Project Report on

To Identify The Emerging Challenges Related To Imports: A Case Of The Indian Pulses Industry

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CERTIFICATE

This is to certify that the project entitled **"To Identify The Emerging Challenges Related To Imports: A Case Of The Indian Pulses Industry"** is the bonafide work carried out by **Mohammad Murtaza Ali,** 2K11/MBA/28, student of Delhi School of Management, Delhi Technological University, during the year 2013, in partial fulfillment of the requirements for the award of the Degree of Master of Business Administration, and that the project has not formed the basis for the award previously of any degree, diploma, associate ship, fellowship or any other similar title.

Signature of the Guide:

Place:

Date:

DECLARATION

I hereby declare that the project entitled **"To Identify The Emerging Challenges Related To Imports: A Case Of The Indian Pulses Industry"** submitted for the MBA Degree is my original work and the project has not formed the basis for the award of any degree, associate ship, fellowship or any other similar titles. It is the result of the project carried out by me under the guidance and supervision of **Mr. Vikas Gupta, Assistant Professor, Delhi Technological University**.

I further declare that I or any other person has not previously submitted this project report to any other institution/university for any other degree/ diploma or any other person.

Signature of the Student:
Place:
Date:

ACKNOWLEDGEMENT

Due to the fact that all the knowledge required was not in the literature, it was imperative that the people who guide be very resourceful and knowledgeable. A deep sense of gratitude for the above reason is thus owed to **Mr. Vikas Gupta** (Assistant Professor, Delhi Technological University) for his continuous guidance and motivation and for helping in whatever capacity he could at various stages in the project.

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EXECUTIVE SUMMARY

Pulses or dals contain rich and cheap sources of protein for human consumption and their production and consumption are important in maintaining food security. Cultivation of pulses also helps to maintain soil fertility through the nitrogen fixation. In India, a large proportion of the Indian population is vegetarian and pulses form the main source of vegetable protein. However, the per capita consumption of pluses has declined from 69 grams/day in 1960-61 to 36 grams/day in 2007-08. For India, the World Health Organization recommends a minimum consumption of 80 grams of pulses / capita /day. The size of Pulses economy of the world is 61.3 million MT. India is the largest producing country with 22 % (13.50 million MT) of the world production concentrated in India, 30 per cent of total consumption and 33 per cent of global acreage under pulses. Productivity of pulses in India has been very low at 622 kg/ ha, when compared to 1908 kg/ha in Canada / USA.

Even though India is the largest pulses producer of the world, it imports large amount of pulses from rest of the world. India also used to be an exporter of pulses but in June 2006 government banned the export of pulses to meet the growing domestic demand. So, it is important to analyze, how the inflow and outflow of pulses from India has changed over period of the time; why India is importing a considerable amount of pulses; examine the impact of inflow of pulses in terms of area under cultivation, quantum of production, prices and net food grains availability for the consumers. But, as India has a large vegetarian population, which is largely dependent upon pulses, wheat and milk as its major source of protein, the size of consumption of pulses in India is around 16 million MT. In order to meet such demand, India is dependent upon import of pulses to the extent of 23 million MT. India imports its requirements from various countries, such as Myanmar (Urad & Tur), Canada, Australia and various other countries.

The research project tries to review the current import policy, the tendering mechanism presently employed by the Indian government & suggests some direction for policies to government of India in import of pulses, which will definitely help to frame out a long term strategy in import of pulses & also assure to meet pulses demand of the country with stabilizing the rising prices of pulses in Indian market giving relief to the Indian consumer.

Pulse importers face a number of risks that threaten the profitability of their transactions. Many importers forward sell their products before taking physical possession of them. Falling domestic prices prior to delivery provide incentive for buyers to renege on contracts. Domestic market conditions, particularly variability in domestic production and import activities, also affect pulse prices. The volume of business and the prices contracted by other importers serving the same market are key factors affecting an importer's profitability. Multiple impending shipments can flood the market and lead to lower prices, increasing the probability of default by domestic clients. Thus, traders closely monitor competitors' transactions but appear to operate independently, with not much communication between them except through their brokers. Indian importers also face foreign exchange risk because transactions with every country are conducted in U.S. dollar.

