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CII
Confederation of Indian Industry

EGG-ONOMIC

Analysis of Egg Value Chain in India

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List of Abbreviations

AI	Avian Influenza
CARI	Central Avian Research Institute
CII	Confederation of Indian Industry
CPI	Consumer Price Index
CSO	Central Statistical Office
DDGS	Dried Distillers Grain Solids
DES	Directorate of Economics and Statistics
DPR	Directorate of Poultry Research
FCR	Feed Conversion Ratio
FPO	Farmers Producers Organisation
GM	Genetically Modified
ICMR	Indian Council of Medical Research
INR	Indian Rupees
MoFAHD	Ministry of Fisheries, Animal Husbandry and Dairying
NECC	Nation Egg Coordination Committee
NFHS	National Family Health Survey
NSSO	National Statistical Survey organization
OEA	Office of Economic Advisor
TE	Triennium Ending
USA	United States of America
WPI	Wholesale Price Index

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INTRODUCTION

Background of the Study

The per-capita availability of egg increased from 38 eggs per annum in 2002-03 to 101 eggs per annum 2022-23 (MoFAHD 2023).

Poultry sector recorded the fastest growth within agriculture in India during the last two decades. While poultry meat production grew at an annual average growth rate of 8.0 percent, egg production grew at an average annual growth rate of 6.5 percent between 2003-04 to 2022-23 (MoFAHD 2023). Currently, India is the second largest egg producer in the world with a production of 138.4 billion eggs in 2022-23 (MoFAHD 2023). The demand for eggs in India has increased substantially especially among the urban consumers due to rising population growth, urbanization, changing dietary preferences, and increasing awareness about the nutritional benefits of eggs. The per-capita availability of egg increased from 38 eggs per annum in 2002-03 to 101 eggs per annum (MoFAHD 2023).

Although the demand for eggs remains stable throughout the year, there is a regional and seasonal concentration in production leading to fluctuations in egg prices. Egg prices remain volatile due to several factors such as temperature variations, outbreak of avian influenza (AI), and feed availability. During peak summer season, egg production tends to decline due to extreme weather conditions, leading to a rise in prices. Fluctuations in the prices of feed crops like maize, soybean, and wheat bran further impact the overall production cost of eggs resulting in volatile egg prices. This is because, poultry feed costs account for a significant portion of egg production expenses. On the other hand, outbreaks of poultry diseases, such as avian influenza, can have a severe impact on the egg industry.

With the imposed restrictions on poultry products during the spread of such diseases, it causes a temporary decrease in egg supply, subsequently driving up the prices. Thus, any imbalances in the demand-supply equation can affect the price of eggs.

Due to the supply and demand dynamics, there is often a significant gap between the prices received by farmers and the prices paid by the consumers. This is due to the presence of a number of intermediaries in the egg supply chain including wholesalers, distributors, retailers, etc. Lack of adequate infrastructure facilities for value addition such as poultry processing, warehousing, cold storage, refrigerated vehicles can further increase the handling and storage costs, contributing to the increasing gap between the farmgate and retail price. Due to asymmetric information, egg suppliers may not always be aware of the right price for their produce due to market dominance by specific players. This often result in lower prices paid to farmers, due to lower limited bargaining power.

Scope and Relevance of the Study

This study is an attempt to delve deeper into the factors that lead to the increasing gaps between farmers and consumers' price and suggest measures that can be taken to stabilize the prices. To tackle these problems, there is a need to boost layer bird productivity, upgrade infrastructure, streamline supply chains, support farmer-producer groups, and ensure fair market practices. By stabilizing prices and reducing volatility, we can achieve fair returns for farmers and affordable eggs for consumers.

Objectives of the Study

This study aims at examining the cost structure, mapping the components, and analysing the interactions of egg value chain in India. Following are the objectives of the study:

- To estimate the share of farmers price in the consumer rupee for eggs in India,
- To identify the key stakeholders of the egg value chain and estimate their margins; and
- To suggest ways to reduce the intermediation cost across the supply chain.

Methodological Framework

Sources of Data: The study uses a combination of primary as well as secondary sources of data. Primary data was collected through stakeholder consultations and inputs by the poultry and egg industry. Data on basic egg statistics such as production, trade and consumption were collected from databases of Central and State governments, Basic Animal Husbandry Statistics, National Egg Co-Ordination Committee (NECC), NSSO Consumption Expenditure 2011-12, etc.

Methodology: The study estimates the share in the consumer rupee of different stakeholders across the commercial egg value chain. The shares were calculated for the last three years (TE2022-23) using farmgate prices obtained from NECC for major producing centres (Barwala in Haryana, Namakkal in Tamil Nadu, Vijayawada in Andhra Pradesh and Hyderabad in Telangana) and retail price from DES for major consumption centres in Delhi, Chennai, Kolkata, Mumbai and Bengaluru respectively.

Outcomes of the Study

The study attempts to provide policy measures in order to stabilize egg prices so that the gap between farmers price and consumer price is reduced and the egg value chain becomes more efficient.

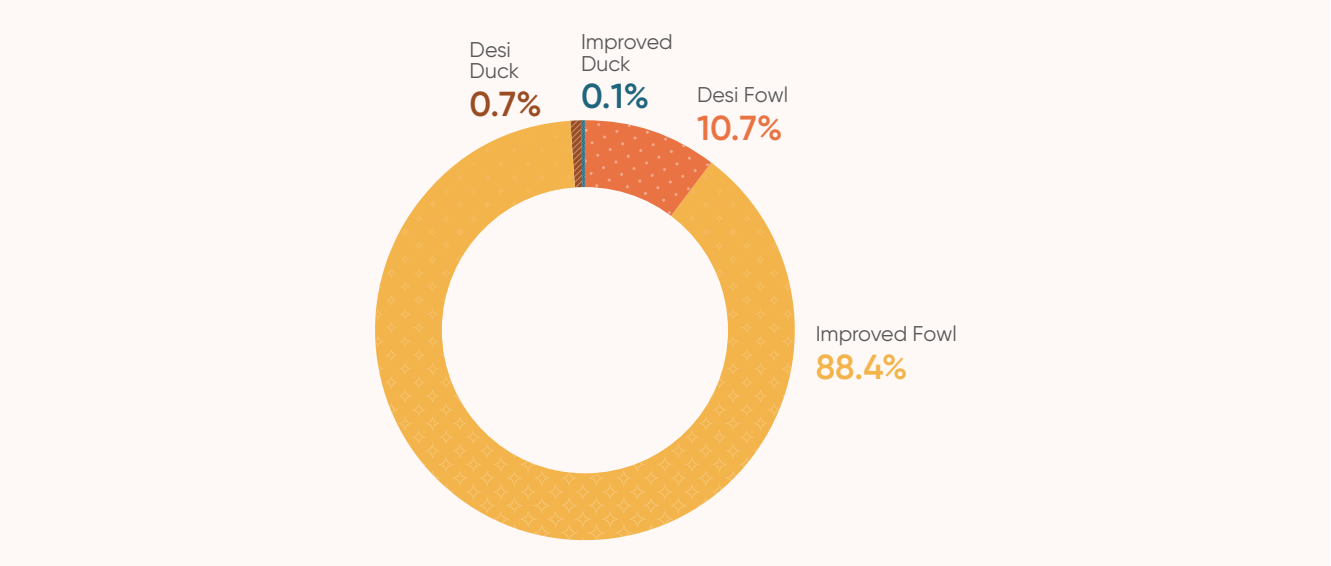
OVERVIEW OF THE EGG ECONOMY

Indian poultry sector transformed from a mere backyard activity in 1950s-1960s into a major organized commercial sector. This was achieved due to liberalization of imports of grandparent poultry stock and the emergence of private sector led vertical integration model through contract farming between large integrators/hatcheries and small poultry farmers (ICAR-DPR, 2015). In 2022-23, India produced a total of 138.4 billion eggs with 118.2 billion eggs (85.4 per cent) contributed by the commercial poultry and 20.2 billion eggs (14.6 per cent) contributed by the backyard poultry. This shows the dominance of commercial poultry sector in the egg industry compared to the backyard poultry farms. Although the commercial sector is led by well- developed integrator model, backyard farming is led by small farmers especially in hilly and rural households in an unorganized set up. Women play a key role in the backyard farming and manages the day-to-day activities including collection and storage of eggs and feeding and watering of birds. In terms of species, almost 88.4 percent of eggs were produced by improved Fowl and 10.7 per cent were produced by Desi Fowls (Figure 1). The remaining eggs were produced by Desi Duck (0.74 per cent) and Improved Duck (0.12 per cent) (MoFAHD, 2023). There has been a gradual shift towards improved fowl breeds over the traditional desi fowl, marking a significant transformation in the poultry sector in India.

In 2022-23, India produced a total of 138.4 billion eggs with 118.2 billion eggs (85.4 per cent) contributed by the commercial poultry and 20.2 billion eggs (14.6 per cent) contributed by the backyard poultry.

Improved fowl, characterized by specific breeds such as commercial layers or hybrid varieties, has gained prominence due to their higher egg-laying capabilities and superior productivity compared to desi fowl. These improved breeds are known for their efficient egg production, with higher laying rates and larger egg sizes, meeting the escalating demands of the market. On the other hand, desi fowl are mostly used in backyard poultry and are known for their resilience and adaptability to local conditions.

Figure 1: Species-wise egg production in India (2022-23)



Source: (MoFAHD, 2023)

Consumption Pattern of Eggs

The consumption of poultry products, including eggs in India has been on a steady rise owing to evolving dietary preferences, urbanization, and a growing inclination towards protein-rich diets. The annual per capita egg consumption in India increased from 1.65 kg in 2000 to 3.76 kg in 2023 (OECD, 2023), which is still low despite India being the second largest egg producer in the world. However, data from the Household Consumption Expenditure Survey of India 2022-23 reveals a notable shift in monthly per capita consumption expenditure (MPCE) towards protein-rich options like eggs, fish, and meat, for both rural and urban households, over the past decade. Notably, rural households allocate a larger proportion of their expenditure (4.91%) to eggs, meat, and fish compared to their urban counterparts (3.57%) (MoSPI, 2024).

