



Forum of Enterprises for
Equitable Development

Beyond the Farm

Unlocking the Potential
of India's
Agri-Value Chains

POLICY BRIEF 02



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Understanding Agricultural Value Chains

Key Concepts and Importance

A value chain encompasses a series of interconnected activities required to bring a product or service from its initial conception through various stages of production, value addition, delivery to consumers, and eventual disposal. In agriculture, a value chain brings together all stakeholders involved in the production system on a common platform, facilitating collaboration, ensuring transparency, and enabling each participant to contribute effectively. The ultimate goal is to enhance efficiency, improve price realization, and increase profitability for all actors involved.

Efficient linkages between stakeholders—ranging from farmers and processors to distributors and retailers—are essential for improving production efficiency, optimizing price realization, and boosting profitability. Interventions within the value chain can focus on enhancing business operations at the level of producers, processors, and other actors, as well as on improving the (contractual) relationships among them. Additionally, the flow of knowledge, information, and innovation is crucial to the value chain's success.

A high-performing value chain relies on coordination and cooperation among its actors. When stakeholders within the chain work together effectively, they can produce higher-quality products, generate greater income, and ensure that all parties benefit fairly from the value created along the chain.

Essential Conditions for an Efficient Agricultural Value Chain

To be deemed most efficient, an agricultural value chain must fulfill two essential conditions:

01. Compactness

The value chain should avoid duplication and overlapping of actors and activities. Each participant should have a clear, distinct role, with streamlined processes that eliminate redundancy.

02. Transparency

The value chain must operate transparently, where stakeholders are fully aware of each other's roles and how their actions influence others within the chain. This transparency ensures that value creation and sharing are done fairly and equitably.



Differences Between Supply Chain and Value Chain in Agriculture

Value Creation:

In a value chain, the focus is on the creation of value through operations and activities from production to the delivery of agricultural commodities to consumers. This value creation is essential, with an emphasis on improving product quality and generating higher income for all stakeholders.

In a supply chain, value creation is not necessarily a priority. The primary concern is the movement of goods from producers to consumers, often without a concerted effort to enhance or distribute value among the participants.

Transparency and Coordination:

A value chain requires transparency and coordination among stakeholders. Each actor in the chain is aware of the actions and contributions of others, which fosters cooperation and ensures that value is fairly distributed among all participants.

In a supply chain, stakeholders may operate in a more disjointed manner, with limited awareness of each other's roles and the impacts of their actions, leading to less coordinated efforts and potentially less value creation.



THE ESSENTIAL ROLE OF VALUE CHAINS

In today's interconnected and rapidly evolving global economy, the agricultural value chain is more vital than ever. The global agribusiness value chain, with an estimated total value of around US\$5 trillion, plays a crucial role in providing sustainable access to affordable food, feed, fiber, and increasingly, fuel. As the global population grows and economies expand, the demand for increased crop and food production intensifies. This demand is further compounded by policies promoting biofuels, which have introduced a significant new source of demand into the global agricultural equation.

The Growing Complexity and Volatility of Supply and Demand

The agricultural sector faces a complex and volatile landscape influenced by multiple factors. While demand for agricultural products tends to be relatively smooth and predictable, supply is much more erratic, largely due to environmental factors such as weather conditions. The advent of global warming is expected to exacerbate this volatility, making weather-driven disruptions more common. On the political front, government actions—such as subsidies, trade policies, and the push toward biofuels—have had a destabilizing effect on world markets, further complicating the supply-demand equation.

In this context, it has become widely accepted that crop prices will remain high and above their long-term historic levels, a continuation of the so-called commodity 'supercycle.' This persistent price elevation reflects the underlying instability and uncertainty in global agricultural markets.

The Multifunctionality and Complexity of Agriculture

Agriculture today is far more than just the provision of food, feed, and fiber. The sector is increasingly being called upon to supply biofuels, transforming it into a multifunctional industry. This shift adds layers of complexity to the already intricate agricultural value chain, which involves a vast array of crops and food types, each with its own distinctive and often fragmented supply chain. The diversity within each crop—stemming from variations in production methods, regional differences, and annual environmental fluctuations—further complicates the value chain.

The Growing Need for Scrutiny and Traceability

As the agricultural value chain becomes more complex and multifaceted, there is increasing pressure to enhance the traceability of food products. Several factors drive this demand:

- **Food Safety Concerns:** Heightened awareness of food safety issues has led to a greater need for traceability, ensuring that food products can be tracked from farm to fork.
- **The Rise of GM Crops:** As genetically modified (GM) crops gain significant penetration, particularly in commodity crops, there is a growing need for identity preservation to ensure that GM and non-GM crops are appropriately managed and marketed. This requirement can also act as a barrier to trade, necessitating careful consideration and management within the value chain.
- **Consumer Awareness:** Modern consumers are increasingly interested not only in the content and safety of their food but also in how it is produced and its environmental and social impacts. This shift in consumer preferences has further heightened the need for transparency and traceability throughout the agricultural value chain.

