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India's meat export: Structure, composition and future prospects

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ABSTRACT

The study analyses the structure of India's meat export, the commodity and market diversification and the prospects of ushering the meat export. The domestic meat production increased from 2.6 million tonnes in 1980 to 6.3 million tonnes in 2010, fuelled by the growth in poultry and buffalo meat production. While buffalo meat accounts for about 23% total production, its contribution in meat export accounts for more than 85%, mostly in frozen form. The growth of meat export has slowed down in the last decade compared to the previous decade with increased instability. Indian meat export has been increasingly getting specialized towards buffalo meat whereas its export markets are gradually getting diversified. Cashing in the competitiveness of India's buffalo, pig and small ruminant production and improving the competitiveness of poultry meat production would help to improve its export performance. Greater investment in disease control and safe meat production so as to adhere with the Sanitary and Phyto- Sanitary Measures of WTO would help in sustainable meat export.

Key words: Composition, Diversification, India, Meat export, Prospects

India is traditionally blessed with a large livestock population but the export of various livestock products was not encouraging, mainly due to high domestic demand, infrastructure bottlenecks and unfavorable export policies. Given the high income elasticity of demand for livestock products like milk, egg and meat, much of the incremental production diverts towards domestic consumption due to factors like high per capita income growth, change in taste preference of the consumers and increasing urbanization (Birthal and Taneja 2006). Domestic production could not meet the demand and livestock products export remained quite insignificant even during early 1980s. Given the vast population of livestock in the country, India stands to gain from the export of meat and meat products, with advanced processing technology, institutional innovation in marketing and favourable export policy. Enhancing the meat export needs to ensure exportable surpluses over and above surging domestic demand and policy adjustments to meet the international requirements like Sanitary and Phyto- Sanitary (SPS) measures of World Trade Oganisation (WTO) agreement. In this context, the present paper addresses the following: (i) The present status and composition of India's meat export (ii) Any significant shift in commodity and geographical composition of India's meat export over years (iii) The export prospects of meat and meat products from India.

The export of livestock products gained considerable attention of researchers. Globally the demand for livestock products, particularly for meat is on rise, owing to the rise of per capital income in many developing countries (Delgado *et al.* 1999). Kumar *et al.* (2007) reported that as on 2006, the share of export revenue of livestock products was 0.8% of the total exports, 7.4% of total agricultural exports and 2.4% of the GDP of livestock origin. They exhibited an increasing trend since 1982. During 2002–04, out of exports of livestock and livestock products worth US$ 472 million, the share of milk (equivalent) was about 14%, whereas that of meat and meat preparations was about 72% (Bardhan 2007). Major commodities of economic significance other than milk and meat were eggs, hair and wool, and hides and skin. Of these, the share of eggs in total livestock products exports was about 10% (as on 2002–04), whereas that of hair and wool and hides and skin was less than one per cent.

Compared to many other livestock products, meat exports enjoy high prospects due to competitiveness. Kumar (2009) indicated that under exportable hypothesis all the meat products from India except poultry meat were competitive in the world market and the competitiveness was the highest in case of bovine meat. This compares well with exported

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milk products like butter, whole milk powder and skimmed milk powder which were far from being competitive. Another major development that has attracted the attention of the researchers is the increasing focus towards food safety measures imposed by the importing countries. This issue has become more pertinent since the inception of WTO wherein SPS measures were given increased thrust. India has been facing impact of increasing non-tariff measures manifested in the form of refusals of its consignments on account of contamination, filthiness, insanitary conditions, inadequate labeling, and use of unsafe additives (Kumar *et al*. 2007).

MATERIALS AND METHODS

The study uses secondary data collected from various sources. The data on livestock population was compiled from Reports of Livestock Census. Time series data on world trade of livestock products and producer prices of meat items in major producer countries were collated from the databases of the Food and Agricultural Organization (FAO). Commodity-wise and market-wise data on exports was collected from Monthly Statistics of Foreign Trade published by Directorate General of Commerce, Intelligence and Statistics, Ministry of Commerce, Government of India.