The National Family Health Survey (NFHS-5) indicates a significant rise in the proportion of Indians consuming eggs, surpassing other non-vegetarian options like fish, chicken, or meat. However, there exists a gender disparity, with men demonstrating a higher inclination towards non-vegetarian foods compared to women. While 84.7% of men reported consuming eggs during 2019-21, compared to 80.3% in 2015-16, the corresponding figure for women stood at 72%, up from 70.8% in 2015-16 (NFHS-5, 2023).

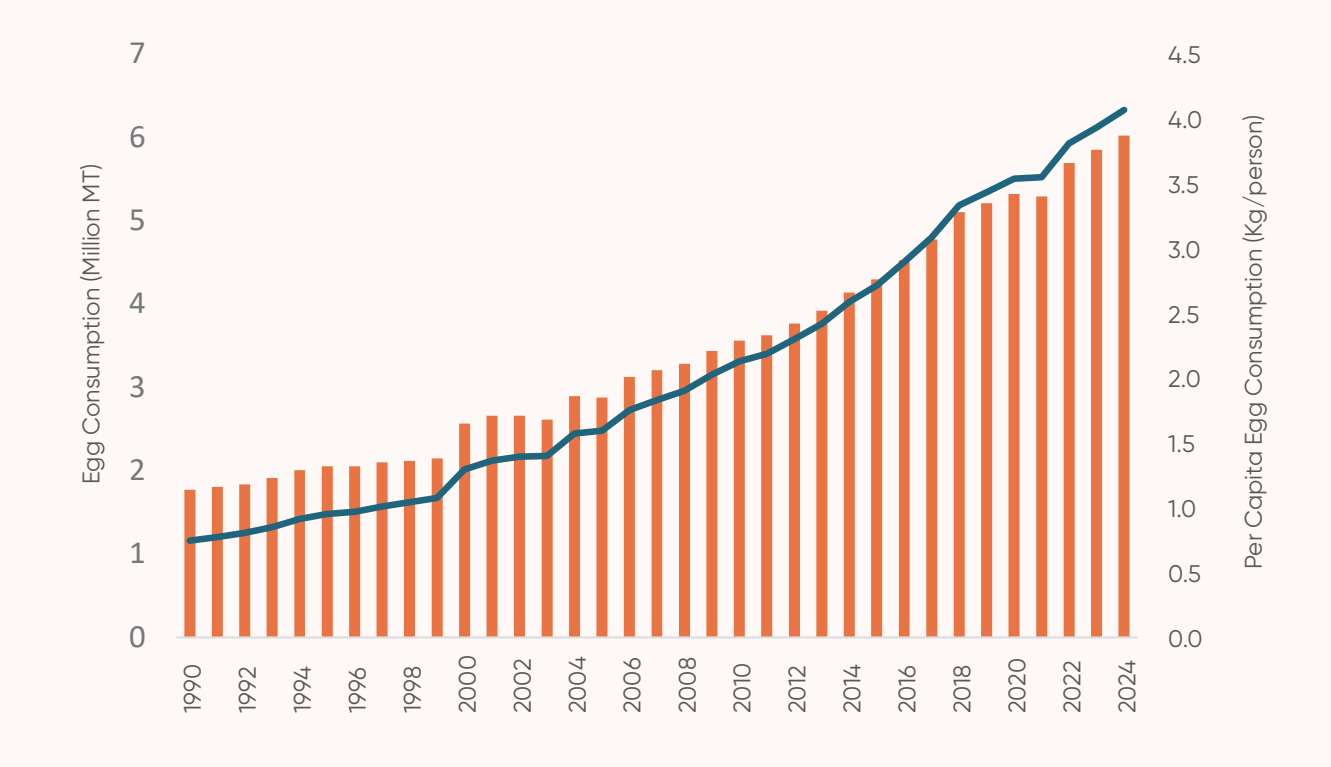
Religious beliefs also influence policies such as the inclusion of eggs in the mid-day meal scheme. Despite the National Institute of Nutrition's endorsement of eggs due to their superior nutritional content and their role in combating high incidences of malnourishment, only about a third of Indian states provide eggs under the scheme. Inclusion of eggs in mid-day meal will not only enhance child nutrition but will also benefit the egg farmers in terms of assured demand for eggs (Dreze, 2019)..

The per capita availability of eggs in India at 101 eggs per annum in 2022-23, falls short of the Indian Council of Medical Research's (ICMR) recommended level of 180 eggs per annum (ICAR-DPR, 2015). Hence, there is a need to address the gap between availability and requirements by upscaling the layer industry by at least 5 times (ICAR-DPR, 2015). Egg availability varies significantly across regions, with states like Andhra Pradesh having the highest per capita availability of eggs at 526 eggs per annum, followed by Telangana (466 eggs per annum), Tamil Nadu (281 eggs per annum), Haryana (274 eggs per annum)

and Andaman and Nicobar Islands (273 eggs per annum) while stakes like Uttarakhand (47 eggs per annum), Maharashtra (59 eggs per annum), and Kerala (63 eggs per annum) lag behind (MoFAHD, 2022).

According to a report by NITI Aayog, the demand for eggs is projected to grow at an average annual growth rate of 4.56% over the next 25 years under the business-as-usual scenario, and even higher (5%) under the high yield growth scenario. While egg production is expected to meet demand in the coming years, challenges such as ensuring quality feeds, balanced diets, and managing seasonal fluctuations in supply and demand must be addressed to sustain this growth (NITI Aayog, 2024).

Figure 2: Egg Consumption in India



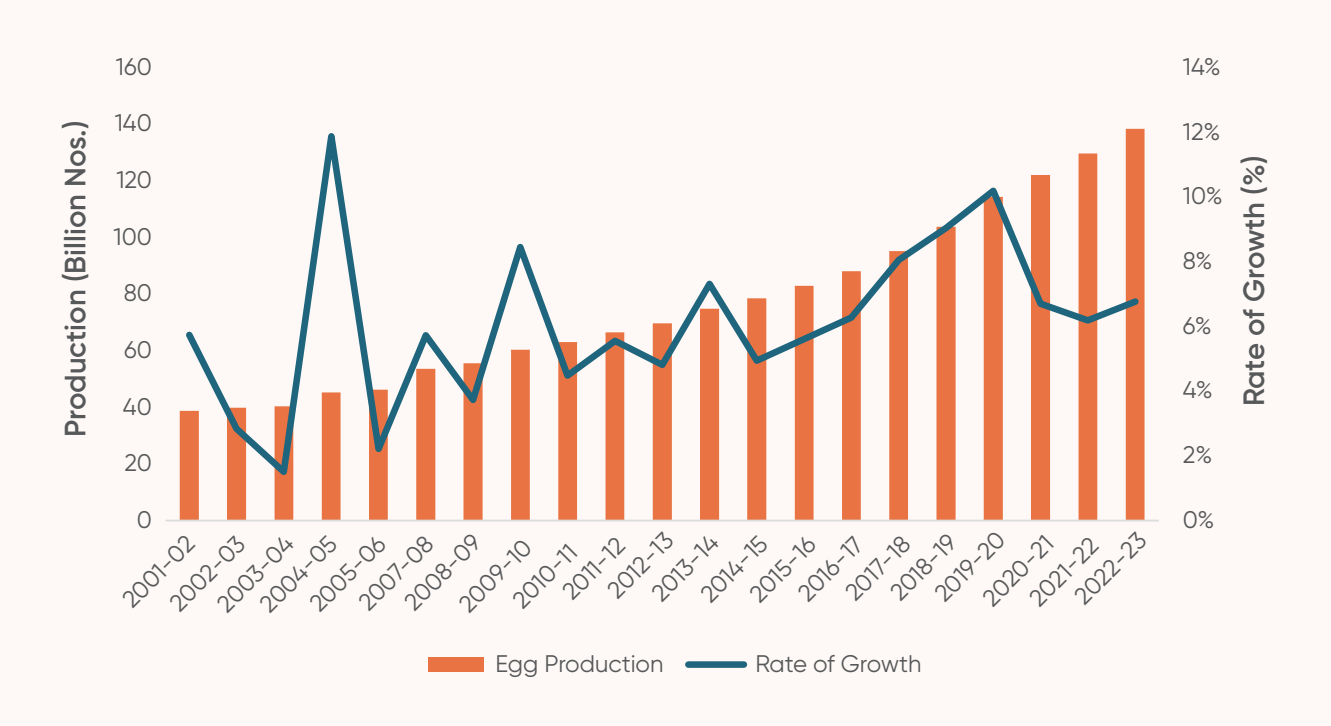
Source: OECD

Production of Eggs in India

Egg production in India has increased from 45 billion to 138.4 billion between 2004-05 to 2022-23, at an average annual growth rate of 6.7 per cent (Figure 3) (MoFAHD, 2023). This increase can be attributed to the growing demand for protein-based diet, improvements in poultry farming practices, and government initiatives to promote egg production as a means of generating income and improving nutrition.

Government of India has taken several measures to support the poultry industry, including providing subsidies for the construction of new poultry farms, increasing the availability of high-quality feed and vaccines, and promoting the adoption of new technologies. However, the growth in poultry sector including eggs is the result of a rise of vertical integration model in poultry farming which accounts for 85 per cent as against the traditional backyard poultry, which accounts for 15 per cent of the total poultry production.

