

Research Bulletin

GROWTH AND PROSPECTS OF EXPORT OF DAIRY PRODUCTS FROM INDIA



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Growth and Prospects of Export of Dairy Products from India

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MESSAGE

The livestock sector has emerged as a vital sector for ensuring a more inclusive and sustainable agriculture system. India ranks first among the world's milk producing nations since 1998 and has the largest bovine population in the World. India's dairy development after independence has been well recognised as "white revolution". Gujarat State is also leading state for milk production in the country. "Amul" pattern is well known and accepted by all the states in our country and some of the other countries also.

The changing food habits and growing income of the people are affecting overall demand for dairy products across the world. Considering the future prospect there is a large potential untapped export market for India.

This Research Bulletin highlights the growth and prospects in export of dairy products from India with in-depth analysis and also provides insights for further improvements. It is also aimed for those who are already in export of dairy products or willing to start new.

The bulletin will be broadly useful to dairy unions, agri-entrepreneurs, start-ups, technocrats, research scholars, students and dairy farmers.

I congratulate all the scientists of this publication for their sincere efforts in compiling and publishing this research bulletin.

Date : 28 /12/2020

(R.V. Vyas)



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FOREWORD

It is my immense pleasure that the Department of Agricultural Economics & WTO Cell is publishing the Research Bulletin on “Growth and Prospects of Export of Dairy Products from India” which is based on a research study conducted by the department during the year 2019-20.

The WTO Cell is functioning at the department since 2009 under which various research studies related to agricultural exports are conducted and training programmes are organised for farmers, students and other stakeholders on regular basis.

The dairy sector in the India has shown remarkable development in the past decade. India is the largest producer of milk in the world with 22 per cent share in global milk production. It has now become one of the largest producers of milk and value-added milk products in the world and emerged as the largest exporter of dairy products in Asia. Looking to the vast untapped export potential of dairy products, this study was taken up at right time and the results of the study will be highly useful in improving our exports.

The sincere and dedicated efforts of all the scientists involved in conducting research as well as publishing this Research Bulletin are highly appreciated.

I hope that this publication will be useful to exporters of dairy products, dairy unions, startups, policy makers and research scholars engaged in the study of dairy development in India.

Date: 21/12/2020

(P. R. Vaishnav)

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EXECUTIVE SUMMARY

India is the largest producer of milk in the world with 22 per cent share in global milk production. India produced 187.7 million tonnes of milk with per capita availability of 394 g/day during the year 2018-19. India's dairy development after independence has been well recognised as “**white revolution**”. The dairy sector in the India has shown remarkable development in the past decade. India has now become one of the largest producers of milk and value-added milk products in the world and emerged as the largest exporter of dairy products in Asia.

The changing food habits and growing income of the people are affecting overall demand for dairy products across the world. The global demand for value-added dairy products that offer health benefits (such as infant formula, flavored/fortified milks, cheese, etc.) are ever increasing. Consumption of cheese is growing in food service, thanks to pizza and burgers. The consumers of all age (young and old) are benefiting from naturally produced dairy goods. Considering the future prospect there is a large potential untapped export market for India.

Recently in 2018, Government of India has announced an agriculture export policy which aims to double agricultural exports from present US\$ 30+ billion to US\$ 60+ billion by 2022. Looking to the export potential of dairy products, a study entitled “**Growth and Prospects of Export of Dairy Products from India**” was undertaken during 2019-20 at Department of Agricultural Economics, B.A. College of Agriculture, AAU, Anand under the scheme “Establishment of WTO Cell at Anand” with an objective to know the growth, instability and direction of trade in export of dairy products from India during last decade.

The salient findings of the study are as follows:

- Milk production in India has significantly risen by 5.43 per cent per annum during the last decade i.e., from 2009-10 to 2018-19. Similarly, per capita milk production has also significantly increased by 4.17 per cent per annum during the same period. Further, they reported very low instability index indicating very less volatility.
- India exported dairy products worth of Rs2423 crore during the year 2018-19 in which butter and ghee contributed the highest share of 58.91% followed by milk powder (26.70%), and cheese (10.31%). Other dairy products viz., milk, whey and butter milk played a very nominal role in export.
- Export of butter and ghee from India has significantly increased by 14.44% per annum in quantity term and by 23.06% per annum in value term during the study period i.e. from 2009-10 to 2018-19. The export prices of butter and ghee has also significantly risen by 7.53% per annum during this period.
- Turkey emerged as the largest export destination for Indian butter and ghee accounting for 24.48 % share followed by Egypt (20.27%), and UAE (12.48%).
- Milk powder emerged as the second largest contributor in export of dairy products from India but has not reported significant growth during last decade.

- Bangladesh emerged as the largest export destination for Indian milk powder accounting for 39.98 % share followed by Malaysia (13.56%) and UAE (13.42%).
- Cheese being the third largest commodity in export has also reported a significant rise by 14.69% per annum in quantity term and by 25.65% per annum in value term during the study period. The export price of cheese has also significantly risen by 9.55% per annum during this period.
- UAE emerged as the largest export destination for Indian cheese accounting for 23.11% share in total cheese export from India during 2018-19 followed by Bhutan (19.31%) and USA (10.26%).
- Overall dairy product export has not shown significant growth in quantity as well as value term during last decade but overall price has significantly increased by 8.56% per annum.
- Turkey emerged as the largest export destination for Indian dairy products accounting for 14.69% share during 2018-19 followed by UAE (12.60%), Egypt (11.94%) and Bangladesh (11.14%).

1. INTRODUCTION

The changing food habits and growing income of the people are affecting overall demand for dairy products across the world. The global demand for value-added dairy products that offer health benefits (such as infant formula, flavored/fortified milks, cheese, etc.) are ever increasing. Consumption of cheese is growing in food service, thanks to pizza and burgers. The consumers of all age (young and old) are benefiting from naturally produced dairy goods. Considering the future prospect there is a large potential untapped market for India.

