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INDIAN BUFFALO MEAT EXPORTS: ISSUES OF GROWTH, INSTABILITY, CONCENTRATION

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ABSTRACT

Meat exports is an important product in the Indian livestock export basket, the predominant form being buffalo meat. An attempt has been done in this paper to analyse performance of buffalo meat export from India for the period 1996 to 2014. The compound growth rates, market concentration and instability indices of the Indian buffalo meat export were analyzed. The quantity and value of buffalo meat export from India increased by 13.61 and 22.48% respectively over the period, largely aided by the rapid growth of meat sector. The study concentrates on major markets *viz*., Malaysia, Maldives, Mauritius, Philippines, Yemen, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates, China, Iran (Islamic Republic of Iran), Jordan since more than 75% of the buffalo meat exports from India were to these markets. Results showed high and positive growth of Indian buffalo meat export in terms of quantity, value and unit value for the period of study. Slight degree of instability in Indian buffalo meat export was revealed using Coppock's instability index (CII). The study revealed that India's buffalo meat export was concentrated mainly to those countries, which is either less desirable (low growth and high risk) or least desirable (low growth and low risk) which is undesirable from point of economic growth of the country. There was evidence of market diversification of Indian buffalo meat export from traditional importing countries to other countries.

Keywords: buffalo meat, compound growth rate, market concentration, instability index, variability, constant market share, India

INTRODUCTION

India is the largest producer of meat with 7 million tons in 2015-16. Indian Animal products exports account for 1.75% of India's exports earnings. Meat export is a major foreign exchange earner contributing 1.6% to India's total export earnings and 91.43% of Animal product exports in terms of value during 2016 (APEDA, 2016).

The global beef/buffalo meat industry is dominated by the United States, which accounts for around 20% of the world's total beef production as well as consumption. India accounts for around 7% of the world's total beef production (ICRA, 2016). Buffalo meat is the most important meat produced in India after poultry meat. India produced 1.61 million tons of buffalo meat in 2015-16 from a population of 13.16 meat animals (BAHS, 2016). The largest producer of meat is Uttar Pradesh which produces 20.2% of the total meat production in the country followed by West Bengal that produces 9.8% of the meat production. Maharashtra is the third largest meat producer state in the country which produces 9.6% of the total meat production

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(BAHS, 2016).

Buffalo meat is a meat product with high demand in the international market. India, Brazil and Australia have remained the leading buffalo meat/beef exporters globally together contributing 56% of the global trade volume, which stood at 9.55 million tonnes in 2015 (ICRA, 2016).

Buffalo meat is the major item of livestock exports accounting for 96.65% of total meat exports and 88.53% of animal products exports in 2015-16 (APEDA, 2016). During the year 2015-16 The country has exported 13,14,158.05 MT of buffalo meat products to the world for the worth of Rs. 2,6681.56 Crores (APEDA, 2016).

Indian buffalo meat exports have grown at a CAGR of 29%, from Rs. 3,533 crore in FY2008 to Rs 26,682 crore in FY2016, enabling it to overtake its close competitors Brazil and Australia to become the largest exporter of buffalo meat/beef, accounting for ~20% of the world's total buffalo meat/beef exports (in volume terms). Buffalo meat has been the highest agri-related export item from India for the past two consecutive years and its contribution to the total export revenues of India has almost doubled to 1.56% in FY2016 from 0.76% in FY2011. Since FY2008, the growth in exports has been driven both by volume expansion (CAGR of 13%) and an increase in realizations (CAGR of 13%) (ICRA, 2016).

India is expected to become a leader in export of buffalo meat in the coming years to take 50% share in world exports surpassing Brazil and Australia which is mainly driven by improving infrastructure, a sizeable buffalo population and the relatively low price of Indian buffalo meat on the back of steady demand in the international market (ICRA, 2016). Moreover India exports about 81.6% of its buffalo meat production to the world due to less domestic consumption (Kumar, 2012; APEDA, 2016). Thus share of exports in production is more in India compared to other countries which further boosts exports. Exports are determined by the demand, domestic production, Domestic consumption, Prices, consumer preference, trade agreements between countries and trade policies. For maximizing export earnings, exports should be stable. Instability may have a direct impact (Hazell, 1982; Rao *et al*., 1988; Larson *et al*., 2004; Jeyanthi and Gopal, 2012; Kumaresh and Sekar, 2013; Shrabanti and Ghosh, 2015; Sabu and Kuruvila, 2016; Velmurugan *et al*., 2016; Das *et al*., 2016), contrary impact (Mahendradev, 1987; Chand and Raju, 2008) and mixed impact on exports (Kumar, 2010; Paltasingh and Goyari, 2013).

Hence managing and stabilizing export instability is an important priority for the exporting countries to maximize earnings. This study was taken with an objective of examining the export performance of buffalo meat from India by assessing growth, market concentration and export instability.

MATERIALS AND METHODS

Export data of buffalo meat for the present study were collected from UNcom trade data base. Country-wise, time-series export data were collected for 20 years *viz*., 1996 to 2013.The major importing countries selected for the study were Angola, China, Hong Kong SAR, Côte d'Ivoire, Gabon, Germany, Ghana, Iran (Islamic Republic of Iran), Jordan, Lebanon Liberia, Malaysia, Maldives, Mauritius, Philippines, Senegal, Turkey, Yemen, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates world as 80% of buffalo export from India was to these countries. The data on herd and production of buffalo meat in India were also collected from BAHS of Department of Animal Husbandry of GOI, and

also from FAO. Export growth, export instability and market concentration were the parameters analysed in this study.