India is finding it difficult to negotiate imports of pulses from Myanmar as the market in the neighboring country is dominated by private traders and no government agency is involved. Despite soaring prices of matpe (black gram) & mung beans in its domestic market, India's government wants to move cautiously in importing pulses from Myanmar. Private traders in Myanmar tend to increase prices whenever they come to know that the Indian government is seeking to import the pulses from them. Once government announce the quantity of pulses we plan to import from Myanmar, the prices of pulses gets pushed up.

There are many costs associated with importing pulses into India. Considering Canadian green peas in June-July 2001, commodity costs were about $120/ton at the foreign port (including inland transportation costs) for No. 2 grade or better. Ocean freight rates ranged from $50-$60/ton for bulk shipments to $80/ton for loose peas in containers (there is typically only a $15/ton difference between the two shipping methods). Importers pay fees equal to 0.5 percent of the shipment value for insurance and export guarantees, which insure payment to the exporting countries. Traders face numerous charges once the pulses reach Indian ports. There are also incidental costs, such as "speed money" to facilitate service at the port. Moreover, penalty charges arise when containers are 18 Economic Research Service, USDA Economic Research Service, USDA 19 kept for more than 14 days, or when a ship is docked for more than 7 days.

Importers try to sell product off the boat in order to minimize handling, transportation, and storage costs, but may choose to store pulses for 23 months if current market prices are

unfavorable. Although importers sometimes realize large margins on cheap and well-timed purchases, average margins are reported to be thin, with profits being made on volume. Interviews with several major importers suggest margins of about 1 percent of total shipment value.

The following directions have been proposed to the government of India for policies in import of pulses:

- To augment the domestic supply and ease pressure on retail prices, the government of India must extend duty free import of pulses by five more years till 2015 next.

- Price subsidization, if any, taken up before financial ending years as it will cause the prices of pulses to be low at the time of crop arrival during kharif season which can cause farmer backlash.

- The government should discontinue its current policy for 15 per cent subsidy on imports by government Agencies. The government should ask their agencies to obtain the goods from the private importers and then decrease the price by 15 per cent (subsidy from the government) and sell the goods to the Public Distribution System (PDS).

- The government agency importing pulses may not succeed in importing at efficient prices as compared to private sector imports and so private players must be encouraged to come forward.

- Far months for pulses may be offered at the time of arrivals to cover the peak consumption so that prices do not nose dive.

- Uniform central government & state polices for states in India. This integration of state and central policies will ensure a better control.

- Ban on the future trading & essential commodity act implemented.

- Instead of selling stock through a tender process, the government agencies should sell the entire imported stock through an electronic platform.

The government of India is advised to adopt the following long term strategy:

- Increase acreage under cultivation, which is absolutely paramount given the rapidly increasing consumption demands.

- Improve yield per acre as there is a pressing need to improve productivity.

- Research initiatives for new genetic varieties of seeds as this will automatically result in a better yield.

- Contract farming to be considered within and outside the country so as to gain the cost benefits.

- Corporate/contract farming on fallow land as it will help in better utilization of land.

- Contract farming with Myanmar & Africa can offer a great cost advantage which can be a huge boost.

- Launch of a national mission mode project on pulses with emphasis on faster execution and powerful communication.

- Emphasis on Private Public Partnership (PPP) aimed at capacity building as this will infuse the industry with more funds to dispense on areas like R&D.

Objective of the Study

Objective of the project is to analyze the following:

1. To understand the changes in inflow and outflow of pulses of India with rest of the world during the last several decades.

2. To examine the trends in area under cultivation, yield and production of pulses in India in the last five decades.

3. To study the consumption pattern of pulses in India with emphasis on Indian Pulses Crisis

4. To examine the impact of inflow and outflow of pulses on area under cultivation, domestic prices, net food grains availability.

5. To review the current import policy, the tendering mechanism presently employed by the Indian government.

6. To suggest the ways to the government of India that will help to frame out a long term strategy for import of pulses.

7. To suggest the ways to the government of India aimed at meeting the country's pulses demand with stabilization of the rising prices of pulses in Indian market giving relief to the Indian consumer.