The study employs common mathematical/ statistical tools like growth rates, ratios and indices of diversity and instability to analyze the data. The growth rate (r) of livestock population over various census periods was estimated mathematically using the formula:

$$r = \left(t\sqrt{\frac{p^t}{p^0}} - 1 \right) \times 100$$

where, P_0 and P_t indicate the population of the livestock at the initial and final years and, t the time interval. The growth rate over years and across countries was estimated statistically by fitting semi-log model of the following type:

$$\text{Ln } Y_t = Y_0 + t \text{ Ln } (1+ r) + e$$

where, Y represents the exports at various points of time, e the stochastic error and t the length of time period.

While the need to increase the agricultural exports are obvious, the instability in the agricultural exports needs to be kept low, as increased instability exposes exporters to income shock, which would be transmitted back to domestic producers, besides impacting the balance of payments of the country. Therefore, the need to have sustained export growth with low instability has always remained a major goal of the EXIM policy. In this study, the instability was estimated by using Cuddy-Della Valle Index (CDVI). Though coefficient of variation (CV) is commonly used for estimating the dispersion with comparability across various units, it cannot be used in case of time series data characterized by time trend (Sen 1989). Any measure of instability needs to exclude the deviations in the data series that may arise due to secular trend or growth. CDVI was originally developed by John Cuddy and Della Valle for measuring the instability in time series data that is characterized by trend (Cuddy and Della Valle 1978). The estimable form of the equation is as follows:

$$\text{CDVI} = \text{CV } (1\text{-}R^2)^{0.5}$$

where, CV, coefficient of variation; R^2, coefficient of determination from time trend regression adjusted by number of degrees of freedom.

To absorb the shock in international economic scenario, the export basked should be broad-based and therefore, diversification is a long term strategy. The diversification in export was calculated using Simpson Index of Diversification (SID), as indicated below:

$$\text{SID} = 1 - \Sigma W_i^2$$

and,

$$W_i = \frac{X_i}{\sum_{i=1}^{n} X_i}$$

where X_i, value of export of i^{th} meat/ meat products; W_i, proportionate value of export of i^{th} meat item in total meat export

The value of the index ranges between 0 and 1. A value of 1 indicates total diversification, and 0 indicates perfect concentration of trade towards a particular product. In the present study, both commodity diversification and geographical diversification has been worked out.

RESULTS AND DISCUSSION

Growth in meat production in India: The domestic meat production increased from 2.6 million tonnes in 1980 to 6.3 million tonnes in 2010 registering an absolute increase of about 3.6 million tonnes (Table 1). Compared to 1980, the production of all the meat items increased, with the largest absolute increase in case of poultry meat (2.2 million tonnes) followed by buffalo meat (0.64 million tonnes). As on 2009,

Table 1. Trend in meat production in India ('000 tonnes), 1980–2010

Year	Buffalo	Cattle	Goat	Pig	Sheep	Poultry	Total meat
1980	820.5	853.4	302.4	261.5	153.8	132.2	2626.8
1990	1078.5	1035.9	430.0	413.0	181.2	560.8	3826.3
2000	1255.8	981.4	469.0	465.9	220.8	904.0	`4443.9
2009	1462.7	1086.5	5686.5	332.5	289.2	2337.7	6270.2

Basic data source: FAOSTAT accessed on 15 June 2012.

buffalo meat accounted for about one third of the total meat production in India. Compared to 1980s, major changes in the composition of meat occurred in case of poultry meat which posted sharp increase in terms of both absolute production as well as its share in total meat production. It was triggered mainly by the private initiatives (Ramaswami *et al*. 2005). The growth in the meat production has close correspondence with the growth in their population as can be observed in the next session.

Livestock population in India: Over a quarter century (1982–2007), the population of all the livestock increased, albeit with wide variations among species and inter-census periods (Table 2). The highest increase in population occurred in poultry, from 208 million heads to 649 million heads registering growth over 212%. The annual growth rates always remained closer to 4% during all the inter-census periods under consideration. This high growth rates was mainly due to technological breakthrough in breeding, feeding and health, institutional innovations in the form of contract farming in the case of broilers and layers, vertical integration, high credit facility and increased demand for white meat (Ramaswami *et al.* 2005). The population increase of the small ruminants during the periods was also commendable- from 49 to 72 million in sheep and 72 to 141 million in goat. Major impediment in increasing the small ruminants' population is the dwindling area and productivity of pastures (Ray 1991). There were many initiatives to conserve the pastures and to increase their productivity through various central and state Government programmes (GoI 2007), though with limited success. The population surge in case of buffaloes ~ 50% over a quarter century—is also worth mentioning. With mechanization of agricultural operations, buffaloes were being displaced from draft use. Unlike cattle, the social prohibition towards buffalo slaughter is not intense. These factors, combined with increased abattoir facilities for handling buffalo slaughter and meat processing has contributed to increased buffalo meat production (Ranjhan 2010).