The dairy sector in the India has shown remarkable development in the past decade. India is the largest producer of milk in the world with 22 per cent share in global milk production. In India, milk is produced mostly by small holders. Milk production contributes to household livelihoods, food security and nutrition. Milk provides relatively quick returns for small-scale producers and is an important source of cash income.

India has now become one of the largest producers of milk and value-added milk products in the world and emerged as the largest exporter of dairy products in Asia.

Milk Production

Global Scenario

The global milk production during the year 2018 estimated by FAO is presented in Table 1 and Fig.1. It shows that world produced 843 million tonnes of milk during the year 2018. India ranked first with 186 million tonnes of production contributing 22.06% share in global milk production followed by European Union (EU) (19.81%) which is a group of 28 small nations and USA (11.74%).

Table 1: Global milk production - 2018

Rank	Country	Milk Production (million tonnes)	% share
1	India	186	22.06
2	EU	167	19.81
3	USA	99	11.74
4	Pakistan	46	5.46
5	Brazil	36	4.27
6	China	32	3.80
7	Russia	31	3.68
	World	843	100.00

Source: FAO, Dairy Market Review, March 2019

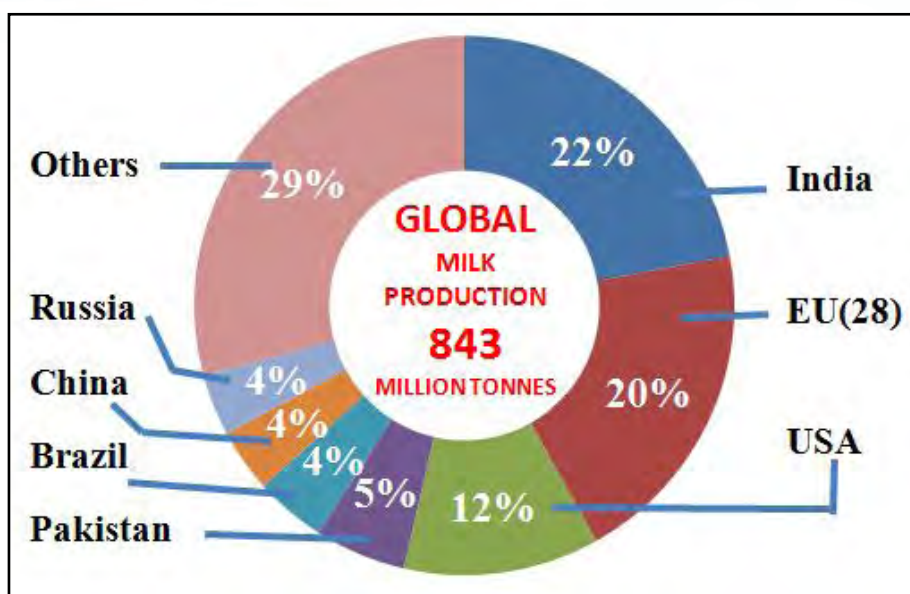


Fig.1: Major milk producing countries - 2018

Indian Scenario

India's dairy development after independence has been well recognised as “white revolution”. The growth in production and per capita availability of milk in India during last decade is presented in Table 2. It shows that India produced 187.7 million tonnes of milk with per capita availability of 394 g/day during the year 2018-19.

The results also show that milk production in India has significantly risen by 5.43% per annum during the period from 2009-10 to 2018-19. Similarly, per capita milk production has also significantly increased by 4.17% per annum during the same period. Further, the growth in production as well as per capita availability had reported very low instability indicating very less volatility.

Table 2: Growth in production and per capita availability of milk in India

Year	Production (million tonnes)	Per capita Availability (g/day)
2009-10	116.4	273
2010-11	121.8	281
2011-12	127.9	290
2012-13	132.4	299
2013-14	137.7	307
2014-15	146.3	322
2015-16	155.5	337
2016-17	165.4	355
2017-18	176.3	375
2018-19	187.7	394
CAGR %	5.43**	4.17**
Instability Index	1.67	1.73

** indicates statistically significant at 1 per cent.

The state-wise production of milk in India during the year 2018-19 is presented in Table 3. It shows that Uttar Pradesh has emerged as the largest milk producing state in the country with 16.26% share followed by Rajasthan (12.61%) and Madhya Pradesh (8.47%). Gujarat state ranked 5th position with 7.72% share in total milk production of the country.

Table 3: Top milk producing states in India (2018-19)

Rank	State	Milk Production (million tonnes)	% share
1	Uttar Pradesh	30.5	16.26
2	Rajasthan	23.7	12.61
3	Madhya Pradesh	15.9	8.47
4	Andhra Pradesh	15.0	8.01
5	Gujarat	14.5	7.72
6	Punjab	12.6	6.71
7	Maharashtra	11.7	6.21
8	Haryana	10.7	5.71
9	Bihar	9.8	5.23
10	Tamil Nadu	8.4	4.45
	Others	35.0	18.62
	All India	187.7	100.00

Source: Department of AHD&F, Ministry of Agriculture and Farmers Welfare, Govt

Export of dairy products

Global Scenario

The data showing major exporting and importing countries of dairy products during the year 2018 are depicted in Table 4 and Fig. 2 and 3.