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INTRODUCTION

India is the largest importer, producer and consumer of pulses. But, on the other hand, India is also the largest pulses processor, as pulses exporting nations such as Myanmar, Canada and Australia, do not have adequate pulses processing facilities. The reason is that these countries do not have domestic consumption of pulses and therefore, they have never attempted in developing domestic processing industry. Their focus has always been to export whole pulses. This has put India in an advantageous position, by developing its niche in processing. As a result, Indian processors have been able to enhance their output efficiency, reduce wastage with good quality of output in pulses processing. Elasticity of demand for pulses is highest among grains (cereals and pulses) in the country. Per capita consumption of pulses has been falling constantly due to stagnant production/productivity and low import. The entire scenario is that the show is not worthy in recent years due to disturbed weather pattern and lack of concerted promotional efforts, in spite of pulses being the only source of protein for the majority vegetarians and an important ingredient in food.

Pulses Overview:

1) Main protein sources for large vegetarian Indian population
2) World production is almost stagnant around 60 million tons in last 78 years
3) Largest producers are India, China, Brazil, Australia, Canada and Myanmar
4) Major exporters are Australia, Canada and Myanmar
5) Major importers India, Pakistan and other developing countries
6) Developing countries especially South Asian countries are major consumers
7) World trade is concentrated in South Asia

Definition

The Food and Agriculture Organization (FAO) of United Nations defines pulses as an annual leguminous crop yielding from one to twelve seeds within the pod and harvested for dried seeds.

Classification of Pulses

According to FAO classification, there are 11 primary pulses/pulse groups. They include:

i. dry beans which cover kidney bean, lima bean, adzuki bean, mung bean, urad bean, scarlet runner bean, moth bean, leper bean,

ii. dry broad beans consisting of horse bean, broad bean, field bean

iii. dry peas covering garden pea, protein pea, (iv) chickpea/Bengal gram /chana/gram

v. pigeon pea/tur/ arhar

vi. lentil/masur

vii. dry cowpea

viii. earth pea

ix. vetch

x. lupines

xi. minor pulses like lablab, hyacinth bean, jack bean, winged bean, velvet bean, yam bean

Area, Production and Yield of Pulses in Major Countries of the World

Pulses are grown in an area of 73.33 million ha with a production of 61.34 million tons in World. The area, production and yield of pulses in major countries of the world in 2007 are presented in Table 1.

Next to India, Niger, Nigeria, Brazil, China, Myanmar, and Canada are the leading countries in area under pulses. The leading producers next to India are China, Canada, Brazil, Nigeria, Myanmar and USA. While the world average yield stood at 836 kgs / ha, USA , Canada and China attained yields of 1,908 kgs / ha, 1,804 kgs /ha and 1,752 kgs /ha respectively. The yield in India at 622 kg/ha was far below the world average as also of other leading producing countries.

Table 1: Area, production and yield of pulses in major countries of the world during 2007

SN	Country	Area (Ha)	% to total	Production (Tons)	% to total	Yield (Kg/ha)
1	Australia	1371000	1.87	1216000	1.98	887
2	Brazil	3947467	5.38	3347435	5.46	848
3	Canada	2313800	3.12	4175000	6.81	1804
4	China	3537200	4.82	6197500	10.10	1752
5	Ethiopia	1281000	1.75	1315000	2.14	1027
6	**India**	**23315000**	**31.79**	**14500000**	**23.64**	**622**
7	Iran	1766000	2.41	1066000	1.74	604
8	Kenya	1447450	1.97	736555	1.20	509
9	Mexico	1882750	2.57	1688602	2.75	897
10	Myanmar	2753500	3.75	2704300	4.41	982
11	Niger	4821948	6.57	1023309	1.67	212
12	Nigeria	4630000	6.31	3203000	5.22	692
13	Pakistan	1632300	2.23	1189100	1.94	728
14	Russia	1130300	1.54	1300940	2.12	1151
15	Turkey	1265000	1.72	1493073	2.43	1180
16	Uganda	1061300	1.45	618300	1.01	583
17	USA	1113111	1.52	2123739	3.46	1908
18	Others	14064980	19.18	13443597	21.92	956
	World	**73334106**	100	**61341450**	**100**	**836**

* Others include: France, Ukraine, Egypt, Argentina, Bangladesh, Indonesia, Japan, Thailand, Spain and Italy.

