International Journal
of Pure & Applied
Bioscience

OPEN ACCESS

Changing Direction of Trade of Hides and Skin in India - An Application of Markov Chain Analysis

Shilpa Shree, J.[1*], Serma Saravana Pandian, A[1]., Kiran, M.[2], Mohankumar, S.[2] and Veena, N.[3]

[1]Dept. of Animal Husbandry Economics, Madras Veterinary College, Chennai-7
[2]Dept. of Vety & Animal Extension Education, Veterinary College, Bangalore-24
[3]Dept. of Animal Nutrition, Veterinary College, Bangalore-24
*Corresponding Author E-mail: shilpashreej23@gmail.com

ABSTRACT

Hides and skin constitute valuable material removed from the animal carcass. It is estimated that bovine hides represent 12% of the value of animal. Generally the hide is 17% of the carcass weight and 7% of live weight. The present study was undertaken to analyse the pattern of export, import and balance of trade of hides and skin in India by tabular analysis. India's export of hides and skin has been growing during last five years and considering such increasing trend and the opportunities and potential for furtherance of export from India in the coming years, the future requirement of raw-materials is expected to increase substantially. The study was also undertaken to find out the direction of trade of hides and skin from 2007-08 to 2012-13 using Markov Chain Analysis. From the transition probability matrix for India exports of hide and skin was indicated that India's previous Hides and skin export to the Bangladesh market followed by China and Italy. India could not retain its previous export of hides and skin to China, Italy and United States during the study period. India's previous Hides and skin export to the other countries market was retained to the level of 15 per cent during the current period. From the transition probability matrix indicated that India could not retain its previous import of hides and skin from New Zealand and other countries during the study period. India's previous hides and skin import from the China market was retained to the level of 20 per cent during the current period. The remaining 80 per cent was diverted to other countries alone. The entire share of other countries was directed to Saudi Arab (36 per cent), followed by China (29 per cent), New Zealand (26 per cent) and Spain (9 per cent). However, other countries gained higher probability from New Zealand import market (1.00), followed by china import market (80 per cent) and Spain import market (54 per cent). Development of awareness, mindset and commitment on improving the quality finished products is necessary. Production of quality hides and skin is attached with the quality of animal slaughtered particularly complete bleeding and de-hiding or de-skinning process. The enforcement of the Slaughterhouse and Meat Inspection Act 2055 as early as possible is one of the major way-out to improve the quality of meat and hides and skin both.

Keywords: *India, Trade, hides and skin, Markov Chain*

INTRODUCTION

Global trade in livestock products is expanding rapidly and significantly due to increase in consumer demands linked to growing educational and awareness of consumer, internationalisation of tastes and habits, developments in science and technology and improvements in communication and transportation. Consequently, the livestock sector has emerged as one of the important drivers of agricultural growth and diversification in India. The rising global demand for livestock products, various global trade negotiations and domestic reforms in India, have improved the access to international markets substantially, particularly during the post-WTO period. Such developments offer an opportunity to India to increase its exports. Investments in the livestock sector can significantly contribute to economic growth, poverty reduction and the attainment of the Millennium Development Goals in India. India's livestock sector has been booming. While the contribution of agriculture to the country's GDP continues to fall with industrialization, the contribution of the livestock sector to India's agricultural output only continues to increase. Keeping these points in mind, the present study was conducted to assess the trade direction and changing pattern of hide and skin trade in India.

MATERIALS AND METHODS

The data used in this study were collected from various secondary sources. Time series data for twenty year (1991 – 2011) on export and imports (quantity as well as in value terms) of various livestock products for the world and India were collected from Food and Agricultural Organization of the United Nations, FAO trade statistics and FAO commodity Review and outlook. The data on top exporting and importing countries were collected from Agricultural and Processed food products Export Development Authority (APEDA), Ministry of Commerce and Industry, Government of India.

Tabular analysis

To find the trend in export and import of hides and skins in India

Markov Chain Analysis – Transitional Probability Matrix

For finding out the changes in the structure of the trade in hides and skin of India, Markov chain analysis was used. Markov analysis is an application of dynamic programming to the solution of a stochastic decision process that can be described by a finite number of states[1]. A finite markov process is a stochastic process whereby the outcome of a given trial t (t = 1, 2... T) depends only on the outcome of the preceding trial (t-1) and this dependence is the same at all stages in the sequence of trials. Central to Markov chain analysis is the estimation of the transitional probability matrix P. The element P_{ij}, of this matrix indicates the probability that export will switch from category i to category j with the passage of time. The diagonal element P_{ii} measures the probability that the export share of ith country will be retained[3,4].

RESULTS AND DISCUSSION

Trend in Export and Import of Hides and Skins in India

India's export of Hides and Skins has been growing during last five years and the opportunities and potential for furtherance of export from India in the coming years, the future requirement of raw-materials is expected to increase substantially. Trend in export and import of hides and skins in India was depicted in the table 1.