Table 2. Population and growth of livestock in India, 1982–2007

Year/time period	Cattle	Buffalo	Sheep	Goat	Pig	Poultry
			Population (million heads)			
1982	192.5	69.8	48.8	95.3	10.0	207.7
1992	204.6	84.2	50.8	115.3	13.0	307.1
2003	185.2	97.9	61.5	124.4	13.6	489.0
2007	199.1	105.3	71.6	140.5	11.1	648.8
			Increase in population in 2007 over 1982 (%)			
	3.4	50.9	46.7	47.4	11.0	212.4
			Growth rate (%/year)			
1982–1992	0.6	1.9	0.4	1.9	2.7	4.0
1992–2003	–0.9	1.4	1.8	0.7	0.4	4.3
2003–2007	0.6	1.9	0.4	1.9	2.7	4.0

Basic data source: Livestock Census, Various Issues.

India's meat and meat products' export: India's share in world export of meat is very low. As on 2008, the world meat export accounted for about US$ 107 billion, of which the highest individual contribution was by Brazil (13%), followed by USA (11%) and Germany (9%). With an export value of about US $1.2 billion, India's share was only one per cent.

India mainly exports meat of bovines, sheep, goat, poultry and swine in various forms like fresh, chilled, frozen, salted, smoked etc. During 2009–10, India exported meat items worth ₹ 6325 crore (₹ 2606 crore at 1993 prices) (Table 3). Since 1981, India made impressive strides in export of meat

Table 3. Structure of meat and meat products export from India, 1980–81 to 2009–10

Meat products	Quantity (lakh kg)				Value (₹ crores)			
	1980–81	1990–91	2000–01	2009–10	1980–81	1990–91	2000–01	2009–10
Total live animals *	8.8	520.0	50.6	7.6	8.5(13.3)	0.6(0.4)	6.5(0.4)	79.9(1.3)
Bovine meat (fresh and/ or chilled)	35.7(6.7)	84.4(11.5)	574.4(18.5)	116.3(2.1)	3.3(5.1)	14.1(10.0)	278.9(19.1)	108.9(1.7)
Bovine meat (frozen)	0(0.0)	549.2(74.7)	2305.9(74.4)	4730.5(86.4)	0(0.0)	92.6(65.6)	1096.1(75.0)	5328.2(84.2)
Swine meat	2(0.0)	0(0.0)	0(0.0)	5.1(0.1)	0(0.0)	0(0.0)	0(0.0)	2.8(0.0)
Mutton/chevon	13.8(2.6)	83.3(11.3)	119.0(3.8)	522.5(9.6)	1.91(3.0)	31.3(22.2)	78.2(5.3)	737.3(11.7)
Edible offal	0(0.0)	6.2(0.8)	0.1(0.0)	62.8(1.2)	0(0.0)	0.98(0.7)	2.0(0.0)	53.6(0.9)
Poultry meat	9(0.0)	0(0.0)	0(0.0)	12.6(0.2)	1.0(0.0)	0(0.0)	42.0(0.1)	6.0(0.1)
Salted and or smoked meat	26.3(5.0)	1.3(0.2)	0.6(0.0)	7.1(0.1)	4.2(6.5)	1.5(1.1)	2.4(0.2)	8.5(0.1)
Other meats	454.8(85.7)	0.5(0.1)	0(0.0)	0.4(0.0)	46.1(72.1)	0.1(0.1)	0(0.0)	0.2(0.0)
Total meat items (excluding live animals)	530.6 (100.0)	735.3 (100.0)	3101.1 (100.0)	5472.6 (100.0)	64.0 (100.0)	141.0 (100.0)	1462.5 (100.0)	6325.2 (100.00)

*In case of live animals the quantity is in '000 nos. Figures in parenthesis indicates percentages to the total.

