facilitate capacity building among the different sectors of the economy. To create an interface between various stakeholders of the food processing sector through the process of free dialogue, the Chamber is organizing this Conference.

I wish the conference all the success.



PROGRESS HARMONY DEVELOPMENT

Estd. - 1905



Mr. N.M. Kejriwal

Chairman, Agribusiness Committee, PHD Chamber

It's a matter of great pleasure that PHD Chamber of Commerce and Industry with support of Ministry of Food Processing Industries, Agricultural and processed foods Agricultural and Processed Food Products Export Development Authority (APEDA) and National Horticulture Board is organizing the second series of two days International Conference & Exhibition on India Farm 2 Fork 2014.

This is a vital subject and touches all the aspects of value chain of food processing sector which needs its due attention.

Technopak being the knowledge partner has furnished the knowledge report to recognize the challenges and remedial strategies which would promote the growth of the food processing sector.

I am sure that this initiative of PHD Chamber shall be a grand success!

About the Report

Farm to Fork 2014 is an endeavor at understanding the food services ecosystem from a holistic perspective, along with the challenges and opportunities extant therein. From our vantage point, we have observed that the business paradigm is transcending from the traditional, fragmented, and narrow orientation towards a more cohesive approach in which social causes are incorporated into the return-on-investment principle.

In order to develop this rounded perspective on the Farm-to-Fork ecosystem, we have adopted the following approach:

- First, we developed a comprehensive understanding of the Farm to Fork ecosystem
- Second, we identified and analyzed the connecting links between the different components of, and challenges and opportunities faced by, the system
- Third, we studied the changes taking place in the sector and also how the industry needs to continuously innovate in order to sustain itself in this ever-changing scenario. We have tried to touch upon the nationally and internationally relevant scenarios which are successful, so that we may learn from, and replicate, them.
- Fourth, we analyzed India's performance in international trade and how India is emerging as a worldwide food leader.
- We conclude this report with an assessment of the opportunities made available for the industry through the "Make in India" initiative and some thoughts on the way forward.

We thank the PHD Chamber of Commerce and Industry for providing this opportunity to participate and present our thoughts on the Indian Farm to Fork Ecosystem.

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Introduction

The Indian Agribusiness and Food sector is one of critical importance, not only because of its contribution to the country's Gross Domestic Product (GDP) but also because of the number of people it employs and its capacity as a lever for achieving food security and a tool for bringing about inclusive and sustainable development. This report provides a holistic perspective on this sector, for which reason it has been titled "Farm to Fork", as it covers the entire ecosystem.

This sector is highly dynamic and also evolving rapidly. Its complexity is thus set to increase due to a number of changing parameters including growing population, expected increase in per capita disposable income, changes in dietary patterns, rise in urbanization, shrinking land base for agricultural usage, globalization, etc. Moreover, the sector's performance is also dependent on not only climatic conditions and natural resources but also on the performance of other sectors such as infrastructure and energy. This ecosystem as a whole is governed by the regulatory environment which is also undergoing a speedy transformation. All these constantly changing parameters, which interact with each other, underpin the complexity of the food ecosystem.

India must produce more using lesser resources in order to keep pace with the nutritional requirements of our growing population. This necessitates ramping up the efficient utilization of resources like water, land, manpower, energy, etc. for increasing per unit agricultural production. There are various means of increasing food production including yield enhancement, cropping intensification, reducing food loss across the value chain (particularly during the post-harvest, storage, and transportation), improving irrigation techniques and thereby water usage efficiency, reducing land degradation, and reducing food waste across all points in value chain.

The way forward to address the extant and expected imbalances within the food ecosystem involves the active inclusion of small scale farmers and to tap their underused production potential. Although the government, as well as international donor agencies, has undertaken initiatives for the inclusion of small and marginal farmers into mainstream agriculture, the impact of such programs has largely been very limited. The segment has remained outside the domain of self-propelled commercial development. Small and marginal farmers face many disadvantages especially on the marketing front, such as low volume of saleable produce to sell, variable quality and quantity, high transaction cost, inability to achieve economy of scale, difficulty to follow food standards, etc. There is a critical need to focus on integrating these farmers into the mainstream agriculture in order to leverage the unexploited food production potential.



Farm to Fork: An Indian perspective

The Farm to Fork ecosystem comprises interrelated networks of business enterprises through which food products and commodities move along the value chain from production to consumption, including pre-production activities. It operates in inter-related continuously interacting network comprising business, operations, and regulatory frameworks.

Farm to Fork ecosystem: understanding the Indian perspective

The term “Farm to Fork” encompasses the entire food ecosystem comprising of products, processes, and people (stakeholders) involved in the production, distribution, and processing of food as well as value addition thereto, besides marketing, consumption, business enablers or support service providers, and regulators governing and creating policies, thereby, defining the operating framework for the ecosystem. Business enabling services such as telecommunications, financial services, energy, and logistics also play a vital role within this ecosystem. Non-business stakeholders are central to food value chain operations; these include governments, NGOs, donor agencies, and international organizations.

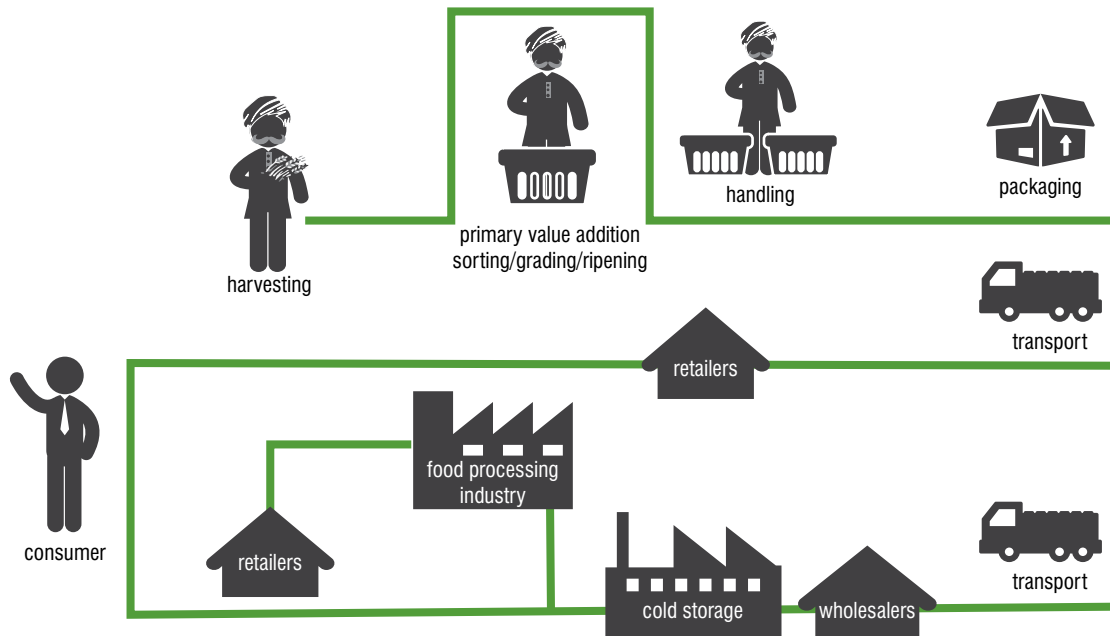
Understanding the ecosystem

The food ecosystem involves a variety of industries and stakeholders, and engages a diverse set of actors along the multiple steps in ecosystem. These form interrelated network of variety of industries operating in regulatory environment, which is influenced by climate, natural resources, governance, and globalization. The process is simply stated below:

- It starts with the farmer deciding to grow a particular crop on his or her field. Agricultural input companies supply seeds, fertilizers, pesticides, equipment, and other necessary inputs etc. Farmers combine these inputs with other necessary resources as land, water, energy, finance, labor, and knowledge for production.
- Post harvesting, the farmer may sell the produce directly or may undertake on-farm primary value addition and then sell it either to intermediaries or directly to consumers. The intermediaries may further sell it to traders, exporters, processors, retailers, or consumers. Along this value chain, packaging and distribution is undertaken by the relevant stakeholders as per the need and the business channel within which the intermediary/stakeholder is operating.
- Across the chain, stakeholders depend on business enablers, such as storage and transport infrastructure, financial services, communication and market information services, energy and water management infrastructure, etc. The enabling environment created by the public sector, which includes Government-provided infrastructure and services, policy, and regulations, also influences commerce.
- The ecosystem is also influenced by the natural environment (soil fertility, water supply, and climate variations), the country’s sociopolitical and economic context as well as global dynamics.