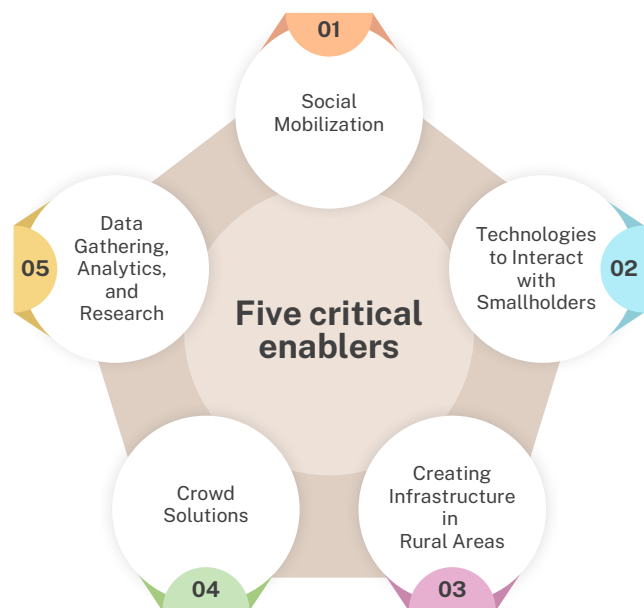
THE IMPACT OF INFORMATION TECHNOLOGY ON VALUE CHAINS

Information Technology (IT) has revolutionized every stage of the agricultural value chain, offering new innovation platforms and tools for stakeholders across the board. For input suppliers, IT has paved the way for advancements in bioinformatics, seeds, and precision agriculture. Farmers, equipped with mobile phones, now have better access to market and agronomic information, such as crop prices, weather forecasts, and financial resources like credit and insurance.

Food companies and retailers have also embraced IT, particularly through social media, to enhance their marketing strategies and customer engagement. Beyond individual stages, IT has played a critical role in integrating the entire value chain by enabling the tracking of crops and foodstuffs from production to consumption. This capability is essential for traceability, ensuring that all stages of the value chain are transparent and accountable.

To build a robust agricultural value chain architecture that meets the demands of modern agriculture and supports the livelihoods of smallholders, five critical enablers are essential:

- **Social Mobilization:** Engaging and organizing smallholders and rural communities is fundamental to ensuring their active participation in the value chain. Effective social mobilization empowers farmers, enhances their bargaining power, and fosters collective action, which is crucial for scaling up agricultural practices.
- **Technologies to Interact with Smallholders:** The adoption of technologies that facilitate direct interaction with smallholders is vital. This includes mobile platforms for disseminating market information, precision agriculture tools, and digital payment systems that enable smallholders to access resources, training, and markets more efficiently.
- **Creating Infrastructure in Rural Areas:** Building infrastructure, such as roads, storage facilities, and irrigation systems, in rural areas is critical for improving access to markets and reducing post-harvest losses. Adequate infrastructure also supports the efficient movement of goods, enhances productivity, and attracts investment in rural regions.
- **Crowd Solutions:** Leveraging crowd-based solutions, such as crowdfunding and crowdsourcing, can provide innovative ways to finance agricultural projects, gather ideas, and involve a broader community in value chain development. These solutions can help bridge the gap between smallholders and larger markets or investors.
- **Data Gathering, Analytics, and Research:** The collection and analysis of data are crucial for informed decision-making in agriculture. By conducting research and utilizing data analytics, stakeholders can better understand market trends, assess risks, and develop strategies that improve the efficiency and competitiveness of value chains.



THE CISS MODEL

Identifying and implementing successful business models within agricultural value chains requires careful evaluation based on specific criteria.

The CISS model—which stands for Competitiveness, Inclusiveness, Scalability, and Sustainability—can be used to score and grade existing business models and institutions. This framework provides a structured approach to evaluating and identifying the winning propositions within agricultural value chains. By applying these criteria, stakeholders can ensure that the selected models are well-positioned to drive positive outcomes and achieve success in the agricultural sector.



1. Competitiveness

The business model must be competitive both domestically and globally. It should offer value propositions that are attractive to consumers and stakeholders, ensuring that the model can thrive in a competitive market environment.



2. Inclusiveness

Inclusiveness is crucial, especially in countries with a large number of small producers. The model should ensure that smallholders and marginalized groups benefit from participation and opportunities within the value chain.



3. Scalability

The model should be scalable, meaning it can expand and adapt to larger volumes or new regions while remaining viable. Scalability ensures that the business model can grow and meet increasing demands without losing effectiveness.



4. Sustainability

Sustainability is essential from both environmental and financial perspectives. The model must be environmentally friendly, minimizing negative impacts on natural resources, and financially sustainable, ensuring long-term viability and profitability.

STRUCTURAL CHALLENGES IMPEDING AGRICULTURAL VALUE CHAIN DEVELOPMENT

The development of agricultural value chains is increasingly recognized as a powerful tool for poverty reduction, particularly for marginal farmers. By enhancing value addition beyond conventional crops, value chains have the potential to elevate agricultural productivity and economic stability. This chapter explores the structural challenges in agricultural value chain development in India and provides data-driven insights to substantiate these issues.

As already discussed, agricultural value chains encompass a sequence of value-adding activities from production to consumption, including processing and marketing. Each segment within the chain has backward and forward linkages that influence overall efficiency and effectiveness. Despite the importance of these value chains, India faces significant challenges in optimizing this framework particularly in the context of marginal farmers.

THE CONTEXT OF MARGINAL FARMING

Marginal farmers, who predominantly operate on small and fragmented plots, constitute a substantial portion of the agricultural workforce in India. According to Thapa and Gaiha, Asia and the Pacific region are home to 87% of the world's 500 million small farms, with China and India accounting for 193 million and 93 million small farms, respectively. Despite the shift from subsistence to market-oriented production, marginal farmers continue to face myriad of challenges that significantly impact their ability to thrive in the agricultural value chain.