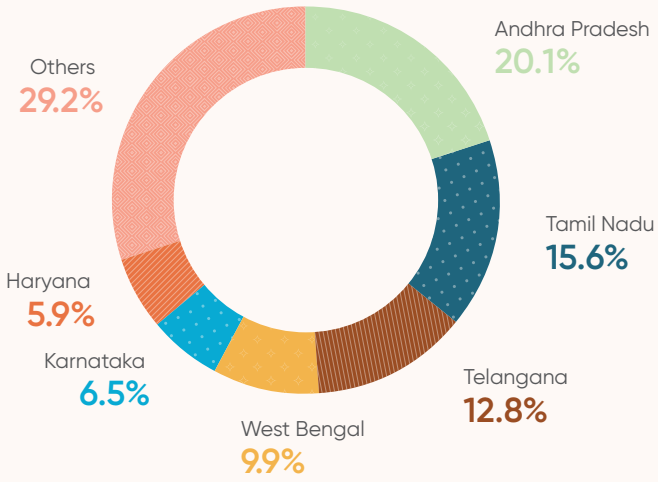
Figure 3: Egg Production in India



Source: (MoFAHD, 2023)

While poultry meat production is spread out across India, egg production is concentrated majorly in the southern states with the five Southern Indian states contributing about 57 percent of total egg production. The top six egg producing states, Andhra Pradesh (20.1 per cent), Tamil Nadu (15.6 per cent), Telangana (12.8 per cent), West Bengal (9.9 per cent), Karnataka (6.5 per cent) and Haryana (5.9 per cent) accounts for 71 per cent of the total egg production in the country (Figure 4). The concentration of egg production in these regions is due to suitable climate, favourable policies adopted by the respective state governments and cultural preferences.

Figure 4: State wise Egg Production in India



Source: (MoFAHD, 2023)

Eggs in Global Context

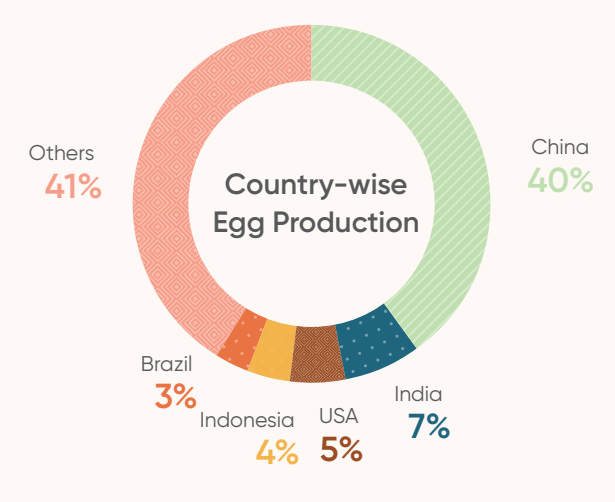
The egg sector plays a crucial role in the global food industry, with various countries contributing significantly to production, consumption, and trade. China is the world's largest producer and consumer of eggs contributing to 40 per cent of the global egg (hen in shell) production (Figure 5). Its egg production is characterized by large-scale operations with millions of layers. China's egg industry has undergone significant modernization and standardization, driven by capital investment, technological advancements, and progressive policies like the Reform and Opening Up (Yang, 2020).

India with 6.8 per cent share is the second largest producer and is followed by USA (4.9 per cent), Indonesia (4.4 per cent), and Brazil (3.1 per cent). India has emerged as a major player in the global egg sector, surpassing the USA to become the world's second-largest egg producer since 2021. India's egg industry is diverse, with a mix of small-scale and commercial operations. Nevertheless, it still has considerable ground to cover before reaching the production levels of China, which are 5.8 times greater than India's.

The USA has a highly developed egg industry, with a focus on large-scale commercial production. It is one of the top egg producers globally and exports a significant portion of its production. Brazil, a major egg player in the global egg market, is known for its efficient production systems and high-quality eggs. The country has seen steady growth in egg production and exports, driven by technological advancements and favorable climatic conditions. Brazil's egg industry is characterized by both large-scale commercial farms and smaller family-owned operations.

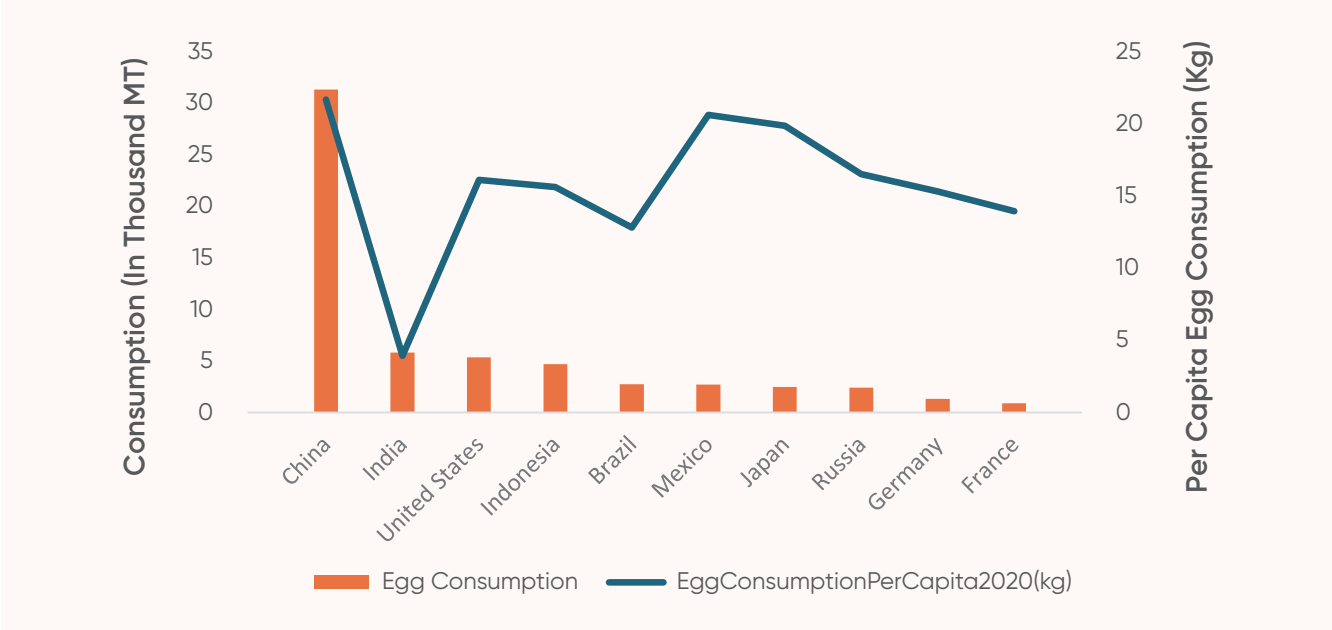
China and India are also the largest consumer of eggs, followed by USA, Indonesia, and Brazil. However, in terms of per capita consumption of egg, India exhibited a lower per capita consumption of 3.93 Kg, indicating a more modest consumption pattern (Figure 6).

Figure 5: Country-wise Egg Production



Source: FAOSTAT

Figure 6: Global Egg Consumption (2021)



Source: FAOSTAT

Export Opportunities for Indian Eggs

Exports play a crucial role in maintaining price stabilization by diverting the surplus and thus averting significant price fluctuations in the domestic market. However, despite being the second largest egg producer in the world, India has a meagre presence in global trade of eggs. In 2022-23, India exported USD 62.4 million worth of eggs in shell and 61.5 million worth of processed form of eggs (Liquid eggs, egg powder, frozen yolk). India's exports were primarily to Oman (42.3 percent), Maldives (24.2 per cent), UAE (13.9 per cent), Qatar (12.2 per cent), which accounted for 93 per cent of India's total exports (APEDA, 2023). Nevertheless, India's egg industry is poised for significant export opportunities, fuelled by its robust production capabilities and emerging markets' demand. With a strategic approach, India can leverage its competitive advantage in cost-efficient egg production to expand its export footprint across various regions.

According to ITC Trade map data, the United Arab Emirates, Saudi Arabia, and Hong Kong stand out as promising markets for bird's eggs in shell exports from India (ITC, 2024). The geographical proximity and lower tariffs are the major reasons for these countries to have high trade potential (APEDA, 2019). Among these, the United Arab Emirates exhibits the most significant untapped potential, with an additional export opportunity valued at USD 9.4 million. In contrast, for dried egg yolks, Indonesia, Vietnam, Japan and Russia have the greatest potential. However, South Africa presents the largest unrealized export potential in this category, with an opportunity worth USD 940,000 (ITC, 2024). India primarily faces competition from the major exporters such as the Netherlands, Türkiye and USA which are able to supply eggs at competitive rates (FAOSTAT, 2024).

Sudden requests from countries facing with economic crisis, price rise or increased demand of eggs also influence export orders for Indian eggs. For example, Sri Lankan government approved the proposal to import over 90 million chicken eggs per month from India to help domestic consumers buy eggs at a fair price (Shivakumar, 2023). Similarly, Bangladesh government approved an order for 40 million and 60 million eggs on two occasions to contain the domestic price rise in eggs (Dhaka Tribune, 2023). Russia too is mulling over exploring egg imports from India due to egg crisis in the domestic market caused by high inflation and sanctions imposed by the West (Jacob & Nandi, 2024). India can explore a long term trade deals with these countries for egg exports and benefit from the growing demand in these countries.

However, regulations in European Union and USA have prohibited Indian eggs since long on grounds of quality, chemical residue on eggs and presence of large amounts of salmonella both on the shell and inside the egg (Arora, 2017). Salmonella Enteritidis (SE) infection poses a significant concern for the European Union and USA. However, in India, vaccination against Salmonella is not commonly practiced among parent stock and layer birds. In India, diagnosed Salmonella-infected herds are often culled as a control measure. Implementing proper biosecurity measures at the farm level can help reduce Salmonella infection. Additionally, including Salmonella vaccination in the vaccination schedule of layer birds can not only aid in improving the health of the birds but also enhance the export potential of poultry products.