Note: world total may not tally as many countries are not included

Source: FAO Production Year Book, Rome

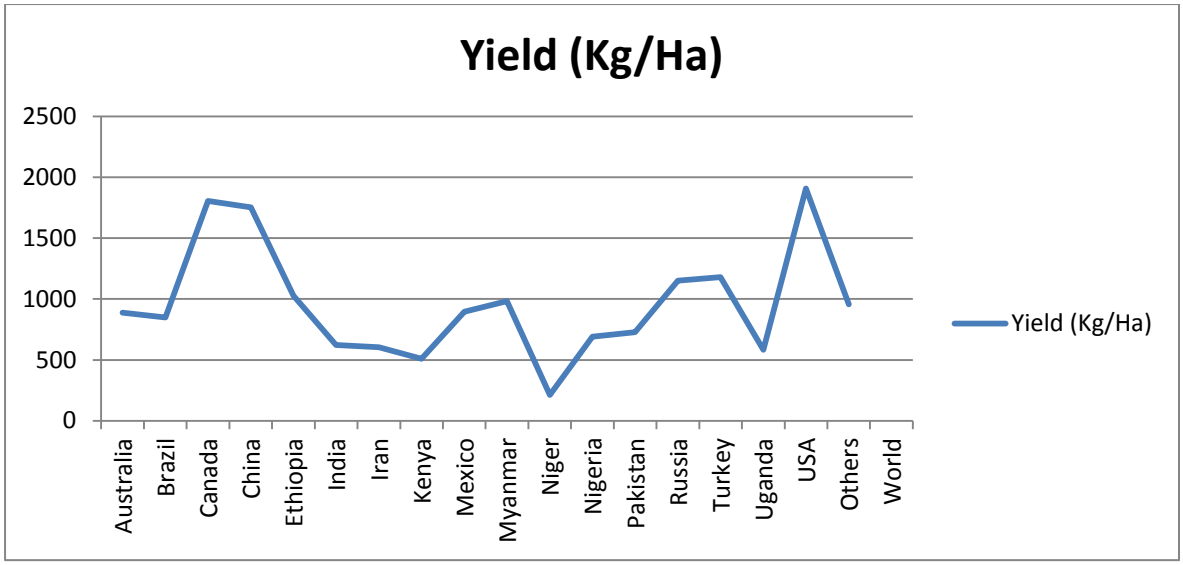


Fig 1: Yield of pulses in major producing countries of the world

Source: Economic survey, GoI, 2007-2008

Industry Profile

India is largest producer, consumer and importer.

1) Cultivated in all three seasons, mostly under rain fed conditions and very vulnerable to weather changes.
2) Nearly 60 percent are produced in rabbi season.
3) Indian production which contributes to nearly 25% of global output is almost stagnant at 1215 million tons in last two decades.
4) According to Assoc ham's Pulse Production Report 2010, pulses production growth registered (CGAR) at 0.27% in last five decades.
5) Average annual pulses output is 13.5 million tons from 1990 to 2010.
6) Major producers are Madhya Pradesh, Maharashtra, Uttar Pradesh, Rajasthan, Karnataka and Andhra Pradesh.
7) Indian pulses output touched ten years high of 15.11 million tons in 2008.
8) Annual domestic pulses consumption is 1718 million tons.
9) India is facing severe shortage of pulses since many decades and dependent heavily on imports.

Table 2: Indian Pulses Scenario 2010 Demand & Supply

Products	Demand	Production	Import
Pigeon peas	2.7 Mill MT	2.30 Mill MT	0.40 Mill MT
Black matpe	1.6 Mill MT	1.06 Mill MT	0.49 Mill MT
Mung beans	1.4 Mill MT	1.00 Mill MT	0.40 Mill MT
Dry Peas	2.3 Mill MT	0.70 mill MT	1.50 Mill MT
Lentils	1.2 Mill MT	0.80 Mill MT	0.40 Mill MT
Chick Peas	6.0 Mill MT	5.80 Mill MT	0.20 Mill MT
Misc	2.5 Mill MT	2.00 Mill MT	0.5 Mill MT
Total	18.4 Mill MT	14.66 Mil MT	3.24 Mill MT

