



# Dairy India Overview

A pack prepared for Dairy Australia  
by Beanstalk

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# Context & Acknowledgements

Dairy Australia is exploring opportunities to develop long-term strategic partnerships with India's dairy industry across science, capability development, policy, and trade. As part of this, Dairy Australia has worked with Beanstalk to prepare a 'Dairy India Overview' pack, drawing on existing research and in-market experts, to provide a snapshot of the state-of-play in India's dairy sector.

This information pack is part of a broader project aimed at identifying strategic opportunities for institutions, government, and private companies to collaborate and build lasting partnerships.

We acknowledge the support of the Australian Government in order to commission this work.

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*Further, Beanstalk thanks the '**Australian Dairy in India Consultation Group**' comprising dairy manufacturing companies, industry organisations, State and Federal Government's, Universities and research organisations who have volunteered information and provided their experience and input into this pack.*

# Industry Snapshot

2018-19\*  
Milk Production Per Year

**191 million tonnes**  
**CAGR: 4.5%**



**Global Rank: 1st**

AUS: 9.2M tonnes, Rank: 12th | NZ: 21.9M tonnes, Rank: 6th  
USA: 101M Tonnes, Rank: 2nd

2018-19  
Indian Dairy Market

**USD \$144B**  
**CAGR: 12%**



**30%**

**Share of Organised Sector**

Cooperatives: 45%  
Private dairies: 55%

**Bovine Population**

**302 million**

Cattle : 192 million  
Buffalo : 110 million



**Households in Milk Production**  
**80 million**

Majority Smallholder Farmers

2019  
Dairy Imports

**USD**  
**\$25M**



Global rank: 102nd

2019  
Dairy Exports

**USD**  
**\$404M**



Global share: 0.36%

**Per Capita Milk Consumption**  
**106 kg/year**



**Global Rank: 67th**

**Per Animal Per Year Yield**  
**1,336 kg**



**Global Rank: 93rd**

AUS: 6,132 kg, Rank: 22nd  
NZ: 4,322 kg, Rank: 31st  
USA: 10,319 kg, Rank: 1st

# Section

- 1) Overview
- 2) Dairy Supply Chain
- 3) Trade Status
- 4) Policy, Regulation, Research
- 5) Outlook

**INDIA'S DAIRY SECTOR**

**BEANSTALK**



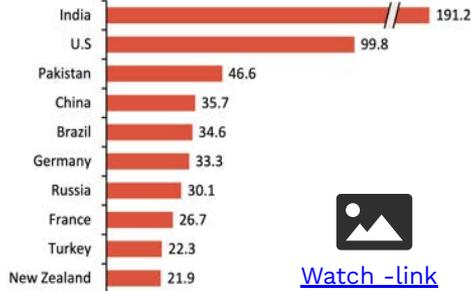
# 1 OVERVIEW

- 01 Overview
- 02 Culture
- 03 Operation Flood
- 04 Milk Production
- 05 Milk Yields
- 06 Farm System
- 07 Livestock
- 08 Cattle Breeds
- 09 Per Capita Consumption
- 10 Dairy Products Consumption
- 11 Consumer & Product Trends

# Overview

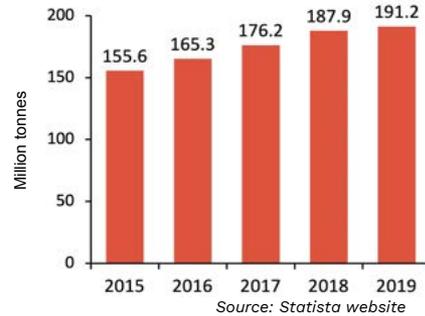
## Top 10 countries in milk production, 2019

million tonnes

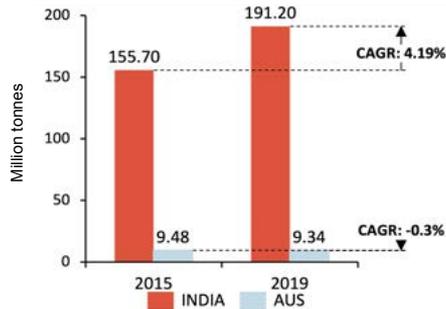


## India's milk production, 2015-2019<sup>6</sup>

million tonnes



## Growth in milk production, 2015-2019<sup>6</sup>



## Milk production in India and Australia

	Australia	India
Population	24.9 Million	1,369 Million
GDP (PPP)	AUD 1.79 T	AUD 14.28
GDP (per capita)	AUD 76,637	AUD 2,951
Milk production	9.3 Million tonnes	191.2 Million tonnes
No. of milking animals	1.7 Million	136.3 Million
No. of dairy farms	5,800	150 Million
Agricultural labor	80,000	620 Million
GDP from agriculture	3.6%	17.4%

## Insights



India is the largest milk producer in the world, producing **191.2 million tonnes** or **22% of the world's annual milk production** - more than **20 times Australia's** total production



Its dairy industry is worth more than **9,168 billion Rupees (AUD 194 billion)<sup>9</sup>** and **contributes 4.2% of India's GDP**. It is India's largest agricultural commodity, dominated by small and marginal farmers with 1-5 dairy animals on less than 22ha of land



The sector is largely self sufficient in milk production, with **80 million rural households<sup>3</sup>** engaged in milk production, and about **10 million employed full-time** in milk production, 71% of which are women.



Milk is an important product in religious ceremonies. Culturally and religiously, dairy is a vital source of protein for the Indian population given it has the **2nd lowest meat consumption per capita in the world**. Moreover, there are more than **500 million vegetarians**. Given the large rural population involved in the dairy sector, the government takes an active interest in the industry to ensure that initiatives assist and enhance the livelihoods of farmers.

# Culture

Cattle have **strong cultural significance** and milk is a key source for India's nutritional security

OVERVIEW

DAIRY SUPPLY CHAIN

TRADE STATUS

POLICY

OUTLOOK

40%

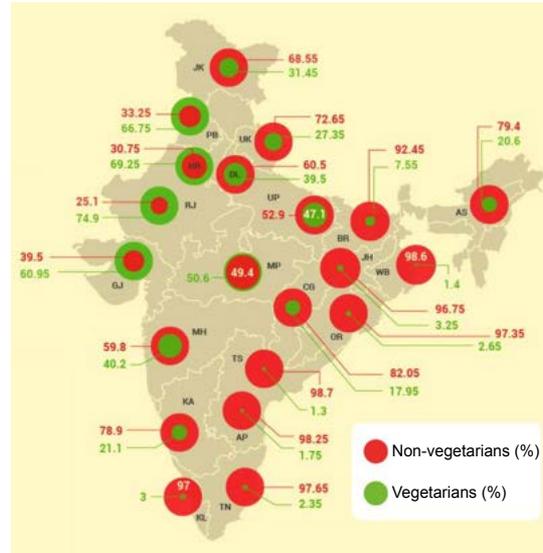


Adhere to a  
vegetarian diet

82%



of Indian population  
practice Hinduism



## Shaping culture through religion

Around **82% of Indians are Hindus**, with many being lacto-vegetarians who rely on dairy for protein. The emergence of Jainism In the early 5th Century BCE increased the spread of vegetarianism. Despite 60% of the population being non-vegetarians, dairy is a vital source of protein with meat consumption per capita per annum at **below 5 kilograms**. India has the **2nd lowest meat consumption** per capita in the world.



## India's sacred cows

India has an ancient tradition of **keeping cattle and producing milk**, with many references in ancient Indian manuscripts and literature.

Around 1000 BCE, agriculture spread across India. **Cows were domesticated** to produce bullocks, which were used for ploughing farms. Milk was mainly given to calves, and only used for human consumption in the higher yielding north west.

In India cow slaughtering is banned in many states, and beef consumption is limited to the north east and southern states. As a result India is the world's largest exporter of buffalo meat, largely to SE Asia and the Middle East. Major production areas are Uttar Pradesh, Andhra Pradesh, Maharashtra and Punjab.

Increased use of farm machinery has reduced the utility of male calves as animal farm labour is disappearing.

# Operation Flood

A key initiative in the development of India's dairy industry

## 1 Overview

After independence, India focussed on food security for the growing population, relying on food aid from developed countries until the late 1960s. A key initiative in India's development was **Operation Flood**, a rural development programme started by India's National Dairy Development in 1970, which aimed to create a nationwide milk grid. The program was the brainchild of **Dr. Verghese Kurien**, the first chairman of National Dairy Development Board (NDDB).

## 2 Solution

**Phase-1 (1970-80)** : Linked 18 of India's primary milk sheds with consumers in major cities such as Delhi, Kolkata, Mumbai and Chennai.

**Phase-2 (1981-85)** : The concept of a National Milk Grid was launched, increasing to 136 milk sheds. 290 urban markets expanded the outlets for milk. By 1985, around 43,000 village cooperatives with 4.25 million milk producers were covered.