NATURE OF EGG MARKETS

Seasonality in Production and Consumption of Eggs

Egg production is seasonal in nature and is highly dependent on factors such as temperature of the production region, rainfall, and daylight hours (Nayak et. al. 2015). These factors can affect the supply of eggs, leading to fluctuations in egg prices.

India being a tropical country, seasonal variation is one of the principal non-genetic factors influencing performance of poultry. For example, the production of eggs is lower in summer months (April to August) in northern India due to extreme temperatures. During the summer months, heat stress can significantly impact egg production by inducing stress in laying hens, leading to reduced feed intake and compromised egg quality due to disruptions in the birds' physiological functions and metabolism. Additionally, mortality of birds exacerbates the situation, further affecting egg production. On the other hand, production is higher during the winter months (November to February).

Consumption of eggs is also affected during summer months as people tend to consume lower number of eggs in summers

Consumption of eggs is also affected during summer months as people tend to consume lower number of eggs in summers. Although Government has been promoting for egg consumption throughout the year, people in Northern India consume lesser eggs in summers due to a belief that it produces more body heat (Scudiero, et. al. 2023) Additionally, in certain parts of India, egg consumption is also affected by cultural and religious beliefs and norms. Hindu auspicious months of Shravan and Navratri usually see lower demand for eggs.

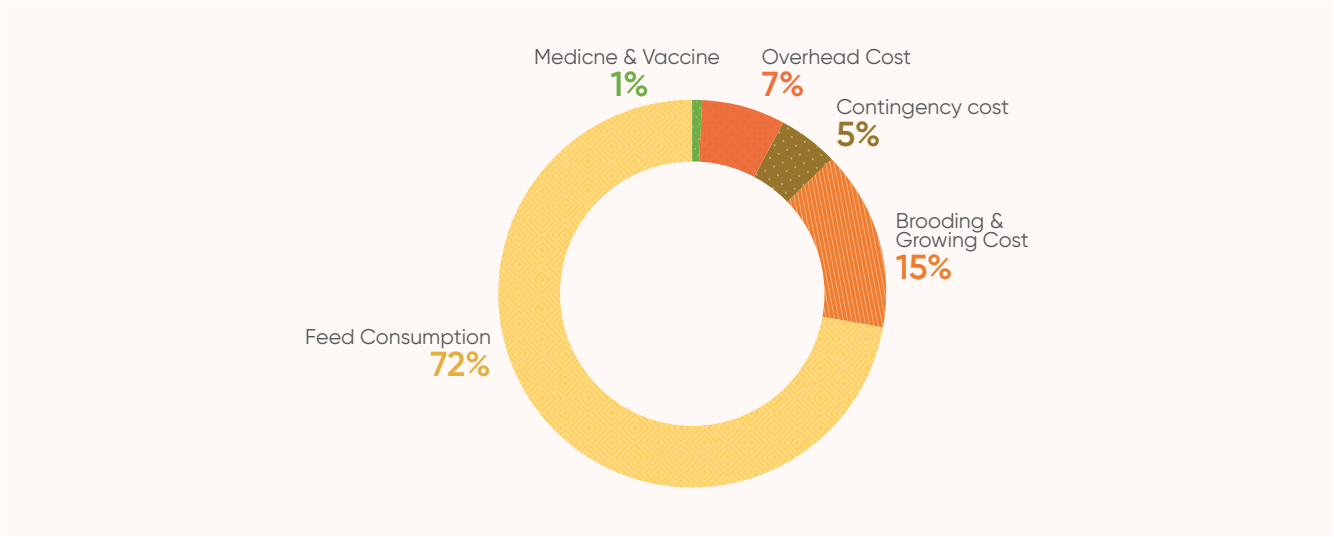
Disease outbreaks or other health issues in poultry farms further affect egg consumption. These issues can decrease the supply of eggs, leading to an increase in prices.

All these factors have direct bearing on the price of eggs. However, the degree of variation in farmgate price or wholesale price is different than the variation in retail prices. This leads to a wider gap in prices received by farmers and the prices paid by consumers.

Cost of Production of Eggs

The cost of production, including the cost of feed, labour, and equipment, can affect the price of eggs. If the cost of production increases, it will lead to an increase in the egg unit rate. As per data received from industry members, the average cost of production of farmers is Rs. 4.35 per egg (for laying considered for upto 80 weeks) and Rs. 4.21 (for laying considered for upto 100 weeks). In this, feed accounts for almost 70 per cent of the cost of production of poultry (Figure 7). In India, most of feed requirement is fulfilled by maize and soymeal (soya de oiled cake). However, the production of maize and soybean have not kept pace with that of poultry production. This prompts the poultry industry to use alternative sources for feed. If maize prices are high, other grains such as bajra, broken wheat and rice, can also be used. In few regions, Distiller's dried grains with solubles (DDGS) which are nutrient rich by product of dry-milled ethanol production can also be used. The composition of feed can differ from region to region. For example, fish meal in West Bengal, and leather meal in Kanpur are also being used.

Figure 7: Cost of Egg Production in India



Note: Costs are weighted average of breeds with laying of 80 weeks and 100 weeks

Source: CIIs' calculation using data provided by CII Industry members

The detailed cost of production of poultry is illustrated in Table 1. According to the table, amortization cost which consists of day-old chick, feed, vaccine and medicine requirements for the chick comes is Rs 280 on an average. The cost of laying depends on the number of weeks upto which eggs are hatched. For laying upto 80 weeks, the cost of laying is Rs 1334 with 354 eggs laid, resulting in a cost of Rs. 4.35 per egg. For upto 100 weeks, the cost is Rs. 1708 with 454 eggs laid, making it Rs. 4.21 per egg.

Table 1: Cost of Production of Commercial Eggs in India

	Laying considered upto 80 weeks			**Laying considered upto 100 weeks**		
	Quantity (No./Kg)	Value (Rs.)	Cost (Rs.)	Quantity (No./Kg)	Value (Rs.)	Cost (Rs.)
Brooding and Growing						
Chick Cost	1	38	38.0	1	38	38.0
Feed Consumption (Kg)	5.64	29	163.6	5.64	29	163.6
Medicine & Vaccine Cost	1	20	20.0	1	20	20.0
Overhead Cost	1	45	45.0	1	45	45.0
Total Amortization Cost	267			267		
Total + 5% contingency			**280**			**280**
Laying Cost						
Feed Consumption (Kgs)	44.9	25.5	1144.4	58.5	25.13	1470.4
Medicine & Vaccine/Cycle	1	20	20.0	1	20	20.0
Overheads/Egg	354	0.3	106.2	454	0.3	136.2
Manpower cost		36	0.1		36	0.1
Electricity + others		12	0.0		12	0.0
Miscellaneous		20	0.1		20	0.0
Depreciation		40	0.1		40	0.1
Total Layering Cost		1271			1627	
Total + 5% contingency			**1334**			**1708**
Total Cost		**1614**			**1988**	
Cost/Egg	**354**		**4.55**	**454**		**4.38**

Source: CII's illustration using data provided by CII Industry members

The scarce availability of feed crops in the country, has prompted the government to import both maize and soybean. Given the increasing divergence of maize to ethanol production, there is a need to increase the production of maize and soybean to substantial amounts to achieve self-sufficiency in poultry feed. Additionally, imports of GM maize and soybean may also be considered.

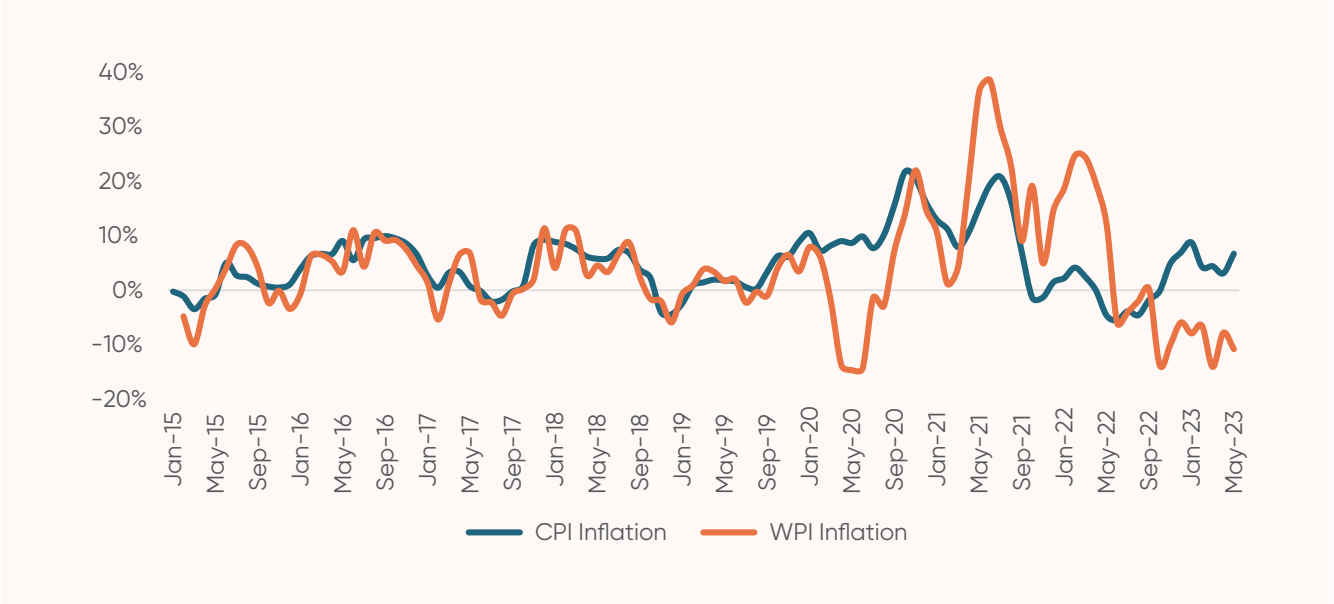
Price Behaviour of Eggs

As the cost of eggs in India vary from region to time of year, the price of eggs varies both spatially and temporally. The cost of eggs in India varies from state to state and also depends on factors such as the quality of the eggs, the season, and the location. On an average, the cost of a single egg in India ranges from Rs. 4-7, with the highest prices being in the urban areas and the lowest in the rural areas.

