Global Trade of Indian Pulses during WTO Regime: International Trade Trends, World Markets & Foreign Trade Policy

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Global trade of pulse crops represents about 15% of global production. The total volume of imports and exports globally has increased by 50% over the last 14 years from 4.4 to 6.7 million. The gap between the supply and demand in 2016 has shot up prices of most pulses beyond the reach of even middle class. It is against this background, when the United Nations General Assembly has declared the year 2016 as the international year of pulses. Even though India is the largest pulses producer of the world, it imports large amount of pulses from rest of the world. So, it is important to analyse, how the inflow and outflow of pulses from India is changed over the period of time and why India is importing a considerable amount of pulses. This study analyzes India's pulses growth rates, elasticity's, instability, price and trade trends across global regions and countries, and recommends government to frame agriculture policies. The study period is 1990-2017. The study observed that import markets are shifting from developing to developed nations. Also, the export and import quantity growth rates have been positive for all the regions during 1990-91 to 2016-17. The maximum export and import quantity growth rate is witnessed for African and American region respectively. The export and import price elasticity of Indian pulses is positive among all the regions, indicating the high responsiveness of quantities to change in prices in international markets. During the study period, export price of all major pulses were more than import prices indicating that India has comparative advantage in pulses. It is also noticed that export as well as import prices of all pulses were found to be unstable. The study found that, the total pulses, export price elasticities for all regions is elastic, whereas the import price elasticities is also elastic except for Asia and Oceania. India is importing from Canada, Myanmar, Australia, Russia and USA and exporting to Sri Lanka, Pakistan, Bangladesh, Egypt and Saudi Arabia. The study suggest that Import from inelastic countries should be exempted from any ban which would help to boost the trade and treat under MFN status. Under MEIS, pulses should be included and trade exemptions should be reconsider towards those countries which have shown elastic in both export and import. Multilateral trade relationship with high CAGR countries would help in smooth trade of pulses.

KEYWORDS Pulses, trade, trends, growth rates, Elasticity's, policies

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1. INTRODUCTION

United Nations General Assembly has declared 2016 as the 'International Year of Pulses'. The Food and Agriculture Organization of the United Nations (FAO) has been nominated to facilitate the implementation of the Year in collaboration with Governments, relevant organizations, non-governmental organizations and all other relevant stakeholders. The Year provides a unique opportunity to encourage global production of pulses, better utilize crop rotations and address the challenges in the trade of pulses. (NABARD, 2016)

Global trade of pulse crops represents about 15% of global production. The total volume of imports and exports globally has increased by 50% over the last 14 years from 4.4 to 6.7 million. On the other hand, the value of imports and exports has more than doubled over the same time period representing a 6% annual growth rate. This means the price of pulse crops traded in the world is increasing at a much higher rate than the quantity. (Sitou Akibode and Mywish Maredia-Michigan State University)

In most of developing countries, agriculture is a major employer and source of national income and export earnings. Growth in agriculture tends to be pro-poor and creates a vibrant economy in rural areas where the majority of poor people live. Agricultural growth, particularly through increased agricultural sector productivity & trade, also reduces poverty by lowering and stabilizing food prices. It is agricultural growth that enables developing countries, poor regions and ultimately poor households to take the first steps in this process (Singh AK et. al, 2015).

India is the largest producer, largest consumer and the largest importer of pulses in the world. In India Pulses are grown in around 24-26 million hectares of area producing 17-19 million tons of pulses annually. India accounts one third of the total world area and 20 per cent of total world production. India primarily produces Bengal gram (chickpeas), Red gram (tur), Lentil (masoor), Green gram (mung) and Black gram (urad). (NCAER-2016). Production of pulses in India has slightly improved, thanks to marginal improvement in the yield of the crops. Volume of pulses production has increased from 12.02 million tonnes in 1991 to 18 lakh tonnes in 2015 (Agristat-2016).

The NAFED and SFAC are responsible to procure pulses under MSP but unfortunately they procured insignificant quantity [1% to 4% of output during 2012-13 to 2014-15] despite MSP for pulses in last five years were higher than rice and wheat. The Santa kumar committee has aptly observed that despite MSP are announced for 23 commodities substantial benefits accrue to wheat and rice growers in selected States leaving pulse-growers often receiving prices much below MSP. Absence of efficient marketing arrangement and production constraints created huge gap between demand and supply resorting to imports (Indian microfinance-2017).

Agricultural policies play a very important role in export and import of agriculture commodities. Currently, we are in the mid-way of self-sustaining in pulses production. India import 2-3 million tons (MT) of pulses during 2010-11, causing huge hard foreign earning. (Singh AK et al., 2015). India imported about 4 million tonnes of pulses during 2012-13. Overall, import requirements may be of the order of 3.8 million tonnes in the current year (NABARD-2017). The total demand of India is around 23.5MT and production is of 18 MT. So there is a gap of relative

5.5MT. India faces challenges of low productivity, lack of irrigation facilities, season failure, lack of future market, price instability and policies.

Pulses occupy a unique place in According to Indian Institute for Pulse Research, by 2030 and 2050 demand for pulses would be around 32 MT and 50 MT to meet country's rising population, urbanization and income of middle class (IIPR-2015). Kumar (1993) and Sawant (1981) attributed the slow growth in pulses production for low growth in yield. The differential impact of technologies, high yielding varieties and irrigation substantially affected area under pulses (Expert Committee on Pulses, 2012). Reddy (2006) studied instability in pulses and concluded that instability is more in production when compared to area and yield (K. Inbasekar-IARI-2014). Lack of processing and marketing facilities in pulses also contributed its share to the woes of pulse growers. The increasing shortage of pulses, resulted in the need for more and more import which, in turn has dampened the speed of rejuvenation of pulse sub-sector of agriculture sector (C.C. Maji, 1995).

During 2007-08 to 2013-14 imports of pulses substantially increased from 2.83 MT [Rs.5375crore] to 3.05 MT [Rs.10551 crores]. Imports from major ones are Canada, Myanmar, USA, Russia and Australia. The gap between the supply and demand in this year has shot up prices of most pulses beyond the reach of even middle class. It is against this background, when the United Nations General Assembly has declared the year 2016 as the international year of pulses (Indian microfinance-2017).

Though the major pulses are imported from across 30 countries, Canada, Myanmar, USA, Russia and Australia have been the major sources of imports. Peas, lentils, gram, chickpeas and pigeon peas constitute to bulk of the imports. India normally exports pulses (Peas, lentils, gram, chickpeas and pigeon peas) to the Asian and African countries i.e. Pakistan, Algeria, Turkey, UAE and Sri Lanka, etc. (Smita Mohanty1, K.J. Satyasai NABARD-2015)

Country wise analyses shows that India imports its major pulses from its major pulse trading partners such as Canada with the highest share of 31.76% in 2012-13 followed by Myanmar (21.66%), Australia (8.48%), Russia (5.81%) and china (5.20%). Further, United States (3.32 %), Tanzania republic (2.64 %), France (2.29%), Mozambique (1.91%) and Malawi (0.83%) ranked 6th, 7th, 8th, 9th and 10th in 2011-12. Whereas export wise data revealed that India export its highest share of pulses to Pakistan (24.04%) in 2011-12 followed by Algeria (23.21%), turkey (17.57%), Sri Lanka (12.91%), United Arab Emirates (8.92%) and Saudi Arab (5.38%). (R. Rajendran& R. Thamilmani-2009)

Government has initiated several nation-wide programs to step up pulses productivity, production and profitability viz. All India coordinated pulses research Project [1965], intensive pulses development project [1969], central sector national pulses development project [1985], integrated scheme of oilseeds, pulses & maize [2002] and national food security mission [2007]. Despite all these programs India has imported pulses on an average of 2.812 million tons [MT] amounting to Rs.5933 crores annually during 2001-02 to 2013-14 with 16% CAGR in terms of value (Indian microfinance, 2017).

Even though India is the largest pulses producer of the world, it imports large amount of pulses from rest of the world. So, it is important to analyse, how the inflow and outflow of pulses from India is changed over period of the time and why India is importing a considerable amount of pulses. Based on above background, this study analyses India's pulses world markets, growth rates, elasticity's, production, price and trade trends' and recommends government to frame agriculture trade policies. The specific objectives are:

Objectives

1. To analyze exports, imports, price growth rates and trends of India's pulses across countries and world regions.
2. To estimate export and import elasticity's for India's pulses across countries and world regions
3. To identify major world markets and trade share in India's pulses trade.
4. To suggest strategies and foreign trade policies for boosting Indian pulses trade globally.

2. METHODOLOGY

This is basically trade analysis of Indian pulses. India's major trade Pulses commodities were selected. It includes Chickpeas, Lentils, Peas and Pigeon Pea. Study Period is 1990-91 to 2016-17. Data on quantity, values, and prices of trade, international prices and destinations of mentioned pulses were collected. India is trading with 20 to 120 countries. Data sources are FAO Stat, Centre for monitoring on Indian economy (CMIE), National Bank for Agricultural and Rural Development (NABARD). Quantity growth rates, compound annual growth rates, trends of quantity exports and imports prices, price elasticity's of exports and imports across countries and regions were estimated for all the pulses and major pulses. For each commodity, the countries classified in to the top 10 countries which accounted major share of exports and imports and rest as other countries. The compound growth rates, price elasticity's, instability index of trade were estimated using the following formulae's.

2.1 Formulae

i. Growth Rate Formula

The simple compound growth rate (r) will be calculated.

ii. Price Elasticity of Exports Formulae

$\sum Pe$ = % change in quantity exports / %change in price.

The percentage change in quantity exports is % ΔQ, and the percentage change in price is $\%\Delta P$.

We calculate $\%\Delta Q$ as $\Delta Q/Qave$ and we calculate $\%\Delta P$ as $\Delta P/Pave$

So we calculate the price elasticity of exports as $(\Delta Q/Qave)/ (\Delta P/Pave)$.

Price elasticity (**E** or **I**) is a measure used in economics to show the responsiveness, or elasticity, of the quantity traded (**E** or **I**) of a good to a change in its price, ceteris paribus. More

precisely, it gives the percentage change in quantity traded in response to a one percent change in price.

iii. Instability Index Formulae

Coefficient of Variation = (Standard deviation/mean) *100

3. RESULTS AND DICUSSIONS

3.1 Global regional trade of Indian Pulses (% qty share)

Table 1: India's pulses export to regions: 1990-91 to 2016-17(% share)

Year	Africa	America	Asia	Europe	Oceania	Others
1990-91	0.21	19.85	72.04	7.33	0.57	
1991-92	0.08	17.15	75.2	6.91	0.66	
1992-93	0.13	13.94	76.13	9.37	0.43	
1993-94	1.14	15.3	72.32	10.58	0.66	
1994-95	2.71	16.74	68.57	11.18	0.81	
1995-96	1.09	10.22	82.07	6.07	0.56	
1996-97	1.31	15.39	74.31	7.74	1.26	
1997-98	26.91	8.06	53.06	11.43	0.55	
1998-99	5.59	10.38	78.14	5.21	0.67	
1999-00	18.68	6.11	71.53	3.27	0.4	
2000-01	31.4	5.66	58.23	3.95	0.76	
2001-02	9.92	10.63	73.22	5.33	0.9	
2002-03	12.48	12.45	67.81	6.52	0.72	0.02
2003-04	3.48	10.94	79.05	5.73	0.8	
2004-05	5.93	6.88	80.65	6.07	0.47	0.01
2005-06	15.33	5.46	73.6	5.2	0.4	0.01
2006-07	10.86	7.03	75.68	5.85	0.57	
2007-08	23.14	1.54	62.39	12.85	0.07	0
2008-09	25.36	2.11	60.01	12.25	0.09	0.18
2009-10	20.96	1.47	62.59	14.6	0.06	0.31
2010-11	19.95	0.67	63.18	15.94	0.06	0.19
2011-12	23.02	2.4	53.38	21	0.19	0.02
2012-13	24.75	2.48	54.48	17.97	0.32	
2013-14	22.38	2.04	50.37	24.83	0.15	0.23
2014-15	20.52	4.43	64.53	10.04	0.48	
2015-16	19.36	4.63	62.87	12.52	0.62	
2016-17	12.04	11.58	61.55	13.91	0.93	

Source: FAO, CMIE Commodities, Accessed on 27th January 2018

The table 1. displays the India's pulses exports to various regions of the world in terms of percentage share. Since 1990's the share of Indian pulses exports to Asia have been the highest over the years. Gradually the exports have increased to other regions such as Africa, America and Europe with a slight decrease in share of pulses exports to the Asian region. This could be due to demand & supply, and economic growth. The share of Indian pulses exports to Africa saw a sudden upsurge in 1997-98 to 26.91% from 1.31% in 1996-97. The share of pulses exports to America

were the lowest in 2010-11 at 0.67%. The share of pulses exports to Europe saw a relatively stable increasing trend since 2000, reaching a peak in 2013-14 at 24.83% and a sudden fall during the 2014-15 at 10.04%. The share of Pulses exports to Oceania have been below 1% since 1990, except during 1996-97. In 2016-17, the major share of pulses exports was to Asia (61.55%) followed by Europe (13.91), Africa (12.04%), America (11.58%), and Oceania (0.93%).