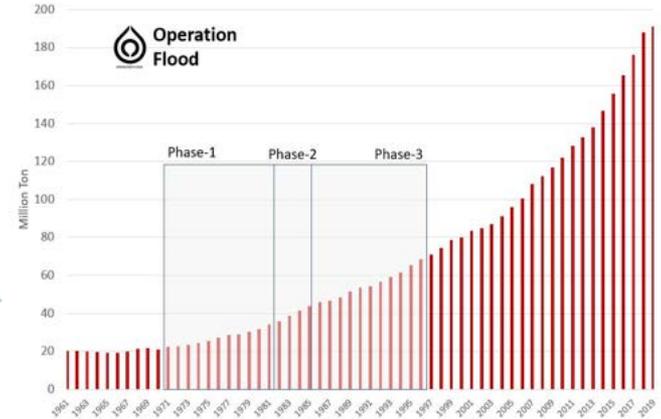
**Phase-3 (1985-1996)** : Dairy cooperatives expanded and strengthened the infrastructure to produce and market increasing volumes of milk. Cooperatives increased to 73,000 by end of Phase-3.

## 3 Key developments

Operation Flood was instrumental in:

1. Making India the largest milk producer in the world today.
2. Anand Milk Union Limited (AMUL) emerging as India's largest cooperative milk company.
3. India's National Milk Grid linking milk producers throughout India with consumers in over 700 towns and cities.

Operation Flood & growth of milk production in India, 1971-1997<sup>5</sup>  
million tonnes

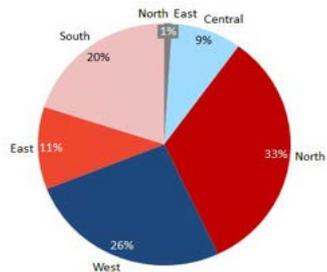


Average milk procurement increased from **2.56 million kg/day** during Phase-1 to **11 million kg/day** during Phase-3.

# Milk Production

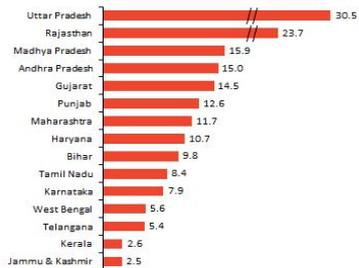
India is the **world's largest** milk producing country

**Regional contribution to milk production, 2018**<sup>5</sup>  
percent



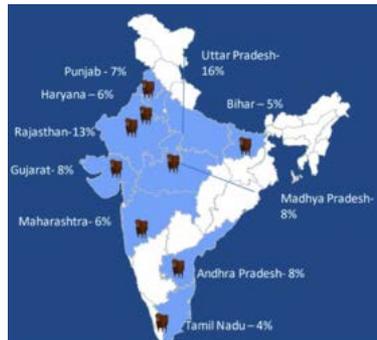
**Northern states are the main producers** of milk with largely buffalo milk followed by western states with a mix of cow and buffalo milk.

**Top 10 milk producing states, 2019**<sup>2</sup>  
million tonnes



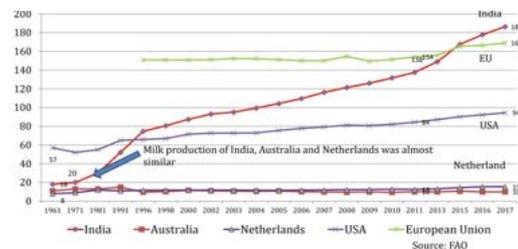
**Central and west India are the fastest growing milk production regions**, due to increased demand from urban populations and availability of milk processing infrastructure.

**Top 10 states for milk production**<sup>7</sup>  
percentage share



Haryana state's milk production of 10 million tonnes is similar to Australia, with a population of around 25 million

**Milk production by country, 1961-2017**<sup>4</sup>  
million tonnes



Increased Indian milk production volumes are due to growth in herd numbers. Yield remains low and is improving slowly.

**>40%**

of Indian households own a dairy animal

In **Uttar Pradesh**

**54%**

of households own a dairy animal

## Key drivers of milk production:

- Livestock population (*'Livestock' slide*)
- Land, fodder & feed supplement availability (*'Yield' slide*)
- Cattle productivity and breeding (*'Yield' slide*)
- Cold chain logistics, chilling and processing infrastructure (*'Cold Chain Infrastructure' slide*)

India is the **world's largest milk producer**, with production increasing from 20 million tonnes in 1960 to 191 million tonnes in 2019. This equates to approximately **1 in 10 litres** of global milk production.

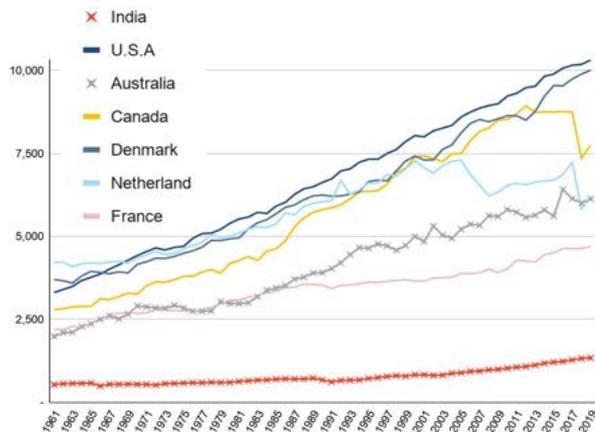
**Six milk producing states account for more than 60%** of India's milk production, relying largely on buffalo (approximately 50%). 33% of milk produced comes from the northern states, with 26% from western states.

The dairy sector is highly **fragmented**.

# Milk Yields

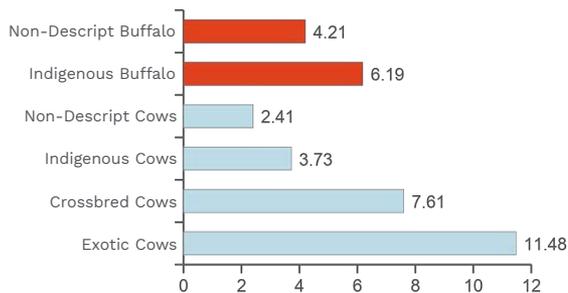
Production is high, but **yields per animal are low**

Milk yield by country <sup>11,4</sup>  
kg/animal/year

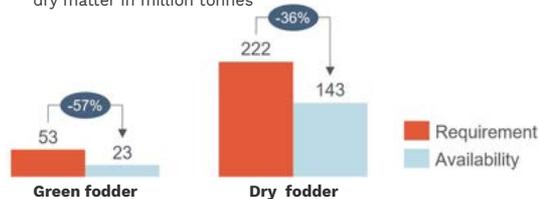


While India is the world's largest milk producer, with the largest dairy herd at 192.5 million cattle, it ranked **93rd globally** in milk yield at **1,336 kg per animal** in 2019 (Australia was ranked 22nd with 6,132 kg per animal).

Milk yield by breed, 2019 <sup>2</sup>  
kg/day



Requirement vs availability of fodder in India <sup>4</sup>  
dry matter in million tonnes



Currently **only 4%** of India's cropping areas is under fodder cultivation, a significant unaddressed opportunity

## Milk Yield Influences

Government training programmes for dairy farmers on **scientific breeding and feeding are resulting in increased yields**. There is a significant opportunity to improve artificial insemination and availability of locally sourced sex semen.

Preferences for buffalo in some areas (with the relatively higher yields of buffalo compared to non-descript and indigenous cow breeds) and increases in the population of higher yielding crossbred and exotic cows also contribute to increasing yields.

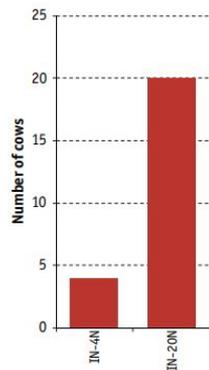
### Low milk yield is mainly attributed to:

- Widespread use of inferior breeds such as indigenous cows and unimproved cattle
- Nutritional deficiencies due to green and dry fodder and concentrate shortages
- Poor feed formulation and feed management
- Poor farm practices and attention to animal health

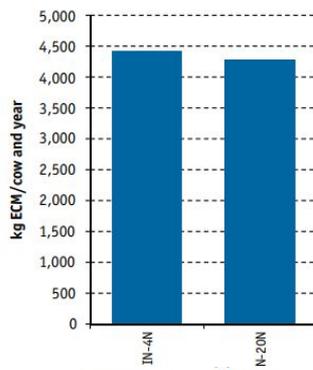
# Farm System

Smallholder farmers produce 80% of India's milk

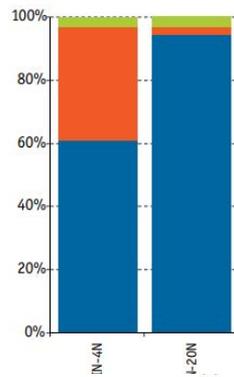
Farm size (number of cows)



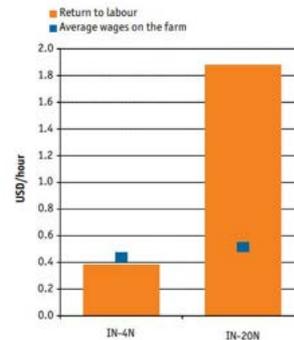
Milk yield



Return structure of the whole farm



Return to labour



■ Other activities ■ Cash crops ■ Dairy (incl. coupled dairy subsidies)

*For illustrative purposes only*

There are 2 typical smallholder dairy farming systems in India:

## 1. IN-4N<sup>8</sup>

Typical farm household with 2 crossbred cows and 2 buffaloes producing 4.4 tonnes of milk (ECM) per year. The feeding system is based on green forages home grown on a quarter of the land owned, straw, crop residues and compound feed. The family operates on about 3 ha of land with other income from crop enterprises.