Due to seasonality in egg production, egg prices remain volatile in India as seen in Figure 8. The figure shows that WPI based inflation rate has higher volatility than the CPI based inflation. The prices are affected by feed costs, production costs, and supply and demand dynamics. In some regions, prices may have increased slightly due to factors such as increased demand or changes in production practices.

As the prices have higher volatility in case of wholesale prices than the retail prices, egg farmers face higher risk in price than the consumers. A steep decline in wholesale price may not translate to similar decrease in retail prices. Hence there is a widening gap between farmers and consumer price. There is a need to have a mechanism where farmers have enough bargaining power for their own price.

Figure 8: Egg Inflation in India



Source: Office of Economic Adviser, (OEA, 2023); Central Statistical Office (CSO, 2023)

CHALLENGES FACED BY THE EGG INDUSTRY

The egg industry in India faces multitude of challenges, impacting the farmers, traders, exporters and the overall supply chain. From rising cost of feed to labor shortages and complex regulatory hurdles, the stakeholders in the poultry sector are navigating a complex landscape for sustained growth of the industry.

Rising Cost of Feed

The cost of feed constitutes a significant portion (about 70 per cent) of the cost of production in egg farming. Fluctuations in the cost of feed, comprising maize and soybean, directly impact the profitability of egg farming operations. Demand for poultry feed in the country has been rising at around 8-10 per cent annually over the last decade. In fact, the annual average growth rate in the poultry sector has surpassed the growth in maize and soybean production.

Further, there are rising concerns over maize being diverted for ethanol production. This has hit domestic poultry producers hard, as India's annual production of 36 million tonnes may not be enough to meet the requirements of the poultry industry. Although other grains like broken rice, jowar, and bajra are also being used, 30 to 60 per cent of the poultry diet must comprise maize. Maize is preferred for its easy digestibility, energy content, and the distinctive yellow color it gives to the yolk.

In order to support the domestic poultry producers, India has been importing maize and also allowed the import of crushed modified soybean meal in 2021. To address this challenge, there is a need to explore alternative sources of protein for feed and conduct periodic reassessments of regional raw materials to ensure cost-effectiveness and sustainability.

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Labour Shortage

The poultry industry in India faces a severe labour shortage, exacerbated by the diversion of potential farm labour to non-farm activities under the MGNREGA scheme. Further, Indian poultry industry remains largely labour intensive unlike fully automated poultry industries in countries like the USA and Australia. Embracing automation, such as automated feeding systems and egg collection, could significantly reduce manual labour requirements and improve efficiency. Although the high initial investment in automated technologies poses a significant barrier, the long-term benefits of enhanced efficiency and reduced labor costs make it a valuable investment. This underscores the need for government support and incentives to ease the transition.

Complex Licensing Process

Navigating the complex and extensive licensing process for egg exports is a significant challenge for poultry exporters in India. Obtaining various certificates, including panchayat, fire safety, and pollution certificates, poses difficulties, particularly in rural areas. According to the discussions with egg exporters at stakeholder consultation in Namakkal, some of the requirements, such as maintaining a 2 km radius free of houses and fully covering poultry droppings, are difficult to implement. Additionally, there is an overlap between animal quarantine and the Export Inspection Agency (EIA) regarding egg certification. Eggs currently require certification from both agencies. To streamline the process, it would be more meaningful that they should only be certified under animal quarantine.

Improved coordination between central and state governments in issuing certificates can help streamline procedures and reduce delays. Streamlining the certification process, adapting OIE norms to the local context, and enhancing cooperation between government bodies are essential steps to alleviate the regulatory burden on poultry farmers.

Market Volatility in Eggs

The egg industry in India is characterized by high volatility in demand due to religious beliefs, traditions and festivals, leading to significant price fluctuations. These variations make it challenging for farmers to predict market trends and adjust their production levels accordingly. To mitigate the impact of market volatility, it is crucial for farmers to develop robust risk management strategies and foster market transparency.

A critical solution to these challenges lies in improving the industry's infrastructure, particularly through the establishment of processing facilities and cold storages.

By setting up egg powder plants, surplus eggs produced during peak seasons can be converted into powder, extending their shelf life and facilitating easier export. This would help manage surplus production efficiently and reduce the risks associated with foodborne illnesses. Additionally, adequate cold storage facilities are essential to prevent egg spoilage and increase holding life, ensuring a steady supply of eggs in the market regardless of seasonal demand fluctuations. Investing in these infrastructural improvements will not only enhance production efficiency and reduce wastage but also support the industry's growth and stability.

Export-Related Challenges

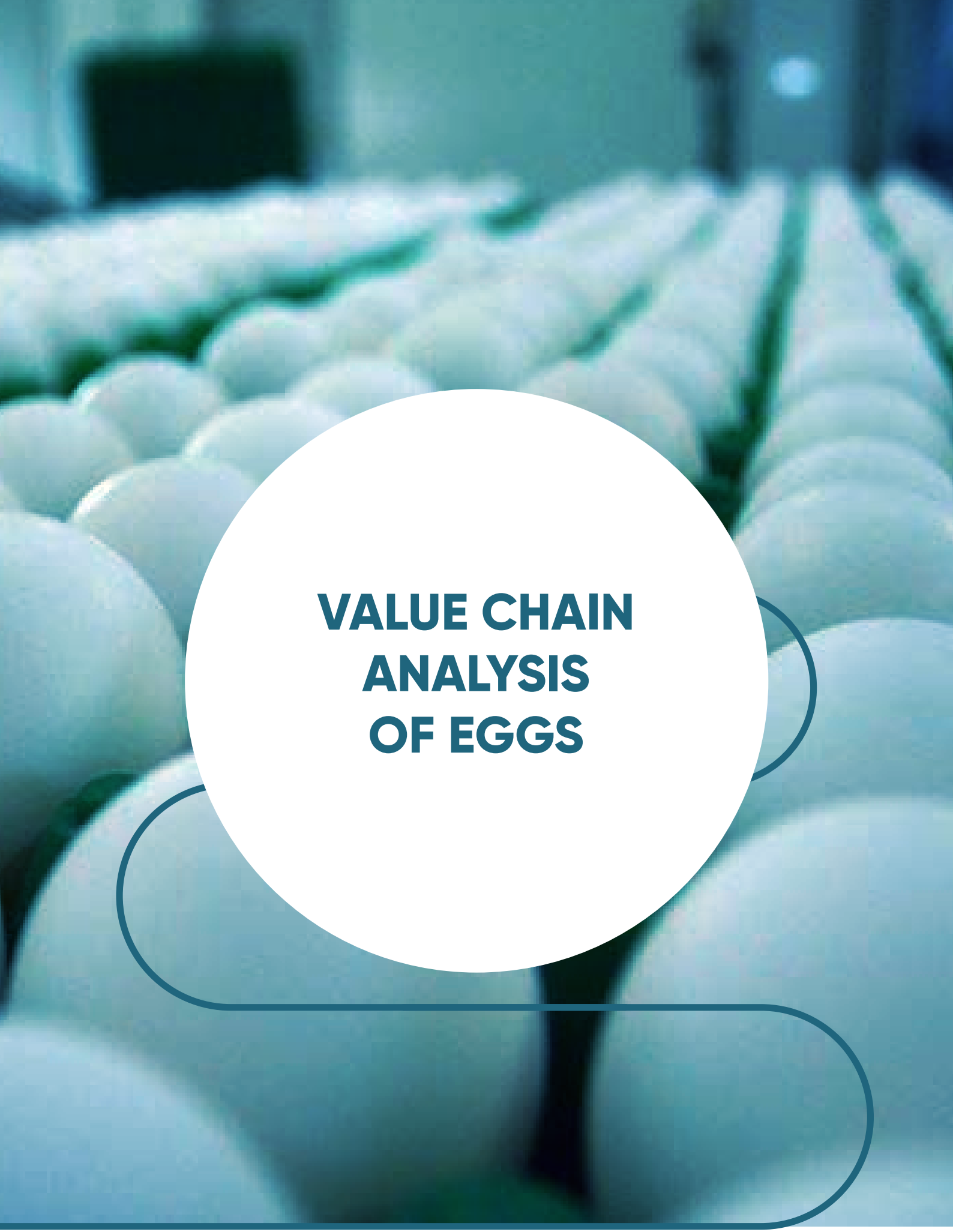
The Indian egg industry faces several export-related challenges for instance, the UAE only accepts exports from compartmentalized farms. In Africa, reducing the accepted expiry dates from 6 months to 3 months hampers export efforts, additionally, Russia, facing egg shortages, presents a promising market for Indian eggs. Studying and comparing the successful policies of competing countries like Turkey can pave a way forward for Indian policy ecosystem. Addressing these export-related issues is vital for expanding the market reach of Indian poultry products and sustaining industry growth.

Lack of an Effective Emergency Redressal System

Eggs, being perishable products, require an effective emergency redressal system to mitigate the burden of spoilage during times whenever immediate interventions are required by the government. The creation of an emergency hearing portal to address urgent issues and concerns promptly, would provide a dedicated platform for farmers to report problems and receive timely assistance, ensuring that critical challenges are managed efficiently. The establishment of such a portal would support the industry's overall stability and growth by facilitating better communication and quicker resolution of emergencies.