Table 1: Trend in Export and Import of Hides and Skins in India

	Export	Import	net trade
1991	0	5281	-5281
1992	0	6146	-6146
1993	0	8529	-8529
1994	0	11348	-11348
1995	0	10759	-10759
1996	0	14270	-14270
1997	0	13479	-13479
1998	1	16765	-16764
1999	0	19043	-19043
2000	49	18179	-18130
2001	700	15276	-14576
2002	547	12119	-11572
2003	942	9288	-8346
2004	1166	8164	-6998
2005	1938	12627	-10689
2006	2077	19319	-17242
2007	6766	20235	-13469
2008	15564	21876	-6312
2009	4945	27553	-22608
2010	1292	21601	-20309
2011	1872	21323	-19451

Changing direction of trade of hides and skin in India

The four major exporting countries for animal casings taken for this analysis were Bangladesh, China, Italy, United States with the remaining importing countries grouped as others. As could be seen from the table 2, the transition probability matrix indicated that India's previous Hides and skin export to the Bangladesh market was retained to the level of 28 per cent during the current period. The remaining 72 per cent was diverted to China (43 per cent) and Italy (29 per cent).

However, Bangladesh has higher probability to gain United States import market (81 per cent) and China import market (29 per cent).

India could not retain its previous export of hides and skin to China, Italy and United States during the study period. The entire share of China was directed to United States (58 per cent), followed by Bangladesh (29 per cent) and other countries (13 per cent). Also, China has probability to gain Italy import market (100 per cent) followed by other countries import market (51 per cent) and Bangladesh (44 per cent).

Table 2: Transitional Probability Matrix for India's Export of Hides and Skin

	Bangladesh	China	Italy	United States	Others
Bangladesh	**0.275112148**	0.4344730	0.28844	0	0
China	0.287560	**0**	0	0.579300	0.126801
Italy	0	1	**0**	0	0
United States	0.811689197	0	0.188311	**0**	0
Others	0	0.514536598	0.20070	0.135612	**0.149231**

The entire share of Italy was directed to China (1.00) alone. Also, Italy has probability to gain Bangladesh import market (29 per cent) followed by United States import market (19 per cent) and other countries import market (20 per cent). The entire share of United States was directed to Bangladesh (81 per cent) and Italy (19 per cent). India's previous Hides and skin export to the other countries market was retained to the level of 15 per cent during the current period. However, other countries gained 13 per cent of the hides and skin import from India of China alone.

Table: 3 Transitional Probability Matrix for India's Import of Hides and Skin

	New Zealand	China	Saudi Arabia	Spain	Others
New Zealand	**0**	0	0	0	1
China	0	**0.201262**	0	0	0.798738
Saudi Arabia	0	0	**1**	0	0
Spain	0.085167	0.030701	0.182169	**0.159156**	0.542807
Others	0.256864	0.289200	0.35860	0.091013	**0**

The four major importing countries for hides and skin taken for this analysis were New Zealand, China, Saudi Arab, Spain with the remaining exporting countries grouped as others. As could be seen from the table 3, the transition probability matrix indicated that India could not retain its previous import of hides and skin from New Zealand and other countries during the study period. The entire share of New Zealand was directed to other countries (100 per cent) alone. However, New Zealand has probability to gain 9 per cent and 26 per cent of the Spain and other countries export market respectively.

India's previous hides and skin import from the China market was retained to the level of 20 per cent during the current period. The remaining 80 per cent was diverted to other countries alone. However, China has probability to gain 3 per cent Spain export market and 29 per cent other countries export market. India's previous hides and skin import from the Saudi Arabia market was perfectly retained to the level of 100 per cent during the current period. However, Saudi Arabia has probability to gain18 per cent and 36 per cent of the Spain and other countries export market respectively.

India's previous hides and skin import from the Spain market was retained to the level of 16 per cent during the current period. The remaining 84 per cent was diverted to other countries (54 per cent) followed by Saudi Arabia (18 per cent), New Zealand (9 per cent) and China (3 per cent). However, Spain has probability to gain 9 per cent of other countries export market alone. The entire share of other countries was directed to Saudi Arab (36 per cent), followed by China (29 per cent), New Zealand (26 per cent) and Spain (9 per cent). However, other countries gained higher probability from New Zealand import market (1.00), followed by china import market (80 per cent) and Spain import market (54 per cent).

CONCLUSION
The present study was undertaken to analyse the pattern of export, import and balance of trade of hides and skin in India by tabular analysis. India could not retain its previous export of hides and skin to China, Italy and United States during the study period. Development of awareness, mindset and commitment on improving the quality finished products is necessary. There should be training programs for producers, traders and respective stakeholders to develop their capabilities to

produce the quality and value added goods and to compete in the open market system. Production of quality hides and skin is attached with the quality of animal slaughtered particularly complete bleeding and de-hiding or de-skinning process. The enforcement of the Slaughterhouse and Meat Inspection Act 2055 as early as possible is one of the major way-out to improve the quality of meat and hides and skin both. Similarly, it is necessary to improve the animal transport system according to animal welfare norms and also provide licenses to the traders who fulfill the defined standards.

REFERENCES

1. Daniel, P., The use of Markov process in measuring the changes in market structure, *Journal of Farm Economics,* **44 (1):** 189 - 199 (1962).
2. Food and Agriculture organization of the United Nations (FAO), FAO Trade year book, Rome and database.
3. Sreenivasamoorthy, D. and Subramanyam, K.V., Onion exports markets and their stability for increasing India's exports: Markov chain approach. Agricultural Economics Research Review, **12(2):** 118 – 127 (1999).
4. Tejaswi, P.B., Naik, B. K., Kunnal, L. B. and Basavaraj, H., Direction of Trade and Changing Pattern of Indian Coffee Exports - An Application of Markov Chain Analysis. *Karnataka J. Agric. Sci.,* **19 (1):** 71-75 (2006).