## 2. IN-20N<sup>8</sup>

Family farm of around 20 crossbred cows and 3 ha of land, mostly used to grow green fodder throughout the year. The feeding system is similar to the IN-4N farm type. Average yield of about 4.3 tonnes of milk (ECM) is slightly lower due to higher stocking rates. Hired labour carries out 70% of dairy operations.

## India's Typical Dairy Farm

In India, dairying is part of a mixed crop-livestock farming system, with animals fed on herbage and crops residues.

Around **95% of India's milk production is from smallholder farmers**, with an average herd size of 1–5 milking animals per household. Average herd size in Australia and New Zealand is 276 and 402 animals respectively.

Dairy farms sized from 50–200 cattle are increasing in some major dairy states such as Punjab, Gujarat and Maharashtra, although they are still few.

Indian coop's ensure

**71-75%**

of consumers' rupee go to the farmers

In AU, NZ & EU

**27-40%**

of consumer dollars go to the farmer

# Livestock

Cattle population is concentrated in **central and north India**

## Cattle population in major states

Category	2019 population (million)
West Bengal	19.0
Uttar Pradesh	18.8
Madhya Pradesh	18.7
Bihar	15.3
Maharashtra	13.9
Rajasthan	13.9
Jharkland	11.2
Assam	10.9
Chhattisgarh	10.0
Odisha	9.9

## Map of India



## India's cattle population



India has the world's largest number of milking cows at **60.6 million**<sup>2</sup> (Australia is ranked 22th at 1.47 million milking cows).

India's cattle numbers are increasing, largely driven by increases in cross-bred cattle and female indigenous cattle.



Cows are cheaper and easier to maintain than buffaloes, but non-descript and indigenous breeds yield less milk than buffaloes.

The higher fat content of buffalo milk is preferred, but buffalo milk production is seasonal. **More than 50% of India's milk production is buffalo milk.**

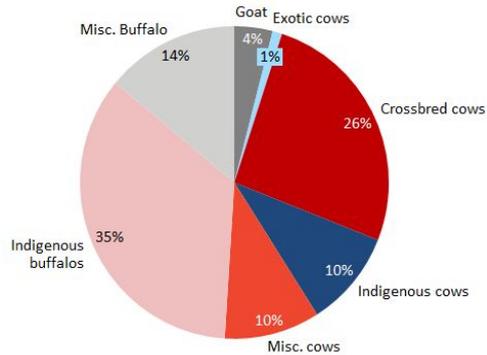


Milk production in India is seasonal with higher winter production. Surplus milk during winter is converted into skimmed milk powder, and reconstituted into milk during summer.

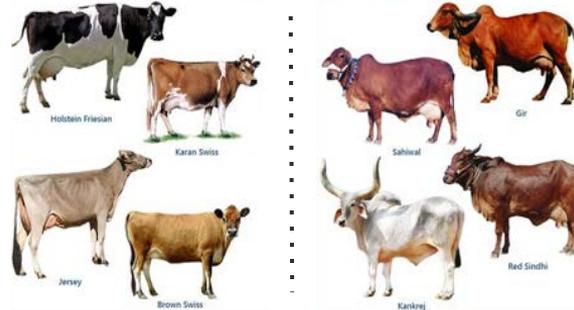
# Cattle Breeds

Increasing population of crossbred and exotic cattle is driven by **yield potential**

**Total milk production by species, 2018<sup>2</sup>**  
percent



**Milk producing cow breeds**



## India's Cattle Breed

The cattle herd in India is diverse, with 27 acknowledged indigenous breeds of cattle and seven breeds of buffaloes, as well as crossbred and exotic cows.

The population of crossbred and exotic cattle increased substantially in 2019 due to their high milk yields (up to 2,400L/yr, compared to 900-1000 for indigenous breeds). Exotic and crossbred cattle account for 56% of cattle milk production despite making up only 32.5% of the cattle herd. **An estimated 49% of India's milk production originates from buffaloes.**

Farmers' interest in indigenous breeds is also declining due to reduced demand for draught animals (most indigenous breeds are used for draught or dual purposes).

Category <sup>2</sup>	2019 Population (million)	Percentage Growth
Total Exotic/Crossbred	50.42	26.9
Total Indigenous/Miscellaneous	142.11	-6

# Per Capita Consumption

Per capita consumption is **above the world average**, and demand will continue to grow

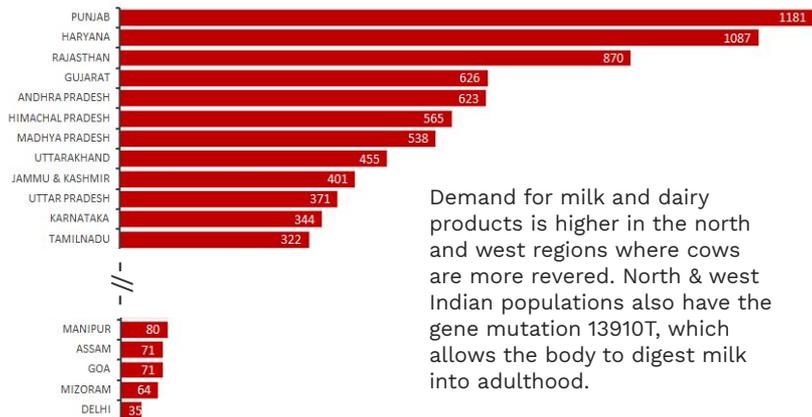
### Milk consumption per capita world comparison, 2018-19<sup>4</sup>

grams/day



### Per capita consumption of milk by state, 2019<sup>10</sup>

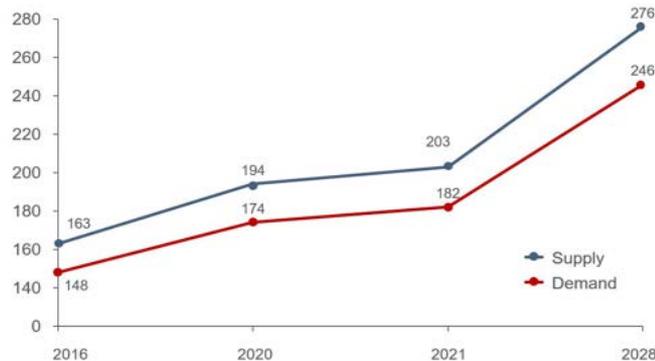
million tonnes



Demand for milk and dairy products is higher in the north and west regions where cows are more revered. North & west Indian populations also have the gene mutation 13910T, which allows the body to digest milk into adulthood.

### Milk supply vs demand in India, 2016-2028<sup>12</sup>

million tonnes



India is world's biggest producer and consumer of milk. Its per capita consumption is above the world average - however well below that of other major markets at **394 grams per day**.

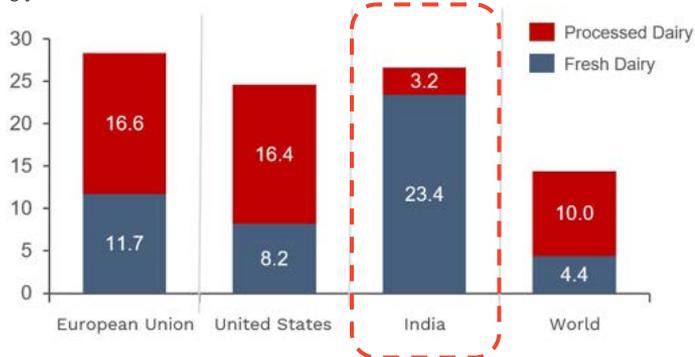
Demand for dairy is expected to grow due to population increase and the large proportion of vegetarians, as well as rising incomes. With almost half of India's population in urban areas in the next 10 years, urban demand for dairy is also expected to grow.

Total consumption is expected to reach 267 million tonnes per year in 2030, with per capita consumption rising to **468 grams per day**.

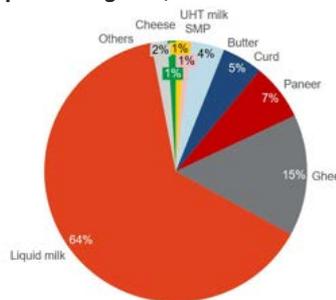
# Dairy Products Consumption

India is ranked 8th in the world for fresh milk consumption per capita - **over 5X the world average** - driven by large vegetarian populations in north & west India

Per capita consumption of fresh & processed dairy products<sup>9</sup>  
kg/year



Market share (value) of dairy industry, by product segment, 2017<sup>9</sup>



## 1. Commodity Products

- Fluid/Liquid Milk
- Skimmed milk powder (SMP)

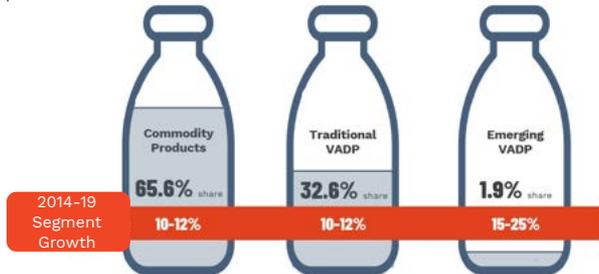
## 2. Traditional value added dairy products (VADPs)

- Butter, curd & ice-cream
- Paneer (cottage cheese)
- Ghee

## 3. Emerging value added dairy products (VADPs)

- Cheese & whey
- Flavoured / UHT milk
  - Lassie
  - Probiotic & other

Consumption share of dairy products in India, by value<sup>5</sup>  
percent



## India's growth in demand

While per capita consumption of fresh dairy products is more than **five times the global average**, per capita consumption of processed dairy products is a third lower than the global average.