Expedited Compartmentalisation Certificate Issuance

In response to bird flu outbreaks across multiple states during 2007-08, which led to nationwide egg bans by importers treating the entire country as one zone, poultry farmers are advocating for compartmentalisation certificates for their farms. According to the OIE Animal Health terrestrial code, compartmentalisation defines a subpopulation of animals based on stringent biosecurity and management practices. Compartmentalisation offers a crucial solution to ensure uninterrupted export of poultry breeding stock, even if other region of the country is facing an outbreak. Farmers emphasize the urgent need for streamlined certification processes, ideally completed within a maximum of three months. This expedited issuance is essential to safeguarding the export capabilities of poultry industry amidst potential disease outbreaks and international trade restrictions.



VALUE CHAIN ANALYSIS OF EGGS

Stakeholders in Egg Value Chain

The farmers receive day old chicks from breeder farms and incur cost on feed, vaccine, medicines and other overhead costs to be covered in hatcheries

The Indian egg value chain is a complex network of breeder farms, hatcheries, feed millers, egg traders, processors, exporters and consumers. The industry is largely dominated by small and medium-sized farmers, who account for around 80 per cent of the country's total egg production.

A typical egg value chain has been illustrated in Figure 9. It shows all stakeholders and the various activities that have to be undertaken in the egg value chain. The farmers receive day old chicks from breeder farms and incur cost on feed, vaccine, medicines and other overhead costs to be covered in hatcheries. The cost depends on factors such as the cost of production, feed prices, and market demand. As of March 2023, the average farm-gate price of eggs in India is around INR 4 to INR 5 per egg. After the eggs are collected from farms, they are sold to wholesale dealers who further distribute them to retailers or local markets. At this level, the price of eggs can vary depending on the location, demand, and supply.

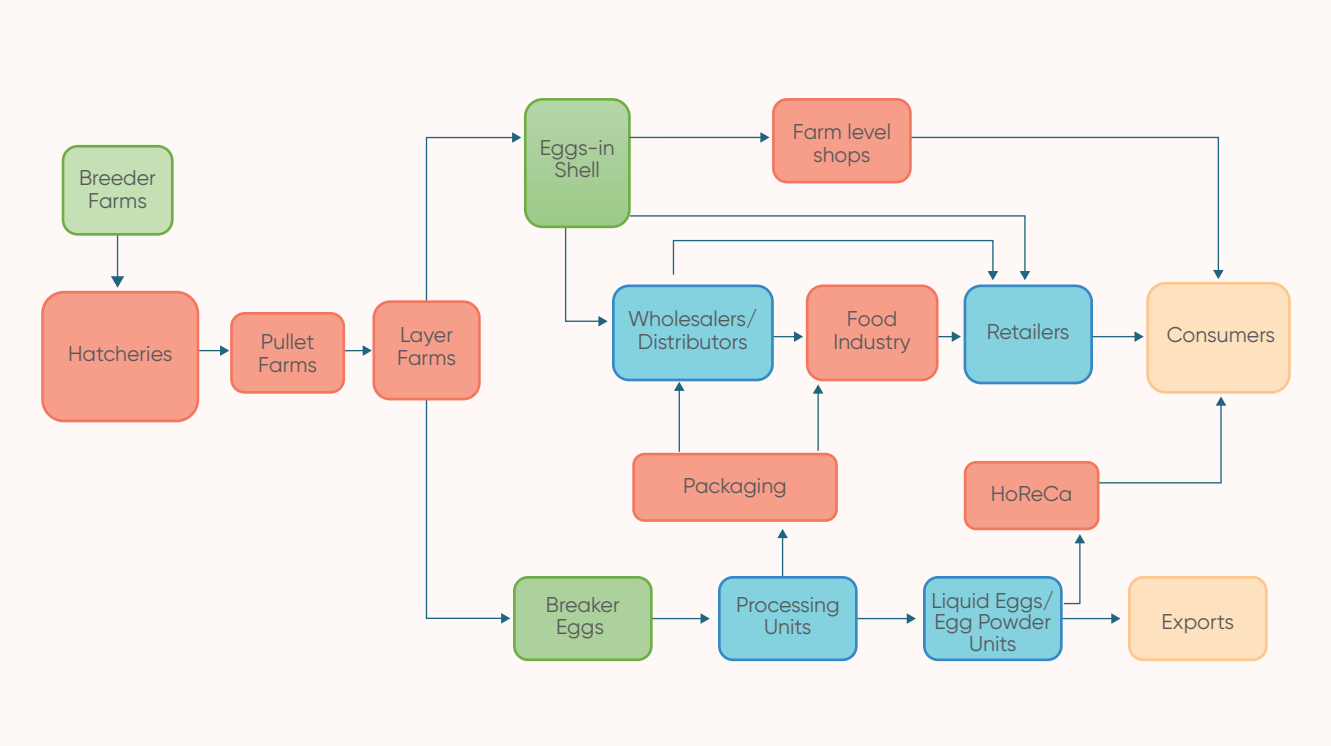
At the retail level, eggs are sold to the end consumers through various channels such as supermarkets, grocery stores, and street vendors.

Consumers also buy processed eggs in the form of liquid eggs or ready to eat egg preparation at HoReCa. The price of eggs at the retail level can vary depending on the location, demand, and competition.

Logistics costs like the cost of transporting eggs from the farm to the market can also affect the egg unit rate. For transporting eggs from Barwala to Delhi, about 10 paise is incurred on a 14 ft by 20 ft trolly for 200 Km distance.

All these stakeholders including the farm, distributor, wholesaler, and retailer incur cost and apportion a margin due to which egg prices increase at each level in the supply chain.

Figure 9: A typical representation of egg value chain in India



Source: Created using inputs from industry members, 2020

Efficiency of Egg Value Chain

To study the price spread between egg farmers and consumers, five key value chains have been analyzed, focusing on the top five egg-consuming regions (Delhi, Chennai, Bengaluru, Kolkata and Mumbai) and their corresponding producing regions (Barwala, Namakkal, Vijayawada and Hyderabad), respectively. While Barwala eggs are mostly transported to Delhi, eggs from Namakkal are transported to several south and east Indian cities such as Chennai, Bengaluru and Kerala. Besides Namakkal, Vijayawada and Hyderabad are other important centres for egg production and supplies eggs to Kolkata and Mumbai, respectively.

The value chains considered are:

- Barwala to Delhi
- Namakkal to Chennai
- Namakkal to Bangalore
- Vijaywada to Kolkata
- Hyderabad to Mumbai

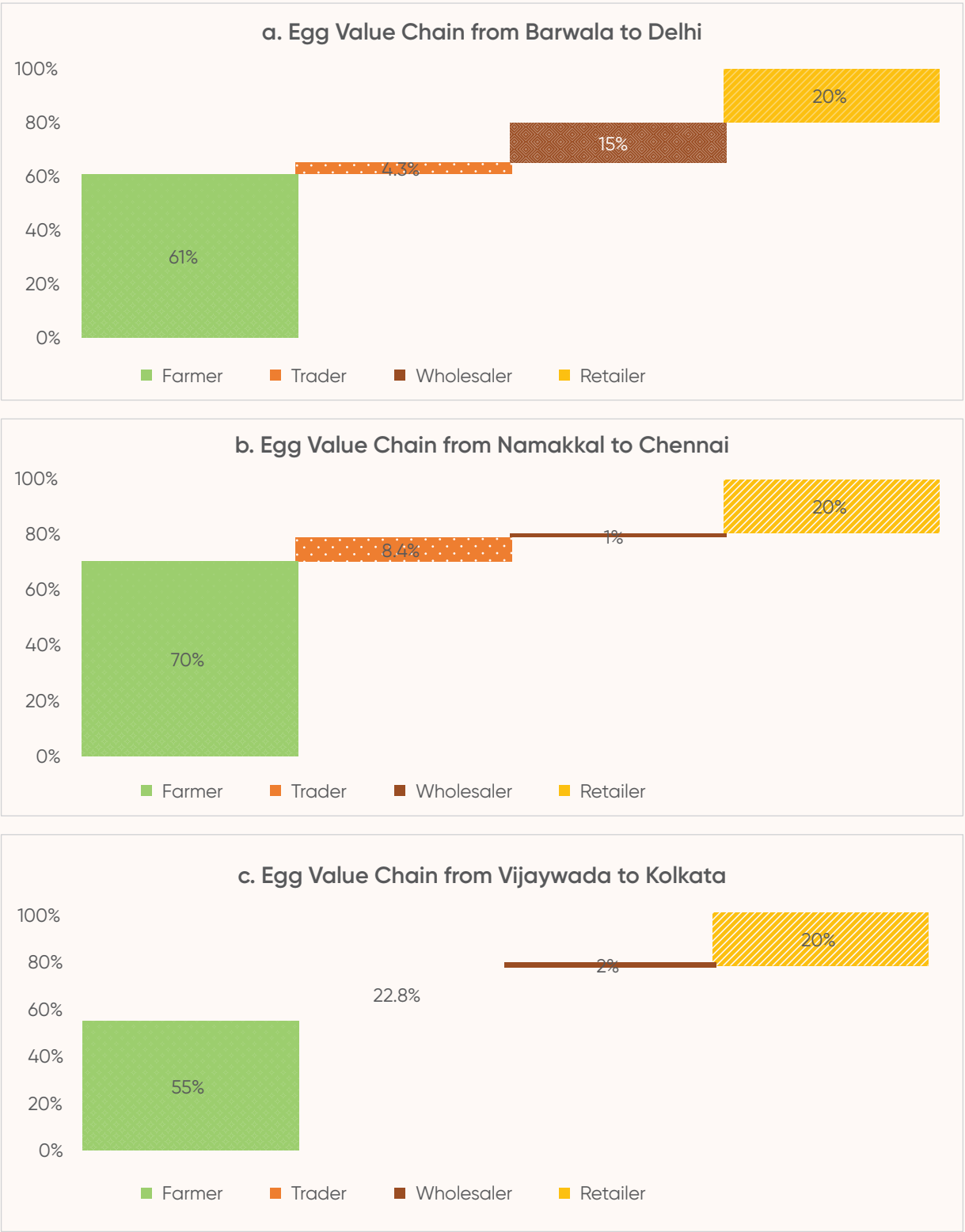
For the farmers' price, the NECC suggested price for TE 2022-23 has been used. According to NECC officials, this suggested price is a close approximation to what farmers actually realize. Depending on market conditions, farmers may receive more or less than the suggested price. In case of a surplus, farmers' realized price is typically lower than the NECC suggested price, whereas in case of a shortage, the realized price is higher. Retail prices for the respective cities are obtained from DES, Ministry of Agriculture and Farmer's welfare. Logistics costs and the shares of other stakeholders in the value chain are based on consultations with egg industry members.