Agricultural value chains can be visualized as a pyramid. Marginal farmers are at the base of this pyramid, with firms and middlemen occupying the middle levels, and consumers at the top. The challenge is to ensure that the resources and prices paid by consumers trickle down effectively to the base of the pyramid, providing sustainable support to marginal farmers. These are certain challenges marginal farmers persistently facing in actively participating in agri-value chain development:

Infrastructure and Investment Challenges

India's agricultural sector faces challenges due to insufficient infrastructure connecting farmers to markets, leading to significant post-harvest losses. Compared to other countries where 5-15% of yield is wasted, India experiences a higher waste percentage of 15-20%.

Additionally, the shift in demand from cereals to high-value commodities like fruits, vegetables, milk, meat, and fish requires substantial investments in cold chains, refrigeration, warehousing, and logistics. Unfortunately, agricultural investment in India has been stagnant, with a compound annual growth rate (CAGR) of less than 2% over the past five years, hindering sector progress and modernization. These necessary investments often exceed the financial capacity of small farmers, making it challenging for them to upgrade and meet market requirements.

Credit and Financial Challenges

Over the past decade, commercial banks and multinational buyers have experimented with various models to provide financing to weaker players integrated into sourcing value chains. However, there is a disproportionate growth of credit relative to savings and agricultural productivity. This disparity highlights the inefficiencies in financial systems that fail to support marginal farmers adequately.

Marginal farmers often struggle with limited access to credit, which affects their ability to invest in productivity-enhancing technologies and inputs. This financial constraint is compounded by the high cost of aggregation, which involves collecting produce from widely dispersed farms, arranging transport, and ensuring quality control. These processes not only incur significant costs but also require considerable time.

Inefficiencies in Agricultural Marketing

The marketing of agricultural products in India is characterized by disorganization and inefficiency, marked by loose sales at the village level involving numerous intermediaries who contribute little value. The current system suffers from fragmented supply chains, high transaction costs, inadequate price discovery, and poor market infrastructure. Studies indicate that even for the commodities where markets are interconnected, producers receive a low share of the consumer price.

In this segment, one of the critical challenges faced by marginal farmers is the very small marketable surplus they produce. Despite India ranking among the top three producers globally for many agricultural commodities, the marketable surplus from individual producers is insufficient to compete effectively in global markets. Consequently, marginal farmers have limited bargaining power, high marketing costs, and elevated transaction costs.

The aggregation of marginal farmers presents additional challenges. The dispersed nature of production centers for crops like pulses, coupled with unchanged consumption centers, leads to inefficiencies in the supply chain. Transportation and processing costs have risen substantially, affecting the overall cost structure for marginal farmers.

BREAKING DOWN CHALLENGES INTO PROBLEMS

Despite various policy supports, marginal farmers continue to grapple with several structural issues:



MONOPOLY AND MARKET INFRASTRUCTURE

The monopoly of licensed agents and inadequate market infrastructure in agricultural markets limit fair access and efficiency.



MARKET ACCESS

High market charges (up to 15% in some states) and significant wastage in the supply chain further erode the profitability of marginal farmers.



INFRASTRUCTURE DELAYS

Long gestation periods for infrastructure projects and poor price realization contribute to the difficulties faced by farmers.



MARKETING CHANNELS AND INTERMEDIARIES

The presence of numerous marketing channels and intermediaries adds complexity, leading to inefficiencies and high marketing costs.



MARKET INFORMATION

The lack of accurate and timely market information impedes decision-making and exacerbates the challenges faced by marginal farmers.

INVESTMENT LANDSCAPE

IN INDIA'S AGRI-VALUE CHAIN DEVELOPMENT

Investing in the agricultural value chain is crucial for modernizing India's agriculture sector, improving productivity, and ensuring sustainability. Gross Capital Formation (GCF) is a key indicator of such investments, representing the total investment in physical assets, including new and existing fixed assets like machinery, buildings, land improvements, equipment, and inventory changes. Strengthening the agri-value chain through sustained investment in these areas is vital for driving economic growth and achieving the goal of doubling farmers' incomes.

In recent years, the GCF in the agriculture sector has shown a steady increase, particularly in its share relative to the Gross Value Added (GVA) in agriculture and allied sectors, largely driven by heightened public investment. Between 2016-17 and 2022-23, the GCF recorded an average annual growth of 9.70%. According to the 2016 Doubling Farmers' Income (DFI) report, to double farmers' incomes by 2022-23, the agriculture sector would require an annual growth rate of 10.4%, which in turn demands an annual growth rate of 12.5% in agricultural investments.

However, several challenges hinder investment in the agricultural sector. Fragmentation of agricultural land is a significant barrier, as it reduces the capacity of farmers to make substantial investments. Furthermore, the private corporate sector's involvement remains minimal, with its contribution to the sector's GCF still below 2%.

To address these challenges, several government initiatives have been implemented. The Agriculture Marketing Infrastructure (AMI) sub-scheme under the Integrated Scheme for Agricultural Marketing (ISAM) is one such initiative, offering capital subsidies to improve storage infrastructure. This demand-driven, credit-linked scheme extends subsidies to a broad range of stakeholders, including individual farmers, Farmer Producer Organizations (FPOs), cooperatives, and state agencies. As of April 30, 2024, 48,357 projects had been sanctioned under this scheme, with ₹4,570 crore disbursed as subsidies. An additional 20,878 projects are currently underway, with ₹2,084 crore already released in subsidies.