Liquid milk is the largest consumed dairy product in India. But there has been a dramatic shift towards consumption of value-added products such as cheese, yoghurt, UHT (ultra-heat treatment) milk, flavoured milk, and whey over the last ten years.

Increasing penetration of the organised sector (the commercial sector namely cooperatives and private dairies) is mainly driven by growth in demand for packed/ready products, growth of e-grocery, demand for high quality contaminant free milk, the increasing high income urban population and product innovation.

In the organised sector, cooperatives dominate mass market ghee, butter, curd, ice cream and packaged milk. Private dairies focus on premium variants of these products along with UHT, powdered and flavoured milk.

Most dairies do not have separate collection systems for cow and buffalo milk, so packaged milk product is mostly a mix of the two.

# Consumer & Product Trends (1/2)

The value added dairy product (VADP) segment is growing rapidly, driven by fast pace of urbanisation, a rising middle class population, changing lifestyles and increased awareness of milk quality

OVERVIEW

DAIRY SUPPLY CHAIN

TRADE STATUS

POLICY

OUTLOOK

## Unstructured markets

## Structured markets

### Emergence of VADPs

Indian consumers today are far more value-conscious than price sensitive, valuing superior taste, clean ingredients and a strong health proposition.

The industry is transforming from a liquid milk to VADPs market, and from an unorganised local market to a more structured branded market.

The organised dairy sector is focusing on VADP segments with the highest profit margins. Curd, cheese, whey, buttermilk and flavoured milk categories can generate 10-25% in EBITDA margins. This has led to increased research and development in new products, process automation, preservation technology and packaging.

Emerging VADPs served

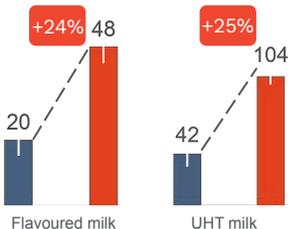
100%

by organised sector

Annual sales growth

15-20%

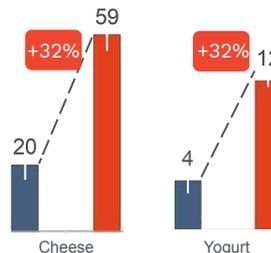
of processed dairy products



CAGR from FY16-FY20

### Flavoured & UHT milk<sup>13</sup>

Flavoured milk & UHT milk drinks are the best performing categories (by value). Improving shelf life through storage and hygiene improvements are enabling transportation to rural areas and helping increase market penetration.



CAGR from FY16-FY20

### Premium milk<sup>13</sup>

Demand for premium milk with longer shelf life is increasing due to busier lifestyles. Higher consumption of VADPs across all states (e.g. cheese, ice-cream, flavoured milk and yoghurts) are to become staple products for the increasing urban population. Further, new VADPs such as camel milk powder (by AMUL) are being introduced to meet health conscientious consumers.

**GOOD MYLK**  
VEGANARKE

10-year CAGR was +10% globally

### Plant-based dairy

Whilst not derived from animal milk, alternate dairy products such as plant-based dairy are also experiencing increased demand driven by growing awareness around health concerns, sustainability and contamination of cow milk (i.e. Epigamia coconut yoghurt).

# Consumer & Product Trends (2/2)

The value added dairy product (**VADP**) **segment is growing rapidly**, driven by fast pace of urbanisation, a rising middle class population, changing lifestyles and increased awareness of milk quality

## Summary of drivers <sup>9,4,12</sup>

### Rising middle class population & income levels

Rapid growth in middle class households and incomes driving milk and dairy product consumption

The market will be **accelerating** at a CAGR of **8.7%**

**255 million (2015)** → **586 million (2025)**

### Urbanisation

Urban population expected to steadily increase with greater access to hygienic and ready-to-eat milk and dairy products from the organised sector

Increasing urban population from **27% (2000)** → **35% (2020)**  
c. 100 million people 

### Changing dietary patterns with focus on milk

Continued shift towards away from cereals to higher value protein such as milk and dairy products for many vegetarians

**29%**  National average vegetarianism → c. 400 million people 

### Shift to packaged food

Increased awareness of quality and food safety will drive packaged dairy products and pasteurised milk. Increasing penetration of the organised sector majorly driven by growth of VADPs

By 2025, **organised sector** to **rise** from approx.

 **30% (now)** →  **50% (2025)**

### Rise of e-grocery

New business models are emerging with direct-to-customer (D2C) market growing faster than the overall dairy sector for premium and organic milk due to consumer awareness, urbanisation, convenience and incomes

The organised sector is predicted to grow over next 5 years by

**20-30x**

### 'Make in India' initiative

The government's focus on local manufacturing through its 'Make in India' program has increased consumers' preference for locally sourced produce

 **60%** of Indians willing to pay extra for products locally made

# 2 DAIRY SUPPLY CHAIN

- 01 Supply Chain
- 02 Milk Journey
- 03 Cold Chain Infrastructure
- 04 Key Players - Dairy Processors



# Supply Chain

Market growth, government initiatives, professionalisation and investment in value-adding and cold chain infrastructure will see the **supply chain evolve** over the next decade



## Organised Sector

- Large, medium and small scale farmers
- Cooperative societies
- Milk aggregators
- Village collection centre
- Bulk cooling at district level
- Refrigerated van
- Insulated milk tankers
- Cooperative plant
- Private plant
- Govt plant
- Own retail outlets
- Supermarkets
- Any retail outlets

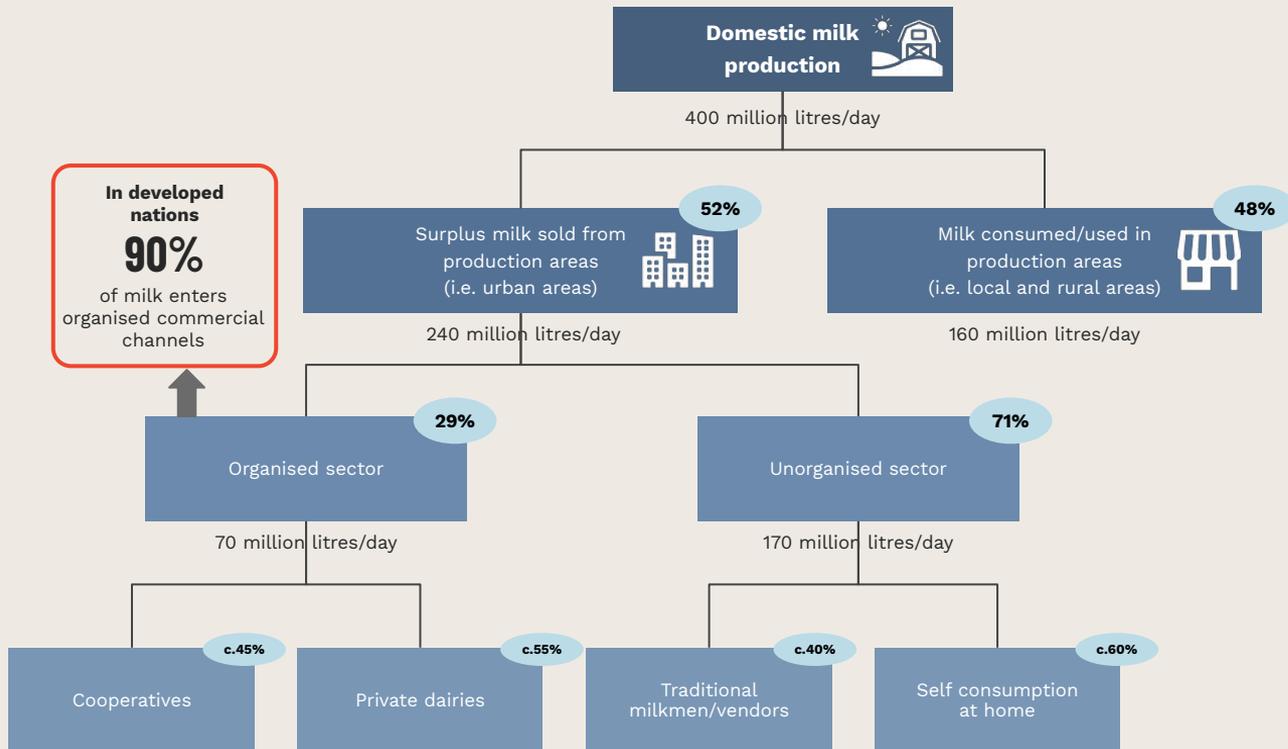
Includes Direct-to-Customer (D2C)

## Unorganised Sector

- Large, medium and small scale farmers
- Local milkman
- Informal value added produce
- Local market

# Milk Journey

About **30% of surplus milk** goes via the organised sector, and the government aims to increase this to 50% by 2023-24



## Milk distribution in India's market

**Around half the milk produced is used locally**, driven by limited shelf life & temperature controlled storage, and transportation.

Surplus milk is available for sale to urban consumers, with around **30% going through the organised sector**. Milk procurement is shifting toward the organised sector.

VADP manufacturers have developed a direct milk procurement supply chain to ensure consistent milk quality and maintain a similar taste.

Business transactions are underpinned by personal relationships between farmers and dairy companies, rather than contracts.