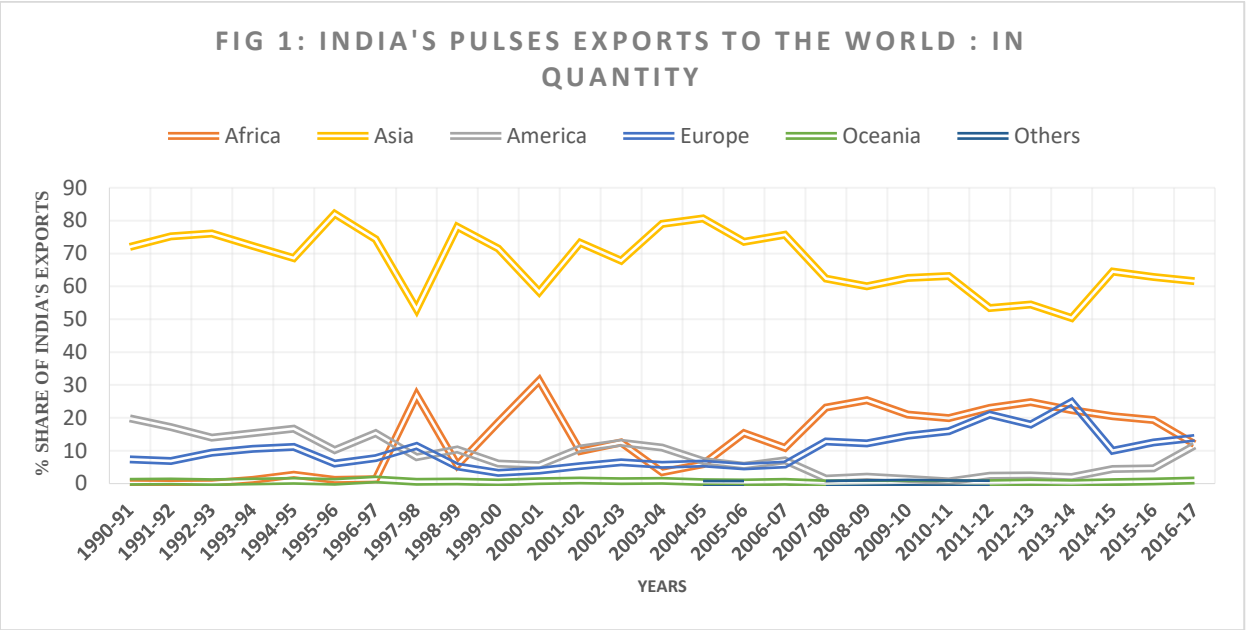


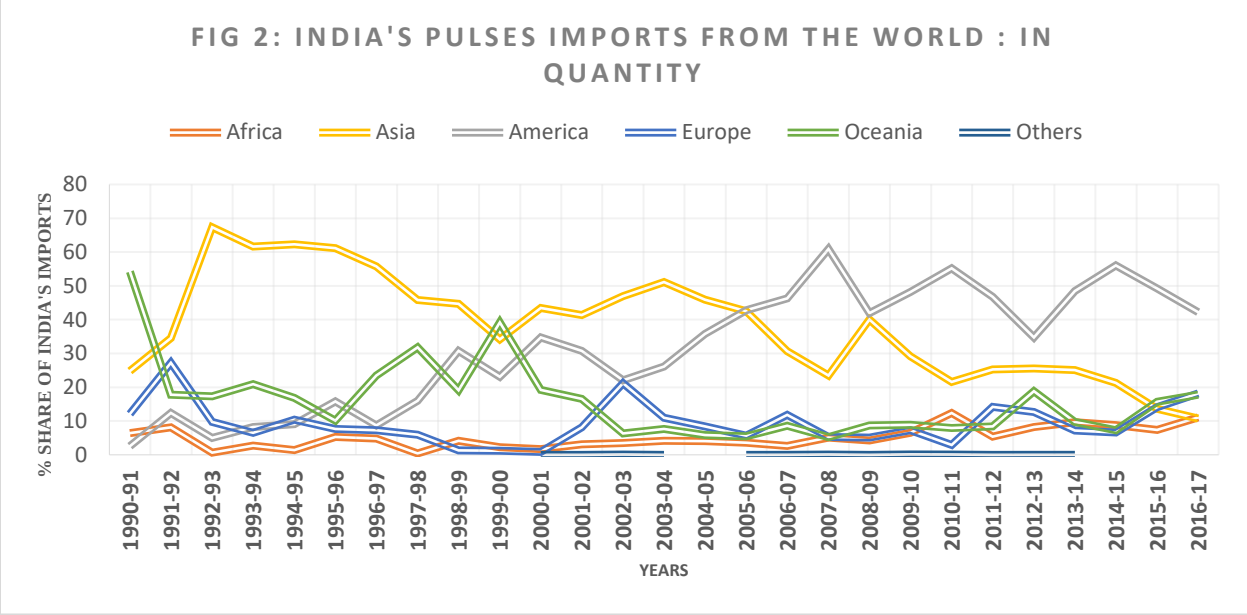
Table 2: India's pulses import from various world regions: 1990-91 to 2016-17(% share)

Year	Africa	America	Asia	Europe	Oceania	Others
1990-91	6.39	2.56	24.78	12.06	54.21	
1991-92	8.1	12.41	34.51	27.24	17.74	
1992-93	0.64	4.97	67.34	9.74	17.3	
1993-94	2.75	8.22	61.62	6.52	20.89	
1994-95	1.42	9.08	62.28	10.41	16.8	
1995-96	5.3	15.78	61.11	7.64	10.16	
1996-97	4.8	8.74	55.74	7.24	23.49	
1997-98	0.41	16	45.83	5.91	31.84	
1998-99	4.14	30.71	44.71	1.31	19.12	
1999-00	2.26	23.09	34.21	1.25	39.19	
2000-01	1.73	34.73	43.48	0.86	19.18	0.01
2001-02	3.11	30.8	41.4	8.12	16.56	0.01
2002-03	3.46	22	46.91	21.22	6.37	0.04
2003-04	4.17	26.16	51.07	10.95	7.63	0.02
2004-05	4.05	35.76	45.89	8.4	5.89	
2005-06	3.6	42.75	42.52	5.69	5.43	0.01
2006-07	2.64	46.32	30.68	11.79	8.57	0
2007-08	5.05	60.9	23.46	5.29	5.23	0.07
2008-09	4.25	41.91	40.08	5.08	8.65	0.02
2009-10	6.53	48.13	29.12	7.25	8.86	0.11

2010-11	12.37	55.15	21.56	2.92	7.93	0.07
2011-12	5.4	46.72	25.27	14.2	8.41	0.01
2012-13	8.22	34.73	25.59	12.67	18.78	0
2013-14	9.6	48.46	25.04	7.21	9.69	0
2014-15	8.77	55.99	21.31	6.65	7.28	
2015-16	7.38	49.25	13.62	14.08	15.67	
2016-17	11.07	42.21	10.74	18.19	17.79	

Source: FAO, CMIE Commodities, Accessed on 27th January 2018

The table 2. displays the India's pulses imports from various regions of the world in terms of percentage share. During 1990-91 the maximum share of Indian pulses imports has been from Oceania at 54.21%. However, the sudden upsurge of imports from Asia, America and Europe during 1991-92 have drastically reduced the share of imports from Oceania. Thereafter, Asia remained the highest exporting region to India until 2005-06. Since, 2005-06 the share of pulses exports from America picked up. In 2016-17, major share of pulses imports has been from America (42.21%) followed by Europe (18.19%), Oceania (17.79%), Africa (11.07%) and Asia (10.74%). Import markets are shifting from developing to developed nations. This is due to demand for superior quality of the pulses.



3.2 Global region-wise export import quantity growth rates and price elasticity of Indian pulses

The Export import quantity growth rates and price elasticity of Indian Pulses during the period 1990-91 to 2016-17 for various regions of the world is given in the table 3. The study found that the export and import quantity growth rates have been positive for all the regions during 1990-91 to 2016-17. The maximum export and import quantity growth rate is witnessed for African and American region respectively. Export price elasticities are signals for exporters to increase or decrease their exports as they indicate export responsiveness to changes in price. The export and

import price elasticity of Indian pulses between 1990-91 and 2016-17 (%) is positive among all the regions. It indicates that responsiveness of quantities to change in prices in international markets is high. However, the import price elasticities for American and European regions are far greater than export price elasticities. The maximum average quantity exported from India is to Asia and the maximum import quantity imported to India is from the American region. The study found that, the total pulses, export price elasticities for all regions is elastic, where as the import price elasticities is also elastic except for Asia and Oceania.

Table 3: Quantity growth rates and price elasticity of Indian pulses during 1990 and 2016-17 (%)

Region	Quantity Growth Rate						Price Elasticity						Average Quantity (000' Tonnes)	
	Exports			Imports			Exports			Imports			Exports	Imports
	1990-91 to 2000-01	2001-02 to 2016-17	1990-91 to 2016-17	1990-91 to 2000-01	2001-02 to 2016-17	1990-91 to 2016-17	1990-91 to 2000-01	2001-02 to 2016-17	1990-91 to 2016-17	1990-91 to 2000-01	2001-02 to 2016-17	1990-91 to 2016-17	1990-91 to 2016-17	1990-91 to 2016-17
World	28.83	-1.02	8.53	-11.08	7.05	6.28	-56.68	-0.08	7.30	-1.51	1.74	2.06	162.10	2109.12
Africa	102.87	0.19	26.03	-21.03	15.90	8.47	-	0.01	-	14.84	6.67	4.33	27.17	141.64
America	14.94	-0.49	6.39	12.73	9.18	17.92	22.41	-0.04	1.90	-7.21	3.19	373.69	9.92	868.01
Asia	26.37	-2.08	7.90	-6.41	-1.61	3.04	-37.51	-0.15	7.62	-2.80	-0.10	0.50	107.00	601.71
Europe	21.79	5.10	11.14	-30.04	12.59	7.91	-33.94	0.90	19.42	-5.03	10.95	243.31	17.19	220.43
Oceania	32.23	-0.82	10.50	-19.09	7.53	1.99	-46.35	-0.08	64.72	-0.69	1.17	0.10	0.76	276.94
Others	-	-	-	-	-100.00	-	-	-	-	-	-	-	0.21	0.81

Source: FAO, CMIE Commodities data, Accessed on 27th January 2018

Global region-wise price elasticity and quantity growth rates for various Indian pulses

The export import quantity growth rates, price elasticity and average quantity of exports and imports of major Indian pulses between 1990-91 and 2016-17 in the global trade is outlined in Table 4. During the 90's the pigeon pea export quantity growth rates have been positive and increasing, but of late, they have been decreasing. The import quantity growth rates show a reverse trend to that of export quantity growth rates. The export import price elasticities of pigeon pea are positive. The gram export import quantity growth rates and price elasticities have been positive over the years. In case of lentils, the export quantity growth rates are positive but the region wise import quantity growth rates are negative. The study found that gram has high demand in the international market. The study found that during the period 1990-91 to 2016 -17 the export elasticities for all the crops across the regions are elastic except for lentils in American region and peas in Asian region, which are inelastic. Pigeon pea import elasticities are inelastic to Oceania. The import elasticities are elastic for gram for all the regions except to Europe. Conversely, the import elasticities are inelastic for lentils and peas for all regions except for peas to European region.