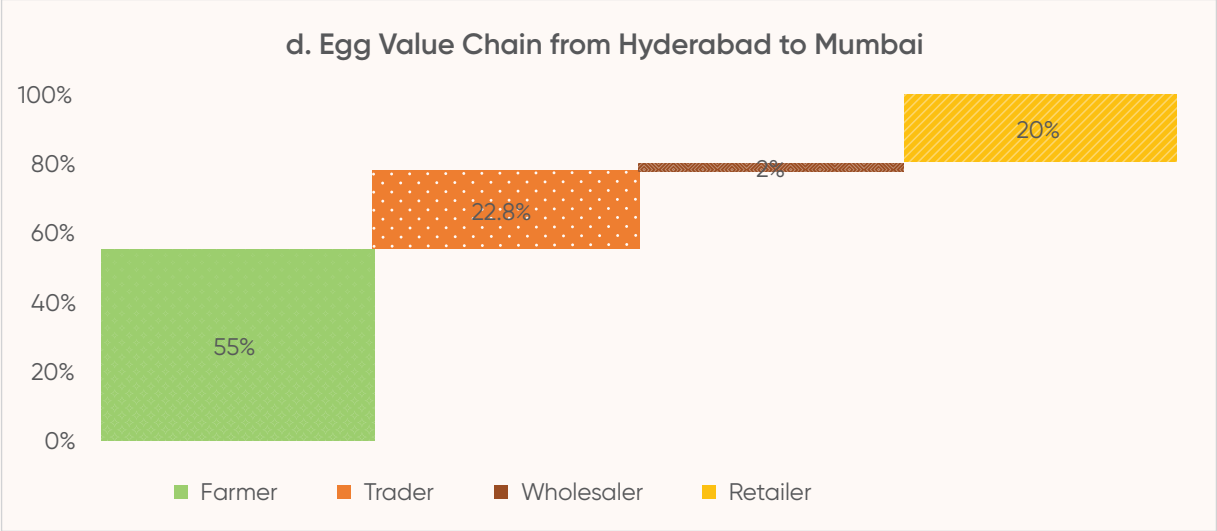
The details on the price spread between different stakeholders in the egg value chain are presented in Annexure 1. Figure 10 illustrates the markups (costs and margins) of various stakeholders, providing insights into the efficiency of the value chain from production to consumption. The figure shows that across value chains, farmers' share in the consumer rupee for eggs ranges between 55 to 70 per cent. However, these shares are not net of profit, as farmers must cover the costs of feed, vaccines, and other overhead expenses, and also bear the risk of disease outbreaks. Farmers can only profit if the price they receive exceeds their cost of production.

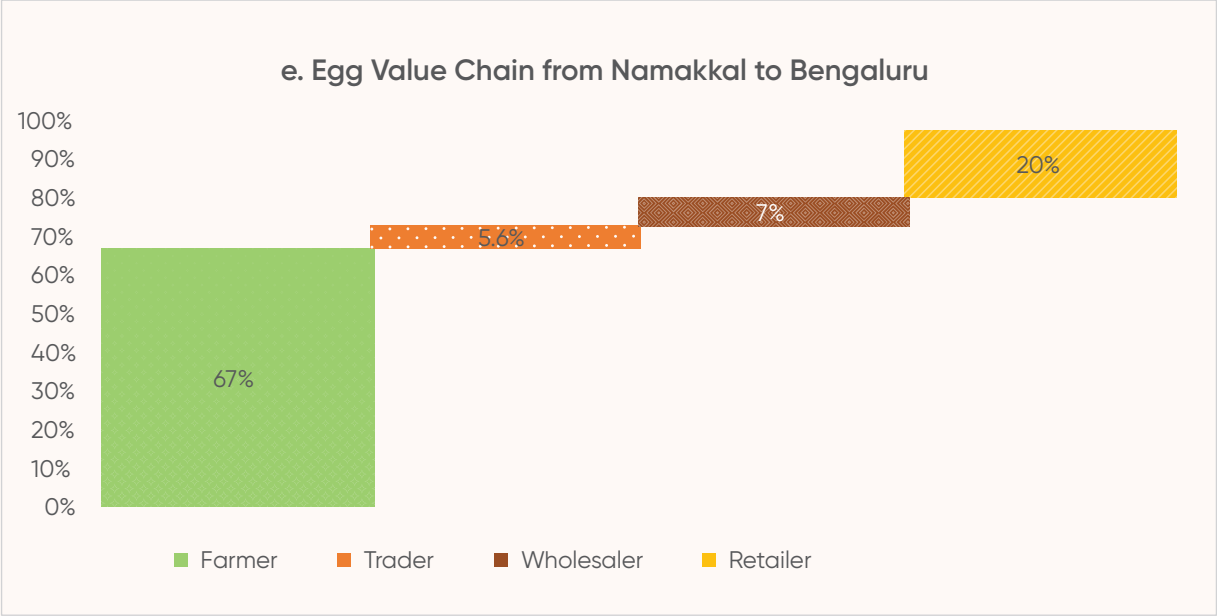
As the egg moves from the farmer to the trader, about 3-4 paisa is added as the farmer's margin. Logistics and overhead costs from trader to wholesaler add approximately 30 paisa per 200 km. The wholesaler then adds a margin of around 5-10 paisa. Retailers, who face the highest risks of perishability and spoilage, apportions the highest margin before selling the egg to the consumer. With higher wastages at the retail level, a retailer also has to incur cost on transportation and a space to rent.

Local demand, distance, and transportation infrastructure are the reasons for the varying shares in consumer rupee across value chains. Regions with efficient logistics and competitive markets tend to have better prices for farmers. For instance, the distance between Vijayawada and Kolkata is about 1200 Km, hence the price for consumers in Kolkata is higher compared to other markets. However, there is an emergence of local egg production in the state which has helped in reducing the egg prices in the state.

Figure 10: Value Chain Markups* for Egg







*The Markups in the figures are inclusive of both cost and margins.

Source: CII's calculations using data from NECC, MoAFW and industry inputs

CONCLUSION AND POLICY RECOMMENDATIONS

This section provides key policy recommendations for developing an efficient egg supply chain, stabilizing egg prices and reducing the gap between farmers and consumers' price of eggs. Key recommendations involve improving the productivity of layer birds, improving the infrastructure, ensuring adequate and affordable feed requirements, streamlining the supply chain, promoting farmer-producer organizations, and ensuring transparent and fair market practices. Measures to stabilize the price volatility will help fulfill the dual objectives of ensuring a remunerative price to farmers and affordable eggs to the consumers.

Key recommendations involve improving the productivity of layer birds, improving the infrastructure, ensuring adequate and affordable feed requirements, streamlining the supply chain, promoting farmer-producer organizations, and ensuring transparent and fair market practices.

Increasing egg productivity

- **R&D for improved breeds of layer birds:** There should be a greater focus on research and development for improving the genetics and disease resistance capability of layer birds. Increasing investments by fostering collaboration between industry stakeholders, government agencies, research institutions, and international partners will be the key towards ensuring knowledge sharing, technology transfer, and joint initiatives among these institutions. The improved genetics of layer birds through cross breeding, back crossing, within-line selection, selection in commercial genotypes, will not only help increase yield of eggs but will also help the birds withstand disease outbreaks. Institutions such as ICAR-CARI have already developed chicken varieties with efficient FCR (Feed Conversion Ration), early age of

maturity etc. However, there should be efforts to make these varieties available to the farmer by reducing the gap between farm and research institutions.

- **Promote egg production in non-traditional regions:** While eggs are consumed throughout the country, its production is mainly concentrated in Southern India. This leads to high logistics cost of transporting eggs to non-producing centres. Therefore, there is a need to develop non-traditional centres for egg production, especially in states with higher consumption. New feed processing centres should be opened up to cater to the increased production in states such as Bihar which have abundant production of maize, a key requirement for poultry feed. Expanding production centres across India will help increase egg consumption, reduce logistics cost and increase livelihood opportunities for farmers.

Undertaking infrastructural reforms

- **Promote dedicated cold storage for eggs:** Due to the seasonal nature of egg production and non-uniform consumption patterns, there is an urgent need to develop dedicated cold storages for eggs in major production and consumption centres. Cold storages will help farmers bargain for a better price during glut season by postponing the date of sale. This will also help reduce spoilage and increase the shelf life of eggs. The increase in cost of eggs will be insignificant (about 1 paisa per egg) if the temperature is kept between 10°C to 12°C. Currently, only large traders and poultry companies have egg cold storages with farmers having no access or capacity. Small farmers who will find it difficult to finance such cold storages can form farmer collectives/FPOs and jointly develop such cold storages. Government schemes such as Agriculture Infrastructure Fund which offers 3 per cent interest subvention for setting up of cold storages, can be leveraged for the construction of cold units.