The Agriculture Marketing Infrastructure (AMI) progress

48,357

projects sanctioned

20,878

additional projects are currently underway

₹ 6,654 cr.

released in subsidies

While subsidies have played an important role in encouraging farmers to adopt sustainable agricultural practices by supporting short-term productivity and income increases. Yet, for long-term modernization, higher levels of investment are necessary, particularly from the private sector, in areas such as post-harvest infrastructure.

Another significant initiative is the Agriculture Infrastructure Fund (AIF), which was launched to strengthen farm gate infrastructure and increase private sector participation. With a financing facility of ₹1 lakh crore to be disbursed between FY 2020-21 and FY 2025-26, and support extended until FY 2032-33, the AIF offers medium-term debt financing for post-harvest management and community farming projects.

The Agriculture Infrastructure Fund (AIF) progress

₹ 73,194 cr.

worth of investment mobilized supporting

17,196

custom hiring centers

2,942

sorting and grading units

14,868

primary processing units

1,792

cold storage projects

13,165

warehouses

18,981

other projects

The government's current focus is on empowering farmers to invest in their farmlands by improving their access to affordable credit. Their primary goal is to provide timely, cost-effective, and adequate credit to reduce reliance on non-institutional sources and boost agricultural investments. This effort has led to a significant decrease in non-institutional credit, dropping from 90% in 1950 to 23.4% in 2021-22.

Introducing a related initiative, the Pradhan Mantri Kisan SAMPADA Yojana (PMKSY) offers credit-linked financial aid through grants to streamline the supply chain from farms to retail. This helps minimize wastage of perishable goods and extend the shelf life of food products.

Pradhan Mantri Kisan SAMPADA Yojana (PMKSY) progress

1,685

projects approved, totaling

₹ 32,780 cr.

in project costs and

₹ 9,300 cr.

in approved subsidies.



INDIA'S PROBLEM OF PLENTY

Today, food is the primary driver of inflation in India, with perishables making the most significant contribution to rising prices. This isn't due to a supply deficit, but rather a lack of efficient supply systems, which perpetuate inflation in food items. The mismatch between supply and demand infrastructure underscores a broader issue in India's agricultural value chain—an inefficient cold chain system.

India boasts the world's largest capacity in cold storage, with a staggering 32.86 million metric tons (MT) spread across approximately 7,129 facilities. However, this capacity primarily serves storage needs rather than enhancing transport and distribution networks. Many studies have pointed out that India needs around 61 million MT of cold storage (commonly referred to as 'cold-chain') to efficiently manage its agricultural produce, indicating a deficit of 31-36 million MT. However, the National Centre for Cold-chain Development (NCCD) and NABCONS conducted a comprehensive assessment and estimated that the country requires around 35.1 million MT — far lower than the earlier estimate.

Despite India's significant storage capacity, 88 percent of the agriculture-related infrastructure is focused solely on storage, with only 12 percent dedicated to transport linkages. This imbalance is a significant barrier to creating an integrated and efficient cold chain system that could better support India's agricultural sector.

Integrated cold-chains have the potential to significantly boost farm productivity by reducing perishability and connecting farms with regional and national markets. By providing farmers with physical access to more markets, cold-chains can increase revenue potential and justify further investments in productivity and production. However, the current cold-chain infrastructure in India is skewed. Most of the cold-chain capacity, particularly refrigerated trucks, is dedicated to frozen processed foods (such as ice cream, frozen peas, and meats), pharmaceuticals, and imported foods. Unfortunately, the domestic supply of fruits and vegetables is largely neglected.

A critical shortfall in the cold-chain system is the lack of pack-houses, which are essential for processing and preparing produce for transportation. Without these facilities, fruits and vegetables cannot be properly inducted into the cold-chain, leading to significant losses in potential income for farmers. Moreover, although many cold storages facilitate the transportation of commodities, 79 percent of them do not own any transportation means. This gap between storage and transport infrastructure is one of the primary roadblocks in maintaining the integrity of cold-chains.

All India Cold-chain Infrastructure Capacity & Gap

Type of Infrastructure	Total requirement (A)	All India existing (B)	All India gap (A-B)
Modern pack-house	789 units	249 units	69,831 units
Cold storage (Bulk)	3,41,64,411 MT	3,18,23,700 MT	32,76,962 MT
Cold storage (Hub)	9,36,251 MT		
Reefer transport	61,826 units	9000 units	52,826 units
Ripening chamber	9131 units	812 units	8319 units

To maximize earnings and ensure the freshness of produce, the cold-chain must start at the farm gate and efficiently reach consumers. However, the absence of appropriate infrastructure for aggregation and marketing exacerbates the challenges faced by India's agricultural sector. Without a well-developed cold-chain, the country struggles to maintain the quality of its perishable produce, contributing to waste, inefficiencies, and inflation in food prices.

STATUS OF FRUITS AND VEGETABLES PRODUCTION, PROCESSING AND TRADE

India is the third-largest agricultural producer globally, yet it currently achieves only about 60 percent of its potential yield for most crops. In the realm of fruit processing, India lags significantly behind other countries, with only 4 percent of its fruits being processed, compared to 23 percent in China, 50 percent in Indonesia, and 70 percent in Brazil. Additionally, the country suffers from an alarmingly high loss of agricultural products, estimated at 25-30 percent of total production.