Basic data source: Monthly Statistics of Foreign Trade, Directorate General of Commerce, Intelligence and Statistics, Ministry of Commerce., Government of India.

items, both in quantity and value terms. It was to the tune of 0.53 lakh tonnes in 1980–81, and increased to the level of 5.5 lakh tonnes by 2009–10 accounting for about 12% of total meat production in India. The corresponding values were ₹ 64 crore in 1980–81 and ₹ 6525 crore in 2009–10. As on 2009–10, about 86% of Indian meat export (in value terms) was contributed by bovine meat. Since meat items are liable to quick spoilage during long distance transport, lion's share of the lots are exported in frozen form, accounting for almost 95% of total bovine meat export. During early 1980s, the export was mainly in the form of fresh/chilled meat. The export of frozen bovine meat was near absent during 1980–81, but it increased to 4.7 lakh tonnes by 2009–10. Mutton/ chevon constituted about 12% of total meat export. They are exported in the form of fresh and chilled lambs and sheep, boneless mutton, frozen lamb and sheep and chevon. Export of small ruminant meat is dominated by sheep, accounting for more than 85% of total quantity and value. One major reason for lower export of Indian small ruminant meat/ meat products is high domestic demand and high prices. An analysis of the wholesale price index of mutton over a decade of time period (1997–98 to 2007–08) indicated that it has risen by about 45%. The year on year inflation calculated with this data indicated positive values during all the time period except for the year 2001–02. This compares well with poultry meat, where 7 out of 11 years reported negative price growth. The case of poultry meat is quite interesting - despite contributing to the extent of 17% in total meat production, its contribution in meat export is meager. As on 2009–10, the export was only about 13 lakh kg worth ₹ 60 crore. The major factor that might have contributed to the lower export is the poor competitiveness of Indian poultry sector as we could see later in this paper. Though pigs accounted for about 10% of the total meat production in India, its export is conspicuous by its near absence. The share of other processed meat items like fresh, chilled or frozen edible offal and salted and/or smoked meat is also very less compared to other meat items.

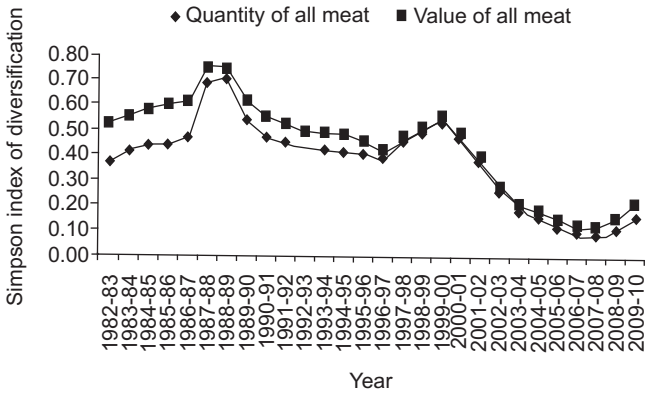

Fig. 1. Trend in commodity diversification of meat export from India, 1982–83 to 2009–10.

Commodity diversification of Indian meat export: The extent of diversification of meat products from India was captured using Simpson Index of Diversification and is presented in Fig 1. To avoid sharper fluctuations, triennial ending data were utilized for the analysis, for a period ranging from 1982–83 to 2009–10. The indices, both of quantity and value, clearly depicted a picture of gradual specialization. The Simpson index (of value) was 0.50 in 1982–83, increased to 0.70 by 1987–88, but gradually declined to the level of 0.20 by 2006–07. This trend is mainly because of increasing dominance of bovine meat in India's meat export.