The growth of Indian buffalo meat export in terms of quantity, value and unit value was estimated using Compound Growth Rate (CGR) by fitting exponential trend function (Shah, 2007; Fauzi and Anna, 2012; Jeyanthi and Gopal, 2012, Kumaresh and Sekar, 2013; Kusuma and Basavaraja, 2014, Padmanaban *et al*., 2014; Shrabanti and Ghosh, 2015; Sabu and Kuruvila, 2016; Velmurugan *et al*., 2016; Anantharaju *et al*., 2016; Das *et al*., 2016; Radhakrishnan *et al*., 2016).

$$Y = abx$$

Where,

Y – Quantity/Value/ Unit Value of Indian buffalo meat export

x – Time period (in years)

a – Constant

b – Coefficient value

CGR (%) = (Antilog 'b' --- 1) x 100

Degree and extent of stability of export as well as the risk associated with profitability and export earnings were assessed by Instability Index (II). There are a number of techniques available to measure the instability (Coppock, 1962; Cuddy and Della, 1978; Ray, 1983; Wasim, 2007). In this study, Coppock's instability index (CII) (Chand and Tewari, 1991; Rao, 1988; Wasim, 2007; Reddy and Mishra, 2010; Fauzi and Anna, 2012; Jeyanthi and Gopal, 2012; Das *et al*., 2016) was calculated to assess the instability. The Coppock Instability Index (CII) technique was introduced by Coppock (1962). CII is a close approximation of the average year-to-year percentage variation adjusted for trend (Kaur and Singhal, 1988).

$$CII = \{(\text{Antilog } Vlog) --- 1\} \times 100$$

Where, Vlog = logarithmic difference of log Xt+1 and log Xt.

Risk assessment of Indian buffalo meat export has been done by correlating growth with instability and categorizing the importing countries into high growth-low risk, high growth-high risk, low growth-low risk and low growth-high risk (Reddy and Mishra, 2010; Jeyanthi and Gopal, 2012; Das *et al*., 2016)

Market concentration is defined as the percentage of the total export of a given type of commodity that is attributable to particular country over the years. In the present study, Hirschman Market Concentration Index (HMCI) was used for working out the market concentration (Bhanu Murthy and Deb, 2008; Ferdous, 2011; Jeyanthi and Gopal, 2012; Bouras, 2013; Sinha, 2016). Market Concentration Index (MCI) was calculated separately for quantity and value of Indian buffalo meat exports. HMCI of quantity and value has been denoted as HMCIquantity and HMCIvalue respectively.

$$HCMI = \sqrt{\sum_{i=1}^{n} P2}$$

Where,

HMCI – Hirschman Market Concentration Index

n – Number of importing countries

P – Percentage share of buffalo meat export in terms of quantity or value

Further we studied the competitiveness of buffalo meat exports by using two stage Constant Market Share (CMS) analysis to decompose the growth of Indian Bovine meat exports into broad components and its sub components. The CMS approach uses a country's market share in a market as a measure of competitiveness. This

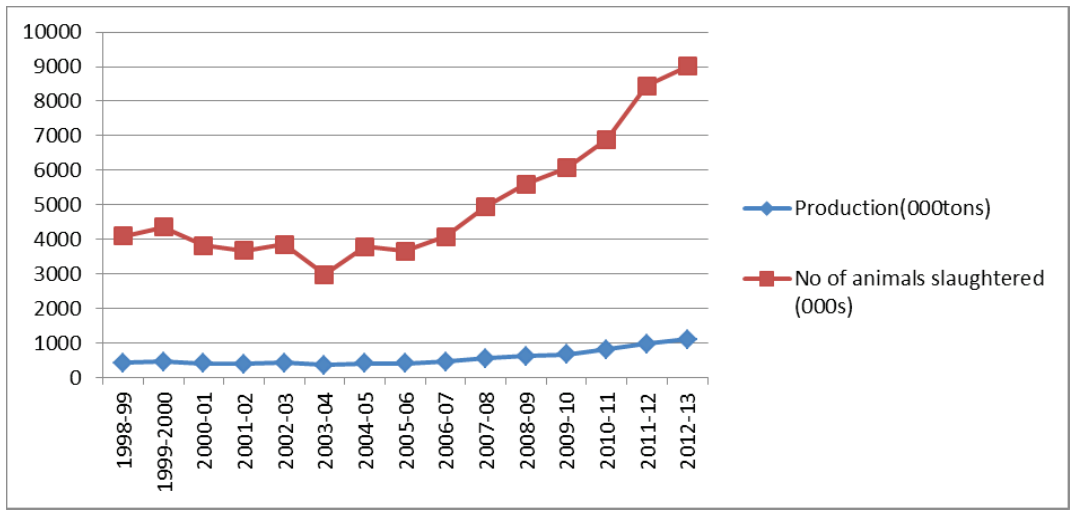

Figure 1. No of animals slaughtered, yield and meat production of Indian buffalo meat (1996-2012).