Table 4: Top exporters and Importers of dairy products in the world - 2018

Rank	Exporters			Importers		
	Country	Million tonnes (milk equivalents)	%	Country	Million tonnes (milk equivalents)	%
1	EU	20.5	27.33	China	14.6	19.47
2	New Zealand	18.7	24.93	Mexico	4.2	5.60
3	USA	11.8	15.73	Algeria	3.8	5.07
4	Belarus	3.8	5.07	Russian	3.7	4.93
5	Australia	3.1	4.13	Indonesia	3.0	4.00
6	Argentina	2.0	2.67	Saudi Arabia	2.8	3.73
7	Uruguay	1.6	2.13	Philippines	2.5	3.33
	World	75.0	100.00	World	75.0	100.00

Source: FAO, Dairy Market Review, March 2019

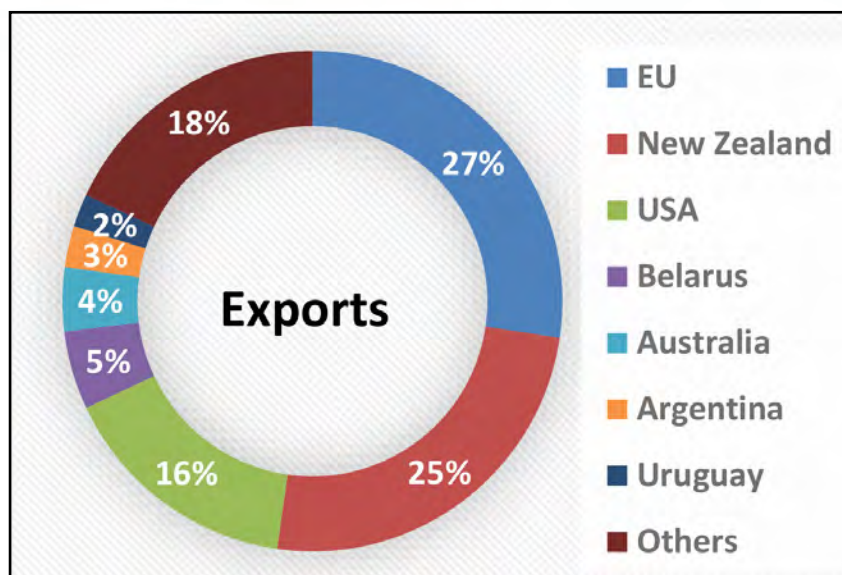


Fig.2: Major exporting countries - 2018

According to FAO, The global dairy export market as shown above is highly concentrated. EU remains the largest exporter of dairy products with a share of 27.33% followed by New Zealand (24.93%), USA (15.73%), Belarus (5.07%), Australia (4.13%), Argentina (2.67%) and Uruguay (2.13%). Together they accounted for about 82% share in world export. Whereas, importers of dairy products were found diversified. China emerged as the largest importer of dairy products in the world with 19.47% share followed by Mexico (5.60%) and Algeria (5.07%). Other large importers are Russia, Indonesia, Saudi Arabia, Philippines and many more.

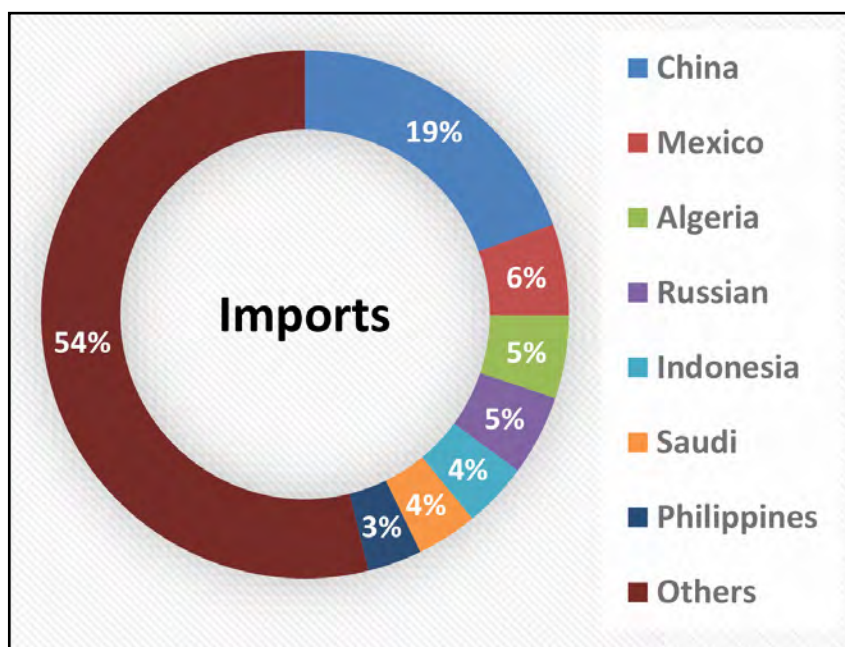


Fig.3: Major importing countries – 2018

In spite being the largest producer of milk in the world, India's share in global dairy products export is negligible. As per APEDA, currently India's share is only 0.36%. This may be due to very high domestic consumption and relatively higher domestic prices as compared to international prices.

2. OBJECTIVES

Milk production in India has significantly risen at 5.43% CAGR during last 10 years. These rising domestic milk production and anticipated firm international demand indicate that there is a great scope for India to increase its exports.

Looking to the export potential of dairy products in India, this study was conducted with following objectives:

- To ascertain the growth in export of selected dairy products from India
- To measure instability in export of selected dairy products
- To study the direction of trade of selected dairy products exports from India

3. ANALYTICAL APPROACH

The study was entirely based on secondary data. The time series data related to export of dairy products were collected from various website of related institutions like Agricultural and Processed Food Products Export Development Authority (APEDA) (<http://apeda.gov.in>), Department of Commerce, GOI (<http://commerce-app.gov.in>), etc.

Analytical Tools

Simple tabular technique was used to compile the data and following statistical tools were employed for analysis of data to meet the objectives of the study.