Source: Ministry of Commerce of India

Pulses import by government agencies and traders surged 45.8 per cent to 3.5 million tons in the last financial year, as the domestic production was lower than the demand. The country's pulses production in the 200910 crop years was estimated at 14.74 million tons against an annual demand for 1718 million tons. Total import of pulses stood at 3.5 million tons in the past financial year, compared with 2.48 million tons in the previous year. The public sector agencies such as MMTC, STC, PEC & Agri-cooperative major Nafed have imported 579,000 tons pulses, while rest has been sourced by private traders. Out of this PEC imported 264,000 tons, STC around 114,000 tons, Nafed 110,000 tons and MMTC 90,000 tons, If these PSUs incur any loss, the government reimburses them up to a limit of 15 per cent of the difference between global and local prices.

Importance of Pulses for India

Pulses in India have long been considered as the poor man's only source of protein. They are the principal source of dietary proteins in a vegetarian country like India. The major pulse crops of the country are red gram or pigeon pea (tur, arhar), chickpea or gram, black gram (urad bean), green gram (moong bean) and lentil (masur). Minor pulses include rajmah and other beans, cowpea, horse gram, moth, khesari-dal, etc.

If we consider some of the major sources of proteins, pulses turn out to be one of the most economical sources of protein for human consumption. Pulses contain 18-25% of protein.

Increasing their production and keeping their prices within the reach of the poor therefore assumes paramount importance.

Table 3: Average cost of protein consumption

Source	Protein content (per kg)	Average price (Rs. per kg)	Avg cost of protein consumption
Milk	3.2%	24	75
Poultry Meat	18-20%	100	53
Eggs	14%	60	42
Pulses	18-25%	85	38

Source: Economic survey, GoI, 2007-2008

However currently, only 11% of India's protein needs are met by pulses. The balance is either met through other sources or not met at all. As per the estimates of World Bank, India ranks second in child malnutrition (next to Bangladesh). It is a fact that Indians today are consuming far less protein than they used to do so in the past.

While per capita availability of pulses, including imports is close to 43 g/day, WHO recommends per capita consumption at 80 g/day for India, clearly pointing to a wide gap in pulses availability. By some estimates, the per capita consumption has lately reduced to as low as 30 g/day due to high prices which affects the buying ability of the consumer, thus indicating a serious concern.

Pulses crops also help increase soil fertility. Benefits from adopting pulses as a rotational crop increases the supply of soil nitrogen through nitrogen fixation by approximately 40 kg/ha N. It also provides agronomic benefits to the succeeding crop in terms of better soil microenvironment, quality and yield.

Key Government Initiatives

1) To fulfill objectives of production and productivity, a Directorate of Pulses Development has been functioning, (now located at Bhopal), with a vision of attaining self-reliance in pulses for household nutritional security and sustainability of the production system.

2) Pulses were brought under the ambit of the Technology Mission of the Ministry's Department of Agriculture & Co-operation in August 1990
3) The National Food Security Mission, launched in 2008, aims at increasing the production of pulses by 2 million tonnes by 2011
4) The government has roped in International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) along with various Agriculture Universities to work with farmers in order to use rice fallows for pulses cultivation
5) National Commission on Farmers was formed under Mr MS Swaminathan, but its core recommendations are yet to be implemented
6) Integrated scheme of Oilseeds, Pulses, Oil Palm and Maize (ISOPOM) was launched in 14 major pulses growing states
7) Rashtriya Krishi Vikas Yojna was launched under which states can undertake Pulses Development Programmes
8) Also, there are programmes like Accelerated Pulses Production Programme and Pulses and Oilseeds villages.

Despite, the launch of number of special mission/ programmes / schemes, production and productivity in pulses has not been optimized, as a result of which, India has remained a net importer of pulses and this failure has been a serious cause of concern.

Area, Production and Yield of Pulses in India

In 2007 India owned 23.31million ha under pulses accounting for 31.79 per cent of the world area with a total production of 14.50 million tons constitute 23.64 per cent of world production. The pulse output is stagnant at 14-15 million tonnes.