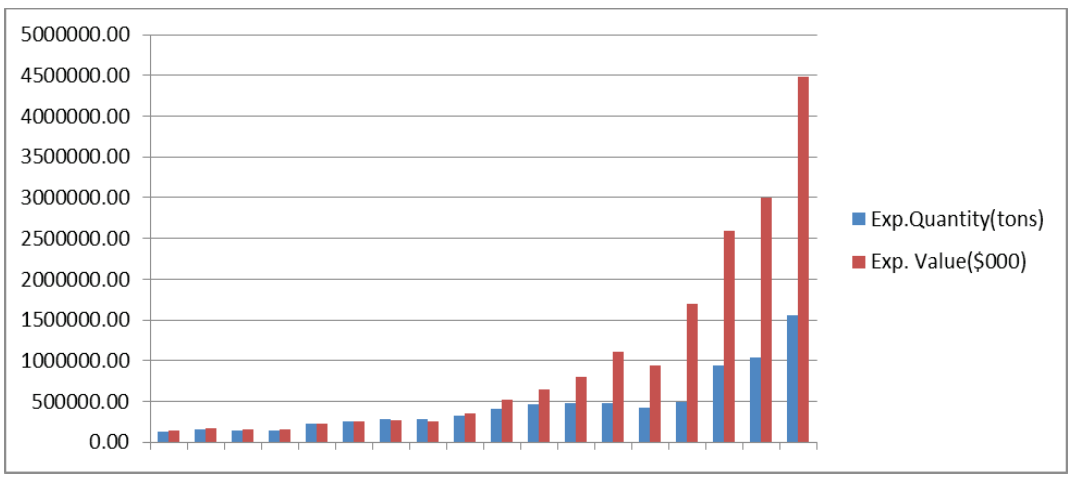

Figure 2. Export performance of Indian buffalo meat 1996 to 2013.

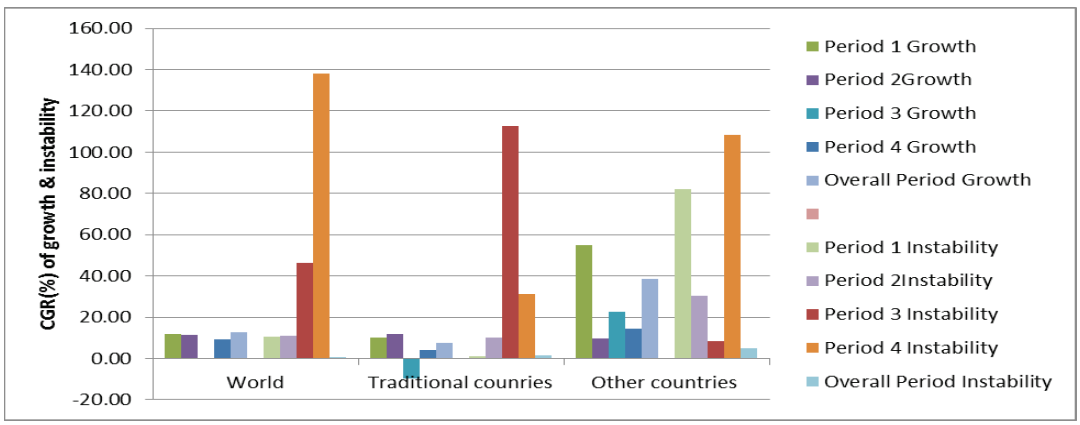

Figure 3. Growth and instability in meat exports (qty) from India (CGR %) (1996 to 2014).

method popularized by Tyszynski (1951) was used in international economics for export analysis (Skriner, 2009; Rifin, 2010; Fathima *et al*., 2006; Rani *et al*., 2014). In this study we used modified two stage CMS analysis modified by Chen *et al*., 2000 and used by Klasra and Fidan, 2005; Singh *et al*., 2011).

RESULTS AND DISCUSSION

Domestic sector

Trend analysis of buffalo meat from reg sector (Table 1 and Figure 1) showed that except PI, Buffalo meat showed positive growth rate for all the parameters in all the periods with overall growth of 6.14%, 0.6% and 6.95% for no of animals slaughtered, yield and meat production respectively. Along with growth, Instability is also growing 9.02%, 0.22% and 12.65% during 1996-2012.

Exports sector

1. Trend and intsability analysis

a) Temporal analysis of trend and instability

The quantity and value of export buffalo meat from India was 125.58 thousand tons worth 141.43 million dollars during 1996 (Figure 2). By the year 2013 to 2014, the quantity and value of buffalo meat export had increased by 1151% and 3071% respectively (to 1558.6 thousand tons valued at $ 4486.28 million).

Temporal analysis of trend shows that buffalo meat exports registered positive growth in all periods for all the parameters (Table 2) except PIII with overall growth of 13%, 22.48% and 7.8% for quantity, value and unit value respectively. Positive results for both growth and instability

Table 1. Trend in growth and instability of buffalo meat production from reg. sector (CGR %).

States/ UTs	Growth in production (CGR(%)				Growth in instability (CGR%)			
	PI	PII	PIII	Overall	PI	PII	PIII	Overall
No of Animals slaughtered	-2.90	11.47	13.72	6.14	15.03	15.13	0.00	9.02
Yield	1.19	-1.51	4.97	0.60	23.78	22.34	-73.66	0.22
Meat production	-1.75	10.21	16.40	6.95	-0.51	17.50	10.22	12.65

Overall production in India is said to be increasing (6.95%) but this growth is instable (12.65%).