Table 4: Quantity growth rates and price elasticity of major Indian pulses during 1990 and 2016-17 (%)

Crop	Region	Quantity Growth Rate						Price Elasticity						Average Quantity (000' Tonnes)	
		Exports			Imports			Exports			Imports			Exports	Imports
		1990-91 to 2000-01	2001-02 to 2016-17	1990-91 to 2016-17	1990-91 to 2000-01	2001-02 to 2016-17	1990-91 to 2016-17	1990-91 to 2000-01	2001-02 to 2016-17	1990-91 to 2016-17	1990-91 to 2000-01	2001-02 to 2016-17	1990-91 to 2016-17	1990-91 to 2016-17	1990-91 to 2016-17
Pigeon Pea	**World**	17.36	1.91	8.77	7.00	4.38	13.96	-14.02	0.17	8.82	-11.48	0.49	22.28	6.50	268.74
	Africa	-	3.31	-	-23.36	27.34	19.71	-	0.50	-	-3.87	28.70	118.10	0.18	84.21
	America	22.21	3.31	11.99	-	-100.00	-	-21.49	0.32	20.87	-	-	-	2.10	1.65
	Asia	13.23	0.36	5.80	9.75	-3.71	9.67	-7.41	0.03	5.38	-29.54	-0.16	4.81	3.72	182.35
	Europe	31.91	0.60	11.99	-	-100.00	-	-	0.05	-	-	-	-	0.38	2.13
	Oceania	19.68	1.84	13.01	-100.00	-22.00	-14.50	-	0.27	-	-	0.98	0.99	0.17	0.56
	Others	-	-	-	-	-	-	-	-	-	-	-	-	0.01	0.28
Gram	**World**	3.03	29.38	15.37	-8.00	4.72	7.33	-0.97	19.61	38.40	3.95	0.77	4.59	74.05	269.47
	Africa	-	58.50	-	-100.00	3.69	11.88	-	-	-	-	0.38	11.26	26.17	16.92
	America	-3.81	21.17	9.57	40.42	-9.36	13.50	1.49	17.49	10.91	-127.15	-0.38	20.97	1.16	23.56
	Asia	5.04	26.65	14.67	10.81	-13.02	6.96	-1.72	12.34	33.84	-68.66	-0.46	2.59	45.01	41.37
	Europe	-13.07	73.52	16.66	-34.05	-0.59	0.14	0.79	-	33.70	3.99	-0.05	0.05	14.71	36.69
	Oceania	-100.00	16.21	12.18	-18.86	12.54	8.50	-	-	-	-12.37	3.82	5.00	0.07	152.10
	Others	-	-	-	-	-100.00	-	-	-	-	-	-	-	0.28	0.31
Lentils	**World**	38.63	-11.29	4.11	5.56	15.14	17.13	-95.50	-0.57	3.66	81.28	853.65	7053.39	55.27	204.45
	Africa	-	-23.13	-	-	-	-	-	-0.84	-	-	-	-	10.43	0.21
	America	12.81	-6.79	0.83	-	23.14	-	-13.61	-0.40	0.29	-	2694.94	-	1.03	224.06
	Asia	33.20	-11.63	3.55	6.22	-20.24	-9.98	-58.31	-0.59	3.25	94.24	-97.32	-94.15	43.60	10.77
	Europe	37.30	0.68	12.75	-100.00	-14.60	-24.28	-55.43	0.11	252.25	-100.00	-92.00	-99.95	1.63	3.80
	Oceania	-	4.89	-	-	4.80	-	-	1.33	-	-	111.70	-	0.21	22.28
	Others	-	-	-	-	-	-	-	-	-	-	-	-	0.02	0.11
Peas	**World**	25.86	14.39	18.67	-14.63	8.59	5.32	-16.96	12.88	-168.69	-1.16	4.16	1.55	2.16	1783.05
	Africa	-	34.01	-	-16.77	-100.00	-100.00	-	-	-	2.71	-	-	0.01	3.47
	America	16.27	-2.20	-7.02	8.62	9.34	17.23	-	-	-	-2.95	4.08	-1401.11	0.05	1345.36
	Asia	24.39	14.51	19.04	-11.67	-33.41	-19.50	-12.25	13.72	-174.08	-1.47	1.00	1.00	2.06	5.22
	Europe	40.62	-14.91	-13.11	-29.55	15.36	9.66	-	-	-	-2.50	14.49	80.22	0.06	341.65
	Oceania	-	-100.00	-	-19.49	-3.52	-6.41	-	-	-	-0.38	-0.37	-0.11	0.01	87.92
	Others	0.00	0.00	0.00	-	-	-	0.00	0.00	0.00	-	-	-	0.00	0.26

Source: FAO, CMIE Commodities data, Accessed on 27th January 2018.

3.3 Export, import prices, growth rates, elasticity's, instability, terms of trade of India's major pulses

The average export-import price of pulse crops, growth rate and instability of export-import quantity and price of pulses, export-import price elasticity of pulses crops (1990-2016) are presented in Table 5. During the period 1990-91 to 2015-16, the export price of all pulses viz, Pigeon pea, Gram, Lentil and Peas are more than import prices indicating that India has comparative advantage in pulses.

3.3.1 Growth rates

The export import quantity growth rate of all pulses crops were found to be positive. The exports quantity growth rate of gram and peas was more than the imports quantity growth rate, while remaining crops i.e., pigeon pea and lentils has showed a reversed trend quantity growth rate. The exports and imports price growth rate of all pulses were found to be positive, except peas exports price growth rate. The imports price growth rate of all pulses were more than compared to exports price growth. It is also noticed that pigeon pea exports and imports price growth rate was more.

3.3.2 Instability Index

The coefficient of variation is a measure of the amount of variability relative to the mean. The instability index (degree of volatility) of pulses shown in Table below. It shows us how much of pulses export and import are volatile. The results of Coefficient of variation of export import prices and quantity of India's major pulses showed that during the period 1990-91 to 2015-16, variation in imports price of all pulses were found to be more than exports price, while similar pattern was observed in imports quantity of all pulses except lentil where export quantity (76.37 %) variation is more than compared to imports quantity (58.54%). It is noticed that export as well as import prices of all pulses were found to be unstable. The study found that the export quantity of all pulses were found to be stable than compared to imports quantity, except lentil where both export as well as imports were found to be stable.

3.3.3 Elasticity of trade

How responsive are export & Import quantities to a change in international prices is of direct relevance in international economics. Trade price elasticities are signals for exporters or importers to increase or decrease their trade as it indicates exports or imports responsiveness to changes in price. During the 1990-91 to 2015-16 period, all pulses have witnessed positive and more export price elasticity than compared to imports. It was found that, among all the pulses, high export elasticity was noticed in peas (2.36%) followed by gram (0.69%), lentil (0.55%) and pigeon pea (0.35%). The study found that peas export elasticities is elastic. The terms of trade of India with other countries found to be improved for all pulses.

Table 5: Average export-import price of pulse crops, growth rate and instability of export-import quantity and price of pulses, export-import price elasticity of various pulses (1990-2016)

Crop	Variables	Variables	1990-91 to 2000-01	2001-02 to 2015-16	1990-91 to 2015-16
Pigeon Pea	**Average Export Import Price US$ /Kg**	Export	0.68	0.87	0.79
		Import	0.35	0.56	0.47
	Quantity Growth rate (%)	Export	17.36 (-251.9)	-5.28 (-77.01)	4.53 (-85.08)
		Import	7 (-136.7)	1.8 (-352.93)	12.71 (-140.88)
	Price Growth rate (%)	Export	-3.76 (-672.32)	8.79 (-165.74)	3.25 (-192.71)
		Import	-0.92 (-543.63)	9.34 (-232.07)	4.5 (-221.69)
	Export Import Price elasticity	Export	1.71	-0.98	0.35
		Import	1.22	0.08	0.31
	Terms of Trade (%)		1.94	1.55	1.68
Gram	**Average Export Import Price US$ /Kg**	Export	0.37	0.79	0.62
		Import	0.41	0.52	0.47
	Quantity Growth rate (%)	Export	3.03 (-108.92)	39.79 (-121.4)	20.11 (-75.78)
		Import	-8 (-111.83)	4.71 (-130.7)	7.43 (-104.79)
	Price Growth rate (%)	Export	-4.54 (-180.55)	6.81 (-300.51)	1.44 (-193.87)
		Import	-1.49 (-233.66)	4.32 (-373.62)	2.21 (-291.04)
	Export Import Price elasticity	Export	-2.33	0.37	0.69
		Import	0.91	0.36	0.53
	Terms of Trade (%)		0.9	1.52	1.32
Lentil	**Average Export Import Price US$ /Kg**	Export	0.6	0.88	0.76
		Import	0.44	0.59	0.53
	Quantity Growth rate (%)	Export	38.63 (-85.12)	-13.63 (-69.25)	3.15 (-76.37)
		Import	5.56 (-103.11)	19.51 (-80.34)	19.76 (-58.54)
	Price Growth rate (%)	Export	-4.12 (-574.87)	5.9 (-214.72)	1.45 (-222.83)
		Import	0.79 (-688.23)	5.98 (-309.35)	2.89 (-318.74)
	Export Import Price elasticity	Export	1.61	1.21	0.55
		Import	0.83	0.4	0.47
	Terms of Trade (%)		1.36	1.49	1.43
Peas	**Average Export Import Price US$ /Kg**	Export	0.57	0.56	0.57
		Import	0.27	0.34	0.31

	Quantity Growth rate (%)	Export	25.86 (-73.64)	14.14 (-90.54)	18.69 (-77.41)
		Import	-14.63 (-118.18)	6.7 (-266.97)	4.14 (-126.45)
	Price Growth rate (%)	Export	-9.88 (-194.05)	3.58 (-232.8)	-3.19 (-218.08)
		Import	4.99 (-444.24)	3.28 (-354.57)	4.19 (-351.28)
	Export Import Price elasticity	Export	3.85	0.55	2.36
		Import	1.18	0.5	0.25
	Terms of Trade (%)		2.11	1.65	1.84

Source: FAO, CMIE Commodities, Accessed on 3rd June 2017
Note: Values in the parenthesis indicates CV (%)

3.4 World Markets / Trade destinations of various pulses:

3.4.1 Trade destinations and country-wise growth rates and elasticities

Among the top 10 India's exports and imports destinations of pulses Pakistan (50.57 MT) ranks the highest in terms of exports followed by Algeria, Sri Lanka, Turkey and others. With regard to imports, India imports the maximum from Canada (1564.98 MT) followed by Myanmar, Australia and others during 1990-91 to 2016-17.

India's exports and imports destinations and top 10, country-wise CAGR and elasticities for pulses during 2008-16 are shown in shown Table 6 & 7. India exports of pulses ranges from 20 to 120 countries of the world. It was found that from last 8 years, Russia is major pulse exporting country to India followed by Australia, Canada, France and USA with annual growth rate of 46.05, 19.82, 13.36, 9.39 and 4.78 respectively. Sri Lanka, Libya, Pakistan, Saudi Arab and Algeria are the major importing countries from India with annual growth rate of 15.72, 13.00, 11.73, 10.59 and 9.34 respectively. It was found that UAE and UK are inelastic to export from India with values -1.8 and -7.9 respectively. Myanmar and Mozambique are inelastic to import to India with values -1.52 and -0.11 respectively.