This inefficiency in the agricultural value chain underscores the need for substantial reforms, particularly as consumer preferences in India are rapidly evolving. With a growing youth and working-class population, there is an increasing demand for frozen, pre-cooked, and ready-to-eat items. The proliferation of shopping malls and eating joints has further intensified this shift, necessitating improvements in the quality, safety, production, processing, and distribution of agricultural products. Farmers are thus compelled to diversify their production systems, and in some regions, they are beginning to adapt to these changes. This shift opens up significant opportunities for expanding the domestic market for non-conventional crops such as fruits

and vegetables.

Fruits and vegetables offer considerable advantages to farmers, providing 2-4 times higher incomes compared to cereals while consuming 40-80 percent less water per hectare. These products are also characterized by high income elasticity of demand, meaning that as incomes rise, the demand for these higher-value crops increases. On the supply side, new technologies and trade agreements present opportunities to enhance production and distribution, aligning with the changing demands of consumers.

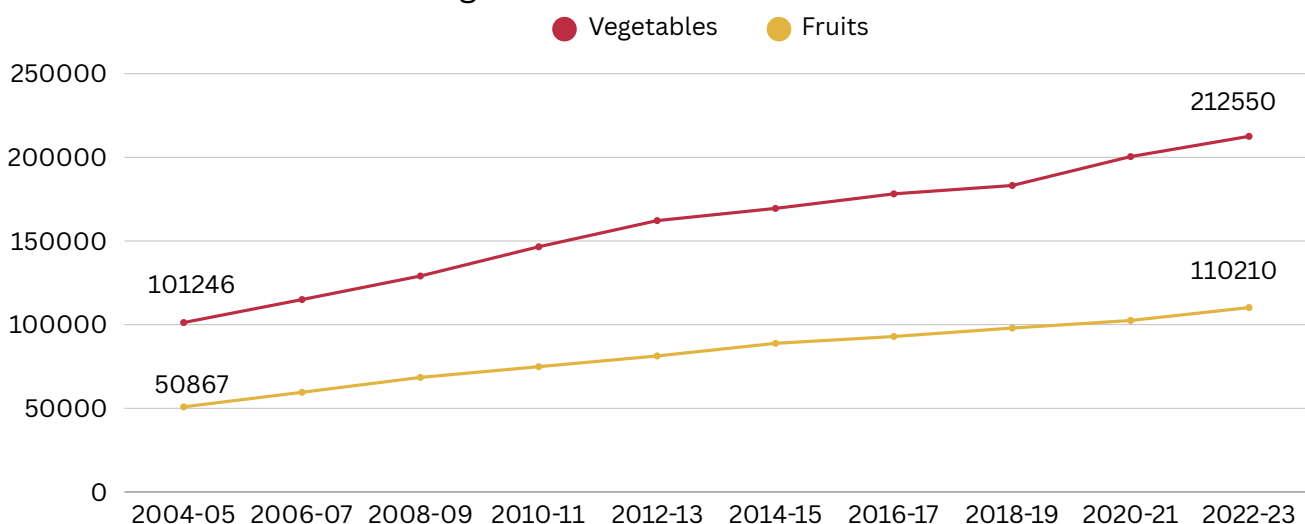
The case of PepsiCo's agricultural operations in India serves as a prime example of how the private sector can play a pivotal role in this transformation.



Despite several positive developments in India's agricultural sector, the growth rate of vegetable production has shown signs of stagnation over the past two to three years, with slight fluctuations observed. In contrast, fruit production has experienced a more stable, steady growth over the past decade. The data below illustrates the trends in vegetable and fruit production from 2004-05 to 2022-23:

Year	Vegetables	Fruits
2004-05	101246	50867
2006-07	114993	59563
2008-09	129077	68466
2010-11	146554	74878
2012-13	162187	81285
2014-15	169478	88819
2016-17	178172	92918
2018-19	183170	97967
2020-21	200445	102481
2022-23	212550	110210

Fruits and Vegetables Production in India (In '000 MT)



This data reveals that while there has been a consistent increase in the production of both vegetables and fruits, the rate of growth for vegetables has slowed down in recent years. Meanwhile, fruit production has maintained a steady growth trajectory. Despite this, the country has yet to fully capitalize on its export potential, particularly within South Asia. By strategically investing in value chain development, India can significantly enhance its fruit exports to neighboring countries, tapping into a lucrative market with immense growth prospects.

The table below illustrates India's total production, current exports, and the potential trade opportunities within South Asia:

	Apple	Fresh Bananas	Fresh Oranges	Fresh Grapes	Guava and Mangoes	Papaya
India's Rank	5	1	3	7	1	1
India's Total Production	2437370	35364110	6264620	3358000	24968000	57442600
India's Total Export	52892	363879	89076	343982	171749	9440707
India's Export to South Asia	52637	57816	73001	103533	18501	7017747
South Asia's Imports From World	122675	58342	387572	153476	20378	9192135
Trade Potential (India to South Asia)	70038	526	314571	49943	1877	274388

Source: Author's calculation based on the data from APEDA AgriExchange and WITS Database for year 2022-23 (the values are in kg)

India's agricultural landscape is often dominated by discussions around the Minimum Support Price (MSP) system, which currently benefits only 8% of the country's farmers. While MSP provides a safety net for some, it is not the only or even the most effective way to empower farmers and integrate them into the global market. A compelling alternative is the development of robust agricultural value chains, as demonstrated by PepsiCo's operations in India.