Table 2. Growth and instability in meat exports from India (CGR %) (1996 to 2014).

Meat type	Growth (CGR %)					CII (CGR %)				
	PI	PII	PIII	P IV	Overall	PI	PII	PIII	P IV	Overall
Exp. quantity	11.96	11.44	-0.22	28.39	13.61	10.53	10.94	46.14	137.96	0.41
Exp. value	8.12	18.86	23.26	31.57	22.48	12.74	25.9	13.26	77.28	4.16
Exp. price	-3.43	6.66	23.52	2.48	7.8	107.16	138.86	-4.23	-54.78	31.13

PI: Period I (1996 to 2000), PII: Period II (2001 to 2005), Period III (2006 to 2010), Period IV (2011 to 2014), Overall: 1996 to 2014.

indicates that buffalo meat exports were not stable though the growth rate was positive and high.

Though buffalo meat exports were increasing instability is also increasing on par with the growth with highest being exports unit value (31.13% CGR in instability index) followed by exports value (4.16%) and quantity (0.41%) during 1996 to 2013. These higher values of instability indicates that the positive and highest growth of buffalo meat exports was not stable.

Moreover exports value is more instable than quantity as indicated by higher values of CII (4.16%) compared to quantity (0.41%). Though instability was decreasing in recent years overall period showed price instability of buffalo meat exports (31.13%) indicating that positive and highest growth of buffalo meat exports was prices was not stable.

b) Country wise trend and instability analysis of export sector

During the period of study (1996 to 2013), country wise exports revealed that the average buffalo meat export in terms of quantity and value was high to Malaysia (70.15 thousand tons and $ 130.94 million) and low to Maldives (0.32 thousand tons and $ 0.81 million) Next to Malaysia, Philippines (41.39 thousand tons) UAE (28.59 thousand tons), Jordan (23.59 thousand tons), Saudi Arabia (23.19 thousand tons) were the major markets in terms of quantity while Saudi Arabia ($ 60.99 million) UAE ($ 49.79 million) Jordan ($ 49.06 million) Angola ($ 36.16 million) in terms of value.

Country wise trend analysis of buffalo export quantity shows that highest growth rates (>20%) in overall period were reported by Angola, Ghana, Others, Qatar, Senegal. India showed overall growth rate of 13.61% with continuously increasing growth except in PIII where it showed negative growth rate of -0.22% (Annexure 1).

Almost all the countries showed positive growth rate with exception of turkey. But during recent years (PIV) Côte d'Ivoire, Ghana, Jordan, Maldives, Philippines, Qatar, Senegal and turkey registered negative growth rate.

For exports value all most all countries showed highest growth rate with the exception of Bahrain, Iran, Malaysia, Mauritius, Philippines, Turkey, UAE and Yemen. In terms of Value, India showed continuously increasing growth with overall growth rate of 22.48%. No country has registered negative growth rate. But during recent years (PIV) Côte d'Ivoire, Ghana, Jordan, Qatar, Senegal, Turkey, registered negative growth rate.

All the countries showed positive growth rate in unit value of exports with highest growth registered by Senegal, followed by Angola and Yemen. India showed positive growth in unit value of exports in all the periods except in PI where it

Table 3. Classification of import countries of Indian buffalo meat exports (Qty).

Growth	**RISK**	
	High	**Low**
High		**Safe**
	World Others	Angola, Côte d'Ivoire, Gabon, Ghana, Iran (Islamic Republic of Iran), Jordan, Kuwait, Qatar, Oman, Senegal
Low	**Least desirable**	**Less desirable**
	Malyasia, Philippines, Turkey, UAE, Yemen	Bahrain, Mauritius

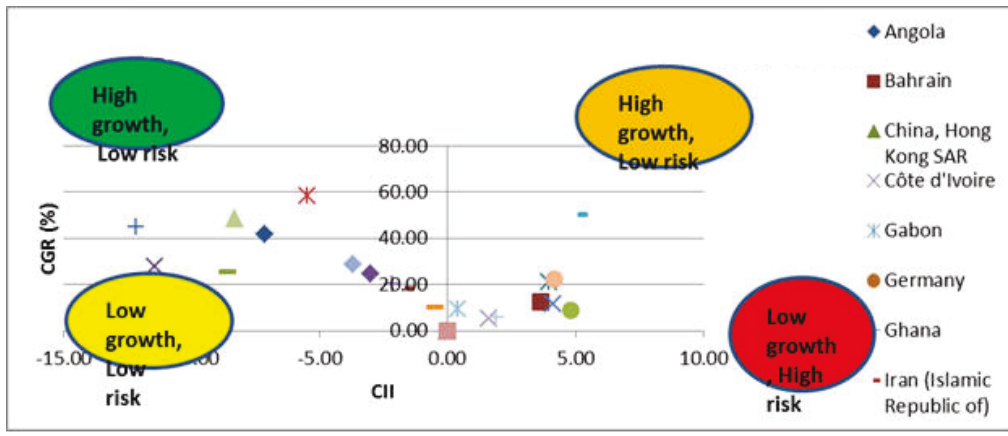

Figure 4. Classification of importing countries of Indian (exports value)-overall period.