For the ecosystem to function effectively and efficiently, there is need to orchestrate all stakeholders (consumers, producers, processors, exporters, entrepreneurs, research institutions, and government agencies and NGOs), coordinated participation from everyone is required. Other groups such as donors, trade and industry associations, technology providers, and media, also play important roles.





Source: Technopak Analysis

Characteristics of Indian Farm to Fork ecosystem

Indian Farm to Fork ecosystem is characterized by its peculiar complexity and uniqueness. It is very vibrant, dynamic, and continuously evolving. Few features that are typical characters of Indian Farm to Fork Ecosystem (FTFE) are listed as under.

Volatile and Unpredictable

Indian agribusiness environment is increasingly becoming more volatile and unpredictable. This increased volatility stems from changing climate, increased global market integration and changing socioeconomic scenario. While demand can be predicted to a reasonable extent, predicting supply trends is becoming more difficult, due to a number of reasons of which climate change is one of the main reasons. Climate change or global warming has led to more weather-driven volatility as there is fluctuation in average temperature and rainfall and occurrence of extreme events. The impact of climate change on agriculture is a developing field and lot of work is happening in this field.

Fragmented

In India, the Farm to Fork value chain is extremely fragmented with a large number of players and disaggregated production both at the farmer and processor level. The presence of a large number of players at each point in the value chain does not encourage competition but, instead, creates inefficiencies in the system. The small size or fragmentation prevents players from achieving economies of scale and hence prohibits them from making necessary investments in production, procurement, processing, and distribution of food. The presence of a large number of players or intermediaries leads to an increase in the spread of farmers and consumers without adding any significant value to the transaction. In India, the average farmer generally receives 25 % of the final consumer price; in comparison, to developed countries in Southeast Asia, where the farmers receive about 60-70 % of the consumer price.



Complexity

The Farm to Fork ecosystem is highly complex, comprising different inter-networked components operating in a dynamic business, climate, and regulatory environment. Factors which add to this already complex ecosystem include heterogeneous production systems, segmented markets, inadequate infrastructure and information systems, credit constraints, integrated global markets, technological innovations, climate change, and political and regulatory influences.

On the production front, each crop has a large number of cultivars or varieties, and farmers follow different cultivation practices in different regions which offer varying agro-climatic conditions, all of which yield a final product which varies in quality. This makes information collection and collation highly complex as there is no standard crop yield or input efficiency measure.

On the demand side, consumers' dietary patterns are changing. Economic growth and increased per capita income has increased demand for food products. There is increased emphasis on the health aspect of food, with food processing companies also coming up with health foods and functional foods. In addition, political influences affect both the demand and the supply side. The government's decisions on subsidizing production by offering subsidies, affecting prices by procuring grains at a pre-determined price (Minimum Support Price), influencing trade by banning exports or imports, increasing import duties, etc. also adds to the complexity.

Inefficiency

Indian agriculture has been growing at 3.6% over the past decade compared to 2.9% in the previous decade. Despite this growth, food inflation has been accelerating at an average of about 8.1% over the past decade. The journey of food from the farm to the fork encompasses a number of stopovers, each involving multiple handling and transfers which add to the cost of the final product but at the same time also leads to deterioration of quality rather than addition of value.

Diversity

The food ecosystem comprises different food value chains even when we discuss the same commodity. The value captured at each point in the food value chain differs not only across different commodities but also across the same commodity grown in different regions. The diversity in the value chain is driven by a number of factors such as type of crop, farmer, region, perishability, usage, commercial value of product, and point of consumption (i.e. domestic market or export market), etc. Also, since each product has different characteristics, the handling, storage, and transportation requirements also differ. The value chain also depends on the operating environment, which is influenced by such external factors as climate and governance. In India, the diversity inherent in the ecosystem's components is thus vast, despite which these parts interact with each other as part of a complex-yet-coherent food ecosystem.



Supply Chain: The Connecting Link

The Farm to Fork Supply Chain: Connecting Links

The food value chain involves multiple steps and engages diverse actors; its complexity and interdependence is both a challenge and an opportunity for businesses. A coordinated set of business-led interventions can activate a “virtuous cycle” of productivity and consumption along the chain, resulting in substantial income gains for stakeholders across the chain as well as broad-based economic growth.

The Farm to Fork Supply Chain: Beyond Business As Usual

Business as usual is no longer the case with the food business in today’s time. Real agricultural prices are showing steep increase; food inflation is at an all-time high; higher volatility is being observed in the prices of food commodities; market conditions are changing rapidly with the emergence of new markets as well as supply regions. Stakeholders across the ecosystem are impacted by these changes and are trying to find ways to sustain themselves within this competitive, globalized and rapidly changing environment. Sustainable long term solutions can be conceived only when the proposed strategy or solution meets the challenges in a sustainable manner within the framework of a viable business model. The farmer must be an integral part of this “viable business model” whereby he gets competitive rewards for his business, i.e. farming. Farmers, including smallholder farmers should have access to an adequate farm income which is proportionate to the amount of risk taken by him varying from climate to fluctuating market prices to regulatory requirements.

India’s food chain is among the most fragmented in the world. The food wastage estimates vary from 18-40% as per the different studies carried out in this space. The lack of adequate cold chain infrastructure and the absence of a well-integrated food processing industry are responsible for this wastage. These two sectors are thus highly critical in terms of taking India from languishing due to this inefficient and wasteful food system to becoming a global food hub.

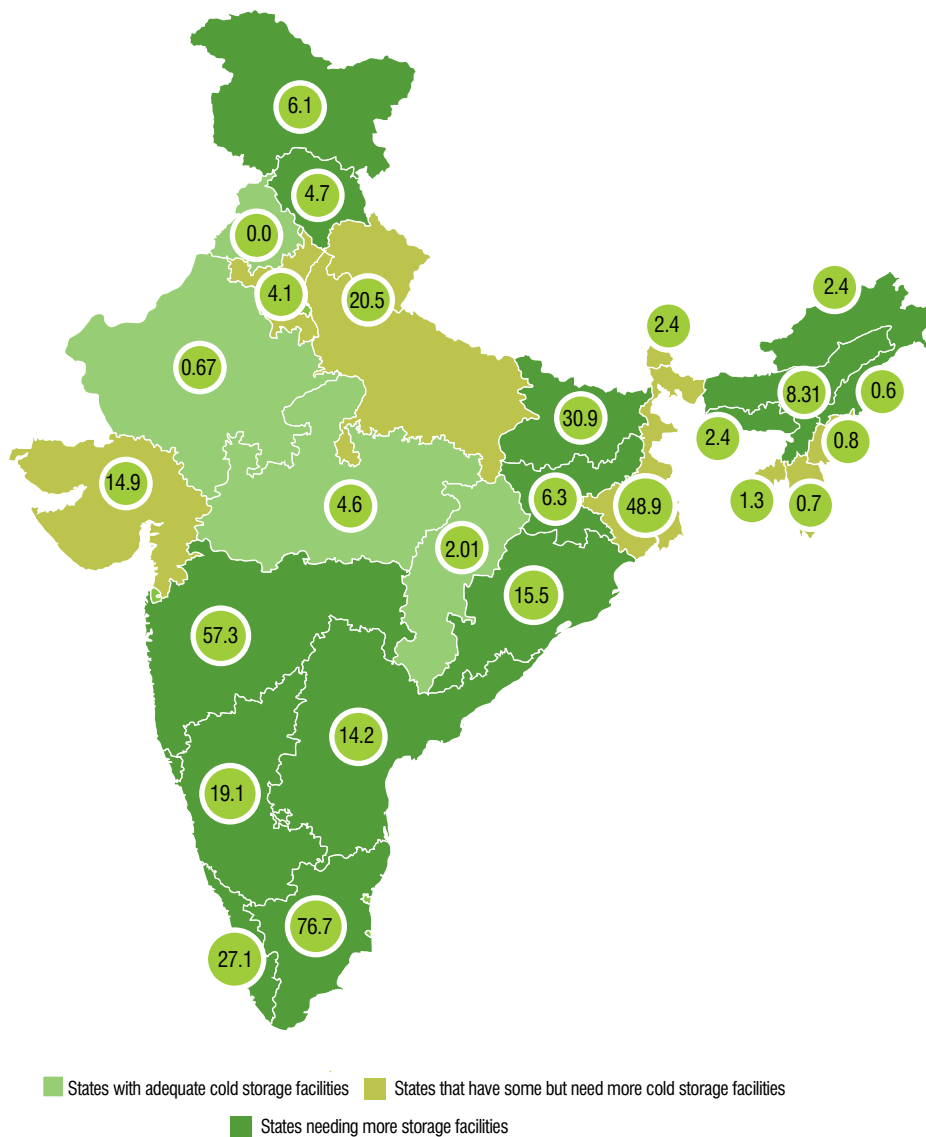


Status of Cold Chain Infrastructure in India

India has approximately 6,300 cold storages across the country with a total capacity of 30.11 million metric tons (MT) in 2012. 60% of this capacity is concentrated in the states of Uttar Pradesh, Gujarat, West Bengal, and Punjab. India's cold chain industry is also fragmented and comprises ~3,500 players operating in this space. The Cold Chain industry comprises cold chain solution providers, which account for 85% of the total market, and refrigerated trucks, or reefers, which accounting for the rest, i.e. 15% of the market. There are ~250 players operating in the reefer transportation space (2010) who cumulatively operate ~25,000 vehicles. Of these, ~80%, or 20,000 vehicles, is being used by the dairy industry in transporting milk. Only 20% of the total, 5,000 vehicles, are used for transporting the rest of the products in the food industry. The kind of transformation brought about by the National Dairy Development Board, for the dairy sector in India, is required for other perishable commodities.