Compound Annual Growth Rate (CAGR)

The CAGR was calculated by fitting the exponential function given below:

$$Y = ab^t \dots\dots\dots(1)$$

Where, Y= export quantity/export value

a = constant

b= regression co-efficient

t= time variable

Natural log on both the sides of eq. (1) was taken to convert it in to linear form.

$$\text{Log } Y = \text{log } a + t \text{ log } b \dots\dots\dots (2)$$

$$\text{CAGR (\%)} = [(\text{antilog of } b) - 1] \times 100$$

Instability Index

The simple co-efficient of variation (CV) often contains the trend component and thus over estimates the level of instability in time series data characterized by long-term trends. To overcome this problem, the Cuddy Della Valle Index was used to correct the CV by following formula.

$$\text{Instability Index (II)} = CV \times \sqrt{(1-R^2)}$$

Where,

CV = co-efficient of variation

R^2 = co-efficient of multiple determination (adjusted)

Markov chain analysis

The trade directions of export were analyzed using the first order Markov chain approach. Central to Markov chain analysis is the estimation of the transitional probability matrix P. The elements P_{ij} of the matrix P indicates the probability that export will switch from country i to country j with the passage of time. The diagonal elements of the matrix measure the probability that the export share of a country will be retained. Hence, an examination of the diagonal elements indicates the loyalty of an importing country to a particular country's exports. While, the row elements indicate the probability of loss in trade on account of competing countries. The column elements indicate the probability of gain in trade from other competing countries.

In the context of the current application, 10 major importing countries were identified on the base of latest year's export value and remaining countries were pooled as "others". The average exports to a particular country were considered to be a random variable which depends only on the past exports to that country, which can be denoted algebraically as:

$$E_{jt} = \sum_{i=1}^r E_{i,t-1} * P_{ij} + e_{jt}$$

Where,

E_{jt} = Exports from India to j^{th} country during the year t

$E_{i,t-1}$ = Exports to i^{th} country during the period $t-1$

P_{ij} = Probability that the exports will shift from i^{th} country to j^{th} country

e_{jt} = The error term which is statistically independent of $E_{i,t-1}$

t = Number of years considered for the analysis

r = Number of importing countries

The transitional probabilities P_{ij} which can be arranged in a (c * r) matrix have the following properties.

$$(1) 0 \leq P_{ij} \leq 1$$

$$(2) \sum_{i=1}^n P_{ij} = 1 \text{ for all } i$$

4. RESULTS AND DISCUSSION

The major dairy products exported from India include butter & ghee, milk powder, cheese, whey and butter milk. The product-wise export during the 2018-19 is presented in Table 5 and Fig.4. It shows India exported dairy products worth of 2423 in which butter and ghee reported the highest amount of export worth of Rs 1427 crore contributing 58.91% share in total export of dairy products from India. It followed by milk powder (26.70%), and cheese (10.31%). These three dairy products jointly contributed 95.92% in total dairy export. Therefore, three dairy products were selected for further study.

Table 5: Export of dairy products from India (2018-19)

Sr. No.	Dairy Product	Export (Rs. crore)	% share
1	Butter and Ghee	1427	58.91
2	Milk Powder	647	26.70
3	Cheese	250	10.31
4	Milk	59	2.42
5	Whey	33	1.35
6	Butter Milk	8	0.32
	Total	2423	100.00

Source: APEDA

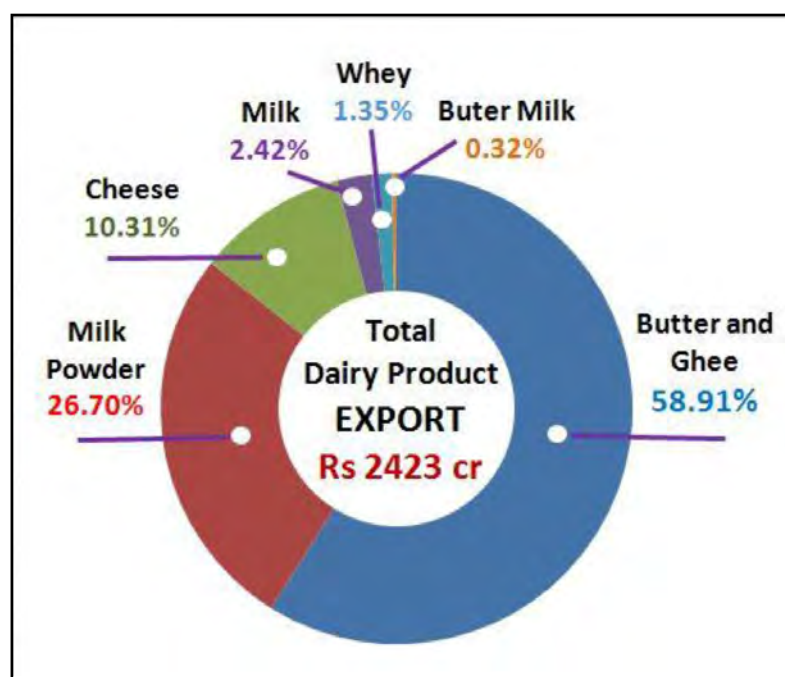


Fig.4: Export of dairy products from India (2018-19)

Growth and instability in export of selected dairy products (*viz.*, butter and ghee, milk powder and cheese) from India were worked out during the year from 2009-10 to 2018-19). The product-wise results are presented as follows:

BUTTER and GHEE

Butter and ghee (clarified butter) are fat-rich dairy products that are rich in nutrients and having various beneficial actions on human health. Some free fatty acids are also generated during the process of manufacturing fermented butter and ghee, which increases the health benefit value of these products. Probiotic microorganisms generated during fermentation in fermented butter and ghee exert health effects.

Ghee is one of the most consumed value-added dairy products in India.



Growth and instability in export

The growth and instability in export of butter and ghee (combined) from India during the period 2009-10 to 2018-19 is reported in Table 6. It shows that export of butter and ghee in quantity terms has increased from 4971 tonnes in 2009-10 to 46138 tonnes in 2018-19. In value terms also it increased from Rs 102 crore in 2009-10 to Rs 1427 crore in 2018-19.

Table 6: Growth and instability in export of butter and ghee from India

Year	Quantity (tonnes)	Value (Rs crore)	Price (Rs lakh/tonne)
2009-10	4971	102	2.06
2010-11	12785	246	1.92
2011-12	7841	194	2.48
2012-13	6500	176	2.71
2013-14	9006	256	2.85
2014-15	8912	299	3.36
2015-16	7424	278	3.74
2016-17	7813	319	4.08
2017-18	16611	625	3.76
2018-19	46138	1427	3.09
CAGR (%)	14.44*	23.06**	7.53**
Instability Index	72.40	48.58	12.52

* and ** indicate statistically significant at 5 and 1 per cent, respectively.