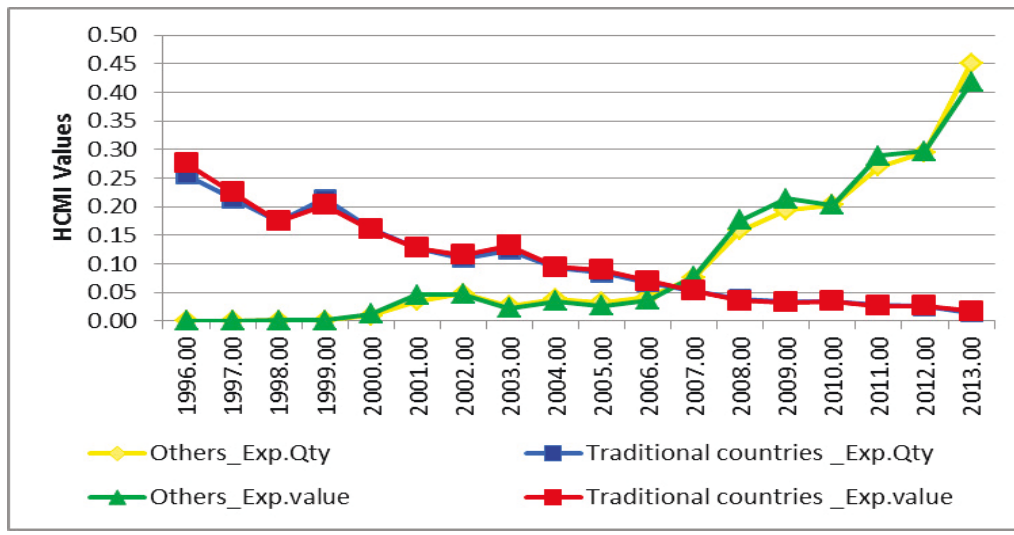

Figure 5. Hirschman market concentration index (HMCI) of Indian buffalo meat exports (1996 to 2013).

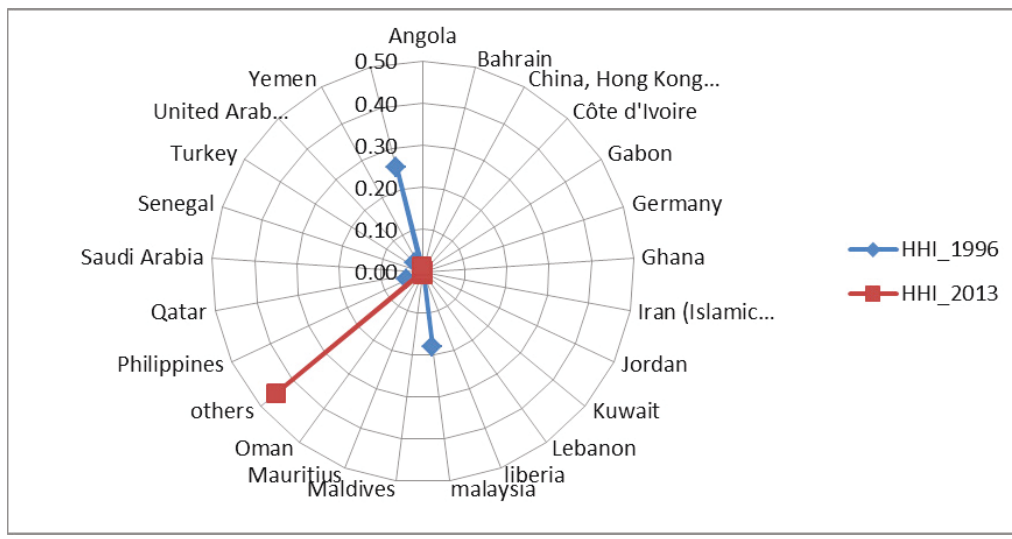

Figure 6. Herfindahl-Hirschman concentration of exports, 1996 and 2013 (source: author's compilation).

has registered negative growth of -3.43%. Except few countries in PI all the countries showed positive growth in all periods.

Countries showing decreasing instability in export quantity were Angola, Bahrain, Cote D' vore, Gabon, Ghana, Iran, Jordan, Kuwait, Mauritius, Oman, Qatar, Senegal with highest decrease reported by Senegal (-15.68%) followed by Ghana (-13.29%).

Increasing instability was reported by others, Philippines, Turkey, UAE, Malaysia, Yemen. Yemen showed highest increase in CII growth with 3.09% among traditional countries followed by Philippines (1.95%), Malaysia (0.78%). Other countries showed CII growth of 4.88% for quantity. Overall India's exports showed slight increasing instability implying instability of exports quantity.

Similarly for exports value the highest and the lowest instability were observed in Malaysia (4.13%), Gabon (3.97%) and Ghana (-12.19%), Cote D' vore (-11.43%).

But, in terms of unit value, the highest and the lowest instability was in Malaysia (17.84%) and Iran (15.08%), Qatar (14.08%) and Philippines (-2.71%) followed by Lebanon (-2.09%). Malaysia is the only country showing high instability in terms of quantity, value and unit value. Both quantity and value instability was low for Senegal and Ghana.