Numbers on the map indicate gap between required and present capacity (Lakh MT)

Exhibit 2



Source: National Center for Cold Chain Development (NCCD)





Challenges Faced by the Cold Chain Industry in India

There is need to develop an economically viable solution which integrates food supply linkages from production centers to consumption centers. This will not only reduce food wastage but will also contribute to the food processing industry. The cold chain industry is very crucial for the growth of the food industry but is not growing at an adequate pace despite the demand due to being non-remunerative at present. Some of the key challenges faced by the industry include erratic power supply, high land cost, lack of indigenous technology, last mile distribution, etc. which are discussed in detail below:

Cold Storage

Inadequate Infrastructure

Considering the current infrastructure, India can store only about 10% of its total production. Most of the cold storage facilities in India are single commodity-based and use outdated technology.

Lack of Awareness regarding Good Operating Practices

Most of the players in the cold chain industry are small and unorganized, operating at very small scale, and do not have the capacity to invest in high technology infrastructure. Majority of them are unaware of best operating practices or of world standards. Inappropriate handling at this stage not only hampers product quality but also leads to the build-up of costs by the time product reaches the retailers.

Capital Intensive

The cold storage industry is a capital intensive industry. It is estimated that approximately INR 50 million is required to build a ~6,000 MT-capacity cold storage facility, excluding land cost. The increasing real estate industry prices are also adding to this.

Type and Technology

Most of the existing facilities are single commodity storage facilities which use either air conditioners or ammonia as a refrigerant. 75% of the total capacity is used only for storing potatoes. In India, multi-commodity facilities are not well utilized and therefore not economically viable. Hence, most of the smaller players prefer to play it safe by constructing cold storage facilities for a single commodity.

Uneven Distribution

Most of the cold storage facilities are concentrated in production areas. Considering the perishable nature of fruits and vegetables, cold storage facilities should be constructed and made available at all major value chain points. But this expansion along the value chain is hindered by high real estate costs in major cities which are also the main consumption centers.



Operational costs

Cost related to operating cold storages can increase tremendously given the erratic power supply in India, which faced a 9% peak power deficit in 2013. Since perishable products constantly require low temperatures, generators which run on diesel need to be used to maintain the temperature, which leads to increase in operational costs.

However, some improvements are taking place within the sector. For example, Adani Agrifresh has invested in developing world-class, controlled atmosphere storage in Himachal Pradesh, for storing apples. The company procures directly from farmers as per set quality parameters and stores them for about eight months and supply directly to retailers.

Refrigerated Transportation

Based on discussions with industry players, it is estimated that about 105 million MT of perishable produce is transported annually between different cities in India. The key issues hindering the growth of the sector are:

Permits

Refrigerated vehicles require a National Permit to operate between states which have to be applied for and renewed annually. These are generally valid for eight years, subsequent to which inter-state movement is not allowed, forcing such vehicles to operate only within a particular state.

Return Load

There is a serious lack of availability of back haulage in reefer transportation, which makes operations economically unviable for many players. Adding to the woes of the industry are inter-state barriers, octroi, poor roads, and traffic congestion on roads.

Vehicle Quality

In the case of reefer transportation, the lack of quality reefer trucks, resulting in fluctuating storage temperatures, contributes to wastage. Thus, real time temperature tracking and vehicle tracing are essential for development of this industry. It takes about 90 to 120 days for a complete reefer truck to be road-ready in India and there are currently only four major reefer truck body manufacturers.



The presence of transport unions in some regions also hinders the development of the industry as these unions do not allow competitive forces to operate in the market. Transporters operating in these regions have no incentive to invest in the latest technology or improve their processes as they have got assured business. For most of the time, the players operating in these regions have to suffer and follow such practices as are dictated by the transport unions.

The Indian government understands the crucial importance of the cold chain industry to the overall food industry and as a means of reducing food losses and wastage, which is equivalent to producing more food.

There is need for the creation of an additional 31 million MT of cold storage capacity in the country and therefore there is a huge opportunity for private sector investment in this sector. Also, the government has recognized and is taking measures for creating a favorable environment for the sector. There are challenges arising from the fact that the sector is highly capital-intensive, but the government has tried to address these challenges by taking the following measures:

- In the Union Budget 2012-13, the government recognized cold chain sector as Infrastructure subsector.
- In the Union Budget 2011-12, the government permitted 100% foreign direct investment, or FDI, in the sector.
- In the Union Budget 2010-11, the government allowed duty free imports of refrigerated units and exempted excise duty on air conditioning equipment and refrigeration panels.
- The government established the National Centre for Cold Chain Development (NCCD) in 2012, thereby creating a favorable environment for industry.
- The sector is at its tipping point and the conditions are ripe for it to take off and reach a new level.

Supply Chain Opportunities, Challenges, and Strategy

Getting agricultural goods to markets more efficiently offers huge potential benefits across social, environmental, and economic dimensions. This section highlights significant supply chain-related barriers faced by stakeholders across the ecosystem, including their impact, and suggests potential solution and strategies to address these challenges. Solutions differ across value chains, so a thorough supply chain assessment is a pivotal part of taking action. Some solutions fall primarily under the purview of the public sector, e.g. infrastructure improvements, creating favorable enabling environment, policy framework, etc., and tend to have a positive impact across regions, crops, and actors. Others are primarily private sector-led and tend to be value chain-specific.

Supply Chain Challenges

India has a distinct advantage in terms of production leadership, a growing consumer base, and varied ecological zones. The links connecting the various actors, from production to consumption, are, however, weak and inefficient. There is thus a need to create an agile, adaptive, and efficient supply chain in order to realize the true potential of the sector. The key areas in this regard are:

Packaging

Packaging has assumed critical importance considering the fact that the average distance travelled by food has increased significantly in the past two decades. Good packaging helps maintain fruit quality, improves shelf life of perishable products, and makes handling easier. Currently, depending on the product, the packaging cost ranges from 10-64% of the total production cost. There is need to make packaging less costly for large scale adoption by stakeholders. This can be achieved by the introduction of new technology and through use of manufacturing automation.

Standards

Standards help bring about process automation, and can be categorized as food standards and process standards or operating standards. While food standards refer to or relate to the content of the food, whether fresh or processed, operating standards refers to standardized operating processes that are being followed within the industry to carry out specific activities. Such standards help in increasing productivity and hence build economies of scale.



Food Safety

With the trend of 'healthy food' catching consumers' attention across geographies, consumers want to know more about the journey of food from the farm to the fork and the safety aspects therein. Also, with the World Trade Organization's (WTO's) Sanitary and Phytosanitary (SPS) agreement, compliance with international safety standards has become a prerequisite for exports. This is a slightly difficult task for India because of the fragmented nature of the industry and the number of small scale farm-holders operating in the country.

Skilled Manpower

Given the evolving food chain, there is need for skilled manpower to manage it. New channels are opening up with varying requirements. For example, the increase in market share of organized retail means that skilled manpower is now required for managing retail operations, distribution, cold chain management, etc.



Complex Business Environment

In India, some aspects are governed by state governments and hence regulations are different in different states. This is made more complex by the fact that taxes also differ from state to state. Thus, when the finished, processed product move from one state to another, the applicable taxes also change. Also, even within the same state, regulatory clearances need to be taken from different regulatory bodies, which adds to the complexity of doing business.

Solutions & Strategies

There are many plausible solutions for addressing specific challenges across the food value chain. But, in order to address these constraints in a holistic manner, it is important to achieve the tipping point of economic efficiency so as to initiate a virtuous cycle which will be beneficial across the board. When we look at the value chain across commodities and regions, the analysis indicates that the lower price points in the chain are more susceptible to losses. The corresponding investment required to address the losses must be commensurate with the expected benefits. If these investments do not allow stakeholders to achieve sustainable profitability, even governmental interventions may not help in achieving the desired results. An example illustrating the above is the cold chain sector. The government launched the schemes but, in the absence of economic efficiency, the success rate of efforts was questionable.