Case Study: PepsiCo's Agricultural Operations in India

PepsiCo's agricultural operations in India illustrate the potential benefits of integrating private sector expertise with traditional farming practices. Currently, 26 percent of PepsiCo's turnover in India comes from processed agricultural products such as rice, potatoes, peanut butter, tomato, chili, garlic, and ginger pastes. The company has established contracts with the Punjab Agro Industries Corporation and Punjab Agricultural University for contract farming and research purposes. PepsiCo provides farmers with inputs and technology, ensuring that they can supply agricultural products at an agreed price and fixed quantity. This arrangement not only guarantees good quality for the company but also mitigates risks for farmers, such as crop infestation and adverse weather conditions.

This model is particularly relevant in the context of India's broader agricultural sector, where marginal farmers often struggle with market access and price volatility.

Farmer Collectives and Supply Chain Integration

For farmer collectives to be truly effective, they must integrate into supply chains that add value and distribute gains equitably. PepsiCo's model shows that when smallholder farmers are brought into a well-structured supply chain, they benefit from economies of scale, improved bargaining power, and shared profits. This approach ensures that the benefits of the value chain reach even the smallest farmers, making collectives sustainable and successful.

Innovative Financing and Agri-Export Zones

PepsiCo's contract farming model also highlights the importance of innovative financing mechanisms in agricultural value chains. By ensuring that farmers have secure contracts, PepsiCo indirectly facilitates access to credit, as financial institutions are more willing to lend to farmers with assured market access. This mirrors international examples, such as Tanzania's maize sector, where farmers use warehouse receipts to secure loans, allowing them to purchase inputs without selling their crops at low prices.

India's 60 agri-export zones, such as the Maharashtra Onion zone, provide further opportunities for integrating farmers into global value chains. By focusing on product-specific zones, India can enhance its export potential, just as PepsiCo has done by creating specialized supply chains for processed foods.

The Shift from 'Farm-to-Fork' to 'Plate-to-Plough'

PepsiCo's success also points to the need for a shift in focus from production-centric to market-centric agriculture. The traditional 'farm-to-fork' model is being replaced by a 'plate-to-plough' approach, where consumer demand drives production. PepsiCo's ability to tap into consumer preferences and translate them back to production decisions is a key reason for its success. India's agricultural policies need to reflect this shift, aligning production with market demand to enhance both domestic and export-oriented agriculture.

Smallholder Efficiency: A Case for Innovation

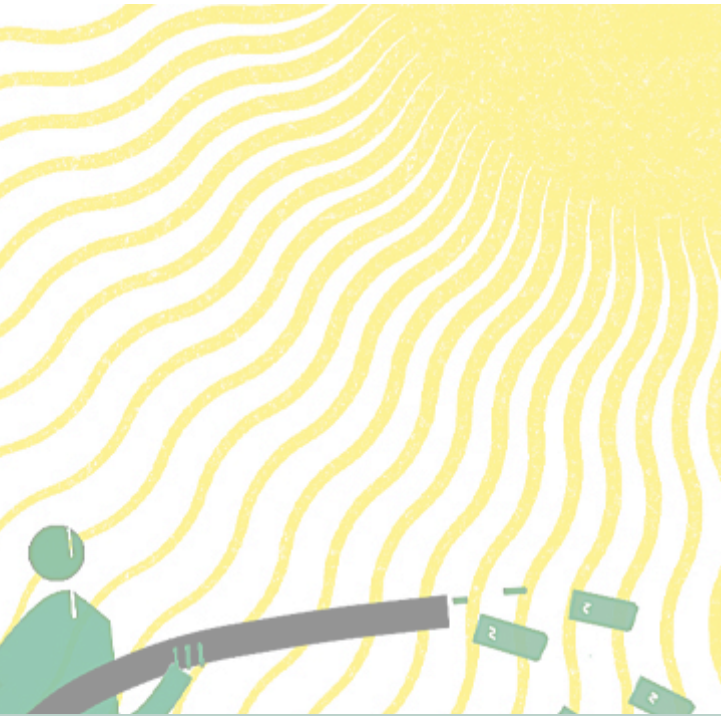
While India's average landholding size is larger than China's, India's agricultural productivity lags behind. PepsiCo's work with smallholder farmers shows that land size is not necessarily a constraint; rather, efficiency and innovation are the keys to higher productivity. By adopting best practices, smallholders in India can achieve significant gains in yield and quality, much like their counterparts in China.

Marketing Challenges and Diverse Value Chains

PepsiCo's experience also underscores the challenges that farmers face in the marketing of their produce. The four Ps of marketing—price, product, place, and promotion—are often beyond the control of individual farmers. By integrating farmers into its value chain, PepsiCo helps them overcome these challenges, ensuring that their produce reaches the right markets at the right price.

India's agriculture sector can benefit from understanding that value chains are not uniform. They vary by region, product, and market type—whether organic, fair trade, or conventional. PepsiCo's ability to navigate these diverse value chains and create tailored solutions for different markets is a lesson that can be applied to India's broader agricultural landscape.

CREATING A COMPELLING CASE FOR MOVING OUT OF MSP



THE LIMITED SCOPE OF MSP COMMODITIES

The Minimum Support Price (MSP) regime, which currently covers 23 commodities, constituted less than 28% of the total agricultural output in 2021-22. In stark contrast, sub-sectors outside the MSP framework, such as horticulture, livestock, and poultry, account for over 72% of agricultural output. These sectors, particularly poultry meat and eggs, have exhibited impressive growth, averaging 7.1% per year from 2000-01 to 2021-22. This disparity underscores the vast potential that lies in diversifying beyond MSP-supported crops.