For the purpose of delineating the importing countries (purpose of delineating the direction of imports), major importing countries of Indian buffalo meat were classified as traditional countries and the others as other countries and the results of growth and instability were presented in Figure 3.

It is evident from Figure 3 that though Indian buffalo meat exports were increasing to other countries (38.68%) Instability is also increasing 4.48% showing less stable exports. In case of traditional countries exports were increasing 7.46% with instability of 1.29%. Overall Indian buffalo meat exports registered less stable (CII of 0.41%) growth (12.63%).

2. Risk assessment of Indian buffalo meat exports

Risk assessment of Indian buffalo meat exports was performed by classification of the countries based on growth and instability. For classification of Importing countries of buffalo meat growth rate of 5% and CII of 0 are taken for delineating the classes. Accordingly countries were classified as high growth and low risk, high growth and high risk, Low growth and high risk, Low growth and low risk destinations. The results showed that Angola, Côte d'Ivoire, Gabon, Ghana, Iran (Islamic Republic of Iran), Jordan, Kuwait, Oman, Qatar, Senegal were turned out to be safe destinations which India can rely upon for Indian buffalo meat exports (Table 3).

Malaysia, Philippines were found to be least desirable destinations. Bahrain and Mauritius were classified as less desirable destination. Overall Indian buffalo meat exports to world and other countries comes under high growth and high risk category resulting from higher instability. Hence it can be concluded that Indian buffalo meat exports growth is not stable though it is high.

In value terms (Figure 4) Angola, Côte d'Ivoire, Ghana, Iran (Islamic Republic of Iran), Jordan, Kuwait, Oman, Maldives, Philippines, Qatar, Senegal were safe or desirable destinations. Bahria, Gabon, Malaysia, Mauritius, others, Turkey, UAE, Yemen, World fall under high growth and high risk category. No other country falls under less desirable or least desirable destinations.

3. Decomposition analysis of meat exports

Having discussed about growth it is

Table 4. Decomposition analysis of buffalo meat exports value from India (CGR %) (1996 to 2014).

	Change in meat exports (000$)					Contribution of different items to total change (%)														
State	PI	PII	PIII	PIV	Overall	PI			PII			PIII			PIV			Overall		
						QE	UVE	IE	QE	UVE	IE	QE	UVE	IE	QE	UVE	IE	QE	UVE	IE
Buffalo Meat	80659	270184	1046457	1894532	4344848	135	-20	-15	59	25	16	4	91	5	89	7	4	37	5	58

Table 5. Hirschman market concentration index (HMCI) of Indian buffalo meat exports (1996 to 2013) (in %).

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
BMQ	25.55	21.44	17.43	21.43	16.15	12.75	10.96	12.42	9.34	8.45	6.76	5.31	3.89	3.43	3.5	2.91	2.55	1.41
BMV	27.55	22.56	17.47	20.27	16.01	12.76	11.6	13.15	9.4	8.91	6.98	5.26	3.54	3.23	3.49	2.7	2.67	1.72
BMOQ	0.07	0.03	0.11	0.08	0.98	3.51	4.77	2.65	3.84	3.3	4.15	7.61	15.79	19.35	20.33	26.99	29.47	45.11
BMOV	0.06	0.02	0.09	0.09	1.25	4.62	4.72	2.27	3.5	2.69	3.72	7.78	17.69	21.4	20.3	28.91	29.68	41.76

B.MQ = Buffalo Meat Quantity, B.MV = Buffalo Meat Value, B. MOQ = Buffalo Meat Others Quantity, B.MOV = Buffalo Meat Others Value

Table 6. Hirschman market concentration index (HMCI) of Indian meat exports (1996 to 2014) (in CGR %).

Category	PI	PII	PIII	PIV	Overall	PI	PII	PIII	PIV	Overall
Traditional countries	-8.77	-9.36	-16.09	-30.26	-14.53	-11.25	-8.86	-17.08	-20.29	-14.53
Others	91.2	-3.38	50.84	29.28	49.61	114.2	-12.89	55.38	20.18	50.2

important to analyse the factors responsible for growth. Hence Decomposition analysis was carried out to find out the sources of growth (Quantity effect/ price effect) in exports value of buffalo meat for different time periods and percentage contribution of individual effects were worked out results were presented in Table 4.

As evident from table Buffalo meat showed positive change in value i.e. it has changed by 4344848 thousand dollars between 1996 to 2014

Table 7. HMCI based ranking of importing countries of Indian meat exports.

Importing country	Buffalo meat	
	H.Q	H.V
Saudi Arabia		1
others		3
Senegal	2	4
Maldives	1	2
Angola	4	8
Ghana	3	7
China, Hong Kong SAR		5
Qatar	5	9
Kuwait	8	12
Jordan	7	11
Liberia		6
Cote, D, Ivore	6	10
Bahrain		
Bhutan		
Vietnam		

Table 8. Decomposition of exports quantity of Indian buffalo meat to world (CMS analysis).