Our suggestion to policymakers is to carefully orchestrate interventions with the broader strategy of creating a high potential value chain wherein the tipping points of profitability can be reached. In this case, the private sector will be able to reinvest retained earnings and a virtuous cycle of development can be triggered.



Addressing Supply Chain Barriers

The approach we suggest for addressing supply chain barriers are:

- Establishing a collaborative mechanism for interactions between public and private stakeholders and creating a governance structure.
- Focusing on achieving specific tipping points by focused use of resources. Stakeholders should align themselves in order to work in a coordinated manner and the entire process should be orchestrated by the previously-suggested collaborative public-private body.
- Mapping high priority trade routes or corridors and value chain of commodities. Focus group discussions may be carried out in order to understand the bottlenecks and the information garnered should be used to develop relevant hypotheses, via being analyzed in a holistic and integrated manner, and to devise strategies.
- Identifying the core team which will implement the strategies for the bottlenecks identified in the previous step. This core team will also define the long list of action points alongside the costs associated with each and their impact on the value chain. After a detailed cost benefit analysis of the various options, the strategy should be revised and resources allocated so as to reap maximum benefit.
- Choosing a Project Manager from the stakeholder group who is trusted by all stakeholders. Not only should owners be clearly identified, the respective responsibilities should also be assigned in a well-defined manner. Milestones should be set for each action point, and there should be a transparent mechanism in place to track progress.
- Reviewing and sharing learnings through a post project review featuring all Project Managers in order to facilitate further improvements

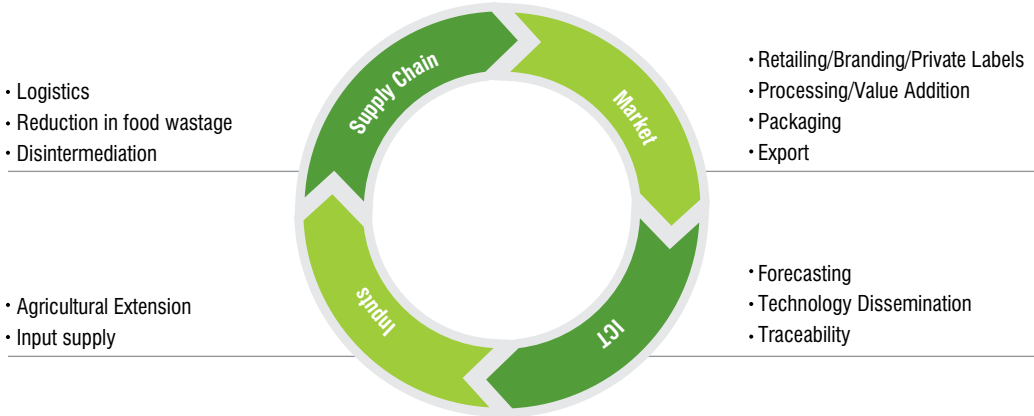
Through a collaborative and coordinated action, we can start a virtuous cycle which will contribute to increased incomes for all stakeholders across the value chain and also ensure economic and environmental sustainability.

Opportunities

We see tremendous opportunities for businesses in terms of building better linkages between farmers and consumers, supporting governments in easing trade and supply chain barriers, and creating value for farmers as well as consumers.

Opportunities

Exhibit 3



Source: Technopak Analysis

We have classified these opportunities into four major areas, viz. supply chain improvements, market opportunities, Information and Communication Technology, and opportunities in the agricultural input domain. The aforementioned areas are discussed briefly hereafter.

Information and Communication Technology (ICT)

At each point along the value chain, stakeholders need data and information on various aspects. In case of unavailability of appropriate information, they may take wrong decisions which will either lead to food wastage or financial losses for decision makers. ICT can play a crucial role in the dissemination of vital information and hence enable effective and efficient supply chain transactions. The government launched the “Strengthening/Promoting Agricultural Information Systems” scheme as part of the Tenth Plan with a budget of INR 100 crore. The private sector has also initiated investment in this area which is largely considered a government domain. For example, Reuters started Reuters Market Light to supply information to farmers. However, the role of ICT is still largely unexplored and offers tremendous opportunities.

Agricultural Input Industry

India’s agricultural inputs industry is well developed with many fertilizer, pesticide, seed, and agricultural equipment companies, including both government and private sector organizations, operating in this space. But the sector offers opportunities in terms of:

- Reaching all farmers and especially small and marginal farmers
- Developing customized products as per farmers’ requirements
- Educating farmers about appropriate use of agricultural inputs including what to use, when to use, and how much to use.

Currently, the farmer follows his peers and adopts practices based on discussions with fellow farmers and on his financial capability. There is tremendous scope in terms of increasing the penetration of agricultural inputs to the farmer community, developing customized products, and educating farmers on optimum use of agricultural inputs.

Markets

Growing markets are providing tremendous investment opportunities for the private sector. In the future, growth will be registered not only in metro cities but will also be driven by consumption in rural markets. About 60% of India’s total population is still based in rural areas; these numbers are not expected to change significantly by 2050.

Also, with growth in organized markets, there will be an opportunity to invest in private labels, value addition of food products, and exports. Growth in the food industry will also drive growth within the packaging industry.

Integrated Supply Chain

An integrated supply chain requires seamless integration of facilities (infrastructure) and services so that products move from farmers to consumers without either loss of quality or wastage. Investing in this sector can have the effect of reducing food wastage and disintermediation. The private sector has already begun investing in integrated Post Harvest Management (PHM) solutions.

The orchestration of the supply chain and innovation therein will lead to creation of value for all stakeholders along the food value chain. The creation of value across the food value chain will in turn generate a plethora of business opportunities for the private sector. The business community has started recognizing this immense potential and is waiting for the right regulatory framework within which to expand its wings.



Change is the Only Constant: Need for Innovation

The Government of India's National Knowledge Commission defines innovation as "a process by which varying degrees of measurable value enhancement is planned and achieved, in any commercial activity. This process may be breakthrough or incremental, and it may occur systematically in a company or sporadically; it may be achieved by:

- » *introducing new or improved goods or services and/or*
- » *implementing new or improved operational processes and/or*
- » *Implementing new or improved organizational/managerial processes in order to improve market share, competitiveness and quality, while reducing cost"*

Changing with Change

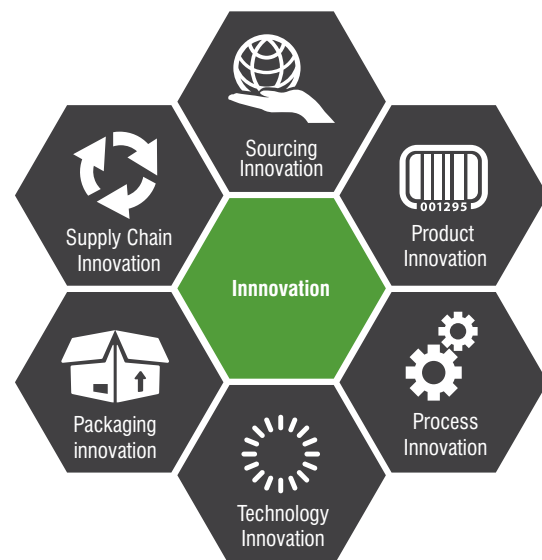
With increasing integration of the Indian market with the global economy, Indian firms and brands are facing increased competition from international brands. Innovation will be a key driver for ensuring the economic survival of companies although it may not be at present a readily visible one.

The Indian food processing industry is also at a tipping point, with companies trying to keep pace with changes in consumer lifestyles, demographics, preferences, buying behavior, etc. These changes are driving companies to rethink their strategy and redesign processes to ensure their sustenance within a dynamic business environment. Innovations are happening, and will happen, across the business and its operating environment, which encompasses products, processes, procurement, supply chain, packaging, and technological fronts.

This section explores the value chain innovations happening in India as well as other developing nations with a view to identifying successful innovations and also the key challenges faced when replicating and scaling up these innovations. Some examples are briefly discussed hereafter.