Further, it was also observed that export of butter and ghee from India has reported significant growth of 14.44% per annum in quantity term and by 23.06% per annum in value term during the study period. The export prices of butter and ghee has also significantly risen by 7.53% per annum during this period.

The significant growth in export quantity, value and prices clearly indicates that India has good opportunity for export of butter and ghee in future. The significant growth in export of butter and ghee was accompanied with high instability in export quantity (72.40) and in export value (48.58). It showed the evidence of high volatility in export. In case of export prices, the instability was found low (12.52) indicated significant and stable growth during the study period.

Major export destinations

The data regarding major export destinations for butter and ghee during the year 2018-19 is depicted in Table 7 and Fig.5. Turkey emerged as the largest export destination for Indian butter and ghee worth of Rs 349 crore accounting for 24.48% share in total butter and ghee export from India during 2018-19 followed by Egypt (20.27%) and UAE (12.48%).

Table 7: Major export destinations for Indian butter and ghee (2018-19)

Rank	Country	Export Value (Rs crore)	% share
1	Turkey	349	24.48
2	Egypt	289	20.27
3	U A E	178	12.48
4	Saudi Arab	80	5.62
5	U S A	73	5.09
6	Morocco	52	3.65
7	Indonesia	48	3.37
	Others	357	25.04
	Total	1427	100.00

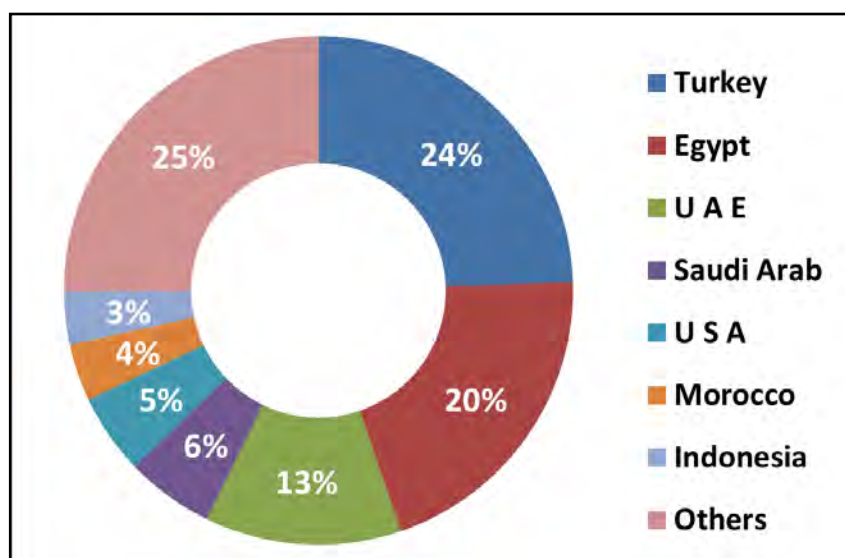


Fig.5: Major export destinations for Indian butter and ghee (2018-19)

Direction of trade

The direction of trade of Indian butter and ghee to different importing countries was studied by estimating the transitional probability matrix using the Markov chain frame work. The transitional probabilities obtained are presented in Table 8 which provides a broader idea of change of the direction of trade over a period from year 2009-10 to 2018-19.

It is evident from Table that Indonesia was found the most stable market among the major importers of Indian butter and ghee as reflected by the higher probability of retention at 1.00, *i.e.*, the probability that Indonesia retains its share over the study period was 100%. UAE was found the moderately stable market with probability of retention at 0.457, *i.e.*, the probability that UAE retains its share by 45.7%. Thus, Indonesia and UAE have emerged as the most reliable and loyal markets for Indian butter and ghee. UAE lost to the tune of 42.8% share to other countries and 11.5% share to Saudi Arab whereas it gained from Morocco (100%), other countries (40.2%) and Egypt (12.7%). Similarly, Egypt reported the moderate probability of retention at 0.239 indicating the probability that Egypt retains its share over the study period was 23.9%.

Table 8: Transitional probability matrix for butter and ghee (2009-10 to 2018-19)

ID	Country	1	2	3	4	5	6	7	8
1	Turkey	0.000	0.000	0.000	0.000	0.000	1.000	0.000	0.000
2	Egypt	0.000	0.239	0.127	0.033	0.084	0.000	0.000	0.518
3	U A E	0.000	0.000	0.457	0.000	0.115	0.000	0.000	0.428
4	Saudi Arab	0.000	0.000	0.000	0.015	0.000	0.000	0.000	0.985
5	U S A	0.000	0.698	0.000	0.000	0.000	0.302	0.000	0.000
6	Morocco	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000
7	Indonesia	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000
8	Others	0.000	0.000	0.402	0.122	0.000	0.052	0.000	0.424

MILK POWDER

Skimmed milk powder is used as an alternative to fresh milk after dissolution in water or by direct addition of the powder in the formulation. Skimmed milk powder is mostly used in products based on reconstituted milk (yogurt, dairy dessert, ice cream, etc.), in chocolates, in confectionery, in baby food, in animal feeding.



Growth and instability in export

The growth and instability in export of milk powder from India during the period 2009-10 to 2018-19 is reported in Table 9. It shows that export of milk powder has increased from 20348 tonnes in 2009-10 to 47987 tonnes in 2018-19. In value terms also it increased from Rs 240 crore in 2009-10 to Rs. 647 crore in 2018-19. Export quantity and value reported high fluctuations in year to year variations which resulted in very high instability (102.87 in export quantity and 117.20 in export value) and finally the growth over the study period was found non-significant. Similarly, the growth in export price was also found non-significant.