Table 4. Compound annual growth rate of export of meat/meat products (% per year) (TE average)

Meat products	Growth in quantity				Growth in value			
	1982–83 to 1989–90	1990– 91 to 1999–00	2000–01 to 2009–10	Overall	1982–83 to 1989–90	1990–91 to 1999–00	2000–01 to 09–10	Overall
Total live animals	2.5	26.4***	12.3***	6.9***	–32.3***	12.2**	29.0***	3.2
Bovine meat (fresh and/or chilled)	28.9*	21.6***	–21.8***	7.0***	27.4*	25.5***	–20.8***	8.3***
Bovine meat (frozen)	-	11.0***	13.8***	-	-	15.1***	17.5***	-
Swine meat	-	-	26.9***	40.6**	183.4**	-	31.8***	43.7*
Mutton/chevon	–3.1	1.5	8.4	1.2	–2.0	4.6***	11.8*	2.0**
Edible offal	-	–45.8***	84.4***	133.0***	-	–42.4***	87.2***	174.5***
Poultry meat	–23.5***	–89.9**	-	–1.8	–15.5***	–74.2	44.2**	14.6
Salted and/ or smoked meat	–27.8***	–5.2**	37.4**	–1.8	–15.4	–8.8***	23.0***	–3.4
Other meats	–30.4**	–50.3**	90.1**	–16.5	–31.8**	–45.4	83.9**	–13.9
Total meat items (excluding live animals)	–0.2	12.5***	10.6***	10.3***	–2.8***	15.5***	14.0***	10.8***

***, **, and * indicates P <0.01, 0.05 and 0.10%, respectively.

Basic data source: As in Table 3.Some figures were not calculated either due to lack of data or near zero export during some years and they are indicated with a hyphen.

Growth and instability of meat and meat products export

The growth and instability of meat export was analyzed for three distinct decades (Table 4). They were calculated after converting the nominal prices into real prices by using whole sale price index of all commodities at 1993–94 prices in order to adjust for inflation. The analysis was carried out using triennial ending averages to smoothen the sharp fluctuations. During the overall period, the export of total meat items from India registered a growth rate of 10.3% in quantity and 10.8% in value. All the livestock products barring salted and/or smoked meat and other meats registered significant positive growth. The growth calculated for value terms were higher than that for quantity terms, highlighting the fact that the unit price of Indian meat items is on increase in international market. High growth rates were observed for some of the meat items, owing to poor/ no export of those items in the initial periods. Frozen bovine meat registered phenomenally high overall growth rate (more than 200%). Growth rates of export of most of the meat items stabilized during the second period compared to the first period.

The overall instability of Indian meat export during 1982–83 to 2009–10 was about 30% in quantity basis and 45% in value basis (Table 5). The instability in export quantity declined from about 9.1% in 1980s to 3.5% in 2000s, whereas that of export value increased from 1.9% to 13% during the corresponding period. The instability in value terms for all the commodities were higher than instability in quantity basis, as the former includes instability in international prices also.

Market composition of Indian meat export: As on 2009–10, Indian meat export was largely concentrated towards two district regions- Southeast Asian and Arab countries (West Asia and Africa). The Southeast Asian countries including Malaysia, Philippines and Vietnam together accounted for about 40% of the total meat products in value terms, whereas the Arab countries including UAE, Saudi Arabia, Kuwait and Egypt together accounted for about 27% (Table 6). It is interesting to note the structural changes in geographical composition over years.

During the triennium ending 1990–91, about 42% of India's meat export was to Malaysia alone and another 32% towards UAE. India found out new markets and the share of Malaysia declined to about 25% by 1999–2000 and further to 11% by 2009–10. The share of UAE declined to 16%, and further to 5% during the above period. The space vacated by these two countries has been occupied by a number of other countries, the prominent one being Vietnam, that accounted for about 23% of Indian meat export as on 2009–10. The Simpson index of diversification during 1991–92 was 0.65 and it increased to 0.88 during 2009–10, clearly indicating increased geographical diversification.

A vivid picture of the growth story can be obtained from

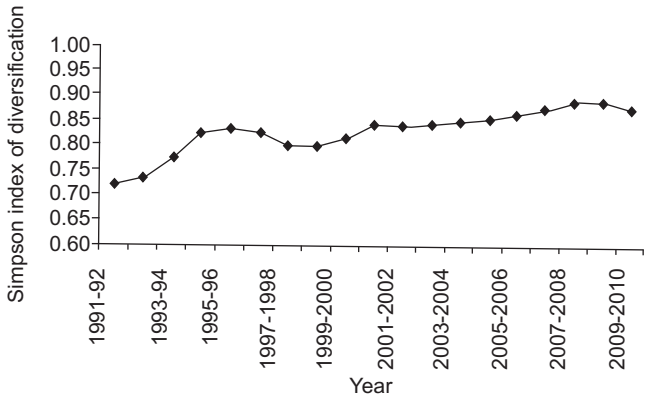

Fig. 2. Trend in geographical diversification, 1991–92 to 2009–10.