Innovation Matrix

Exhibit 4



Source: Technopak Analysis



Product Innovations

- **Stevia**, a natural sweetener extracted from a shrub (*stevia rebaudiana*), is awaiting approval from FSSAI and can thereafter be used commercially as sugar substitute by the food processing industry. The active ingredient i.e. steviol glycoside has up to 150 times the sweetness of sugar but has negligible effect on blood glucose levels.
- **Low Glycemic Index (GI) Foods:** GI is a measure of the effect of carbohydrates on blood sugar levels. With the increasing population of diabetic people in India, we see rise in the number of low GI index foods in the market.
- **Gluten-free products:** To address the needs of people suffering from gluten allergy, the industry has started substituting wheat with gluten-free ingredients such as amaranth green.
- **Edible Oils** comprising diacylglycerols (DAG) and triacylglycerol (TAG), of which DAG is immediately utilized by the body whereas TAG is stored as fat. Research is still underway on how to increase the percentage of DAG in edible oils.
- To address the needs of vegetarians, a Malaysian company has developed soya-based products whose taste mimics that of seafood.

Packaging Innovations

- **Innovations like Tetrapak and retort packaging** have seen tremendous success and have been widely adopted by the industry.
- **Edible packaging** is creating a buzz within the food packaging segment. WikiCell, a start-up based in Cambridge, Massachusetts, has ventured into the edible packaging segment and has the capability to make edible packaging for products ranging from yogurt to coffee to alcoholic drinks.
- **Biosensor Chips** There has been a breakthrough in terms of developing biosensor chips which can detect changes in food quality within the package and give indications for same.

Technological Innovations

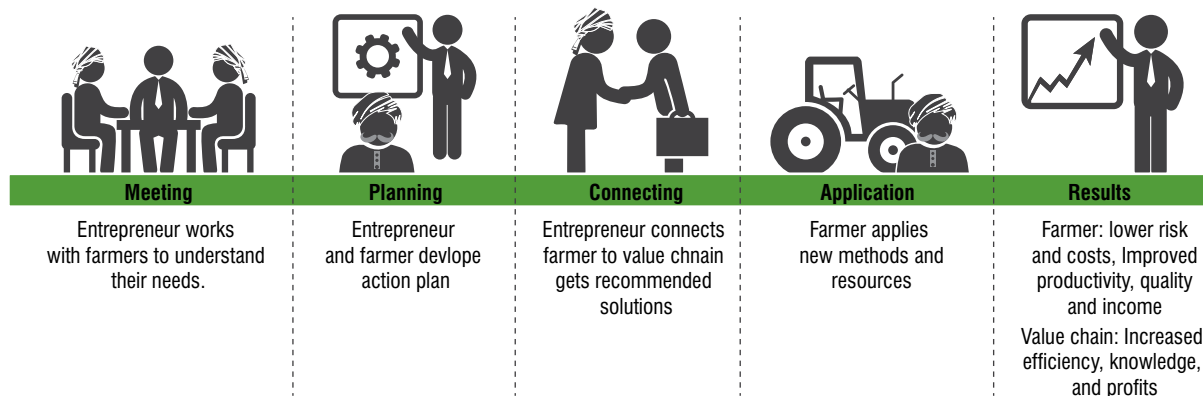
- **High Pressure Processing (HPP)** involves processing food at high pressures due to which certain microorganisms and enzymes present in food products are rendered inactive. This helps in increasing the shelf life of food products, but its adoption by industry is limited due to the high cost involved.

Information and Communications Technology Innovations

- **Esoko** is a multi-commodity market information provider, headquartered in Ghana, having presence in 16 African countries. The company has developed web based platform to facilitate flow of market data to farmers. It started in 2005 with development of price discovery tool, Tradenet. In 2009, the company restructured and rebranded itself and started offering broader set of services, thereby, empowering farmers.
- **Grameen Intel Social Business Co Ltd**, founded in 2009, is joint collaboration between Intel Corporation (USA) and Grameen Trust (Bangladesh); established with an objective to provide IT solutions for rural entrepreneurs.

The company launched eAgriculture project in Odisha (India), with the help of eKutir, an Odisha-based entrepreneur. In 14 months period, it was able to reach 6,000 farmers by establishing 12 kiosks. eKutir has goal to serve 12.5 million farmers by 2014 -15.





Source: Intel World Ahead Program

Distribution Innovations

- **Logistimo** provides mobile and web supply chain technology for rural emerging markets. Their platform enables stakeholders in the integration of the first and last mile of the value chain. It enables the orchestration of distribution and collection, thereby facilitating the decision-making process as well as in coordinating with actors at different points along the value chain.

Currently, innovation in the food industry is not very visible but it may be expected that, by 2020, it will become the core strategy of all food processing companies and have a noticeable impact on their cash flow and profitability.

Changing Food Plate: Understanding the Consumer

This is the era of coexistence of traditions with the increasing adoption of global trends with consumers more open to experimenting. Some of these trends which may shape consumer behavior in the near future include:

More is less: Technology has made it possible to do more with less time, space, and effort. New age consumers have got used to a range of multiple touch-points and want to explore newer experiences on a continuous basis. Also, the number of options available in the market has increased tremendously and has led to increased competition among brands seeking to occupy consumers' mind space.

Efficiency: Today's generation seeks smarter ways to do things. Collaborative technology is helping mobilize collective intelligence and is taking imagination to the next level. There is an increased integration of multiple functions within one device. We want to do more in less time and with fewer efforts. This intensity is reflected in consumers' desire for super efficiency.

Hedonism: The trend of indulgence is catching up with the consumer. With an increasingly faster-paced life and the corresponding stress, there is a craving for freedom and for letting loose. Consumers are thus seeking occasions which allow them to indulge in luxury.

Personalization: It is becoming easier to gather data on consumer preferences especially in the case of online shopping. This provides retailers and manufacturers opportunities for providing more personalized merchandise for which new age consumers are equally willing to pay more. These products are specific to their needs and taste and offer unique identity.

International Trade

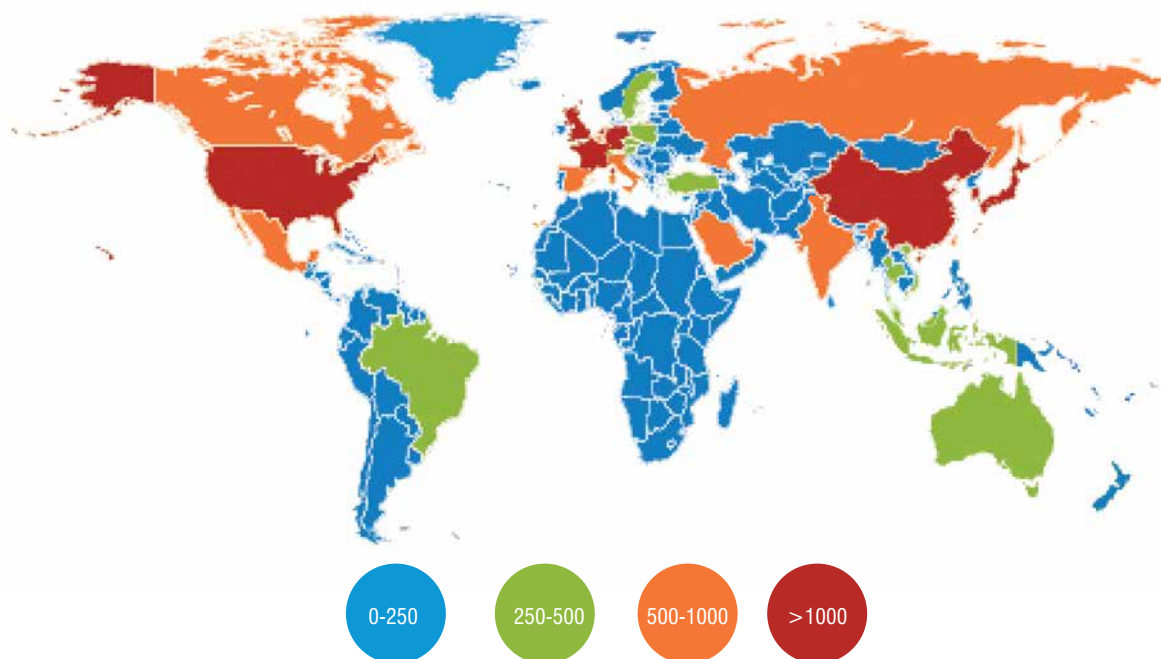
International Trade is an important indicator of the economic activity of countries. *Exhibit 6* represents world economies by the size of their merchandise trade in 2013. India too is active in international trade and has a share of 1.7% and 2.5% in global exports and imports, respectively.

In 2013, global merchandise exports grew by 2.5% in volume terms whereas agricultural products trade registered a growth of 3%.

The world's agricultural products exports stood at USD 1744.8 billion, while imports were worth USD 1851.2 billion, in 2013. India registered an 11% increase in growth in the exports of agricultural products, the highest compared to all other countries.