**80%**

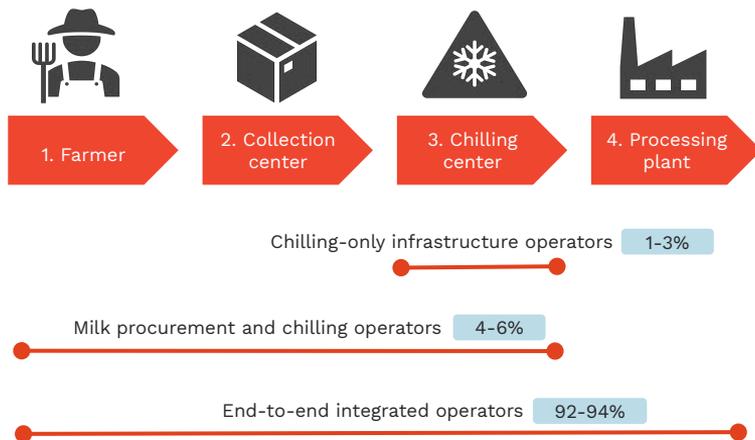
of surplus milk is procured by **5 states**

1. **Gujarat** (driven by Amul)
2. **Karnataka** (driven by Nandini)
3. **Maharashtra**
4. **Tamil Nadu**
5. **Rajasthan**

# Cold Chain Infrastructure

Most milk procurement, chilling and processing is carried out by **end-to-end integrated players** (cooperatives & private)

## Current business models for cold chain infrastructure



## India's top E2E integrated operators

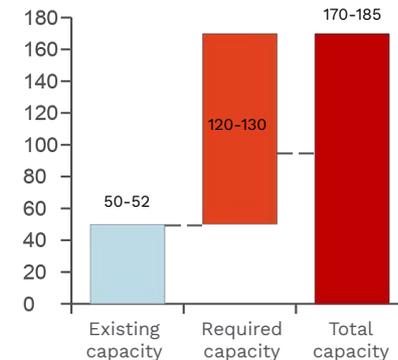


Chilling capacity needs to **more than double** to meet the capacity required by 2025

VADPs require high-end manufacturing, storage and logistic infrastructure

Further, remote regions do not have three-phase electricity grids to support cold storage facilities

Chilling capacity requirements<sup>4</sup> million tonnes



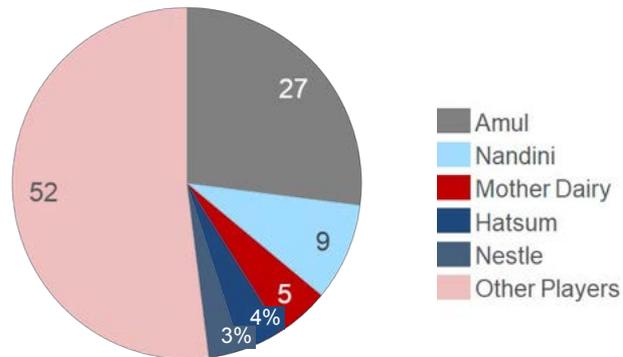
New 'startup' entrants focusing on outsourcing milk procurement and chilling functions are emerging - for example, integrate dairies expanding to new regions prefer to outsource these functions



# Key Players - Dairy Processors

Top 5 companies command 50% share

Market share of dairy companies by sales value, 2018<sup>9</sup>  
percent

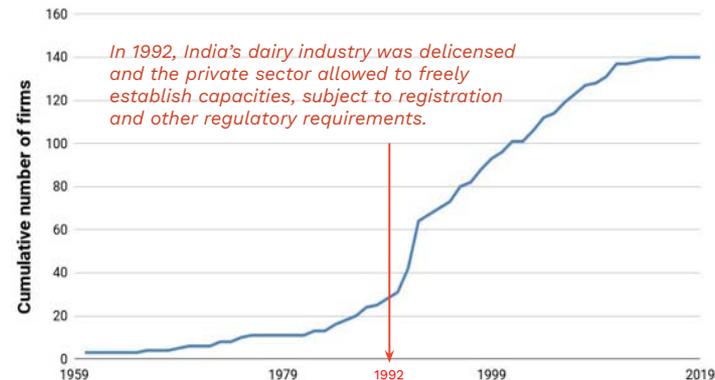


India's dairy landscape has been dominated by **AMUL (Anand Milk Union Limited)**, with a net turnover of around **USD4.4 billion**, for the last two decades.

During Operation Flood, Amul revolutionised the dairy supply chain by eliminating the role of middlemen who served as mediators between producers and processors. Its parent company Gujarat Cooperative Milk Marketing Federation plans to expand this model across the country.

While most dairy products are sold in the B2B market, companies such as Heritage and Hatsun have focused on developing strong brands, with over 90% of their revenues from the B2C market.

Emergence of private dairy firms in India after 1992<sup>15</sup>



The number of firms has increased since the industry was **delicensed in 1992**. It has been an attractive investment destination for private dairy companies, private equity and corporate investors acquiring companies such as Prabhat Dairy and Kvality Ltd, which have occurred over the last 5 years. There is now strong competition between dairy firms, focussed more on marketing than procurement.

Due to trade barriers for dairy imports, foreign dairy corporations have entered the Indian market through joint ventures, mergers or acquisitions of local dairy companies. However, market entry has been challenging for foreign dairy corporations given the highly fragmented market. Companies such as Danone and Fonterra have reportedly exited, before re-entering in different avatars.



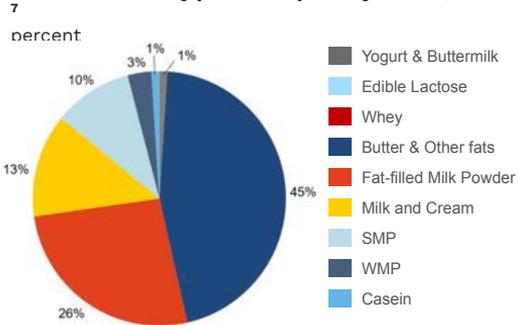
# 3 TRADE STATUS

- 01 Dairy Exports
- 02 Dairy Imports
- 03 Dairy Trade Policies
- 04 Recent Foreign Activity in Indian Dairy
- 05 Australia-India Dairy Engagements

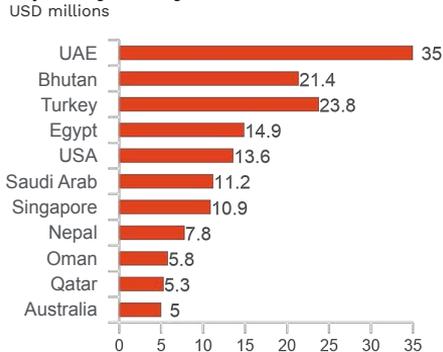
# Dairy Exports

India exports small volumes of dairy products

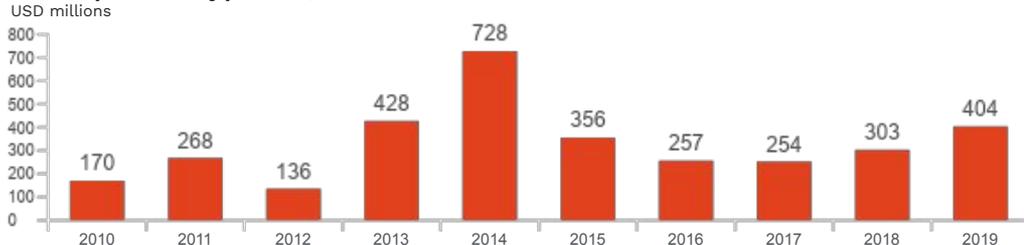
Breakdown of dairy product exports by volume, 2018



Exports by country<sup>1</sup>



Indian exports of dairy products, 2010–2019<sup>1</sup>



## Insights



Small volumes of value added dairy products are exported when prices are competitive and overseas demand is strong.



Total exports of dairy products were worth **USD404 million**<sup>14</sup> (AUD565 million) between April 2018 and February 2019, up 34% on the previous period.



**Butter & other fats** and **Milk powder** (SMP, WMP & FFMP) are the largest exports.



Major export destinations are Turkey, United Arab Emirates, Egypt, Bangladesh, Bhutan, the United States, Saudi Arabia and Malaysia.



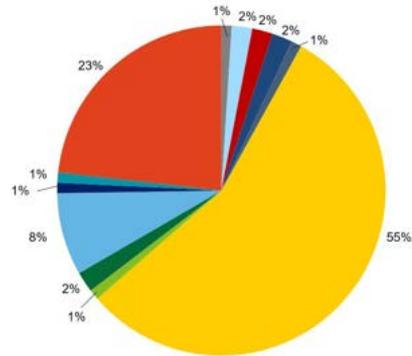
Developed nations like EU and USA provide significant subsidy support to their dairy farmers for exports. However, the Indian Government has to date been more ad-hoc providing limited subsidies such as when there is surplus supply.