Table 9: Growth and instability in export of milk powder from India

Year	Quantity (tonnes)	Value (Rs crore)	Price (Rs lakh/tonne)
2009-10	20348	240	1.18
2010-11	17404	240	1.38
2011-12	519	7	1.29
2012-13	72038	1126	1.56
2013-14	138970	2930	2.11
2014-15	36248	721	1.99
2015-16	16956	320	1.89
2016-17	19517	378	1.94
2017-18	14765	302	2.05
2018-19	47987	647	1.35
CAGR (%)	12.22	16.75	4.03
Instability Index	102.87	117.20	17.88

Major export destinations

The data showing major export destinations for milk powder during the year 2018-19 are depicted in Table 10 and Fig.6. Bangladesh emerged as the largest export destination for Indian milk powder worth of Rs 259 crore accounting for 39.98 % share in total milk powder export from India during 2018-19 followed by Malaysia (13.56%) and UAE (13.42%).

Table 10: Major export destinations for Indian milk powder (2018-19)

Rank	Country	Export Value (Rs crore)	% share
1	Bangladesh	259	39.98
2	Malaysia	88	13.56
3	Afghanistan	87	13.42
4	Bhutan	54	8.41
5	Pakistan	46	7.06
6	Nepal	32	4.95
7	U A E	31	4.72
	Others	51	7.88
	Total	647	100.00

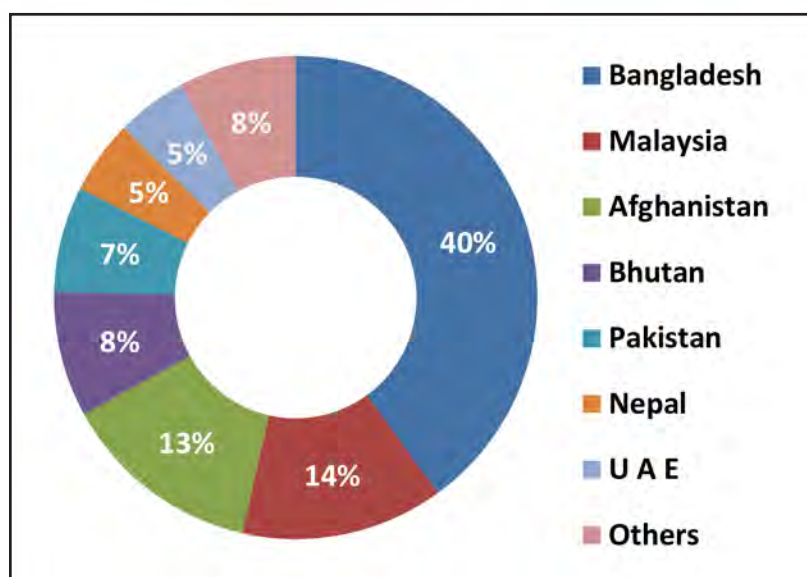


Fig.6: Major export destinations for Indian milk powder (2018-19)

Direction of trade

Transitional probabilities in export of milk powder during the period 2009-10 to 2018-19 were worked out and the same are presented in Table 11 which provides a broader idea of change of the direction of trade over the study period.

It is evident from Table that Pakistan was found the most stable market among the major importers of Indian milk powder as reflected by the higher probability of retention at 0.364, *i.e.*, the probability that Pakistan retains its share over the study period was 36.4%.

Table 11: Transitional probability matrix for milk powder(2009-10 to 2018-19)

ID	Country	1	2	3	4	5	6	7	8
1	Bangladesh	0.225	0.000	0.071	0.029	0.202	0.431	0.042	0.000
2	Malaysia	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
3	Afghanistan	0.853	0.043	0.000	0.000	0.000	0.000	0.104	0.000
4	Bhutan	0.000	0.000	0.756	0.244	0.000	0.000	0.000	0.000
5	Pakistan	0.330	0.000	0.023	0.283	0.364	0.000	0.000	0.000
6	Nepal	0.283	0.000	0.033	0.022	0.121	0.024	0.036	0.481
7	U A E	0.637	0.033	0.000	0.000	0.000	0.192	0.000	0.138
8	Others	0.144	0.017	0.000	0.000	0.000	0.000	0.059	0.780

Thus, Pakistan has emerged as the most reliable and loyal market for Indian milk powder. Pakistan lost to the tune of 33.0% share to Bangladesh, 28.3% to Bhutan and 2.3% share to Afghanistan. Whereas it gained from Bangladesh (20.2%) and Nepal (12.1%).

Similarly, Bhutan and Bangladesh reported the moderate probability of retention at 0.244 and 0.225, respectively. It indicates that the probability that Bhutan and Bangladesh retain their share were 24.4% and 22.5%, respectively.

CHEESE

Cheese is a dairy product derived from milk that is produced in a wide range of flavours, textures, and forms by coagulation of the milk protein casein. During production, the milk is usually acidified, and adding the enzyme rennet causes coagulation. The solids are separated and pressed into final form. Apart from serving during wine tasting cheese has other uses as well. Cheese can prevent osteoporosis – as it is rich in vitamin D. It can have a positive effect on your dental health, and is also the best dietary source for calcium, protein, vitamin B12 and can prevent common cancers.



Growth and instability in Export

The growth and instability in export of cheese from India during the period 2009-10 to 2018-19 is reported in Table 12. It shows that export of cheese in quantity terms has increased from 2673 tonnes in 2009-10 to 7691 tonnes in 2018-19. In value terms also it increased from Rs 38 crore in 2009-10 to Rs. 250 crore in 2018-19.

Table 12: Growth and instability in export of cheese from India

Year	Quantity (tonnes)	Value (Rs crore)	Price (Rs lakh/tonne)
2009-10	2673	38	1.43
2010-11	2510	37	1.47
2011-12	2389	45	1.90
2012-13	3526	76	2.17
2013-14	3263	80	2.45
2014-15	4695	120	2.56
2015-16	4770	132	2.77
2016-17	6139	174	2.84
2017-18	6935	206	2.98
2018-19	7691	250	3.25
CAGR (%)	14.69**	25.65**	9.55**
Instability Index	11.38	9.73	7.02

** indicates statistically significant at 1 per cent

Further, it was observed that export of cheese from India has significantly increased by 14.69% per annum in quantity term and by 25.65% per annum in value term during the study period. The export

price of cheese has also significantly risen by 9.55% per annum during this period. The significant growth in export quantity, value and prices clearly indicates that India has good opportunity for export of cheese in future.