Global Merchandise Trade

Exhibit 6



Source: WTO Report, *International Trade Statistics – 2014*

In 2013, India's exports and imports of agricultural products stood at USD 47 billion and USD 24.4 billion respectively with 2.7% and 1.3% share in global agricultural exports and imports, respectively. India's trade surplus is also growing at a rapid pace, and had grown to USD 22.5 billion, by 2013, from USD 2 billion, in 2000. Rice, fishery products, and bovine meat contribute the majority of exports. Also, India continues to be largest importer of edible oils and pulses.

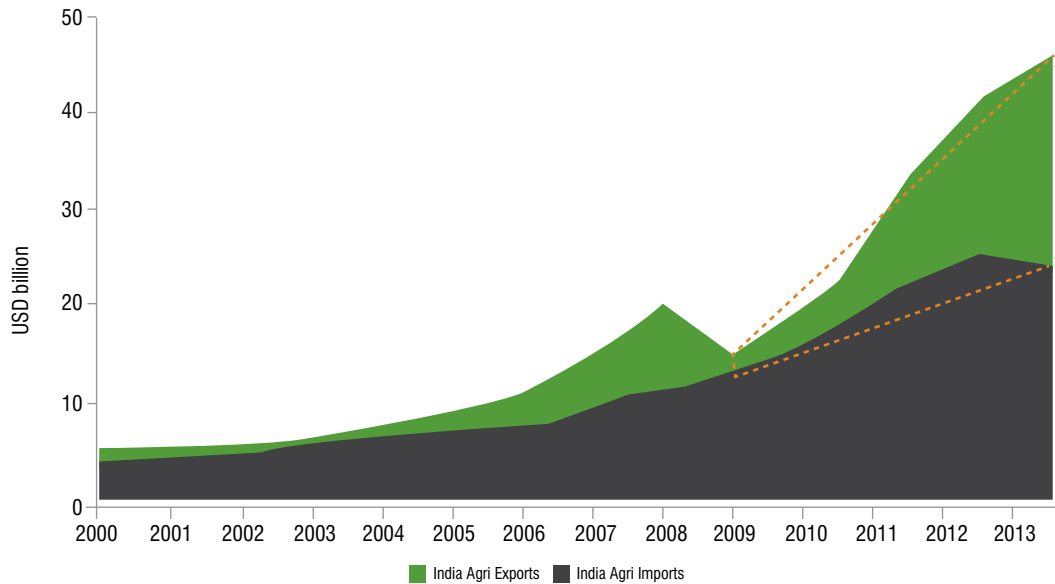
India is fast emerging as a major exports destination for agricultural commodities and was the sixth largest exporter* worldwide, in 2013. Its exports increased to USD 47 billion, in 2013, from USD 5.9 billion in 2000. This increase in exports has been made possible by government policies supportive of both production and exports. The majority of India's exports cater to least developed countries, or LDCs, as per UN classification.

*Considering EU (28) as a single export destination



India's Rising Trade Surplus

Exhibit 7

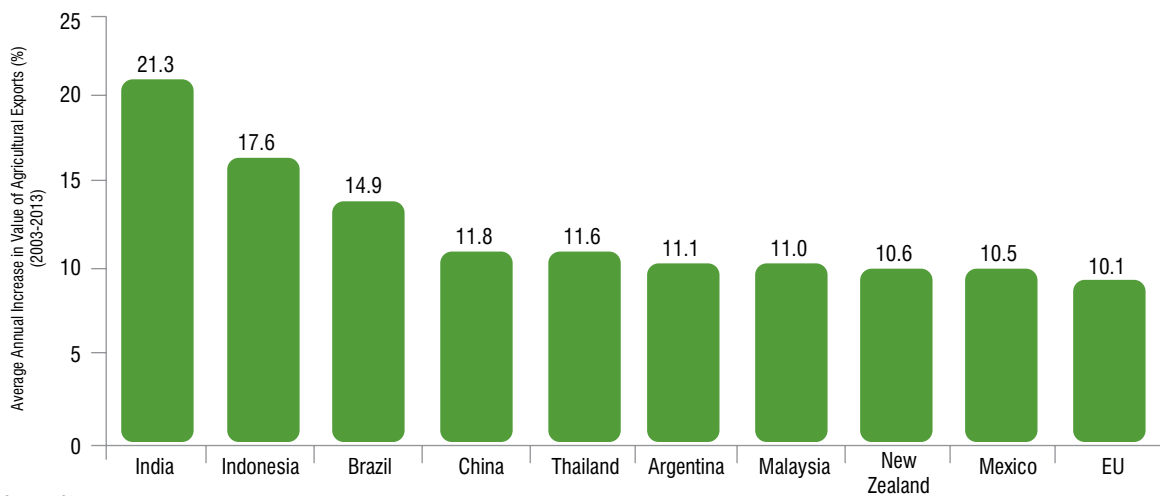


Source: WTO data, Technopak Analysis

The majorly exported commodities from India are rice, cotton, sugar, and beef. In addition to these, other important export commodities are soybean meal, guar gum, corn, and wheat. According to United States Department of Agriculture (USDA), India's exports have grown by more than 21% in the past decade, compared to such other major global exporters as Brazil, China, and United States, whose exports grew at 15%, 12%, and 9% annually, respectively, in the past decade. India's exports during the period January to May 2014, also went up from last year's exports during same period, with rice exports up by 10%, cotton by 2%, bovine meat (buffalo) by 18%, and wheat by 75%. The key driver behind this growth in exports is support from the government via creating a favorable policy environment. India became the world's second largest cotton exporter after United States. China accounts for ~60% of the total cotton exported from

India's Export Growth Rate

Exhibit 8



Source: USDA

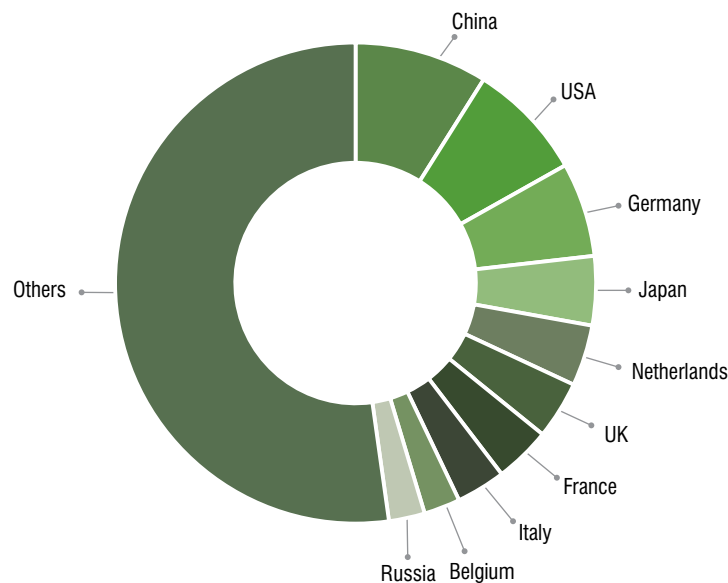
India. However, India periodically imposes export bans to counter increases in the domestic price of cotton. India ranks second in bovine meat exports after Brazil, with Southeast Asia accounting for almost 60% of the market and ~32% made up by the Muslim countries of the Middle East and North Africa. Indian bovine meat is competitively priced and is especially preferred by Muslim countries because it is processed in a halal manner.



India's major exports destinations are China, Iran, Vietnam, Bangladesh, Saudi Arabia, United Arab Emirates, Indonesia, Malaysia, and Pakistan, which together account for ~79% of the total exports. The growth in exports is also mostly with respect to developing countries and LDCs. India's exports to LDCs has increased by 314% over the past five years, compared to Indonesia, at 133%, and United States, by 28%. Indonesia is the second-fastest growing exporter to LDCs.

World's Leading Importers

Exhibit 9



Source: WTO data, Technopak Analysis

India's agricultural imports stood at USD 24.4 billion, or a 1.3% share of world's import. China is the world's largest importer, with a ~9% share in global imports, followed by USA (7.9%), Germany (6.3%), Japan (4.6%), and the Netherlands (4.1%). India ranks 17th globally, in terms of agricultural imports.

Edible oil accounts for more than 50% of the total value of India's food imports. Other majorly imported items are raw cashew nuts which make up a 10% share. In recent years, the share of processed fruits and vegetables has increased to about 12–14%.

India imported palm oil worth USD 6.76 billion in 2011, which accounted for about 40% of the total food imports with soybean oil, at 7%, the next biggest import. Other major items imported on a regular basis include raw cashew nuts (for processing), tree nuts (primarily almonds), and fruits (primarily apples).