Table 5. Instability of export of meat/meat products from India (%)

Meat products	Quantity				value			
	1982–83 to 1989–90	1990– 91 to 1999–00	2000–01 to 2009–10	Overall	1982–83 to 1989–90	1990–91 to 1999–00	2000–01 to 09–10	Overall
Total live animals	22.4	59.3	19.4	62.5	25.7	44.6	13.3	95.7
Bovine meat (fresh and/or chilled)	56.0	32.4	47.5	93.6	53.8	46.9	53.0	100.4
Bovine meat (frozen)	93.4	14.8	7.2	38.9	90.2	12.6	9.3	52.7
swine meat	79.4	89.0	49.9	90.3	79.0	100.5	53.1	94.2
Mutton/chevon	24.6	9.1	55.8	46.5	23.4	7.5	63.4	53.9
Edible offal	80.9	82.5	64.8	127.7	77.3	102.7	64.6	137.0
Poultry meat	36.5	83.9	88.4	151.6	25.0	96.6	75.4	134.6
Salted and/ or smoked meat	13.6	18.1	41.4	97.2	69.9	11.4	18.9	106.8
Other meats	16.7	105.4	68.0	124.6	15.8	146.3	61.1	126.4
Total meat items (excluding live animals)	9.1	6.2	3.5	29.9	1.9	5.8	13.1	44.5

Basic data source: Monthly Statistics of Foreign Trade, Directorate General of Commerce, Intelligence and Statistics, Ministry of Commerce., Government of India.

Table 6. Market structure of meat/meat products export from India (1993–94=100)

Country/year	Value (₹crores)			Share (%)		
	1990–91	2000–01	2009–10	1990–91	2000–01	2009–10
Angola	0.00	16.3	84.8	0.0	1.7	3.3
Congo	0.00	2.9	53.5	0.0	0.3	2.1
Egypt	0.00	184.8	216.7	0.0	19.6	8.3
Iran	0.00	37.6	35.9	0.0	4.0	1.4
Jordan	8.3	35.9	85.3	4.4	3.8	3.3
Kuwait	4.0	17.1	158.9	2.1	1.8	6.1
Malaysia	78.6	236.8	280.7	41.6	25.2	10.8
Mauritius	2.3	10.7	17.1	1.2	1.1	0.7
Oman	10.6	28.2	51.5	5.6	3.0	2.0
Philippines	0.00	128.9	178.2	0.0	13.7	6.8
Saudi Arabia	10.3	21.0	207.8	5.5	2.2	8.0
UAE	60.2	150.8	124.3	31.8	16.0	4.8
Vietnam	0.2	0.0	597.6	0.1	0.0	22.9
Yemen	5.4	8.6	7.29.0	2.9	0.9	0.3
Others	9.1	61.0	506.6	4.8	6.5	19.4
Total Meat	189.0	940.6	2606.3	100.0	100.0	100.0

Basic data source: As in Table 3.

Table 7. Growth and instability of export of meat/meat products from India (TE Average at constant price 1993–94=100)

Country/Year	Growth rate (%)			Instability (%)		
	1991–92 to 1999–00	1991–92 to 1999–00	1991–92 to 1999–00	1991–92 to 1999–00	2000–01 to 2009–10	1991–92 to 2009–10
Angola	-	34.7***	290.6***	115.0	16.4	60.8
Congo	-	50.3***	292.5***	120.5	20.7	84.8
Egypt	21.8	–0.1	55.2***	191.2	81.7	111.2
Iran	-	5.3*	98.7***	50.3	22.8	31.9
Jordan	4.2	13.7***	14.1***	27.5	23.3	34.1
Kuwait	11.3***	35.8***	17.1***	14.4	24.9	67.9
Malaysia	9.2***	1.5	5.3***	9.7	7.2	10.5
Mauritius	24.2***	4.5**	5.9***	19.1	16.7	26.3
Oman	2.1	10.7***	6.7***	26.7	6.3	20.5
Philippines	-	5.9***	110.1***	47.2	8.8	20.0
Saudi Arabia	14.5*	40.2***	14.2***	35.6	29.5	68.6
UAE	12.5***	–1.5	2.7**	15.2	18.4	25.2
Vietnam	95.1	156.4***	129.2***	60.9	107.5	198.5
Yemen	–0.4	0.7	–5.6	105.1	11.6	111.3
Others Countries	36.7***	26.3***	19.8***	36.6	6.7	36.6
Total Meat	15.1***	14.3***	12.4***	9.3	13.9	26.0