Main component	Sub-component	PI	PII	PIII	PIV
Structural effect (% to change in export quantity)		41.58	42.92	34.2	22.44
		44.26	44.93	64.5	67.71
Competetive effect (% to change in export quantity)		0	0	0	-1489158
	General competitive effect (% to competitive effect)	100	100	100	1489258
	Specific competitive effect (% to competitive effect)				
Second order effect (% to change in export quantity)		14.16	12.15	1.3	9.85
	Pure second-order effect (% to second-order effect)	31.98	27.03	2.02	14.55
	Dynamic structural residuals (% to second-order effect)	68.02	72.97	97.98	85.45
Change in export quantity (%)		100	100	100	100
Absolute change in export quantity (000 tonnes)		95.83	157.63	27.45	613.03

Annexure 1. Trend in buffalo meat exports (qty) from India (CGR%) (1996-2014).

State	PI	PII	PIII	P IV	Overall	State	PI	PII	PIII	P IV	Overall
Angola	188.17	32.17	-27.08	20.00	29.96	Maldives		180.37	-14.96	-4.38	
Bahrain	9.89	-5.61	-8.77	4.63	3.95	Mauritius	-1.24	-4.26	-8.23	1.91	0.32
China, Hong Kong SAR	-46.05		5.47	23.20		Oman	15.44	2.14	-8.38	9.33	11.11
Côte d'Ivoire	-5.90	68.51	-31.00	-34.00	19.36	Others	54.82	9.55	22.55	45.98	38.96
Gabon	36.16	0.56	-10.30	21.98	11.60	Philippines	7.45	-0.65	-8.97	-0.72	2.87
Germany	53.23	-21.16				Qatar	5.95	13.63	-0.66	-1.73	19.78
Ghana	33.90	107.09	-22.53	-14.02	34.27	Saudi Arabia			2.08	10.59	
Iran (Islamic Republic of Iran)	18.45	-7.50	-16.39	24.87	9.54	Senegal	77.13	74.59	-18.56	-13.90	35.87
Jordan	41.67	20.66	-8.31	-16.09	17.39	Turkey	-32.06	102.03	-28.91	-35.81	-1.90
Kuwait	13.11	62.21	-12.93	2.04	16.84	United Arab Emirates	13.92	3.54	-10.10	10.40	0.81
Lebanon	24.58		35.62	0.30		world	11.96	11.44	-0.22	28.39	13.61
Liberia	388.14		-22.16	8.99		Yemen	9.48	-7.35	-18.03	11.00	-3.17
Malaysia	4.47	3.37	-5.48	12.25	3.44						

China*: China Hong Kong SAR, UAE-United Arab Emirates

Annexure 2. Countries selected for the study of buffalo meat exports.

Type	Countries studied
Buffalo meat exports	Angola, China, Hong Kong SAR, Côte d'Ivoire, Gabon, Germany, Ghana, Iran (Islamic Republic of Iran), Jordan, Lebanon Liberia, Malaysia, Maldives, Mauritius, Philippines, Senegal, turkey, Yemen, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates, others , world

Annexure 3. HHI in buffalo meat exports (qty) from India (CGR%) (1996-2014).

State	PI	PII	PIII	P IV	Overall	State	PI	PII	PIII	P IV	Overall
Angola	562.48	40.65	-46.60	-12.63	30.84	Maldives	995.89	532.92	-27.37	-44.53	44.24
Bahrain	-3.66	-28.26	-16.40	-33.59	-16.28	Mauritius	-22.18	-26.19	-15.41	-36.99	-22.04
China, Hong Kong SAR	-76.78		11.73	-7.91		Oman	6.30	-16.00	-15.69	-27.48	-4.35
Côte d'Ivoire	-29.37	128.63	-52.18	-73.58	10.37	others	91.20	-3.38	50.84	29.28	49.61
Gabon	47.89	-18.57	-19.19	-9.72	-3.50	Philippines	-7.90	-20.52	-16.78	-40.20	-18.01
Germany	87.30	-49.95	64.03			Qatar	-10.45	3.96	-0.89	-41.41	11.15
Ghana	43.02	245.33	-39.72	-55.15	39.67	Saudi Arabia		1203.71	4.65	-25.80	
Iran (Islamic Republic of Iran)	11.93	-31.10	-29.78	-5.40	-7.05	Senegal	150.29	145.43	-33.39	-55.02	43.03
Jordan	60.11	17.22	-15.57	-57.29	6.75	Turkey	-63.18	228.66	-49.24	-75.00	-25.44
Kuwait	2.06	111.87	-23.86	-36.83	5.76	United Arab Emirates	3.52	-13.68	-18.82	-26.05	-21.26
Lebanon	23.80	-84.01	84.72	-38.97	-7.00	Yemen	-4.38	-30.88	-32.51	-25.24	-27.36
Liberia	1800.86		-39.15	-27.93		world	0.00	0.00	0.00	0.00	0.00
Malaysia	-12.93	-13.97	-10.27	-23.55	-17.10	Traditional countries	-8.77	-9.36	-16.09	-30.26	-14.53

(Table 4).

Analysis of factors affecting exports value by decomposition analysis shows that both quantity and price has contributed for positive change in exports value in case of buffalo with resulting interaction effect of (58%). Though both has contributed quantity effect is more than the price effect (37%).

Diversification of Indian meat exports across regions

Diversification of Indian exports were analysed by using by using Hirschman Market Concentration Index (HMCI) and Constant Market share analysis.