Among major importing countries India depends on Indonesia, Malaysia, and China to fulfill its domestic demand. Indonesia accounted for one-third of the total imports, and, along with Malaysia, fulfills more than 50% of India's domestic edible oil demand. Apart from this, 19% of cocoa products are also supplied by Indonesia. India depends on Argentina for imports of edible oil as well as pulses. In 2013-14, Argentina accounted for about 80% of the total maize imports to India. China contributes to India's imports of floriculture, and also small quantities of processed and fresh fruits and vegetables.

Based on the above analysis, we see that India will see active trade activity in food and agricultural products. Hence, this is right time for manufacturing companies to invest in setting up and expanding their manufacturing base.

Make In India

A major new national program designed to facilitate investment, foster innovation, enhance skill development, protect intellectual property, and build best-in-class manufacturing infrastructure.

India is among the leading producers of food in the world. The growth in consumer demand has presented significant opportunities for investment; “Make in India” is an initiative seeking to leverage the demand and supply advantages extant within India. The initiative presents opportunity to lay the foundation for a prosperous future by increasing manufacturing activities in India.



India's Food Processing sector ranks fifth in terms of production, growth, consumption, and export. It is forecast to reach USD 194 billion by 2015. Realizing the potential of the food processing industry, the private sector has begun investing in the expansion of their manufacturing units. Some of the investments in the sector made by key players are elaborated as under.

Ruchi Soya has entered into a joint venture with Tsusho Corporation and J-Oil Mills Inc. and has plans to cater to institutional clients.

ITC plans to invest about INR 1,000 crore in the Indian Food & Consumer Products sector.

Mini Melts merged with Honey Bee Amusements to bring in investments worth INR 25,000 crore and plans to target the ice-cream segment.

Costa Coffee plans to invest about INR 200 crore by 2015 in expanding their presence.

Cargill India has outlined an investment of INR 400 crore in Karnataka for setting up a corn milling plant, as well as ~INR 100 crore for the expansion of current units.

Twinings India, a subsidiary of Associated British Foods, UK, plans to invest about INR 50 crore by 2016 in order to expand its product line.

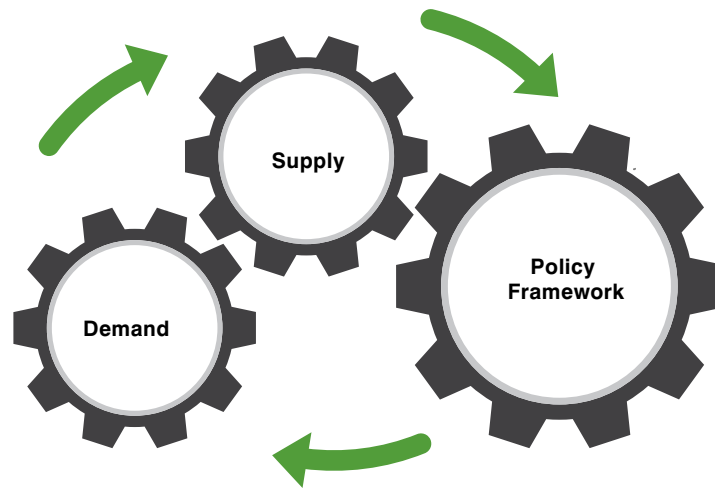


Why Make in India

India offers significant supply and demand advantages alongside favorable government policies which can be instrumental in terms of attracting foreign investors.

Why Make in India

Exhibit 10



What does India have to offer to the world?

The demand and supply advantages of India are as listed in the table below.

Demand comprises both domestic demand and export demand. On domestic front, demand for food and food products comprises a third of total demand. Thus, the growing population along with the desire for convenience will drive the demand for processed food. India has also started its journey towards increasing its share in the global food trade. In 2012–13, India registered a 63% growth in the exports of agricultural products and processed food. We expect the Indian Food Processing industry to register growth in excess of 10% annually till 2020.



On the **supply** side, India offers an excellent supply base. Globally, India ranks first in milk production, second in the production of fruit and vegetables and third in fish production. With increase in productivity and proliferation of technological interventions, there is scope for further enlargement of the country's supply base. It is thus possible to foresee India as a global sourcing hub.

Demand & Supply Advantages

Exhibit 11

DEMAND	
Domestic Demand	Export Demand
<ul style="list-style-type: none"> • Increase in per capita disposable income • Urbanization • Time paucity • Increased media penetration • Convenience 	<ul style="list-style-type: none"> • Strategic location of India for growth • Integration with global markets • Increased presence of Indian population in foreign countries adding to demand for "Indian" food • Expected increase in global food demand
SUPPLY	
<ul style="list-style-type: none"> • Favorable agro-climatic conditions • Natural resource base • Comparatively low manufacturing cost • Leading producer of most agricultural commodities 	

Favorable Policy Framework

Exhibit 12

Policy Framework	Government Assistance
<ul style="list-style-type: none"> • 100% EoUs: permission to sell 50% of total production volume in the domestic market, tax exemption on export profits, import duty waivers for raw materials and capital goods • 100% tax exclusion for new agro-processing companies for a period of 5 years and 25% for next 5 years • Excise duty exemption on machinery used for cold storage installation 	<ul style="list-style-type: none"> • Strategic location of India for growth • Financial assistance of INR 14,574 lakh to 966 food processing units in FY 2012 -13 • Allocation of INR 10,000 crore toward National Food Security Act (NFSA) • National Institute of Food Technology Entrepreneurship and Management (NIFTEM) established with the objective of catering to skill development for the food industry

For international food processing companies, Make in India is thus a window of opportunity within which to establish their manufacturing base in India.



Way Forward

As a leading management consulting firm, Technopak works closely with food and beverage manufacturers across the country. It is our business to help our customers make smart choices that lead to growth in market share, increase efficiency, facilitate making strategic decisions, and support implementation, thereby maximizing profits.

Trends Shaping the Food & Beverage industry

The food processing industry is at an inflection point and is set to witness tremendous changes in terms of the business, operational, and regulatory framework within which it operates. We expect the industry to evolve more rapidly over the next decade; the trends which will shape this transformation are briefly discussed below.

Manufacturing Efficiency: Increased volatility and competition on both the supply and demand sides has put pressure on food and beverage manufacturers. We anticipate that manufacturing units will increasingly focus on better capacity utilization, optimum utilization of raw materials and inputs, minimizing wastage across the value chain, leveraging technology, and focus on innovation. We also foresee a greater concern for and responsibility towards the environment, leading to the adoption of more environment-friendly processes.

Product Differentiation: New age consumers are open to experimentation and seek products tailored for their needs. It is also important for manufacturers to stand out amid a crowded marketplace, and hence, product differentiation becomes important.

Big is better: To achieve economies of scale, we will see more collaboration and consolidation among players in the industry. This will enable companies to manage complexity, volatility, and uncertainty in a better manner. Companies which are vertically integrated or work in close collaboration with stakeholders upstream and downstream along the value chain have greater visibility and access to business intelligence. They can also wield greater influence on their environment and are thus better equipped.

Value Chain Restructuring: In tandem with dynamic changes occurring in the marketplace, the food value chain is also expected to evolve. We expect to see increasing collaboration and coordination among value chain actors. Manufacturers may work in close coordination with retailers in order to understand and adapt to changing consumer preferences. They will have to work closely with producers and suppliers as well so as to secure a supply base and minimize risk. Information and Communication Technology (ICT) will make it possible to have access to more information about the journey of food from farm to fork. All these factors may lead to restructuring of the value chain and we may see a complete makeover of the value chain.

Safety: Consumers will demand transparency about the food journey from farm to fork. Meanwhile, the industry may respond to safety concerns by either adhering to third-party standards or raising their own internal standards and sharing information with consumers in transparent manner. We can already see the trend of consumers paying price premium for products which use fewer additives.

Retail Brands: Organized retail will play an increasingly larger role in the years to come, especially in emerging markets. Currently, the market share of private brands within their respective product categories is marginal, but in coming years we anticipate their increasing share.

The future unfolds in unexpected ways, but we have summarized the trends as we see it in our crystal ball.

About Technopak

India's leading management consulting firm with more than 20 years of experience in working with organizations across consumer goods and services.

Founded on the principle of "concept to commissioning", we partner our clients to identify their maximum-value opportunities, provide solutions to their key challenges and help them create robust and high growth business models.

We have the ability to be strategic advisors providing customized solutions during the ideation phase, implementation guides through start-up assistance, and be a trusted advisor overall.

Drawing from the extensive experience of close to 125 professionals, Technopak focuses on four major divisions, which are Retail & Consumer Products, E-tailing; Fashion (Textile, Apparel & Engineering); Food Services & Agriculture, and Education.

Our key services are:

Business Strategy. Assistance in developing value creating strategies based on consumer insights, competition mapping, international benchmarking and client capabilities.