***, **, and * indicates P <0.01, 0.05 and 0.10,% respectively.

Basic data source: As in Table 3. Some figures were not calculated either due to lack of data or near zero export during some years and they are indicated with a hyphen.

growth rates across countries (Table 7). For estimating country growth rates, two distinct time periods (decades) were considered, viz. the 1991–92 to 1999–2000 and 2000–01 to 2009–10. During the overall period, all the countries barring Yemen registered positive growth rate. During the first period, the total meat export registered a growth rate of 15%, which slightly declined during the second period (14.3%). Two noteworthy observations about the second period are - negative/insignificant growth rate for Malaysia and UAE and the exemplary growth rate for Vietnam. During the second period the instability also declined in 12 out of 15 countries under consideration, except in case of UAE, Vietnam and Kuwait, which resulted in higher overall instability during the second period (13. 9%) compared to the first period (9.3%).

Augmenting meat export from India: Role of Markets and institutions

International prices: Knowledge regarding growth and instability of prices in the international market is important

to plan exports and insulating from income shocks. Price of major meat items including their growth and instability is provided in Table 8. Highest price growth has been observed in case of lamb meat, where the real price increase during the period of 1980–2010 was 52% compared to 17% in case of chicken meat and 38% in case of beef. The most intriguing factor is the extent of price instability in international markets which would expose Indian exporters to greater price risk. The international price instability was quite high at about 15% for both lamb and beef. The possible step to mitigate the transmission of this instability is greater geographical diversification of Indian meat export.

Table 8. International prices of major meat items and its growth and instability, 1980–2010

Year	Commodity price (cents/kg, constant 2000$)		
	Lamb	Chicken	Beef
1980	225.80	88.1	351.6
1990	244.9	96.0	253.7
2000	261.9	120.1	180.7
2010	379.4	140.6	249.7
Percentage change over 1980			
1990	8.4	8.9	–27.8
2000	7.5	25.1	–28.8
2010	52.0	17.0	38.2
Growth rate and instability (1980–2010)			
Growth rate (1980–2010)	1.3*	1.7*	–1.5*
Instability (1980–2010)	14.6	6.3	15.2

*indicates probability at <0.01% level. Basic data source: FAO Prices and World Bank Commodity Outlook.

Increasing competitiveness: The difference between international price vis a vis the domestic price is the most important factor that affect the competitiveness of trade (Chand 2002). The trend in the producer price of various meat items in major producing countries are given in Table 9. Though the comparison of the producer prices is a crude method of ascertaining the competitiveness compared to other measures like nominal protection coefficient, it helps in ascertaining the trend, that are not complicated with the nuances of variables like tariffs and transportation costs. It can be observed that buffalo meat is the most competitive as the domestic producer price is lower than all the other major producers. Similar trends can be observed in case of pig meat also. The trend in mutton and chevon depicts a mixed picture, wherein India is not competitive compared to some countries, particularly Australia. In poultry meat, the prices are not competitive to most of the major producers, particularly USA, China and Thailand. The analysis clearly indicates the need to bring down the producer costs to attain better competitiveness. Kumar (2009) also reported that under exportable hypothesis the trade of mutton, bovine meat and pig meat is competitive, whereas that of the poultry meat is not competitive.