# Dairy Imports

India is **ranked 102nd among dairy importing countries**  
(Australia is ranked 18th)

Imports of dairy products by volume, 2017 <sup>16</sup>  
percent

Lactose is the largest import, followed  
by whey powder



**LEGEND:**

- Buttermilk
- Casein
- Cheese
- Ice Cream
- Infant Powder
- Lactose
- Milk
- Milk Products
- Protein
- SMP
- Whey
- Whey Powder

Imports reached an all  
time high in 2011

**USD 252M**

India imported

**46,350t**

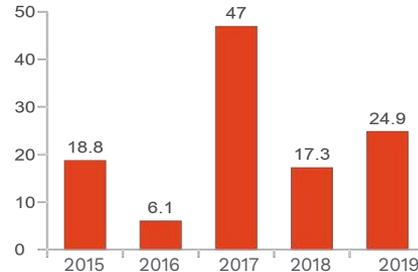
of lactose in 2019

**Foreign dairy brands on India's shelves:**

📍 U.S      U.S      Ireland      France      Denmark



**Imports of dairy products, 2015-2019 <sup>16</sup>**  
USD million



## Insights



Indian imports of dairy products are negligible compared to production and consumption.



India was a net importer of dairy products before Operation Flood. Since then imports have generally declined.

**Lactose is the largest dairy import** and growing. In



2019 India imported 46,350 tonnes of lactose, primarily used in the food (including baby formula) and pharmaceutical industries. Whey powder is the second largest import.

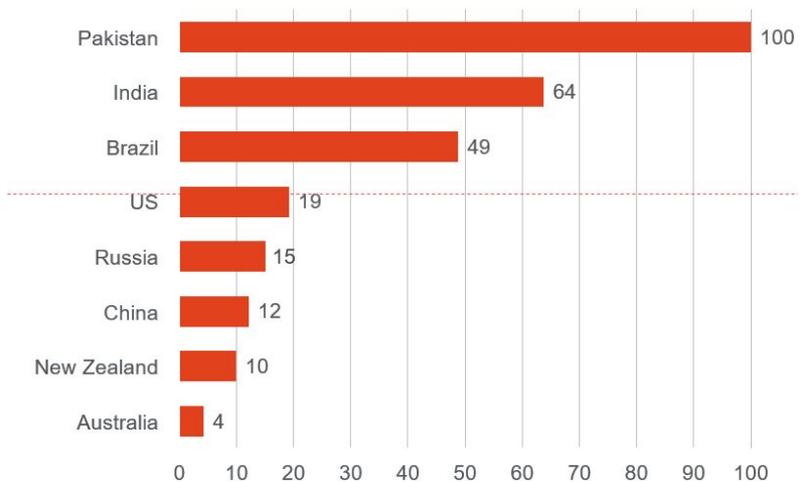


India applies **40-60% import tariffs** for volumes above import quotas for SMP and butter oil, to restrict imports of cheap dairy products that could threaten local businesses (restrictive import regulations are discussed further on the next page).

# Dairy Trade Policies

India's trade restrictions **limit market access**

Average final bound duties on dairy products, 2019<sup>14</sup>  
percent



Source: World Tariff Profiles 2019

In 2019 **India had the 2nd highest import duties** on dairy products in the world

## Insights



India has imposed several trade restrictions on imports limiting market access **limit market access for US-based food products**, effectively banning Imports of most livestock and livestock derived food products (including milk and milk products).



**Beef imports are banned** for religious reasons, with strict import controls on dairy products from animals fed bovine extracts.



**Revised safety standards of milk and milk products** apply from 1 July 2020 for domestic and imported foods. Imports of milk and dairy require a **sanitary import permit** and a **veterinary health certificate** from the exporting country's veterinary authority.



In 2019 **imports of China's milk and milk products were banned** (including foods with fluid milk or dairy solids as an ingredient) until all laboratories at the port of entry have been upgraded to test for melamine.

# Recent Foreign Activity in Indian Dairy

**Foreign direct investment** has boosted the growth of dairy processing and value added dairy products <sup>15</sup>



## 1. Fonterra Dairy Company

New Zealand's multinational dairy cooperative launched the Dreamery brand in India through a joint venture with retail giant Future Group - the first brand under the joint venture Fonterra Future Dairy.



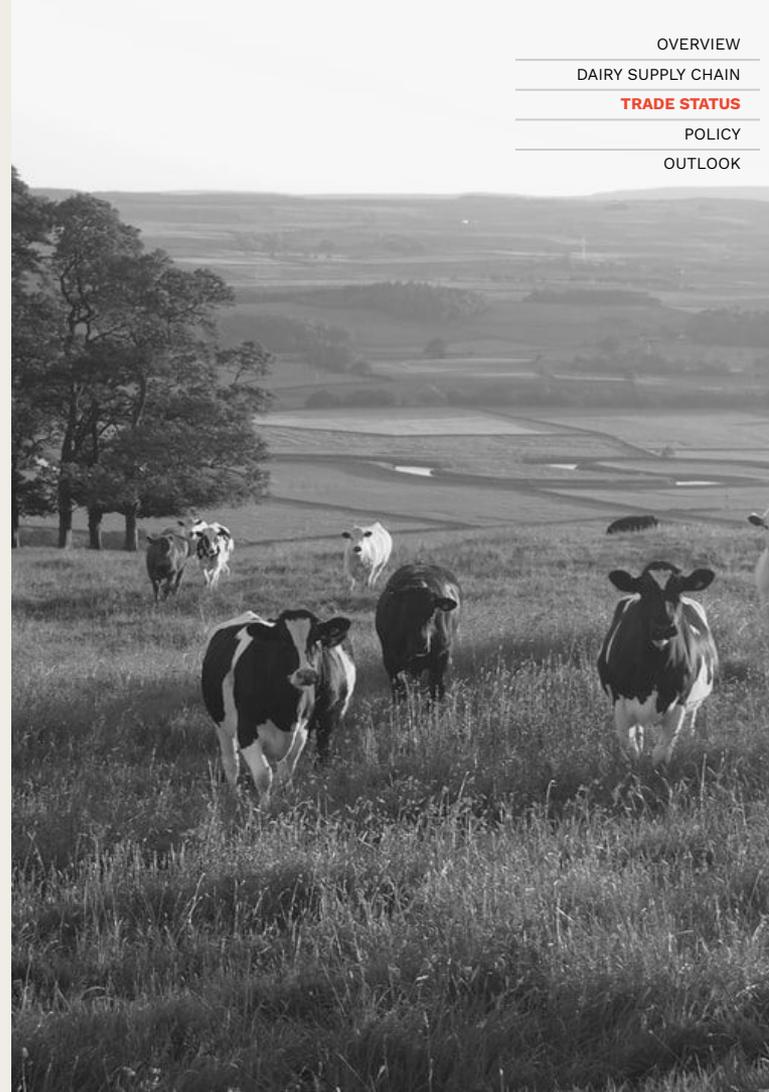
## 2. Danone

In 2019 French dairy company Danone re-entered the Indian market through its flagship Protinex brand targeting the infant milk formula market, and invested in local yogurt manufacturer Epigamia.



## 3. Lactalis

French multinational Lactalis entered India by acquiring Chennai based Tirumala Dairy in 2014, and Anik Dairy (Indore) in 2016. In 2019 Lactalis acquired the milk product business of Prabhat Dairy (Maharashtra) for INR 1,700 crore (USD 239 Million).



# Australia-India Dairy Engagements

Australian dairy industry engagement in India to date has been **ad hoc**

## ACCELERATING DAIRY IN INDIA



### Facial recognition for cows

A Perth based startup collaborating with Microsoft to bring artificial intelligence and face recognition to Indian dairy farmers to help with identifying animals on heat, veterinary needs and nutritional supplement requirements.



### Train the trainer program

Parag Milk Foods sent four of its dairy trainers to South Australia in 2018 for class room and hands-on training at TAFE SA, focused on increasing the productivity of Indian dairy farmers.



### Heat stress workshops (2019)



The University of Melbourne joined 48 scientists, veterinarians and industry researchers in India sharing solutions to heat stress in farm animals in Bengaluru as part of the Australia-India Council Grant.

In 2019, Melbourne University also hosted a study tour from the National Institute of Food Technology Entrepreneurship and Management exploring areas of technological collaboration.



### Green Grass Dairy Training for Kerala (2019)

The program developed by TasTAFE and Queensland Agricultural Training Colleges delivered training of modern agricultural practices via app and in-person to four regions in Kerala. This also involved a study tour into Queensland and Tasmania.



### Veterinarian training

Dr Philip Chamberlain from Queensland provided one training to NDDDB officials through the University of Queensland and Gatton Campus relationships. Dr Chamberlain is now a Veterinarian Training Course Developer at NDDDB.



### Study tour for capacity building (2018)

The Goulburn Ovens Institute of TAFE, funded by the National Dairy Development Board, hosted over 50 Indian dairy professionals providing training across food processing, food safety and dairy production.



### Best practice breeding

The University of Queensland researchers with Professor Ben Hayes are working with BAIF Development and Research Foundation, and Amul Cooperative to improve artificial insemination using big data genomic breeding technology. This project is supported by the Bill & Melinda Gates Foundation.