Start-up Assistance. Leveraging operations and industry expertise to 'commission the concept' on turnkey basis.

Performance Enhancement. Operations, industry & management of change expertise to enhance the performance and value of client operations and businesses.

Capital Advisory. Supporting business strategy and execution with comprehensive capital advisory in our industries of focus.

Consumer Insights. Holistic consumer & shopper understanding applied to offer implementable business solutions.

Our Divisions

Food Services & Agriculture

Technopak's Food Services & Agriculture team comprises of established domain experts who build and enhance the business performance of organizations which are either working in the sector or are willing to enter this space. Our end-to-end solutions are customized as per the business's requirements and capabilities. We continuously strive to create strong industry relationships and work for a global footprint by delivering a wide range of services to organizations that operate or wish to operate in the Food and Agriculture sector, in India as well as internationally.

Retail & Consumer Products, E-tailing

Technopak aids retailers and consumer product companies in formulating growth strategy and performance enhancement mandates. Over the past two decades, we have worked on various facets such as entry into the Indian market, development of new category, activation of new retail formats, channel development, product extension, region expansion etc. One key reason why Technopak is considered the industry leader is the relentless focus on the Indian Market. We help clients understand the market dynamics in India and help them arrive at the best method to grow business in India. Our Retail and Consumer product expertise helps gain a competitive edge by providing execution capabilities and corporate strategies.

Fashion - Textile, Apparel & Engineering

With almost 20 years of experience in delivering end-to-end solutions to the entire gamut of the textile industry, right from fibre to retailing, the Fashion division at Technopak assists the textile and apparel organizations in optimizing their profits through enhancement and expansion. Many leading Indian and international Textile manufacturers and Apparel brands have benefited from our offerings in the areas of business planning and strategy, apparel operations, supply chain management and strategic alliances. Our team consists of top calibre advisors who have worked closely with a diverse group of clients comprising textile manufacturers, apparel retailers, garment manufacturers and exporters, apparel sourcing organizations, trade promotion councils, industry associations, international development bodies, and financial institutions as well as central and state governments.

Education

Technopak Education division has a vast understanding of the sector in terms of industry environment, growth potential, regulation and policy, which has enabled us to become a thought leader in the sector. Technopak caters to all the education segments – K-12, Higher Education, Vocational Training and ancillaries. Innovative business models and government thrust on privatization has led to assertive participation by private organizations. Such participation spans various levels of investment and operational scale, be it organization planning for expansion in the country or foreign institutions aiming to foray into the Indian education sector.

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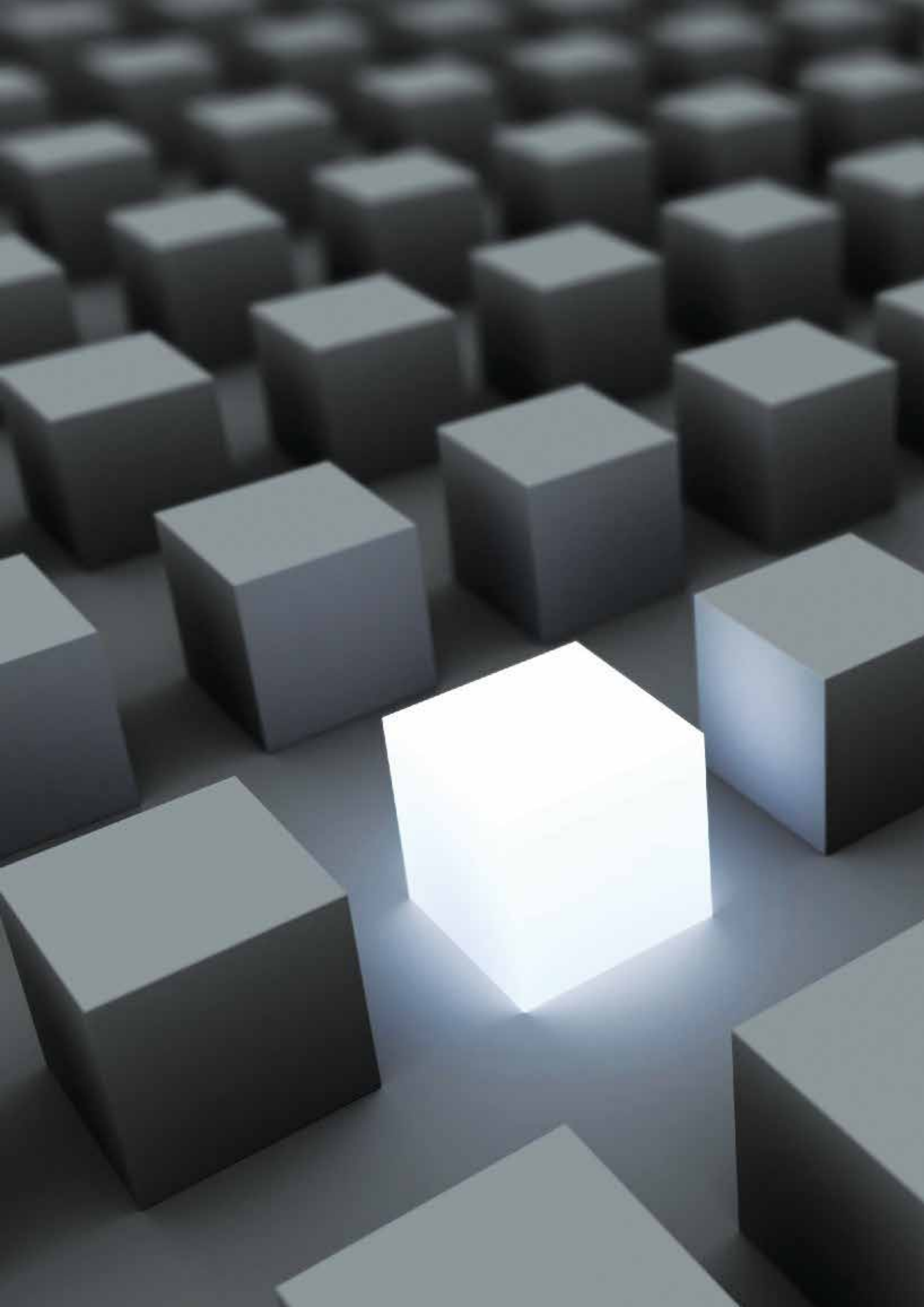
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About PHD Chamber

The PHD Chamber as one of the prestigious Chambers. Being 109 years old it is one of the oldest Chamber's in the country. We have had the milestone opportunity of working with the business houses, Government in the Centre State, Communities, International bodies and also reaching the smallest industrial clusters with our programmes on technology transfer and information sharing. Since development is an area we are closely working with the stakeholders to impart training and also certifying. Our focus areas are Infrastructure, Industrial Policy, Education & Skill Development, Health and Rural Development & Agribusiness. Besides housing the Secretariat, the prestigious PHD House, headquarters of the Chamber, also has exquisite Conference Rooms, an excellent 250-seater auditorium, Business Centre, and a host of other facilities to cater to the Members' business requirements. Conference Manager of the Chamber will be happy to assist you on this.

"PHD Chamber is more than an organization of the business community, as it lives by the chosen motto 'In Community's Life & Part of It' and contributes significantly to socio-economic development and capacity building in several fields through its research-based policy advocacy role, positively impacts the economic growth and development of the nation amongst its key thrust areas. In a nutshell, the Chamber acts as a catalyst in the promotion of industry, trade and entrepreneurship. The Chamber also circulates its consolidated monthly generic publication "PHD Bulletin" amongst all its members, International MOU Partners, Diplomats and Govt. Officials, is an insightful issue on all the day-to-day functioning and various activities undertaken by the Chamber.

The Chamber caters to the business, economical and social interests of Chhattisgarh, Bihar, Delhi, Haryana, Himachal Pradesh, Jharkhand, Jammu & Kashmir, Madhya Pradesh, Punjab, Rajasthan, Uttar Pradesh, Uttarakhand and the Union Territory of Chandigarh. The Chamber comprises of over 2000 corporates as its direct members and serves more than 48,000 indirect members through 200 Association Members and 8 Secretarial Affiliates. The Chamber operates through its Expert and State Committees and Task Forces on various important subjects which are supported by an effective Secretariat and allied infrastructure, including a full-fledged Library, Data Bank, Information Cell, Computer Cell etc. PHD Chamber reconstitutes its various Expert/State Committees every year. These Committees consist of experts drawn from amongst the membership and also special invitees. PHD Chamber attaches great importance to these Committees as it draws upon the knowledge and expertise of persons nominated on such Committees for rendering effective and result oriented services to its membership.



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