- **Modernization of infrastructure:** While egg production has increased in the country, the improvement in infrastructural requirements have not kept pace. Therefore, there is an urgent need to develop and promote modern infrastructure projects such as improved hatcheries, breeding farms, processing units, and reefer vehicles, etc.

Ensuring adequate and affordable feed requirements

- **Increasing feed productivity:** The poultry industry's rapid growth necessitates a corresponding increase in feed grain production, chiefly maize and soybean. However, the current production levels of these crucial grains fall short of meeting the escalating demands of the poultry sector. Further, the diversion of maize towards ethanol blending has been intensifying competition and straining the availability of these grains. India resorts to importing maize and soybean whenever there is a demand from the poultry industry revealing a lack of self-sufficiency in poultry feed production. There should be efforts to elevate the productivity of maize and soybean to align with global standards. Achieving this goal could potentially enable India to attain self-sufficiency in these vital crops.

This will further help in stabilizing the prices of poultry feed and consequently, poultry products. Additionally, this self-sufficiency would be a boon for maize and soybean farmers, enhancing their profitability and sustainability in the market.

- **Reducing feeding cost:** As the cost of feed is the most significant proportion of input cost of egg production, there should be efforts to find ways to reduce its cost.

  Farmers should be made aware of different measures that can be employed to reduce feeding cost like reducing feed wastage by using proper feeder, avoiding overfeeding, temperature maintenance, and keeping breeds with better Feed Conversion Ratio (FCR).

- **Alternative feed materials:** Besides maize and soybean, efforts should be made to develop alternative sources for poultry feed. There are several crops with high potential of alternative feed sources such as Tapioca, Millets and Azolla. All these crops are already being cultivated in India and can be another alternative for poultry feed. These have high content of proteins, essential amino acids and other vitamins and minerals.

- **Consider adoption of modified maize and soybean as feed:** The ever-expanding poultry sector in India, higher prices, lower productivity of feed material, and increasing diversification of maize for other industrial uses has necessitated the exploration of modified maize and soybean for feed processing in India. Notably, the utilization of cottonseed oil cake, a by-product of Bt cotton, as livestock feed is already in practice. India may consider regulated imports of modified soybean and maize for feed processing. This move could address the poultry sector's needs, improve productivity, and potentially pave the way for greater competitiveness in the international market for Indian eggs by bringing down the feed cost. However, there is a need to strike a balance between leveraging the advantages of the modified crops and safeguarding the interests of the domestic producers.

Strengthening egg marketing in India

- **Marketing eggs as a protein rich food:** Besides being abundant source of high-quality protein, eggs also contain essential vitamins and minerals crucial for overall health, including vitamin B12, vitamin D, and selenium. Emphasizing the nutritional benefits of eggs as protein-rich foods will be helpful in achieving nutritional security in India. Public awareness campaigns through digital and traditional media can facilitate widespread dissemination of nutritional information, ultimately reshaping consumer perceptions and encouraging the integration of eggs into everyday diets as a nutritious staple.

- **Value addition and processing of eggs:** Processing of eggs in the form of egg albumin powder, egg liquid, pickled eggs should be promoted in India as it offers numerous benefits to both farmers and consumers. For farmers, it provides an opportunity to increase their income by offering diversified products that fetch higher prices compared to traditional egg sales. By tapping into these value-added markets, farmers can mitigate price fluctuations and improve their overall profitability. Additionally, processing adds value to eggs that may not meet retail standards, reducing food waste and maximizing resource utilization. For consumers, value-added egg products offer convenience, versatility, and enhanced nutritional options. It will also open up avenues for Indian trade.

- **Branding and marketing of high value eggs:** Marketing high-value and premium category eggs require streamlining the distribution chain to tackle existing challenges posed by numerous intermediaries and unhygienic conditions in farming and marketing. Direct marketing, modern retail, and offering branded eggs to consumers are pivotal in achieving this goal. This will help strengthen traceability in the value chain, facilitate delivery of cleaner and safer eggs to consumers, and thereby enhance confidence and satisfaction. Moreover, scaling up markets for free-range, antibiotic-free, and nutrient-dense eggs is essential to meet the rising demand driven by consumer awareness and food safety concerns. These premium products offer high value for farmers and cater to consumers seeking healthier and ethically produced products. Tapping into this niche market segment and implementing effective distribution strategies will help boost farmers' profitability and sustainability in the egg industry.

Other policy measures

- **Transparent price discovery mechanism:** The current method of price fixation for eggs may not accurately reflect the true cost of production borne by farmers, limiting their bargaining power in price discovery. There is a clear necessity for a more transparent price discovery mechanism, where market forces of demand and supply play a greater role, and farmers have a significant say in determining prices. Involving farmers directly in the price discovery process alongside other stakeholders would ensure that the prices set are fair and reflective of production costs. This approach not only empowers farmers but also promotes a more equitable and sustainable egg industry.
- **Clear regulations on import of vaccines/ enzymes:** In India, there is no production of essential vitamins and amino acids required by the poultry industry and all of these are imported. A clear regulation for importing vaccines/ enzymes should be adopted and focus should be on developing indegenous vaccines and enzymes in the future.
- **Reduce import duty on pre-mix:** Pre-mix is an important part of the feed composition of the poultry industry and currently the import duty on pre-mixes is significantly higher than the import duties in other South and South East Asian countries. In order to benefit the Indian poultry industry and lower their cost of production, import duty on pre-mixes should be re-looked at while promoting the production of pre-mixes in India for the future.

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Annexure 1

Barwala to Delhi			
		Price per 100 eggs	Share (%)
1	Price received by farmers (Barwala)	423	61%
2	Traders Cost and margin	30	4.3%
3	Wholesale Price in Delhi (1+2)	453	
4	Wholesalers Margin and Cost (5-3)	104	15%
5	Price to Retailer (From DES)	557	
6	Retailers Margin and Cost (25% of retail price)	139	20%
7	Price paid by consumers (5+6)	696	100%

Namakkal to Chennai			
		Price per 100 eggs	Share (%)
1	Price received by farmers (Namakkal)	453	70%
2	Traders Cost and margin	54	8.4%
3	Wholesale Price in Chennai (1+2)	507	
4	Wholesalers Margin and Cost (5-3)	8	1%
5	Price to Retailer (From DES)	516	
6	Retailers Margin and Cost (25% of retail price)	129	20%
7	Price paid by consumers (5+6)	645	100%

Vijayawada to Kolkata

		Price per 100 eggs	Share (%)
1	Price received by farmers (Vijayawada)	437	55%
2	Traders Cost and margin	180	22.8%
3	Wholesale Price in Kolkata (1+2)	617	
4	Wholesalers Margin and Cost (5-3)	16	2.0%
5	Price to Retailer (From DES)	633	
6	Retailers Margin and Cost (25% of retail price)	158	20%
7	Price paid by consumers (5+6)	791	100%

Hyderabad to Mumbai

		Price per 100 eggs	Share (%)
1	Price received by farmers (Hyderabad)	430	59%
2	Traders Cost and margin	105	14.4%
3	Wholesale Price in Mumbai (1+2)	535	
4	Wholesalers Margin and Cost (5-3)	47	6%
5	Price to Retailer (From DES)	582	
6	Retailers Margin and Cost (25% of retail price)	146	20%
7	Price paid by consumers (5+6)	728	100%

Namakkal to Bengaluru			
		Price per 100 eggs	Share (%)
1	Price received by farmers (Namakkal)	453	67%
2	Traders Cost and margin	38	5.6%
3	Wholesale Price in Bengaluru (1+2)	491	
4	Wholesalers Margin and Cost (5-3)	49	7%
5	Price to Retailer (From DES)	539	
6	Retailers Margin and Cost (25% of retail price)	135	20%
7	Price paid by consumers (5+6)	674	100%

Note: Traders cost includes overhead costs (transportation, labour, etc. @ 30 paisa/200 Km) and his margin

Calculation includes:

Wholesale Price: Price received by farmers + Traders Cost and margin
Wholesalers Margin and Cost: Price to Retailer - Wholesale Price
Price paid by consumers: Price to Retailer + Retailers Margin and Cost
Source: CII calculations using data from NECC, MoAFW and industry inputs

Notes

Confederation of Indian Industry

The Confederation of Indian Industry (CII) works to create and sustain an environment conducive to the development of India, partnering Industry, Government and civil society, through advisory and consultative processes.

For more than 125 years, CII has been engaged in shaping India's development journey and works proactively on transforming Indian Industry's engagement in national development. With its extensive network across the country and the world, CII serves as a reference point for Indian industry and the international business community.

In the journey of India's economic resurgence, CII facilitates the multifaceted contributions of the Indian Industry, charting a path towards a prosperous and sustainable future. With this backdrop, CII has identified "Globally Competitive India: Partnerships for Sustainable and Inclusive Growth" as its Theme for 2024-25, prioritizing 5 key pillars. During this year, it would align its policy recommendations, initiatives, and activities with this overarching framework to facilitate strategic actions for driving India's global competitiveness and growth through a robust and resilient Indian Industry.

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Food and Agriculture Centre of Excellence

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- Improve on and off-farm productivity through the dissemination of best practices and technological innovation
- Invest in capacity building initiatives and skill development for supply chain participants across the value chain
- Strengthen linkages across the value chain through market access initiatives, thereby reducing losses and increasing farmer incomes

FACE's service portfolio comprises commodity specific value chain assessments and supply chain advisory services for food and agri businesses, training and consulting services in the area of food safety, and sectoral research across different market segments. FACE also works on projects in PPP mode, to develop business models that are scalable and replicable across geographies.

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