4. Hirschman market concentration index (HMCI)

a) Year wise HCMI values

Annexure 2 gives the countries selected for meat exports for analysing diversification of Indian meat exports. The results for HCMI of export quantity of buffalo meat exports were presented in Table 5 and Figure 5.

Analysis of market concentration of Buffalo meat exports (for the countries studied) using HMCI showed continuously decreasing trend over the 20 years period studied for buffalo meat with overall decrease in concentration of -14.53% for both quantity and value. HMCI decreased from 25.55 to 1.41% for quantity and 27.55 to 1.72% for value (Table 5 and Figure 5) indicating market diversification during the period of study. Values of HMCI quantity ranged between 1 and 25, and HMCI value between 1 and 27. This showed slightly influence of value in deciding market concentration

of buffalo meat than quantity exported.

Buffalo meat exports to other countries showed increasing trend from 0.07% to 45.11% quantity and 0.06 to 41.76% for value indicated increasing market concentration (49.61% and 50.2% CGR) to other countries during the period of study. But here quantity has influence in deciding market concentration of buffalo meat than value.

b) Growth in hirschman market concentration index (HMCI) of Indian meat exports

Growth rates were computed for HCMI values for both quantity and value for different periods and the results were presented in Table 6 and Figure 6. Analysis of market concentration for buffalo meat exports using HMCI showed decreasing trend over the 20 year period studied. HMCI is estimated to be decreasing -14.53% for both quantity and value (Table 6) for the countries under study.

The Herfindahl index shows an improvement in the trend of diversification of exports to the traditional countries. There is decreases in concentration from 0.26 to 0.01 for these countries. Countries where concentration is decreasing (Annexure 3) were Bahrain, Gabon, Iran, Lebanon, Malaysia Mauritius, Oman, Philippines, turkey, Yemen, UAE. India has shifted its exports concentration from these countries to other countries.

Moreover Malaysia, Philippines respectively recorded a more decrease in concentration, thus improving their diversification. There has been a decrease in the index for the year 1996 to 2013, respectively from 0.18 to 0.01 for Malaysia, from 0.04 to 0.00 for the Philippines.

Other countries showed concentration of buffalo meat exports making an increase of index from 0.0006 to 0.45. While traditional countries showed diversification, opposite trend is observed for other countries where HCMI is increasing 49.61% and 50.2% for quantity and value respectively showing diversification of buffalo meat exports from traditional countries to new countries.

c) **HMCI based ranking of Indian meat exports to different countries**

Ranking of meat importing countries based on HMCI showed that the top five markets for buffalo meat in terms of quantity were Maldives, Senegal, Ghana Angola, and Qatar. But in terms of value Saudi Arabia, Maldives, others, Senegal, China, Hong Kong SAR have taken top five positions.

Overall results of hirschman market concentration index (HMCI) shows that India is showing diversification of buffalo meat exports from traditional countries to other countries.

5. Constant market share analysis

Constant market share (CMS) approach was used to examine the changing pattern of competitiveness of Indian buffalo meat exports in the different countries between 1996 and 2014. The present study utilized the CMS analysis to decompose the growth of Indian meat exports to the different countries into structural, competitive and second-order effects in the first stage and those effects into sub-effects in the second stage of decomposition. The results of Constant market share (CMS) for total exports of meats by India to the world are presented in Tables 8.

The growth rate of Indian buffalo meat exports to the world is also due to growth in value of exports (structural effect) as well as an increase in the export share (competitive effect) (Table 8). Indian buffalo meat exports to the world enjoyed competitive advantage during through out the period (Table 8).

Overall results of CMS analysis shows that the growth in Indian buffalo meat exports to the world was mainly due to competitive effect for almost all periods.

CONCLUSIONS

This paper has examined the export performance of Indian buffalo meat exports for 20 year period covering 1996 to 2013 by using growth rates, instability index, concentration index. Study has found positive but instable buffalo meat production of India. From the study, it was evident that export growth in terms of quantity, value and unit value was high. Positive results for both growth and instability indicates that buffalo meat exports were not stable though the growth rate was positive and high. Moreover exports value is more instable than quantity. Buffalo meat exports registered highest growth for other countries compared to traditional countries. Increased buffalo meat exports to other countries (38.68%) was associated with higher Instability resulting in less stable exports. Angola, Côte d'Ivoire, Ghana, Iran (Islamic Republic of Iran), Jordan, Kuwait, Oman, Qatar, Senegal. Were turned out to be safe destinations (both in terms of quantity and value) as far as Indian buffalo meat exports were considered. Decomposition analysis showed the influence of quantity in deciding exports value. While study countries HCMI is decreasing -14.53% for both quantity and value, HCMI for other countries is increasing 49.61% and 50.2% for quantity and value respectively showing diversification of buffalo meat exports from traditional countries to new countries. Low market concentration with low instability in buffalo meat export from India has been observed. Since the Quantity has largely influenced the buffalo meat exports value, there is a need to increase buffalo meat production and ensure steady supply of raw material to the meat processing industry. Indian Buffalo meat export was mainly focused to less desirable and least desirable destinations and attempts at identifying competitive and stable market destinations are necessary. As the exports to other countries is increasing compared to traditional countries and also concentration is increasing it is necessary to increase India's exports to other countries at the same time measures to be taken to decrease the instability as the instability is higher compared to traditional countries.

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