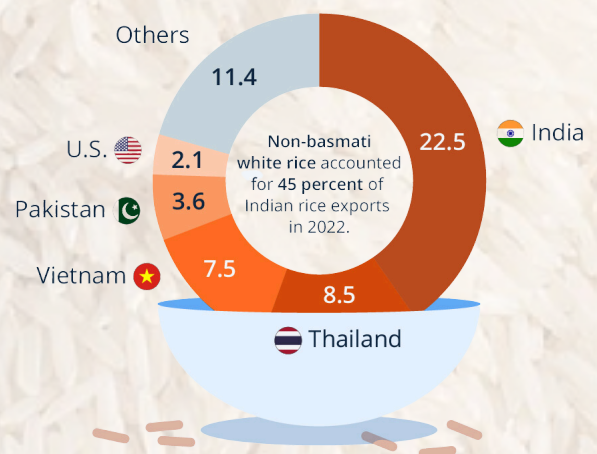
CAPITALIZING ON HIGH-GROWTH SECTORS

By shifting focus to rapidly growing segments like horticulture, livestock, and spices, farmers can tap into greater economic opportunities. This diversification can help mitigate the challenges posed by stagnating incomes in traditional crop sectors.

For instance, while India remains a significant player in global rice exports, continuing policies from the 1960s — when the country faced severe food shortages — no longer aligns with the current context. In 2022-23, India exported 22.5 million metric tons of rice, accounting for 40% of global rice trade, illustrating its dominant position and the reduced necessity for MSP-based policies aimed at ensuring food security.

The World's Biggest Exporters of Rice

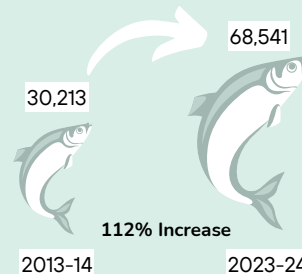
Biggest exporters of rice worldwide in 2022 (in million tons)



HIGH-VALUE COMMODITIES - TRENDS & INSIGHTS

The agricultural sector is increasingly seeing a shift towards high-value commodities. The share of crops in Agriculture Gross Value Added (GVA) at current prices decreased from 61.75% in 2014-15 to 55.28% in 2022-23. Meanwhile, allied activities such as livestock and fisheries have shown robust performance, with their share in agriculture GVA rising from 24.38% and 4.44% respectively in 2014-15 to 30.23% and 7.25% in 2022-23. The poultry sector, for instance, has evolved from a backyard activity into a fully integrated and commercial industry, largely driven by private sector investment.

INDIA ACHIEVED AN ALL-TIME HIGH
EXPORTS OF FISH AND FISH PRODUCTS
(IN Rs. Crore)



Similarly, the fisheries sector has emerged as a significant contributor to agricultural exports, accounting for approximately 15.2% in 2022-23. This sector has become a substantial source of income for fishing families, highlighting the potential of non-traditional agricultural activities.

THE ROLE OF HORTICULTURE AND INNOVATIVE TECHNIQUES

Horticulture, in particular, is growing at a much faster pace than cereals. Innovative production techniques, such as cultivating under controlled environments in polyhouses equipped with fertigation systems, can significantly enhance productivity and incomes for farmers. These methods not only boost yield but also conserve vital resources like water and fertilizers.

ENCOURAGING PRIVATE SECTOR INVESTMENT

As consumer incomes rise and dietary preferences diversify, the trend towards high-value agriculture is expected to strengthen. Encouraging private sector investment in building efficient value chains through a cluster-based approach can be a highly effective strategy. This approach can create synergies that lead to improved market access, better infrastructure, and higher incomes for farmers.



Untapped Potential of the Food Processing Sector

The Vision 2047 aims to harness the potential of India's food processing sector to drive economic growth, create employment opportunities, reduce food wastage, and enhance the availability of nutritious food. By improving the processing of fruits and vegetables and increasing the proportion of value-added products in India's export portfolio, this vision seeks to transform the agricultural landscape and elevate rural incomes.



USD 866 billion

Market size of Indian food processing sector (2022)



1.93 million

People employed in the food processing industry (~12% of the total)

The food processing industry in India, although still in its early stages, has shown significant growth. Currently, it processes less than 10% of the total food produced in the country. Despite this modest base, the sector has been expanding at an impressive average annual growth rate of around 7.3%. In 2020-21, the food processing sector contributed 10.54% to the gross value added (GVA) in manufacturing and 11.57% to the GVA in the agriculture sector, both calculated at 2011-12 prices.

India's agricultural and processed food exports have witnessed substantial growth, surpassing USD 50 billion in 2022-23. Notably, processed food exports accounted for 22.6% of the overall agri-food exports, highlighting the sector's increasing importance in the global market. This growth trajectory underscores the sector's potential to become a major driver of economic development and rural prosperity.

PM Formalisation of Micro Food Processing Enterprises (PMFME)

Rs 4600 Crore

Designed to create modern infrastructure and efficient supply chain management from farm gate to retail outlets.

Pradhan Mantri Kisan Sampada Yojana (PMKSY)

Rs 10,000 Crore

Strengthen branding and marketing, and integrate micro-enterprises with organized supply chains.

Production-Linked Incentive Scheme for Food Processing Industry (PLISFPI)

Rs 10,900 Crore

Designed to create modern infrastructure and efficient supply chain management from farm gate to retail outlets.