Table 6: Importing countries CAGR & elasticity

2008-16 Exports from India		
Importing countries	**CAGR**	**Elasticity**
Pakistan	11.73	0.52
UAE	-4.30	-1.82
Algeria	9.34	0.42
Sri Lanka	15.73	0.65
Turkey	7.92	0.47
Egypt	-3.10	3.10
Saudi Arabia	10.59	0.52
Tunisia	1.01	0.11
UK	-8.32	-7.93
Libya	13.01	0.59

Table 7: Exporting countries CAGR & elasticity

2008-16 Importing Nations to India		
Exporting countries	**CAGR**	**Elasticity**
Canada	13.37	0.50
Myanmar	-8.56	-1.52
Australia	19.83	0.43
Russia	46.06	0.80
USA	4.78	0.56
China	3.60	0.27
France	9.40	1.15
Tanzania	-12.63	1.34
Mozambique	-1.81	-0.11
Malawi	-12.52	4.14

Source: FAO, CMIE Commodities, Accessed on 27th January 2018

3.4.2 Price elasticity and quantity growth rates for various Indian pulses with export and import destinations

The decadal growth rates for the period 1990-91 to 2016–2017 for exports and imports, and the price elasticities of pigeon pea (Table.8), Gram (Table.9), Lentils (Table.10) and Peas (Table.11) for the 10 major countries are summarized. During the period 1990-91 to 2016-17, Canada (20.30) has the highest pigeon pea export growth rate followed by UK (11.91), USA (10.63) and others. The import growth rates of pigeon pea have been the highest for Tanzania (17.94), followed by Kenya (10.34) and Myanmar (10.23). Price elasticity of both the imports and exports of pigeon pea is found to be positive. Gram has the highest export growth rate in Saudi Arabia (13.21) followed by Sri Lanka (9.30) and highest import quantity growth rates for Canada (18.46) followed by USA (13.45) and others for the period 1990-91 to 2016-17. However, Iran and Turkey have the negative import growth rates of 100 and 10.57 respectively. The price elasticities have been positive for all the gram exporting and importing countries except for Turkey (0.53). The export and import quantity growth rates in case of lentils, have been negative except for Kuwait (3.05). The lentil price elasticity for UAE is negative at 1.49. The peas import quantity growth rates are positive for Canada (27.94) and USA (8.19). The price elasticities for peas are mostly negative.

The export price elasticity of pigeon pea for USA, UAE and Malaysia and the import price elasticities for Myanmar, Tanzania and Kenya are elastic. For gram, the export price elasticities for UAE and Saudi Arabia and the import price elasticities for Australia, Myanmar, Tanzania and USA are elastic. The import price elasticities of gram from turkey is inelastic. The export import price elasticities for lentils are inelastic except for Kuwait export price elasticity, which is elastic. The import price elasticities of peas for Canada are elastic.

Table 8: Quantity growth rates and price elasticity for Indian pigeon pea during 1990 and 2016-17 (%)

Country	Quantity growth rate%			Price elasticity			Average Quantity (000' Tonnes)
	1990-91 to 2000-01	2000-01 to 2016-17	1990-91 to 2016-17	1990-91 to 2000-01	2000-01 to 2016-17	1990-91 to 2016-17	1990-91 to 2016-17
Top 10 India's Export destinations							
UAE	9.82	-0.04	4.89	-5.04	0.00	4.39	2.01
USA	21.40	1.56	10.63	-66.58	0.12	7.03	1.85
Nepal	-	-	-	-	-	-	0.88
Bangladesh	-	-	-	-	-	-	0.69
Sri Lanka	-	-3.33	-	-	-0.26	-	0.47
Saudi Arabia	27.57	-4.62	5.18	-	-0.47	-	0.36
Canada	31.67	11.47	20.30	-	2.46	-	0.35
Malaysia	19.37	0.72	5.74	-14.00	0.07	10.64	0.35
Kuwait	33.03	-10.74	8.14	-	-0.80	-	0.32
UK	28.45	1.39	11.91	-	0.09	-	0.31
Top 10 India's Import destinations							
Myanmar	10.21	-3.65	10.23	-30.83	-0.16	5.54	179.04
Tanzania	-100.00	21.84	17.94	-	17.61	127.49	44.35
Kenya	-100.00	15.35	10.34	-	5.76	13.31	4.87
Nigeria	-	-	-	-	-	-	3.64
China	-	-	-	-	-	-	3.62

Japan	-	-	-	-	-	-	2.13
Germany	-	-100	-	-	-	-	1.83
Italy	-	-	-	-	-	-	1.68
France	-	-	-	-	-	-	1.50
South Korea	-	-	-	-	-	-	1.46

Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

Table 9: Quantity growth rates and price elasticity for Indian gram during 1990 and 2016-17 (%)

Country	Quantity growth rate%			Price elasticity			Average Quantity (000' Tonnes)
	1990-91 to 2000-01	2000-01 to 2016-17	1990-91 to 2016-17	1990-91 to 2000-01	2000-01 to 2016-17	1990-91 to 2016-17	1990-91 to 2016-17
Top 10 India's Export destinations							
Pakistan	-	-	-	-	-	-	39.23
Algeria	-	-	-	-	-	-	22.35
Turkey	-	-	-	-	-	-	16.81
Sri Lanka	-	18.00	-	-	5.73	-	8.09
UAE	-24.31	20.24	9.30	0.95	2.81	6.37	6.03
Saudi Arabia	-7.25	-	13.21	-3.89	-	19.34	4.72
Egypt	-	-	-	-	-	-	4.64
Spain	-	-	-	-	-	-	3.25
Iraq	-	-	-	-	-	-	2.25
Libya	-	-	-	-	-	-	2.16
Top 10 India's Import destinations							
Australia	-18.85	12.54	8.51	-12.17	3.82	5.00	152.03
Russia	-	15.20	-	-	5.75	-	39.87
Iran	-0.99	-100.00	-100.00	-0.90	-	-	24.99
Pakistan	-	-	-	-	-	-	24.80
Canada	73.51	-15.54	18.46	-	-0.37	-	19.53
Myanmar	27.34	-7.90	12.12	-44.33	-0.32	17.05	17.24
Tanzania	-100.00	7.94	11.03	-	1.05	8.49	13.47
Turkey	-47.15	-14.24	-10.57	1.00	-0.39	-0.53	12.39
France	-	-100.00	-	-	-	-	6.62
USA	10.24	5.14	13.45	2.70	1.41	16.54	3.40

Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

Table 10: Quantity growth rates and price elasticity for Indian lentils during 1990 and 2016-17 (%)

Country	Quantity growth rate%			Price elasticity			Average Quantity (000' Tonnes)
	1990-91 to 2000-01	2000-01 to 2016-17	1990-91 to 2016-17	1990-91 to 2000-01	2000-01 to 2016-17	1990-91 to 2016-17	1990-91 to 2016-17
Top 10 India's Export destinations							
Bangladesh	-	-16.80	-	-	-0.38	-	35.88
Sri Lanka	-	-11.89	-	-	-0.70	-	15.72
Egypt	-	-100.00	-	-	-	-	15.62
Pakistan	-	-1.55	-	-	-0.19	-	4.40
UAE	0.20	-1.82	-2.47	-0.06	-0.22	-1.49	4.10

Iraq	-	-9.47	-	-	-0.69	-	2.88
Turkey	-	-	-	-	-	-	2.60
Myanmar	-	-	-	-	-	-	2.32
Nepal	-	-	-	-	-	-	1.80
Kuwait	36.26	-15.25	3.05	-62.13	-0.62	3.76	1.70
Top 10 India's Import destinations							
Canada	-	22.12	-	-	17.39	-	198.28
USA	-	45.08	-	-	312.52	-	30.06
Australia	-	4.80	-	-	0.73	-	24.57
Nepal	15.44	-100	-100	25.48	-	-	8.44
Russia	-	-	-	-	-	-	4.61
Turkey	-100	-	-24.05	-	-	1.00	3.71
China	-	-	-	-	-	-	1.74
Taiwan	-100	-	-100	-	-	-	1.56
Singapore	-100	-	-100	-	-	-	0.86
Philippines	-	-	-	-	-	-	0.81

Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

Table 11: Quantity growth rates and price elasticity for Indian peas during 1990 and 2016-17 (%)

Country	**Quantity growth rate%**			**Price elasticities**			**Average Quantity (000' Tonnes)**
	1990-91 to 2000-01	**2000-01 to 2016-17**	**1990-91 to 2016-17**	**1990-91 to 2000-01**	**2000-01 to 2016-17**	**1990-91 to 2016-17**	**1990-91 to 2016-17**
Top 10 India's Export destinations							
Sri Lanka	-	17.76	-	-	27.35	-	1.82
Bangladesh	-	-100	-	-	-	-	0.78
Myanmar	-	-	-	-	-	-	0.35
Ukraine	-	-	-	-	-	-	0.28
Philippines	-	-	-	-	-	-	0.25
Argentina	-	-	-	-	-	-	0.22
Pakistan	-	-100	-	-	-	-	0.16
Nepal	-	-	-	-	-	-	0.12
Iran	-	-	-	-	-	-	0.10
Spain	-	-	-	-	-	-	0.07
Top 10 India's Import destinations							
Canada	35.57	8.60	27.94	-60.90	3.50	12116.75	1187.87
USA	-19.06	26.58	8.19	2.38	140.75	-168.34	151.63
Russia	-	-	-	-	-	-	137.76
Australia	-19.52	-3.36	-6.39	-0.37	-0.36	-0.11	87.74
France	-	4.12	-	-	1.44	-	87.08
Ukraine	-	49.91	-	-	-	-	71.65
Germany	-	-	-	-	-	-	11.68
Argentina	-	-	-	-	-	-	6.30
Denmark	-	-100	-	-	1.00	-	4.69
China	-11.38	-100	-100	3.01	1.00	1.00	3.37

Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

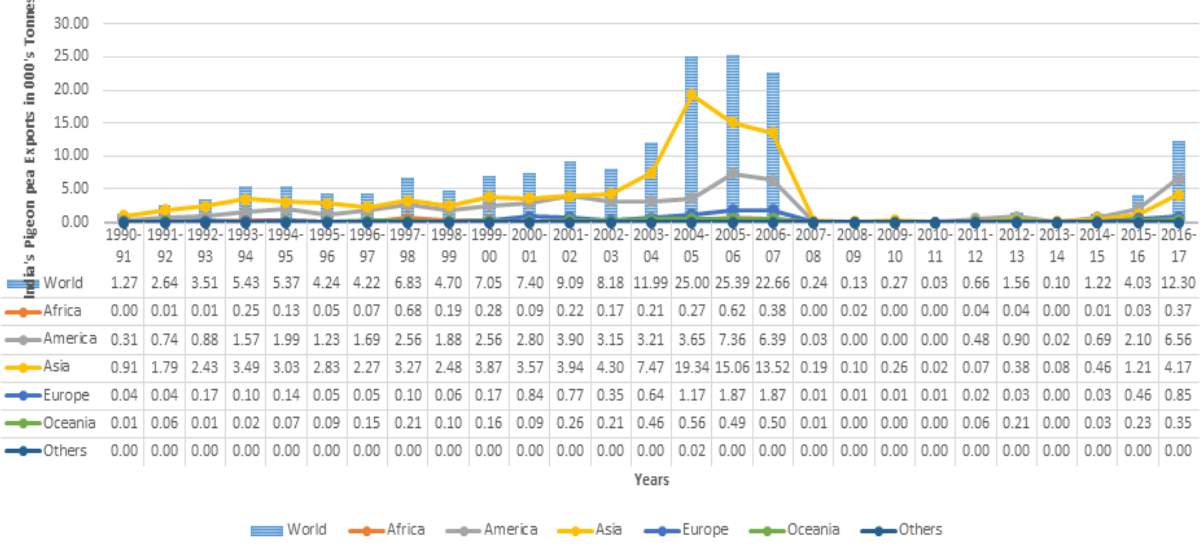
3.5 Trends of trade in major pulse crops:

The following section depicts the trends of exports and imports of Pigeon Pea (Figs 3 & 4), Gram (Figs 5 & 6), Lentils (Figs 7 & 8) and Peas (Figs 9& 10) to the world and different regions from India during 1990-91 to 2016-17 in thousand tonnes.