# 4 POLICY, REGULATION RESEARCH

- 01 Policies & Programs
- 02 Regulation
- 03 Research & Development
- 04 Innovation
- 05 Summary of Key Initiatives

# Policies & Programs (1/2)

OVERVIEW

DAIRY SUPPLY CHAIN

TRADE STATUS

**POLICY**

OUTLOOK

MINISTRIES



**Ministry of Fisheries, Animal Husbandry & Dairying**



**Ministry of Finance**

Continue next slide

INSTITUTIONS

**Department of Animal Husbandry & Dairying (DAHD)**



**National Dairy Development Board (NDDB)**



**National Bank for Agriculture & Rural Development**

SCHEMES & PROGRAMS

**National Livestock Mission** - Improvement in livestock production systems and capacity building

**National Dairy Plan (Phase 1)** - Multi-state initiative to increase productivity through breed improvement and animal nutrition. Phase-1 launched in 2011-12

**Dairy Entrepreneurship Development Scheme** - Provide subsidies for capital projects to generate self-employment in production and infrastructure development

**National Livestock Policy** - Framework for sustainable development of the livestock sector

**National Dairy Plan (Phase 2)** (Mission milk) - A USD1.09 billion initiative for 2020-25. This will focus on improving milk processing capacity and milk quality testing infrastructure.

**Animal Husbandry Infrastructure Development Fund** - USD2 billion fund to establish dairy and meat processing, value adding infrastructure, and animal feed plants

**Rashtriya Gokul Mission** - Research, development and conservation of indigenous breeds through breeding & genetic improvement

**National Programme for Dairy Development** - Strengthen infrastructure for production, procurement, processing of milk and marketing to increase milk production

**Dairy Processing and Infrastructure Development Fund** - USD1.6 billion fund to modernise milk processing facilities for VADPs

**Livestock Health & Disease Control Scheme** - Prevention, control and containment of animal diseases of economic importance e.g. foot and mouth disease & brucellosis

**Network for Animal Productivity & Health** - IT application to collect data on breeding, nutrition and health services

**NABARD Warehousing Scheme** - Provides direct loans for construction of warehouses, silos, cold chain infrastructure, and producer working capital loans

END IMPLEMENTATION AGENCIES

Central government schemes and programs are implemented through **End Implementation Agencies (EIAs)** such as:

- State Cooperative Dairy Federations
- District Cooperative Milk Producers Unions
- Cooperative form of enterprises
- State Livestock Development Boards
- Central Cattle Breeding Farms
- Central Frozen Semen Production and Training Institute
- Regional Stations for Forage Production and Demonstration
- Registered Societies/Trusts (NGOs)
- ICAR Institutes and Veterinary/Dairy Institutes/ Eligible Universities
- Others

Examples:



# Policies & Programs (2/2)

OVERVIEW

DAIRY SUPPLY CHAIN

TRADE STATUS

**POLICY**

OUTLOOK

MINISTRIES



**Ministry of Rural Development**



**Ministry of Women & Child Development**



**Ministry of Food Processing Industries**



**Ministry of Commerce & Industry**

INSTITUTIONS



**National Institute of Food Technology Entrepreneurship and Management (NIFTEM)**



**Indian Institute of Food Processing Technology (IIFPT)**

**Pradhan Mantri Kisan SAMPADANA Yojana (PMKSY)**



**Agricultural and Processed Food Products Export Development Authority (APEDA)**



**National Bank for Agriculture & Rural Development**

SCHEMES & PROGRAMS

**National Rural Livelihood Mission (NRLM)** - Platform enabling rural poor to increase income through dairy farming and access to financial services

**Support to Training & Employment Programme for Women (STEP)** for organisation of women dairy cooperatives

**Cold Chain Scheme** - the scheme is focused on developing cold chain and preservation infrastructure facilities, without any break, from farm gate to the consumer

**Food Processing Fund** - a special fund for the development of food processing clusters to reduce waste and create rural employment

**Community Investment Support on Livestock and Dairying** - Promote healthy milking animals through network of para-vets, animal health & vaccination camps and supply of medical kits

**Grant-in-Aid Scheme** to assist voluntary organisations for induction of cattle for women beneficiaries

**Mega Food Park Scheme** - mechanism bringing together producers, processors and retailers to drive value addition, minimise waste, and increase farmer income. This is a 'cluster' approach to support high value infrastructure and agricultural zones

**Financial Assistance Schemes**

**Agro Processing Cluster Scheme** - focused on attracting entrepreneurs to set up modern infrastructure and common facilities for food processing units based on a cluster approach and linking groups of producers

**Creation/ Expansion of Food Processing/ Preservation Capacities (CEFPCC) Scheme** - focused on infrastructure for a range of post-harvest processing for shelf life extension and preservation of perishables, including waste reduction

END IMPLEMENTATION AGENCIES

Central government schemes and programs are implemented through organisations such as:

- Project Execution Agencies (PEA)
- Central & State Public Sector Undertakings/Enterprises
- Farmer Producer Organisations (FPOs)
- NGO's
- Cooperatives etc.

# Regulation

OVERVIEW

DAIRY SUPPLY CHAIN

TRADE STATUS

**POLICY**

OUTLOOK

## MINISTRIES



**Ministry of Health & Family Welfare**



**Ministry of Consumer Affairs, Food & Public Distribution**

**Ministry of Fisheries, Animal Husbandry & Dairying**



**Ministry of Agriculture & Farmers Welfare**



**Ministry of Commerce & Industry**

## REGULATORY AUTHORITIES



**Food Safety and Standards Authority of India (FSSAI)**

Establishes science based standards for articles of food, Regulates manufacture, storage, distribution, import and sale of food



**Bureau of Indian Standards**

Operates product certification schemes by granting licenses to manufacturers from agriculture and textiles to electronics

**Trade Unit (Department of Animal Husbandry and Dairying)**

Regulates imports of livestock & livestock products to prevent exotic diseases

**Directorate of Marketing & Inspection**

within BIS is compatible with QMS and HACCP and helps identify and control food safety hazards, promote a food safety culture and reduce the risk of food safety incidents



**Society of Bio Safety, India**

Professional association to promote biosafety and biocontainment



**Export Inspection Council**

India's official export certification body, which ensures quality and safety of exported products

**Agricultural & Processed Food Products Export Development Authority**

Develops and promotes exports of scheduled products (products specified under the APEDA Act)

## CERTIFICATIONS PROGRAMMES



**Integrated Milk Certification System**

within BIS is compatible with QMS and HACCP and helps identify and control food safety hazards, promote a food safety culture and reduce the risk of food safety incidents



**AGMARK**

is a certification mark employed on agricultural products in India, assuring they conform to standards approved by the Directorate of Marketing and Inspection

**Food Safety Management System**

The Export Inspection Council operates the Food Safety Management System scheme for dairy products



**APEDA**

Exporters of scheduled products must be registered under APEDA

# Research & Development

OVERVIEW

DAIRY SUPPLY CHAIN

TRADE STATUS

**POLICY**

OUTLOOK

MINISTRY



Ministry of Agriculture & Farmers Welfare

GOVERNING COUNCIL



## Indian Council of Agricultural Research

Coordinates, guides and manages research and education in agriculture including horticulture, fisheries and animal sciences. It is one of the world's largest national agricultural systems, with 101 ICAR institutes and 75 agricultural universities

## Other Relevant Organisations

There are many international development agencies, research institutes, not-for-profits and NGOs undertaking research & development activity for India's dairy sector

KEY RESEARCH INSTITUTES

## National Dairy Research Institute (NDRI)

India's premier dairy research institution undertakes research, teaching and extension activities in dairy production, processing, management and human resource development to promote industry growth and well-being of milk producers and consumers

### Commercialised technologies developed by NDRI

1. New colour based test for rapid detection of detergent in milk (patented)
2. Strip based test for detection of neutralizers in milk (patented)
3. A PCR based method for differentiating A1 and A2 milk (patented)

## Indian Grassland and Fodder Research Institute (IGFRI)

IGFRI has been conducting research, development and training in forage production and utilisation. IGFRI provides technologies, human resource development skills, consultancy and technical services.

## Indian Veterinary Research Institute (IVRI)

IVRI is dedicated to livestock research and development of the region, with a focus on research, teaching, consultancy and technology transfer activities

## Central Institute for Research of Buffaloes (CIRB) -

aims to improve buffalo yield, reproduction and nutrient utilisation through identification, conservation and propagation of elite germplasm



# Innovation (1/2)

Investment in agricultural innovation in India is **on the rise**

## India is home to many AgTech accelerators and incubators

Investment in AgTech in India grew at 48% per year between 2014 and 2019, with more than 600 active AgTech startups securing more than US\$1.9 billion during this period.



PUSA KRISHI



BUILT AT IIMA



Centre for Cellular and Molecular Platforms



making it possible



naarm



### Case Study #1

1

#### Problem

The multiple handling points across the dairy value chain - from cattle health through to temperature monitoring in chilling tanks - is complex and inefficient, leading to adulteration and low quality milk.

2

#### Solution

Stellapps provides holistic solutions in digitising the dairy value chain to optimise milk production, milk procurement and cold chain management. Its herd management system alone has over 450,000 users and dairy farmers have benefited by reducing cattle health expenses by up to 50%. Stellapps currently impacts 1.7 million farmers and 0.7 million cattle across 23,000+ villages in India.

**Stellapps raised US\$25 million between 2014 and 2019**

OVERVIEW

DAIRY SUPPLY CHAIN

TRADE STATUS

**POLICY**

OUTLOOK

## Key Drivers

**1. Shifts in demand for food** (e.g. towards high value proteins) are driving change in agriculture

**2. Improvements in digital infrastructure** are enabling new business models such as digital marketplaces

**3. Need for supply chain efficiencies to meet industry standards** and reduce post-harvest losses of up to 40%

In a conversation with SocialStory, **Mr Ranjith Mukundan, CEO of Stellapps**, shared:

*“Some of the common malpractices that I have heard about are injecting oxytocin in lactating cows, feeding low-quality fodder, using unsterile equipment to artificially inseminate cows, failure to provide timely veterinary care, and other ill-conceived breeding and nutritional methods.*

*This boils down to the lack of awareness when it comes to scientific and healthy animal husbandry practices among small and marginal farmers”*

# Innovation (2/2)

Investment in agricultural innovation in India is **on the rise**

## Adulteration and contamination is a rising concern in India

Indian dairy companies are adopting new technologies enabled by Internet of Things and data analytics to digitise the dairy supply chain for increased quality assurance and safety.