The significant growth in export of cheese was accompanied with low instability in export quantity (11.38), export value (9.73) and export prices (7.02) indicated significant and stable growth during the study period.

Major Export destinations

The data pertaining to major export destinations for cheese during the year 2018-19 are depicted in Table 13 and Fig.7. UAE emerged as the largest export destination for Indian cheese worth of Rs 58 crore accounting for 23.11% share in total cheese export from India during 2018-19 followed by Bhutan (19.31%) and USA (10.26%).

Table 13: Major export destinations for Indian cheese (2018-19)

Rank	Country	Export Value (Rs crore)	% share
1	U A E	58	23.11
2	Bhutan	48	19.31
3	U S A	26	10.26
4	Singapore	21	8.35
5	Qatar	17	6.71
6	Saudi Arab	15	6.14
7	Philippines	11	4.58
8	Other	54	21.54
	Total	250	100.00

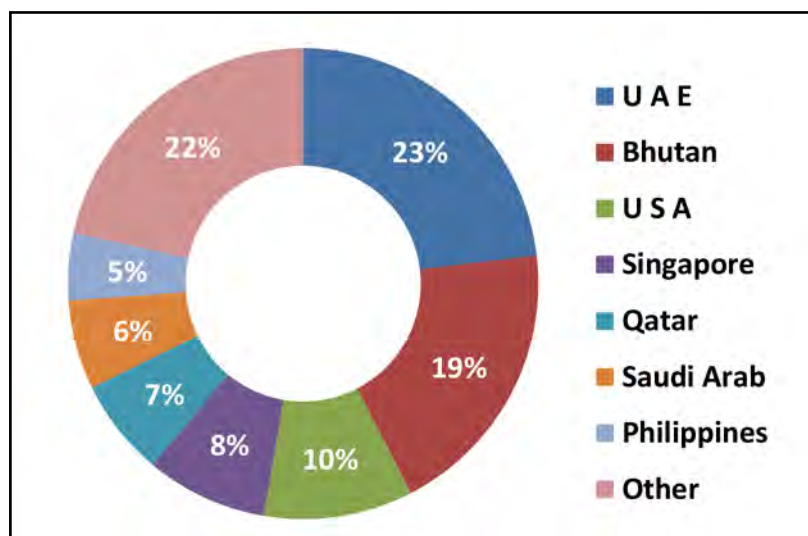


Fig.7: Major export destinations for Indian cheese (2018-19)

Direction of Trade

The transitional probability matrix for export of cheese from India is presented in Table 14 which provides a broader idea of change of the direction of trade over a period from year 2009-10 to 2018-19.

Table 14: Transitional probability matrix for cheese (2009-10 to 2018-19)

ID	Country	1	2	3	4	5	6	7	8
1	U A E	0.424	0.000	0.024	0.080	0.140	0.000	0.036	0.296
2	Bhutan	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000
3	U S A	0.000	0.000	0.000	0.566	0.009	0.126	0.000	0.299
4	Singapore	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000
5	Qatar	0.000	0.000	0.000	0.000	0.000	0.000	1.000	0.000
6	Saudi Arab	0.000	0.452	0.000	0.000	0.000	0.000	0.548	0.000
7	Philippines	0.346	0.000	0.022	0.156	0.150	0.284	0.042	0.000
8	Other	0.332	0.000	0.077	0.000	0.013	0.000	0.000	0.578

It is evident from Table that Bhutan was found the most stable market among the major importers of Indian butter and ghee as reflected by the higher probability of retention at 1.00, *i.e.*, the probability that Bhutan retains its share over the study period was 100%. UAE was found the moderately stable market with probability of retention at 0.424, *i.e.*, the probability that UAE retains its share by 42.4%. Thus, Indonesia and UAE have emerged as the most reliable and loyal markets for Indian cheese. UAE lost to the tune of 29.6% share to other countries and 14.0% share to Qatar whereas it gained from Philippines (34.6%) and other countries (33.2%).

TOTAL DAIRY PRODUCTS



Growth and instability in Export

The growth and instability in export of dairy products from India during the period 2009-10 to 2018-19 is reported in Table 15. It shows that export of dairy products in quantity terms has increased from 34286 tonnes in 2009-10 to 113726 tonnes in 2018-19. In value terms also it increased from Rs

402 crore in 2009-10 to Rs 2423 crore in 2018-19. Export quantity and value reported high fluctuations in year to year variations which resulted in very high instability (63.49 in export quantity and 61.88 in export value) and finally the growth over the study period was found non-significant. It was further noticed that the export prices during the study period have significantly increased by 8.56% per annum accompanied with low instability index.

Table 15: Growth and instability in export of total dairy products

Year	Quantity (tonnes)	Value (Rs crore)	Price (Rs lakh/tonne)
2009-10	34286	402	1.17
2010-11	37366	548	1.47
2011-12	25605	289	1.13
2012-13	87712	1411	1.61
2013-14	159229	3319	2.08
2014-15	66424	1205	1.81
2015-16	33443	756	2.26
2016-17	39167	906	2.31
2017-18	48039	1196	2.49
2018-19	113726	2423	2.13
CAGR (%)	6.83	15.98	8.56**
Instability Index	63.49	61.88	12.66

** indicates statistically significant at 1 per cent

Export destinations

The data pertaining to major export destinations for dairy products during the year 2018-19 are depicted in Table 16 and Fig.8. Turkey emerged as the largest export destination for Indian dairy products worth of Rs 356 crore accounting for 14.69% share in total dairy products export from India during 2018-19 followed by UAE (12.60%), Egypt (11.94%) and Bangladesh (11.14%).