3.5.1 Pigeon Pea

It can be observed in fig 3. that over the years the highest quantity of exports was to the Asian region, reaching the highest quantity in 2004-05 at 19.34 thousand tonnes followed by a decreasing trend thereafter. Exports to the Asia slightly rose from 2007-2008 to 2016-17 (0.2 to 4.1 thousand tonnes). Since 2011-12, the exports have picked up to the American region over the other regions.

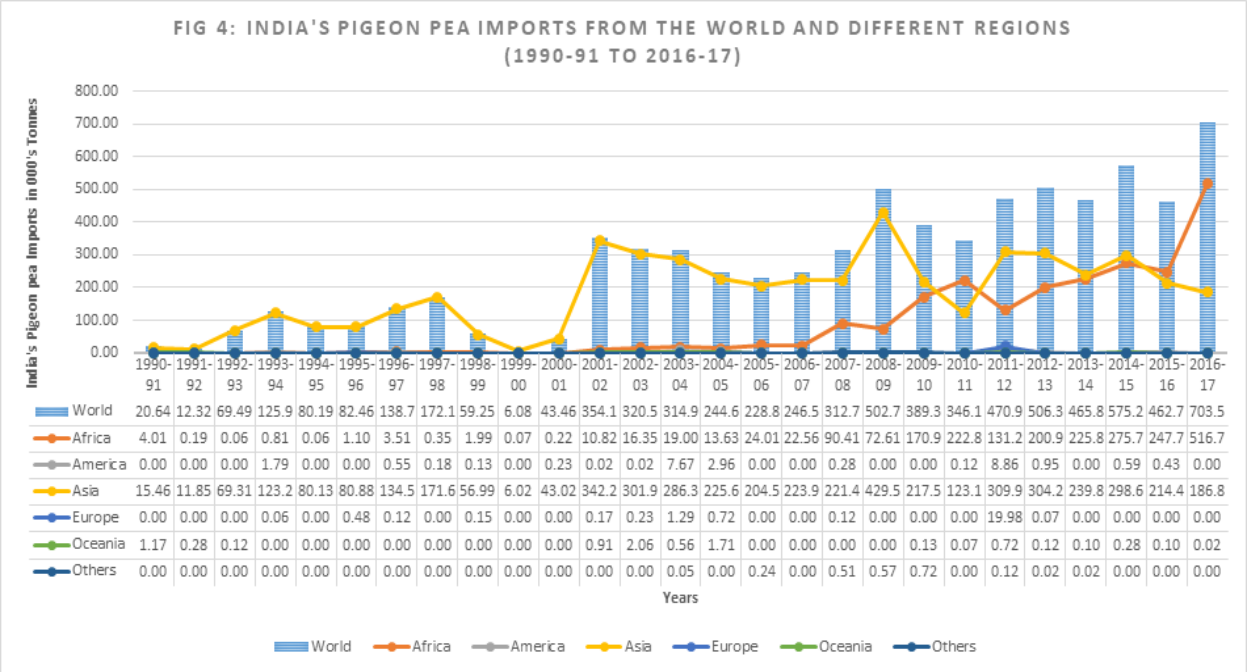
FIG 3: INDIA'S PIGEON PEA EXPORTS TO THE WORLD AND DIFFERENT REGIONS (1990-91 TO 2016-17)



	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
World	1.27	2.64	3.51	5.43	5.37	4.24	4.22	6.83	4.70	7.05	7.40	9.09	8.18	11.99	25.00	25.39	22.66	0.24	0.13	0.27	0.03	0.66	1.56	0.10	1.22	4.03	12.30
Africa	0.00	0.01	0.01	0.25	0.13	0.05	0.07	0.68	0.19	0.28	0.09	0.22	0.17	0.21	0.27	0.62	0.38	0.00	0.02	0.00	0.00	0.04	0.04	0.00	0.01	0.03	0.37
America	0.31	0.74	0.88	1.57	1.99	1.23	1.69	2.56	1.88	2.56	2.80	3.90	3.15	3.21	3.65	7.36	6.39	0.03	0.00	0.00	0.00	0.48	0.90	0.02	0.69	2.10	6.56
Asia	0.91	1.79	2.43	3.49	3.03	2.83	2.27	3.27	2.48	3.87	3.57	3.94	4.30	7.47	19.34	15.06	13.52	0.19	0.10	0.26	0.02	0.07	0.38	0.08	0.46	1.21	4.17
Europe	0.04	0.04	0.17	0.10	0.14	0.05	0.05	0.10	0.06	0.17	0.84	0.77	0.35	0.64	1.17	1.87	1.87	0.01	0.01	0.01	0.01	0.02	0.03	0.00	0.03	0.46	0.85
Oceania	0.01	0.06	0.01	0.02	0.07	0.09	0.15	0.21	0.10	0.16	0.09	0.26	0.21	0.46	0.56	0.49	0.50	0.01	0.00	0.00	0.00	0.06	0.21	0.00	0.03	0.23	0.35
Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

From fig 4. the study observed that over the years the imports from the African region showed a consistent rise, recording a highest in 2016-17 at 516.73 thousand tonnes. Imports from the Asian region followed a mixed trend with peaks during 2001-02 and 2008-09 at 342.26 and 429 thousand tonnes respectively. However the imports from the Asian region declined after 2014-15.

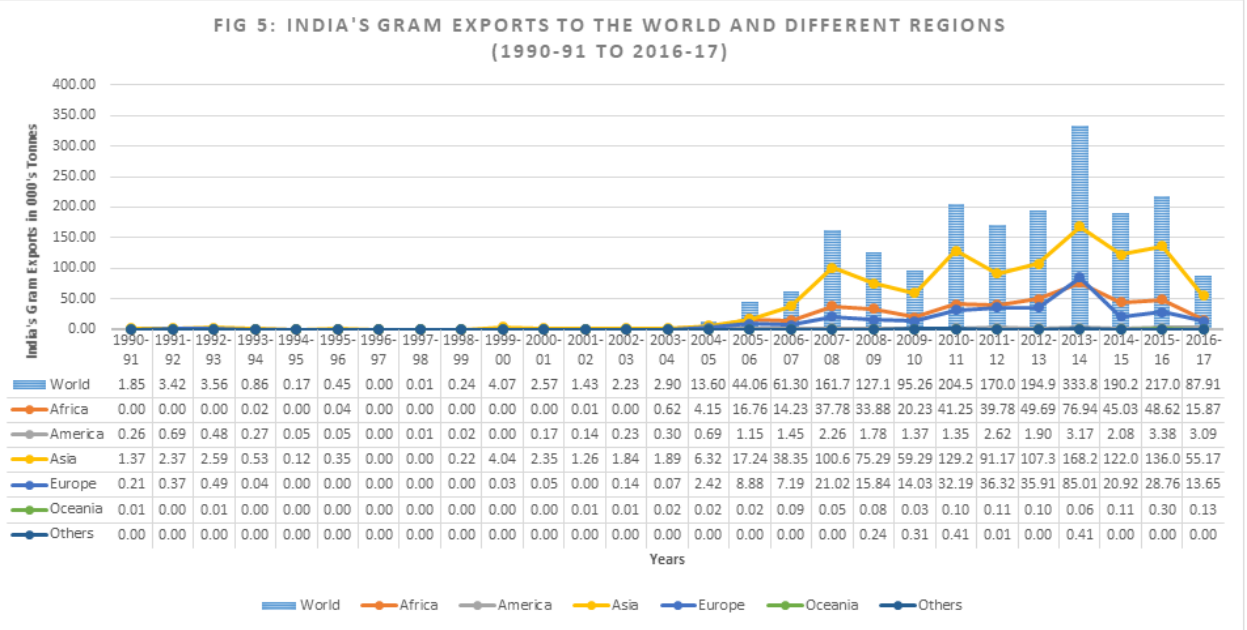


	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
World	20.64	12.32	69.49	125.9	80.19	82.46	138.7	172.1	59.25	6.08	43.46	354.1	320.5	314.9	244.6	228.8	246.5	312.7	502.7	389.3	346.1	470.9	506.3	465.8	575.2	462.7	703.5
Africa	4.01	0.19	0.06	0.81	0.06	1.10	3.51	0.35	1.99	0.07	0.22	10.82	16.35	19.00	13.63	24.01	22.56	90.41	72.61	170.9	222.8	131.2	200.9	225.8	275.7	247.7	516.7
America	0.00	0.00	0.00	1.79	0.00	0.00	0.55	0.18	0.13	0.00	0.23	0.02	0.02	7.67	2.96	0.00	0.00	0.28	0.00	0.00	0.12	8.86	0.95	0.00	0.59	0.43	0.00
Asia	15.46	11.85	69.31	123.2	80.13	80.88	134.5	171.6	56.99	6.02	43.02	342.2	301.9	286.3	225.6	204.5	223.9	221.4	429.5	217.5	123.1	309.9	304.2	239.8	298.6	214.4	186.8
Europe	0.00	0.00	0.00	0.06	0.00	0.48	0.12	0.00	0.15	0.00	0.00	0.17	0.23	1.29	0.72	0.00	0.00	0.12	0.00	0.00	0.00	19.98	0.07	0.00	0.00	0.00	0.00
Oceania	1.17	0.28	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	2.06	0.56	1.71	0.00	0.00	0.00	0.00	0.13	0.07	0.72	0.12	0.10	0.28	0.10	0.02
Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.24	0.00	0.51	0.57	0.72	0.00	0.12	0.02	0.02	0.00	0.00	0.00

Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

3.5.2 Gram

It can be viewed in fig 5. that over the years the highest quantity of exports was to the Asian region, reaching the highest quantity in 2013-14 at 168.22 thousand tonnes followed by a rapid decrease to 55.17 thousand tonnes in 2016-17. Similarly, exports to Africa and Europe consistently grew until 2013-14 and then saw a declining trend thereafter. In 2016-17 the exports to Africa and Europe were 15.87 and 13.65 thousand tonnes respectively.