Case studies

Anantapur, Andhra Pradesh (Banana Cluster)

To boost the export potential of Indian bananas and enhance farmers' remuneration, a cluster-based value chain development approach was implemented in Anantapur, Andhra Pradesh. The Agricultural and Processed Food Products Export Development Authority (APEDA), in collaboration with the Government of Andhra Pradesh and the Ministry of Railways, facilitated the movement of refrigerated trains from Anantapur to the Middle East and Iran via the JPNT port. Key interventions included identifying Farmer Producer Organizations (FPOs) within the cluster and training them in good agricultural practices. This initiative was further strengthened by establishing forward linkages through contract farming agreements, which featured a buy-back arrangement with five leading banana exporters.

Impact

Increased price realisation for farmers

After

Farmers were fetching average price of INR 11/kg

120% increase

Before

Farmers were fetching average price of INR 5/kg

Impact

Increased price realisation for farmers

After

Farmers were fetching average price of INR 30/kg

~70% increase

Before

Farmers were fetching average price of INR 18/kg

Varanasi, Uttar Pradesh (Fresh Vegetable Cluster)

In Varanasi, Uttar Pradesh, a cluster-based value chain development approach was implemented to enhance the export potential of fresh vegetables. This initiative achieved convergence between various departments, including the Ministry of Commerce and Industry, APEDA, and the state government, leading to the development of the Varanasi Agri Export Hub. Key interventions included signing MoUs and organizing buyer-seller meets, which facilitated the export of approximately 20,000 MT of agro products, including 5,000 MT of fresh fruits and vegetables.



CONCLUSION: STRENGTHENING AGRICULTURAL VALUE CHAINS FOR A SUSTAINABLE FUTURE



India's agricultural sector is at a critical juncture, where the development of robust national and regional value chains holds the potential to create significant economic and social impacts, not just within the country but across the region as a whole. However, the current political and economic conditions present challenges that hinder the realization of these benefits. To overcome these challenges and achieve desired economic outcomes, it is essential to develop a favorable policy environment and encourage market conditions that support the growth and sustainability of agricultural value chains.

The Need for a Congenial Value Chain Ecosystem

The development of a robust and congenial value chain ecosystem is crucial for transforming agriculture into a more diversified, remunerative, and demand-driven sector. Such an ecosystem would minimize price volatility, reduce waste, and mitigate risks associated with agricultural production. Additionally, it would foster competition, enable efficient price discovery, and reduce intermediation, leading to lower marketing costs and reduced wastages. Private sector participation in investment for infrastructure and services would further enhance the efficiency and effectiveness of value chains, providing farmers with more choices and better opportunities.

New Generation Investments in Infrastructure

To meet the aspirations of stakeholders within agricultural value chains, new generation investments in infrastructure are essential. This includes the development of cold chains, storage facilities, refrigerated vehicles, warehouses, and advanced packaging solutions. Such investments would not only improve the post-harvest handling of produce but also ensure that agricultural products are processed and packaged efficiently, adding value and extending shelf life. The focus on infrastructure development is crucial for taking production dynamics to the next level, enabling optimal utilization of produce, and ensuring that farmers receive a fair deal.

Capacity Development and R&D Support

Capacity development is another critical area that requires attention. Adequate research and development (R&D) support is needed to produce agricultural outputs of the desired quality. This includes the scientific handling of produce at the post-harvest level, the adoption of technology for processing and value addition, and the packaging of final products for consumption. By building capacity in these areas, stakeholders within the value chain can enhance their productivity, efficiency, and competitiveness in both domestic and international markets.

Creating a New Market Architecture

The evolving aspirations of stakeholders within the agricultural economy have triggered the need for a new market architecture. This architecture must be designed to accommodate the diverse needs of farmers, processors, traders, and consumers. It should facilitate the smooth functioning of value chains, ensuring that all participants benefit from fair pricing, efficient logistics, and timely access to markets. The development of such an architecture is essential for driving the growth of the agricultural sector and ensuring its sustainability in the long term.

The future of India's agricultural sector lies in the development of resilient and sustainable value chains that can withstand the challenges posed by the current political and economic environment. By implementing the recommendations outlined above, India can transform its agricultural sector, making it more competitive, inclusive, and capable of delivering broad-based economic and social benefits. The journey ahead requires concerted efforts from all stakeholders, including the government, private sector, farmers, and research institutions, to create a value chain ecosystem that drives growth, reduces inequalities, and ensures a prosperous future for all.

RECOMMENDATIONS

Policy Environment and Market Conditions

Develop a favorable policy environment that supports the growth of agricultural value chains. This includes creating market conditions that encourage private sector investment, promote competition, and enhance price discovery mechanisms.

Infrastructure Development

Invest in new generation infrastructure, including cold chains, storage facilities, refrigerated vehicles, and packaging solutions, to improve the post-harvest handling of agricultural produce and add value to final products.

Capacity Building and R&D

Strengthen capacity development through adequate R&D support, focusing on producing high-quality agricultural outputs, scientific post-harvest handling, and technology-driven processing and packaging.

Market Architecture

Design a new market architecture that addresses the diverse needs of stakeholders within agricultural value chains, ensuring fair pricing, efficient logistics, and timely market access.

Entrepreneurship and Employment

Promote entrepreneurship in agriculture and allied sectors, particularly among the youth, to reduce region-wide unemployment and stimulate economic growth.

Diversification and Risk Management:

Encourage the diversification of agricultural production to meet changing consumer demands, while implementing risk management strategies to minimize price volatility and market uncertainties.

Acknowledgements

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