Table 16: Major export destinations for 1 dairy products from India (2018-19)

Rank	Country	Export Value (Rs crore)	% share
1	Turkey	356	14.69
2	U A E	305	12.60
3	Egypt	289	11.94
4	Bangladesh	270	11.14
5	Bhutan	144	5.96
6	U S A	105	4.31
7	Saudi Arab	95	3.94
8	Other	858	35.41
	Total	2423	100.00

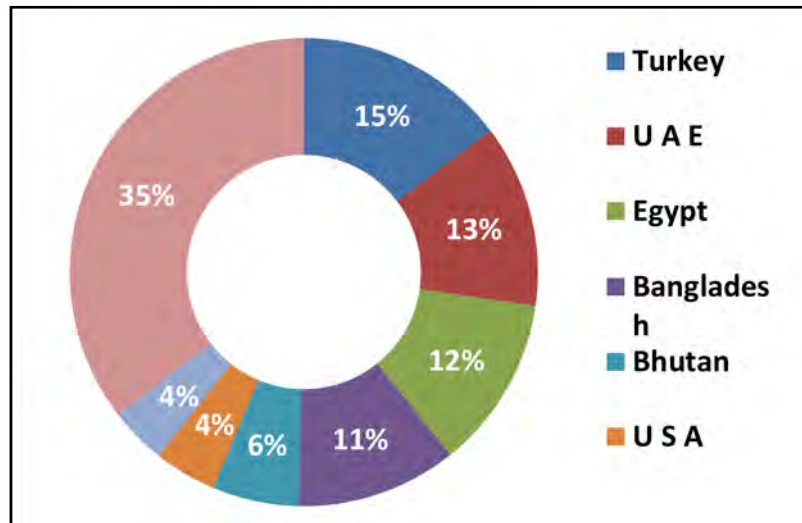


Fig.8: Major export destinations for Indian dairy products (2018-19)

Direction of Trade

The transitional probability matrix for export of dairy products from India is presented in Table 17 which provides a broader idea of change of the direction of trade over a period from year 2009-10 to 2018-19.

Table 17: Transitional probability matrix for total dairy products (2009-10 to 2018-19)

ID	Country	1	2	3	4	5	6	7	8
1	Turkey	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000
2	U A E	0.000	0.346	0.263	0.006	0.026	0.056	0.054	0.248
3	Egypt	0.049	0.000	0.041	0.243	0.000	0.073	0.099	0.495
4	Bangladesh	0.000	0.356	0.000	0.000	0.132	0.005	0.000	0.507
5	Bhutan	0.000	0.000	0.272	0.000	0.496	0.232	0.000	0.000
6	U S A	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000
7	Saudi Arab	0.000	0.000	0.000	0.458	0.000	0.000	0.000	0.542
8	Other	0.000	0.101	0.000	0.196	0.000	0.000	0.035	0.667

It is evident from Table that Bhutan was found the most stable market among the major importers of Indian dairy products as reflected by the highest probability of retention at 0.496, *i.e.*, the probability that Bhutan retains its share over the study period was 49.6%. Further, it was noticed that Bhutan lost to the tune of 29.6% share to other countries and 14.0% share to Qatar whereas it gained from Philippines (34.6%) and other countries (33.2%).

UAE was found the moderately stable market with probability of retention at 0.346, *i.e.*, the probability that UAE retains its share by 34.6%. Thus, Bhutan and UAE have emerged as the most reliable and loyal markets for Indian dairy products. UAE lost to the tune of 27.2% share to Egypt and 23.2% share to USA whereas it gained from Bangladesh (13.2%) and UAE (2.6%).

5. POLICY IMPLICATIONS

In spite being the largest producer of milk in the world, India's share in global export of dairy products is only 0.36%. This is might be due to huge domestic demand as well as high domestic prices as compared to international prices. India consumes almost all its domestic dairy production, but some value-added dairy products such as butter and ghee, skimmed milk powder, cheese, etc. are exported when prices are competitive and overseas demand is strong.

Milk production in India has significantly risen at 5.43% CAGR during last 10 years. These rising domestic milk production and anticipated firm international demand indicate that there is a great scope for India to increase its exports.

The following policy implications are suggested to increase our export share in the world market of dairy products.

- Investments in dairy sector need to be increased to enhance production capacity, processing and packaging of value added dairy products.
- Livestock productivity needs to be improved with aims to make the cost of milk production competitive in the country to withstand the global market competition.
- Dairy farmers should be provided skill training along with support for feed & fodder availability to enhance productivity and product diversification.

REFERENCES

Websites visited:

<http://apeda.gov.in>

<http://commerce-app.gov.in>

<https://dahd.nic.in/about-us/divisions/statistics>

<http://fao.org>



Department of Agricultural Economics and WTO Cell

B. A. College of Agriculture Anand Agricultural University, Anand (Gujarat)

The Department of Agricultural Economics is an integral part of B. A. College of Agriculture, Anand Agricultural University, Anand established in 1947. The prime mandate of the department is to impart education in the field of Agricultural economics coupled with research and extension activities. Accordingly, the department imparts teaching to undergraduate as well as post graduate level. Different courses related to agricultural economics are taught in B. A. College of Agriculture, College of Agriculture, Vaso, College of Agricultural Information Technology, Anand and Institute of Distance Education, Anand. The department has 5 research schemes under which various research studies are conducted. Among these, studies on cost of cultivation of major crops are conducted on regular basis whereas socio-economic problems related studies as well as agricultural marketing and finance related studies are also conducted on need base. The findings of these studies are highly useful to farmers, policy makers and agri-entrepreneurs. WTO Cell is functioning at this department since 2009 under which various training programmes related to agri-exports are organised for farmers and other stakeholders on regular basis. Seminars and workshops are also organised in context to objectives of WTO Cell. The department regularly participates in various extension activities like Krushi Mahotsav and farmers training programmes organised by other departments.