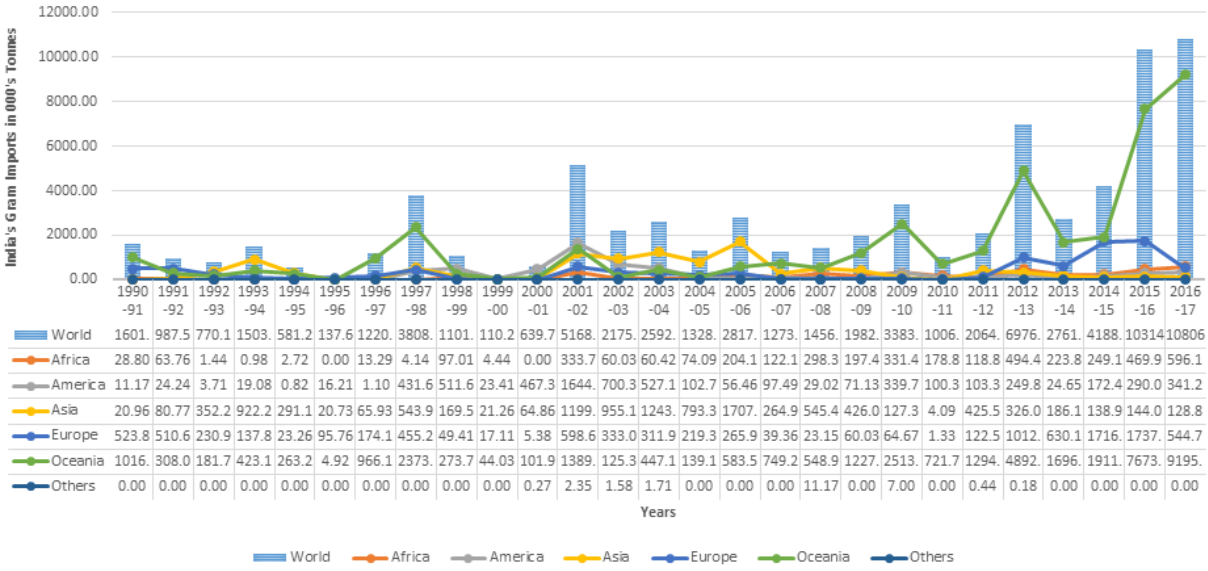


	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
World	1.85	3.42	3.56	0.86	0.17	0.45	0.00	0.01	0.24	4.07	2.57	1.43	2.23	2.90	13.60	44.06	61.30	161.7	127.1	95.26	204.5	170.0	194.9	333.8	190.2	217.0	87.91
Africa	0.00	0.00	0.00	0.02	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.62	4.15	16.76	14.23	37.78	33.88	20.23	41.25	39.78	49.69	76.94	45.03	48.62	15.87
America	0.26	0.69	0.48	0.27	0.05	0.05	0.00	0.01	0.02	0.00	0.17	0.14	0.23	0.30	0.69	1.15	1.45	2.26	1.78	1.37	1.35	2.62	1.90	3.17	2.08	3.38	3.09
Asia	1.37	2.37	2.59	0.53	0.12	0.35	0.00	0.00	0.22	4.04	2.35	1.26	1.84	1.89	6.32	17.24	38.35	100.6	75.29	59.29	129.2	91.17	107.3	168.2	122.0	136.0	55.17
Europe	0.21	0.37	0.49	0.04	0.00	0.00	0.00	0.00	0.00	0.03	0.05	0.00	0.14	0.07	2.42	8.88	7.19	21.02	15.84	14.03	32.19	36.32	35.91	85.01	20.92	28.76	13.65
Oceania	0.01	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.02	0.02	0.09	0.05	0.08	0.03	0.10	0.11	0.10	0.06	0.11	0.30	0.13
Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.31	0.41	0.01	0.00	0.41	0.00	0.00	0.00

Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

It can be noticed in fig 6. that over the years the imports from the Oceania region shows a fluctuating rise, despite being the major region with the maximum imports to India. A record highest quantity of 9195.45 thousand tonnes has been imported in 2016-17 from this region.

FIG 6: INDIA'S GRAM IMPORTS FROM THE WORLD AND DIFFERENT REGIONS (1990-91 TO 2016-17)

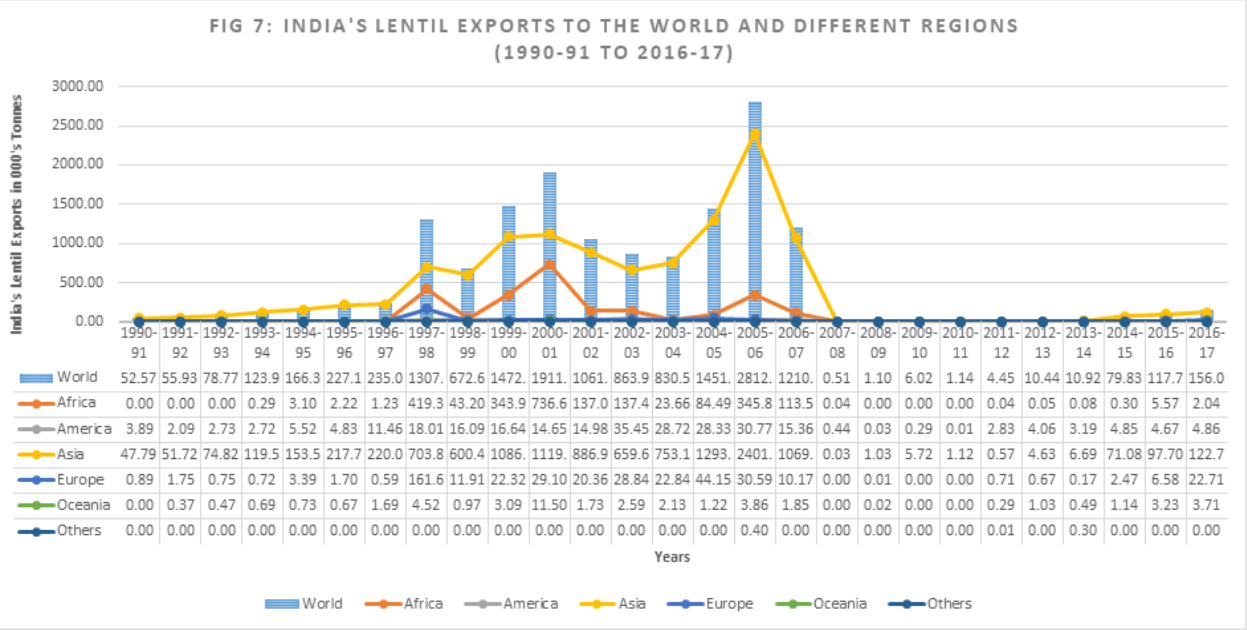


	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
World	1601.	987.5	770.1	1503.	581.2	137.6	1220.	3808.	1101.	110.2	639.7	5168.	2175.	2592.	1328.	2817.	1273.	1456.	1982.	3383.	1006.	2064.	6976.	2761.	4188.	10314	10806
Africa	28.80	63.76	1.44	0.98	2.72	0.00	13.29	4.14	97.01	4.44	0.00	333.7	60.03	60.42	74.09	204.1	122.1	298.3	197.4	331.4	178.8	118.8	494.4	223.8	249.1	469.9	596.1
America	11.17	24.24	3.71	19.08	0.82	16.21	1.10	431.6	511.6	23.41	467.3	1644.	700.3	527.1	102.7	56.46	97.49	29.02	71.13	339.7	100.3	103.3	249.8	24.65	172.4	290.0	341.2
Asia	20.96	80.77	352.2	922.2	291.1	20.73	65.93	543.9	169.5	21.26	64.86	1199.	955.1	1243.	793.3	1707.	264.9	545.4	426.0	127.3	4.09	425.5	326.0	186.1	138.9	144.0	128.8
Europe	523.8	510.6	230.9	137.8	23.26	95.76	174.1	455.2	49.41	17.11	5.38	598.6	333.0	311.9	219.3	265.9	39.36	23.15	60.03	64.67	1.33	122.5	1012.	630.1	1716.	1737.	544.7
Oceania	1016.	308.0	181.7	423.1	263.2	4.92	966.1	2373.	273.7	44.03	101.9	1389.	125.3	447.1	139.1	583.5	749.2	548.9	1227.	2513.	721.7	1294.	4892.	1696.	1911.	7673.	9195.
Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	2.35	1.58	1.71	0.00	0.00	0.00	11.17	0.00	7.00	0.00	0.44	0.18	0.00	0.00	0.00	0.00

Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

3.5.3 Lentils

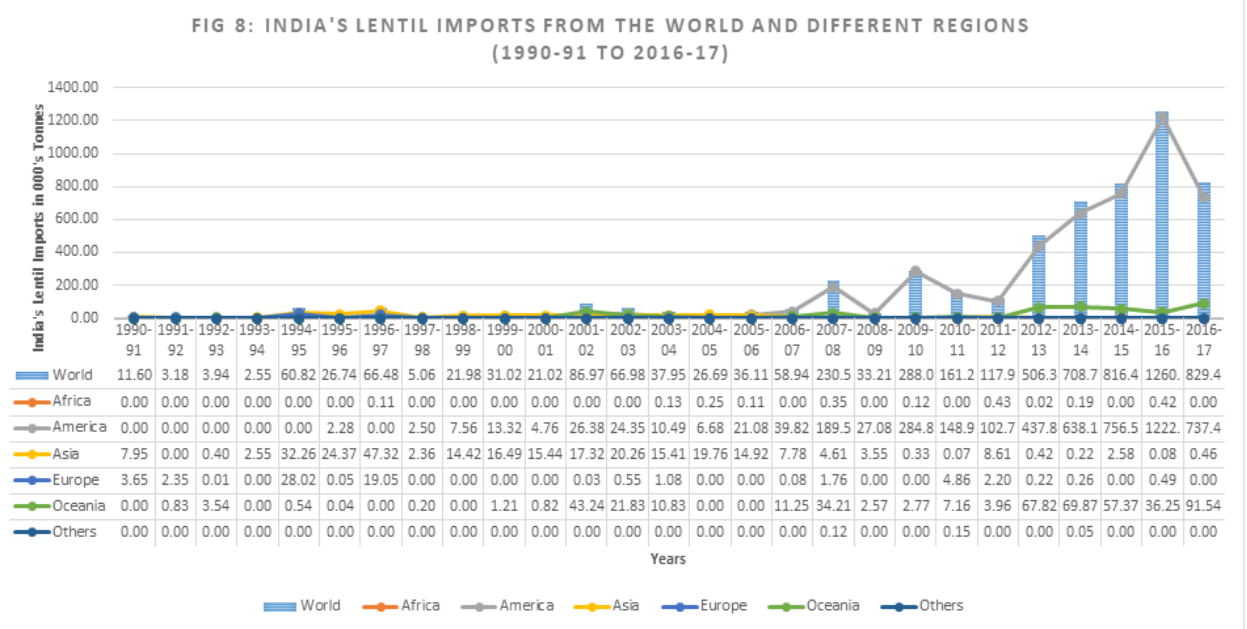
Lentil exports decreased suddenly to almost zero from 2007. This may be because of government ban on export or higher duties on export to meet domestic demand. USA, Canada, UK and some of Asian countries were major importers from India. However, the exports picked up from 2011-12 gradually with Asian region being the top destination in 2016-17 at 122.73 thousand tonnes followed by Europe (22.71), America (4.86), Oceania (3.71) and Africa (2.04) as is observed from fig 7.



	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
World	52.57	55.93	78.77	123.9	166.3	227.1	235.0	1307.	672.6	1472.	1911.	1061.	863.9	830.5	1451.	2812.	1210.	0.51	1.10	6.02	1.14	4.45	10.44	10.92	79.83	117.7	156.0
Africa	0.00	0.00	0.00	0.29	3.10	2.22	1.23	419.3	43.20	343.9	736.6	137.0	137.4	23.66	84.49	345.8	113.5	0.04	0.00	0.00	0.00	0.04	0.05	0.08	0.30	5.57	2.04
America	3.89	2.09	2.73	2.72	5.52	4.83	11.46	18.01	16.09	16.64	14.65	14.98	35.45	28.72	28.33	30.77	15.36	0.44	0.03	0.29	0.01	2.83	4.06	3.19	4.85	4.67	4.86
Asia	47.79	51.72	74.82	119.5	153.5	217.7	220.0	703.8	600.4	1086.	1119.	886.9	659.6	753.1	1293.	2401.	1069.	0.03	1.03	5.72	1.12	0.57	4.63	6.69	71.08	97.70	122.7
Europe	0.89	1.75	0.75	0.72	3.39	1.70	0.59	161.6	11.91	22.32	29.10	20.36	28.84	22.84	44.15	30.59	10.17	0.00	0.01	0.00	0.00	0.71	0.67	0.17	2.47	6.58	22.71
Oceania	0.00	0.37	0.47	0.69	0.73	0.67	1.69	4.52	0.97	3.09	11.50	1.73	2.59	2.13	1.22	3.86	1.85	0.00	0.02	0.00	0.00	0.29	1.03	0.49	1.14	3.23	3.71
Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.30	0.00	0.00	0.00

Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

It can be noticed in fig 8. that over the years the imports from the Asian region show a decrease since 2005-06, followed by an increase in imports from American region. Imports from the American region increased gradually with maximum import quantity in 2015-16 at 1222.96 thousand Tonnes. The sudden upsurge in import quantity during 2007-08 could be due to the inadequacy in the domestic production. However, the imports from all the regions witnessed a sudden decrease in 2008-09.