*"Tech plays a very big role in building quality traceability and supply chain at scale - all of this while staying very capital efficient. We want to give our customers the best quality products at the lowest possible price & directly to their doorstep." - **Chakradhar Gade, Co-founder, Country Delight***



### Case Study #2

#### Country Delight

**Country Delight** is a direct-to-home consumer brand. Their farm to door model is underpinned by a digital platform. This platform is designed to reduce middlemen handling, increase quality testing and self testing, and ensure unadulterated high quality milk for consumers.



### Case Study #3

#### Chitale Dairy

**Chitale Dairy** collaborated with Dell Technologies to virtualise its supply chain on the cloud allowing improved management of animal health and nutrition, and therefore higher quality milk.

# Summary of Key Initiatives

The dairy sector is a **cornerstone priority of the Government of India**. Some key policy initiatives include:

## NATIONAL DAIRY PLAN INITIATIVE

### NDP-1 (2012-19)

**Phase 1** of the National Dairy Plan focused on animal productivity, feed, nutrition and genetics. This led to a 6% per year increase in milk production over the past 5 years



### NDP-2 (2020-25) - Mission Milk

**Phase 2** of the NDP is yet to be announced and will focus on enhancing milk processing capacity, supply chain infrastructure and milk quality testing equipment

#### 55% milk from organised sector

The Government of India (GoI) has set a target to increase the procurement of milk by the organised sector from 35% to 55%

#### 100% AI of cows

The GoI is aiming to achieve 100% artificial insemination of cows through sex-selection semen by 2025

#### DIDF investment

The US\$2b Dairy Processing & Infrastructure Development Fund was established to modernise milk processing plants and create additional infrastructure for more milk and value addition

#### Ear tagging

Each cow to be ear tagged as part of the national vaccination program to eradicate foot & mouth diseases and brucellosis, and development of a centralised database

#### Launch of Pashu Mitra

The NDDB in October 2020 launched a call centre (Pashu Mitra) to address farm queries on animal health, nutrition and productivity. A key aim is to raise awareness on scientific dairying

#### Focus on animal productivity

Increasing focus on productivity as opposed to herd numbers through genetics, sexed semen, and in-vitro fertilisation

#### Clean milk program

GoI funding entrepreneurs to establish D2C models in the private sector

#### Food processing investment

The GoI has allowed 100% foreign direct investment for food processing to boost growth of dairy processing and VADPs

#### Fodder development

GoI funding for fodder development for both production and post harvest management to augment quality feed and fodder

#### AgTech Innovation

GoI, states and industry investment into AgTech incubation leading to startup growth to modernise in areas of agri-finance, food testing, hygiene and traceability

# 5

## OUTLOOK

- 01 Impact of COVID-19
- 02 Future Trends



# Impact of COVID-19

Revenue growth is expected to be **flat in 2020-2021** due to COVID-19

## Impact analysis of COVID-19 on the Indian dairy industry <sup>9</sup>

	Milk production	Milk collection, chilling & storage	Processing & packaging	Transportation	Market (local/exports)
GLOBAL	<ul style="list-style-type: none"> <li>Raw milk production</li> </ul>	<ul style="list-style-type: none"> <li>Collection surplus</li> </ul>	<ul style="list-style-type: none"> <li>Production of processed foods</li> </ul>	<ul style="list-style-type: none"> <li>Cross boundary transportation - time taken for clearances</li> </ul>	<ul style="list-style-type: none"> <li>Demand for dairy products</li> <li>Exports</li> <li>Prices for SMP products</li> </ul>
DOMESTIC	<ul style="list-style-type: none"> <li>Raw milk production</li> <li>Procurement cost of milk</li> </ul>	<ul style="list-style-type: none"> <li>Collection surplus</li> <li>Storage cost by small organised sector</li> <li>Wastage in unorganised sector</li> </ul>	<ul style="list-style-type: none"> <li>Production of processed foods for large organised sector</li> </ul>	<ul style="list-style-type: none"> <li>Minor disruption due to local lockdown</li> </ul>	<ul style="list-style-type: none"> <li>Household demand for processed products (e.g. milk solids, packaged fresh milk products)</li> <li>Sale of regional players (organised/unorganised)</li> <li>Increase of milk product sales via e-commerce platforms</li> <li>Launch of new products such as Hald (turmeric) milk and camel milk for immunity</li> <li>Demand for ice cream</li> <li>Low demand from hotel, restaurant and catering sectors</li> </ul>

Source: Industry Interaction UNIDO

● Positive impact     
 ● Negative primary impact     
 ● Negative secondary impact

## Impact of COVID-19

Revenue growth is expected to be flat in 2020-2021 due to weak sales of value added products such as ice-creams, flavoured milk, cheese and flavoured yogurt.

These products account for more than 30% of industry revenue, and are impacted by lockdown restrictions on sales at hotels, quick service restaurants, food courts and to-go purchases.

However, for online direct-to-customer (D2C) channels, Covid-19 had led to many consumers trying online grocery ordering for the first time. India was amongst the highest percentage of connected consumers ordering online.

# Future Trends

**Government initiatives** to improve resource utilisation and promote cattle breeding, clean milk production, dairy development, and feed fodder management

## Future trends shaping the Indian dairy sector

### An industry poised for growth

The Indian dairy industry has seen significant growth over the last decade. Amul's revenue increased **six times** from USD1 billion in 2009-10 to USD6.7 billion in 2019-20. Both the cooperative and private dairy sector is projected to grow at around 14% annually in value in the coming years.

#### 1. Growth of niche dairy products

Rising internet penetration and consumer awareness are shifting consumers' preferences towards healthier milk alternatives such as camel, goat and donkey milk.

#### 2. Changing customer sentiments

Urban Indian consumers are increasingly quality-sensitive and tech-savvy, adopting new online delivery services for premium milk and packaged milk products.

#### 3. Product expansion by dairy platforms

Tech-backed dairy delivery platforms are likely to expand their offerings to stock and deliver milk, milk products, vegetables, groceries and other everyday essentials to strengthen their product portfolio and improve customer stickiness to offset high customer acquisition costs.

The future of the Indian dairy industry lies in increasing processing capacities and making its dairy farmers into a cost efficient and competitive global producer.

## GOVERNMENT FOCUS TO 2025

Increase India's share of global dairy exports from 0.36% to 10%



Double dairy processing capacity from 54 to 108 million tonnes by 2025



Control spread of foot & mouth diseases and brucellosis in cattle



Ensure availability of quality feed and fodder with door delivery of veterinary services



US\$2b dairy infrastructure fund to promote private investment and increase capacity by 50%

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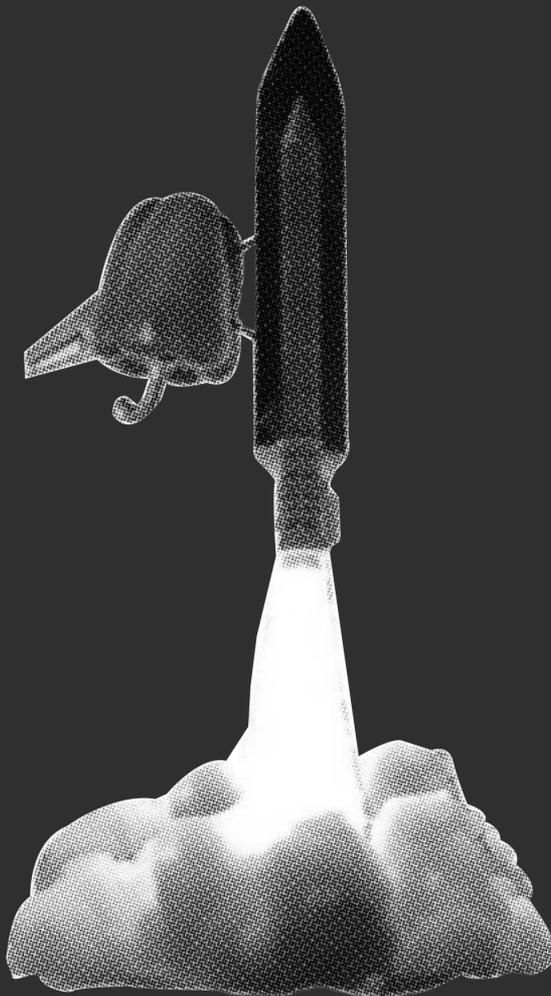
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**William Taing**  
will@beanstalkagtech.com

**Hemendra Mathur**  
hemendra.mathur@gmail.com



**Melbourne**  
3 Albert Coates Ln,  
Melbourne VIC 3000

**Sydney**  
20-40 Meagher St,  
Chippendale, NSW 2008

**Perth**  
191 St Georges Tce  
Perth WA 6000

**Singapore**  
LEVEL 3, 20 Pasir Panjang Rd,  
Singapore