Increasing domestic meat production: The major steps in the direction are to enhance the meat production through population and productivity. This warrants assessment of the

Table 9. Producer prices of meat items in major producer countries in 2008 (US$/tonnes)

Countries	Goat		Sheep		Chicken		Buffalo/bovine*		Pig*	
	PP	Ratio	PP	Ratio	PP	Ratio	PP	Ratio	PP	Ratio
Argentina	5893	2.2	6812	2.2	2874	1.6	1469	4.3	948	2.2
Australia	1775	0.7	2208	0.7	2075	1.1	2236	6.5	1593	3.7
Bhutan	3086	1.15	3086	1.0	1850	1.0	1566	4.6	1900	4.4
Brazil	1293	0.5	2167	0.7	1367	0.7	1133	3.3	584	1.3
China	2782	1.0	3125	1.0	1564	0.8	1832	5.3	1401	3.2
Egypt	5049	1.9	2979	0.9	1959	1.1	3132	9.1	2803	6.4
France	6751	2.5	5115	1.7	1623	0.9	3855	11.2	1449	3.3
Germany	1951	0.7	4979	1.6	1623	0.9	3090	9.0	1502	3.5
India	2690	1.0	3108	1.0	1859	1.0	342	1.0	435	1.0
Indonesia	5487	2.0	6561	2.1	2732	1.5	3067	8.9	1570	3.6
Iran	5795	2.2	7917	2.6	1888	1.0	3315	9.7	–	–
Malaysia	7547	2.8	5184	1.7	1624	0.9	1764	5.1	1825	4.2
Nepal	3138	1.2	5463	1.8	2239	1.2	1097	3.2	1002	2.3
New Zealand	3013	1.1	4455	1.4	1065	0.6	1827	5.3	2117	4.8
Philippines	3390	1.3	2728	0.9	1854	1.0	1654	4.8	1624	3.7
Sri Lanka	4741	1.8	2840	0.9	1562	0.8	702	2.1	1797	4.1
Thailand	1832	0.7	5577	1.8	1547	0.8	1754	5.1	1475	3.4
Turkey	7048	2.6	1832	0.6	2510	1.4	5044	14.7	4548	10.5
USA	–	–	1503	0.5	1278	0.7	3607	10.5	1415	3.3

* Data is for the year 2005.Basic data source: FAOSTAT accessed on 22nd January 2011. PP indicates producer price and ratio indicates the ratio of the price to Indian prices.

resource potential of the regions to grow more number of livestock. One of the major constraints in this regard is the deficiency of feed and fodder. As on 2007–08, the feed and deficiency was up to the extent of 64% in case of green fodder, 55% in dry fodder and 130% in concentrate mixture (GoI 2008). Expansion of area under fodder, conservation of pasture resources and increasing its productivity through technological intervention may be possible steps to augment the fodder production (Birthal and Taneja 2006).

Compliance with sanitary and phyto-sanitory measures: Compliance with the food safety measures is gaining greater attention, particularly after establishment of WTO. Meat products, being highly perishable, pose risk for human health, and therefore, warrants strict quality adherence. Stringent quality checking mechanisms for livestock products are in place in most of the importing countries. For example, the European Union has a well established system for faster spread of information regarding the safety of imported food and feed items, known as Rapid Alert System for Food and Feed (RASFF), which issues alert/ information notification to the member countries when a risk is detected in food products entering the territory. Alert notifications may result most probably in rejection or recall of the consignment. Adherence to safety norms is very important to have sustainable export. One major area of attention in this regard would be establishment of diseases free zones against diseases like FMD (Kandeepan *et al.* 2009).

Indian meat export has undergone expansion in the last three decades driven mainly by the increased meat production, institutional interventions in meat processing and policy initiatives to bring down tariffs. The growth of export of meat was much higher compared to other livestock products, including milk, egg, or fishery products. Over years, the commodity composition of meat export depicted a trend of gradual specialization towards frozen bovine meat. Domestic demand for bovine meat being poor, the potential of this sector is to be expanded for realizing better growth in future too. Other potential growth areas are pig and poultry meat. The international prices of all major meat items exhibited high degree of growth and instability which could be transmitted back to India. The possible income shocks out of high international price volatility can be insulated by further diversification of export markets. India's meat production, namely bovine, pig and small ruminants is competitive in terms of producer prices, and this offers brighter opportunities for export. On the other hand, poultry sector is not competitive, mainly due to high input costs which can be addressed through increased cost efficiency of feed production. Food safety measures are becoming increasingly important in the context of SPS measure of WTO. Greater investment in meat processing sector, establishment of disease free zones and increased compliance with SPS measures may boost India's meat export.

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