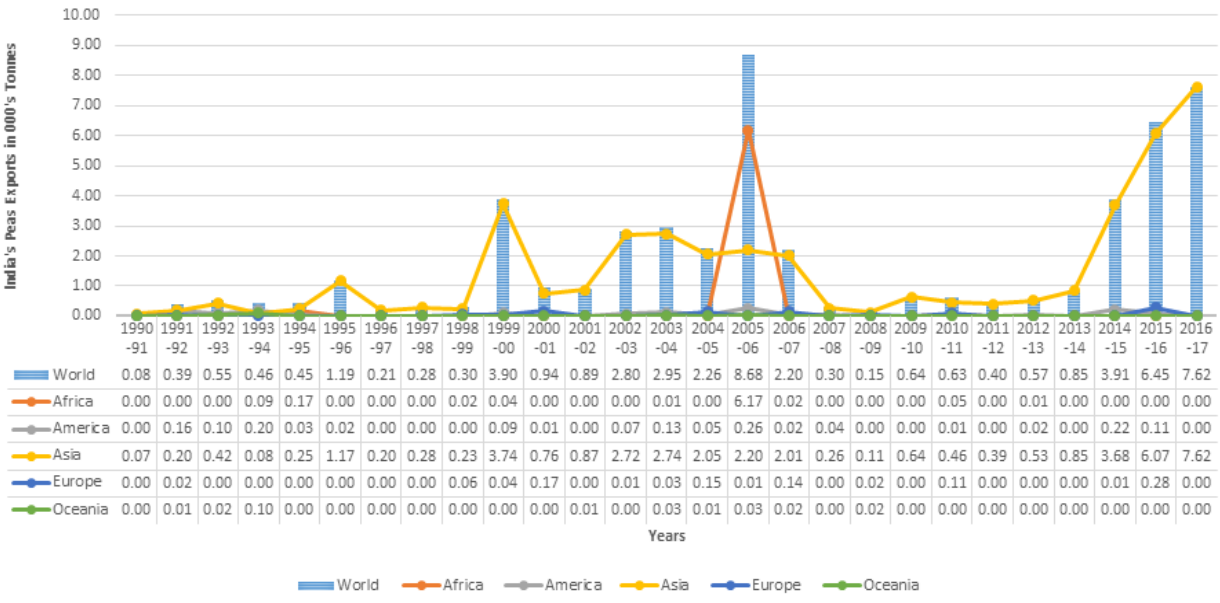
	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
World	11.60	3.18	3.94	2.55	60.82	26.74	66.48	5.06	21.98	31.02	21.02	86.97	66.98	37.95	26.69	36.11	58.94	230.5	33.21	288.0	161.2	117.9	506.3	708.7	816.4	1260.	829.4
Africa	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.25	0.11	0.00	0.35	0.00	0.12	0.00	0.43	0.02	0.19	0.00	0.42	0.00
America	0.00	0.00	0.00	0.00	0.00	2.28	0.00	2.50	7.56	13.32	4.76	26.38	24.35	10.49	6.68	21.08	39.82	189.5	27.08	284.8	148.9	102.7	437.8	638.1	756.5	1222.	737.4
Asia	7.95	0.00	0.40	2.55	32.26	24.37	47.32	2.36	14.42	16.49	15.44	17.32	20.26	15.41	19.76	14.92	7.78	4.61	3.55	0.33	0.07	8.61	0.42	0.22	2.58	0.08	0.46
Europe	3.65	2.35	0.01	0.00	28.02	0.05	19.05	0.00	0.00	0.00	0.00	0.03	0.55	1.08	0.00	0.00	0.08	1.76	0.00	0.00	4.86	2.20	0.22	0.26	0.00	0.49	0.00
Oceania	0.00	0.83	3.54	0.00	0.54	0.04	0.00	0.20	0.00	1.21	0.82	43.24	21.83	10.83	0.00	0.00	11.25	34.21	2.57	2.77	7.16	3.96	67.82	69.87	57.37	36.25	91.54
Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.15	0.00	0.00	0.05	0.00	0.00	0.00

Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

3.5.4 Peas

The fig 9. depicts the peas exports to the world and different regions from India during 1990-91 to 2016-17 in thousand tonnes. Exports from the Asian region showed a mixed trend until 2010-11 and thereafter there was a gradual increase in exporting quantity with highest quantity exported in 2016-17 at 7.62 thousand tonnes. In 2005-06 there was an unexpected upturn in the exports to the African region with 6.17 thousand tonnes.

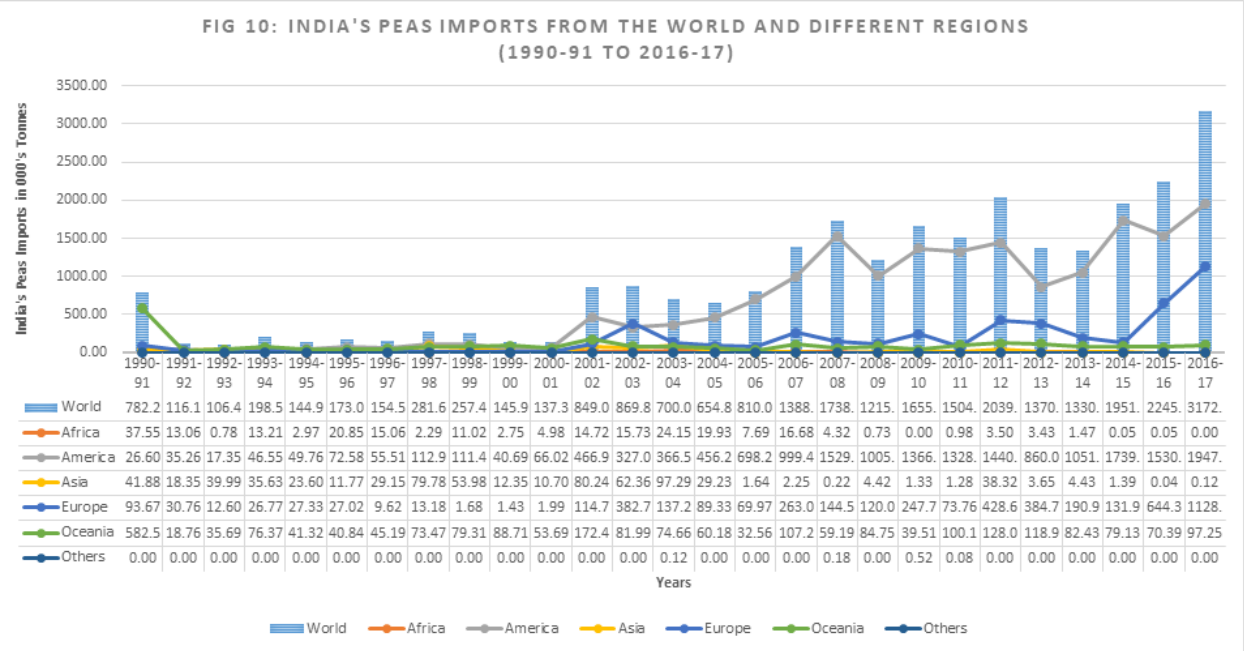
FIG 9: INDIA'S PEAS EXPORTS TO THE WORLD AND DIFFERENT REGIONS (1990-91 TO 2016-17)



	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
World	0.08	0.39	0.55	0.46	0.45	1.19	0.21	0.28	0.30	3.90	0.94	0.89	2.80	2.95	2.26	8.68	2.20	0.30	0.15	0.64	0.63	0.40	0.57	0.85	3.91	6.45	7.62
Africa	0.00	0.00	0.00	0.09	0.17	0.00	0.00	0.00	0.02	0.04	0.00	0.00	0.00	0.01	0.00	6.17	0.02	0.00	0.00	0.00	0.05	0.00	0.01	0.00	0.00	0.00	0.00
America	0.00	0.16	0.10	0.20	0.03	0.02	0.00	0.00	0.00	0.09	0.01	0.00	0.07	0.13	0.05	0.26	0.02	0.04	0.00	0.00	0.01	0.00	0.02	0.00	0.22	0.11	0.00
Asia	0.07	0.20	0.42	0.08	0.25	1.17	0.20	0.28	0.23	3.74	0.76	0.87	2.72	2.74	2.05	2.20	2.01	0.26	0.11	0.64	0.46	0.39	0.53	0.85	3.68	6.07	7.62
Europe	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04	0.17	0.00	0.01	0.03	0.15	0.01	0.14	0.00	0.02	0.00	0.11	0.00	0.00	0.00	0.01	0.28	0.00
Oceania	0.00	0.01	0.02	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.01	0.03	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

The below given fig 10. displays the peas imports from the world and different regions to India during 1990-91 to 2016-17 in thousand tonnes. Imports in peas picked up after 2000-01 after the flat growth of imports since 1991-92. The American region has been the major source of imports over the years followed by Europe, Oceania and Asia. In 2016-17, the highest quantity of 1947.03 thousand tonnes was imported from American region.

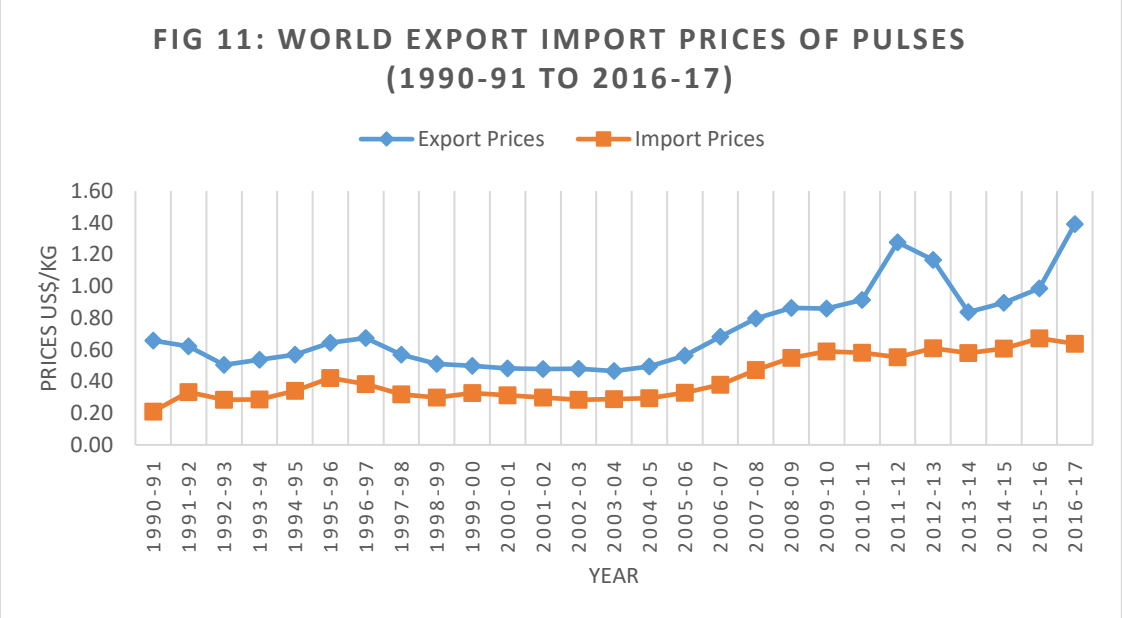


	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
World	782.2	116.1	106.4	198.5	144.9	173.0	154.5	281.6	257.4	145.9	137.3	849.0	869.8	700.0	654.8	810.0	1388.	1738.	1215.	1655.	1504.	2039.	1370.	1330.	1951.	2245.	3172.
Africa	37.55	13.06	0.78	13.21	2.97	20.85	15.06	2.29	11.02	2.75	4.98	14.72	15.73	24.15	19.93	7.69	16.68	4.32	0.73	0.00	0.98	3.50	3.43	1.47	0.05	0.05	0.00
America	26.60	35.26	17.35	46.55	49.76	72.58	55.51	112.9	111.4	40.69	66.02	466.9	327.0	366.5	456.2	698.2	999.4	1529.	1005.	1366.	1328.	1440.	860.0	1051.	1739.	1530.	1947.
Asia	41.88	18.35	39.99	35.63	23.60	11.77	29.15	79.78	53.98	12.35	10.70	80.24	62.36	97.29	29.23	1.64	2.25	0.22	4.42	1.33	1.28	38.32	3.65	4.43	1.39	0.04	0.12
Europe	93.67	30.76	12.60	26.77	27.33	27.02	9.62	13.18	1.68	1.43	1.99	114.7	382.7	137.2	89.33	69.97	263.0	144.5	120.0	247.7	73.76	428.6	384.7	190.9	131.9	644.3	1128.
Oceania	582.5	18.76	35.69	76.37	41.32	40.84	45.19	73.47	79.31	88.71	53.69	172.4	81.99	74.66	60.18	32.56	107.2	59.19	84.75	39.51	100.1	128.0	118.9	82.43	79.13	70.39	97.25
Others	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00	0.18	0.00	0.52	0.08	0.00	0.00	0.00	0.00	0.00	0.00

Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

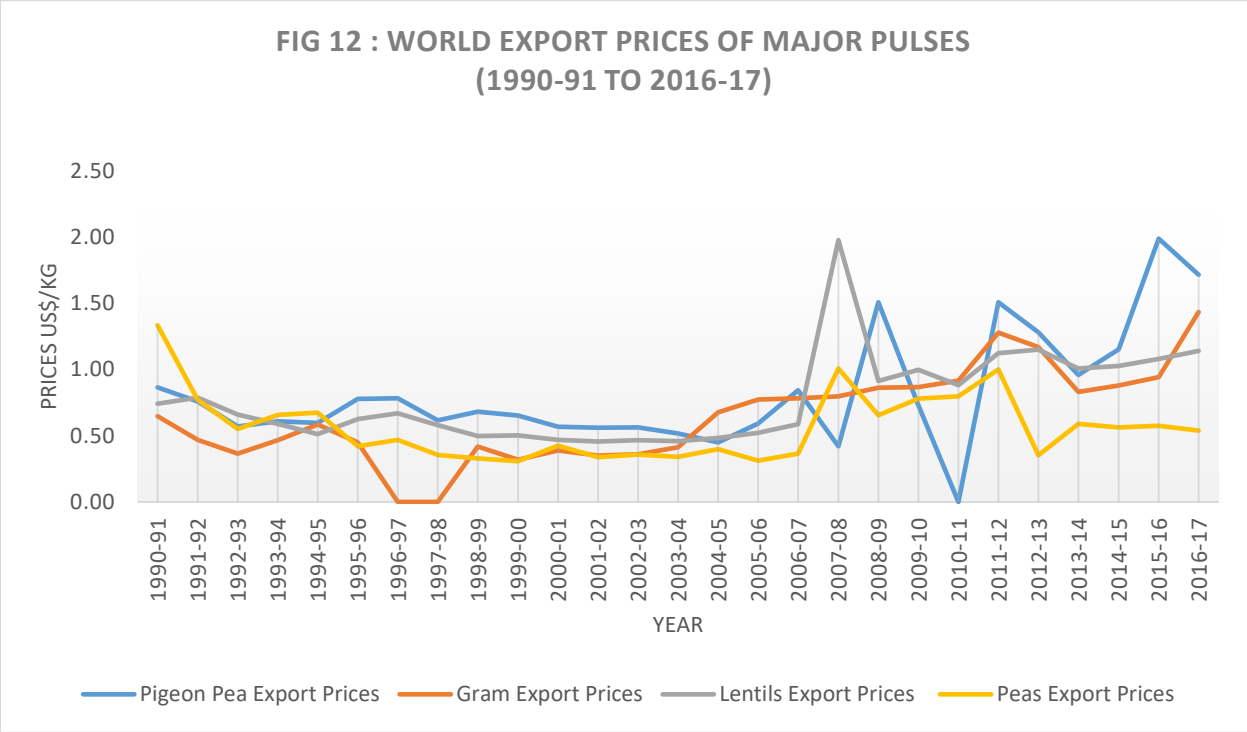
3.6 Price trends in pulses trade

Fig.11. shows that the export prices were fluctuating from 2008 to 2013 due to government intervention (high export duty) and changes in rupee value against US$ (USA recession 2008). However, since 2013-14 export prices followed an increasing trend. Import prices have almost been flat since 2008. From the Fig.12 & 13, we can say export prices are more fluctuating than import prices and export prices are better than import prices. Import prices of chickpeas were highly fluctuating than any pulse crops because of inconsistency in domestic production.



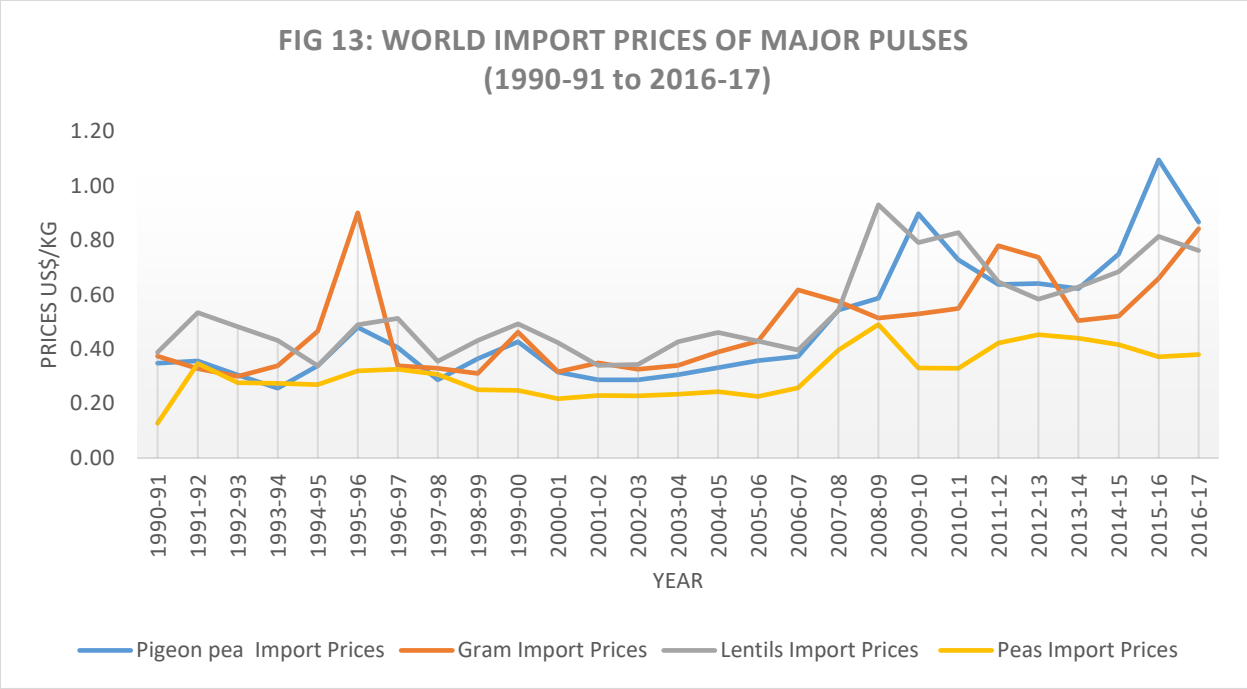
Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

Among all pulse crops, lentil and chick peas are major crops which were exported. From fig 12. The export prices of chick peas increased from 2003 and up to 2011, followed by a decrease in the next two years and then an increase until 2016-17. Lentil exports prices decreased suddenly in 2008. Lentil export prices there after saw a stable trend. The export prices of peas followed a similar trend of lentils with a sharp increase in 2007 and a drop in 2008. Export prices of peas however have dropped again in 2012. Pigeon pea export prices have seen a reverse trend to that of all other major pulses. In 2008-09 there was a sudden upsurge of prices. But since 2013, the export prices of pigeon pea have increased.



Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

Fig.13, shows that Import prices of all the major pulses generally increased over the period between 1990- 91 and 2016-17. Pigeon pea and lentils import prices have a parallel trend with increase in 2007-08, 2008-09 and a decrease in 2012-13. There after the import prices of both pigeon pea and lentils increased until 2015-16. Gram import prices followed a mixed trend with an increase in prices since 2013 until 2016. Peas import prices have relatively stable flat growth.



Source: FAO, CMIE Commodities, Accessed on 27th January 2018.

4. CONCLUSION

United Nations has declared 2016 as the 'International Year of Pulses'. This provides a unique opportunity to encourage global production of pulses and address the challenges in the trade of pulses. The major share of Indian pulses exports was to Asia (61.55%) followed by Europe (13.91), Africa (12.04%), America (11.58%), and Oceania (0.93%) during 2016-17 .The study observed that Indian import markets are shifting from developing to developed nations. Also, for all the regions during the study period, the export and import quantity growth rates have been positive. The maximum export and import quantity growth rate is witnessed for African and American region respectively. The export and import price elasticity of Indian pulses between 1990-91 and 2016-17 (%) is positive among all the regions, indicating the high responsiveness of quantities to change in prices in international markets. The study found that gram has high demand in the international market. During the period 1990-91 to 2015-16, the export price of all pulses viz, Pigeon pea, Gram, Lentil and Peas are more than import prices indicating that India has comparative advantage in pulses. It is noticed that export as well as import prices of all pulses were found to be unstable. The study found that peas export elasticities are elastic.

The study found that, the total pulses, export price elasticities for all regions is elastic, whereas the import price elasticities is also elastic except for Asia and Oceania. During the period 1990-91 to 2016 -17 the export elasticities for all the crops across the regions are elastic except for lentils in American region and peas in Asian region, which are inelastic.

In case of Total pulses, UAE, UK & Egypt were elastic to export from India with values -1.8, -7.9 & 3.09 respectively. Myanmar and Malawi were elastic to import to India with values -

1.52 and 4.41 respectively. Export and import at international trade were not depends much on prices but depends on government policies or regulations.

Myanmar and Mozambique shows price sensitive as these exporting countries are instable and inelastic with elastic values -1.5 and -0.11 respectively. Among importing nations UAE and UK are the highly instable countries with elasticity of -1.82 and -7.92 respectively. Even though pulses trade is stable with foreign countries, it's better to import pulses in spite of exporting as demand in domestic market is increasing every year.

Major trade destinations are Canada, Myanmar, Australia, Russia and USA for exporting to India and Sri Lanka, Pakistan, Bangladesh, Egypt and Saudi Arab are importing countries from India.

The inflow and outflow of pulses from India to the rest of the world have brought certain important impact on country's economy. Particularly liberalized and subsidized import of pulses of India helps to meet demand-supply gaps, which occurred because of stagnation in the area under cultivation, very slow growth in yield, poor increase in production and speedy increase in population.

The study suggest that Import from inelastic countries should be exempted from any ban (without any quantity restriction) which would help in good relationships. Exemption to chick peas crop from export ban on quantity, as availability and production is very high in domestic market. Under FPS, pulses should be included and trade exemptions should be reconsider towards those countries which have shown elastic in both export and import. Multilateral trade relationship with high CAGR countries would help in smooth trade of pulses.

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