Lowest area of 18.78 million ha was under pulses during 1951-52 and highest 24.83 million ha during 1959-60. Production of pulses was minimum at 8.35 million tons during 1966-67 and maximum at 15.12 million tons during 2007-08. Lowest yield recorded at 377 kg/ha during 1966-67 and highest 635 kg/ha in three years namely in 1996-97, 1999-00 and 2003-04. As regards percentage of irrigation covered under pulses, it was observed that lowest area

devoted for irrigation was to the extent of 7.1 per cent during 1977-78 and highest at15 per cent was during 2005-06.

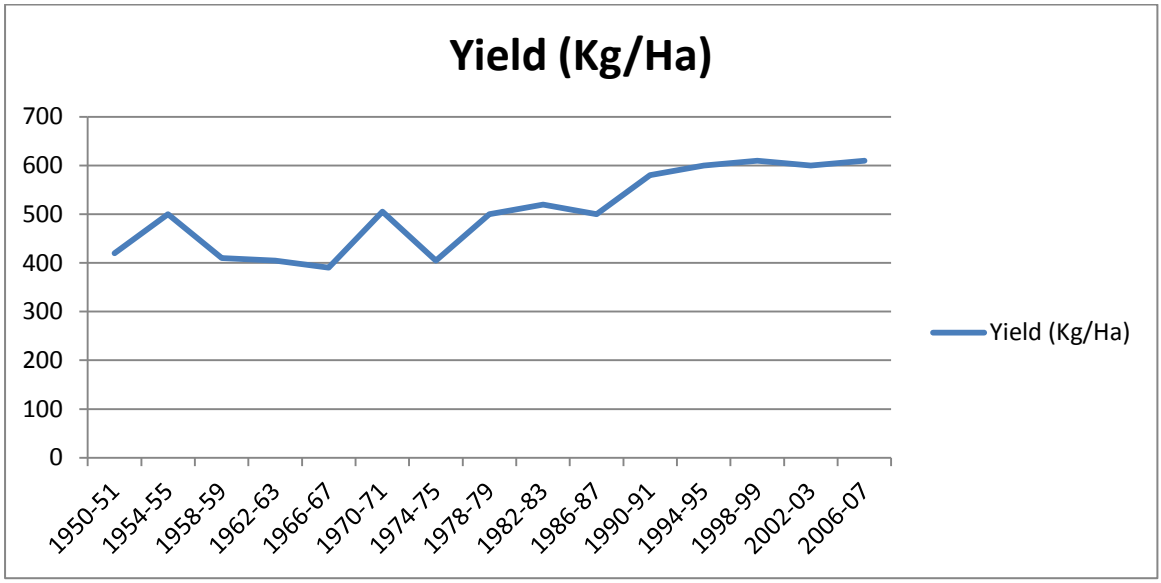


Fig 2: Yield of pulses during 1950-51 to 2006-07 in India

Source: Economic survey, GoI, 2007-2008

Table 3: Area and production of pulses and food grains in India during 1960-61 to 2006-07

Year	Area		Production	
	Food Grains	**Pulses**	**Food Grains**	**Pulses**
1960-61	115.6	23.6 (20)	82.5	12.7 (15)
1970-71	124.3	22.54 (18)	108.4	11.82 (11)
1980-81	126.7	22.46 (18)	129.6	10.63 (8)
1990-91	127.8	24.66 (19)	176.4	14.26 (8)
2000-01	121	20.35 (17)	198.8	11.08 (6)
2001-02	122.8	22.01 (18)	212.9	13.37 (6)
2002-03	113.9	20.50 (17)	174.8	11.13 (7)
2002-03	123.4	23.46 (19)	213.2	14.91 (7)
2003-04	120.1	22.76 (19)	198.4	13.13 (7)
2004-05	121.6	22.39 (18)	208.6	13.39 (6)
2005-06	123.5	23.19 (19)	216.1	1420 (7)

(Area in Million ha. and Production in Million Tons)

***Figures in the parentheses indicate percentage of pulses to food grains**

Source: Economic survey, GoI, 2007-2008

Area under pulses as a percentage of area covered under food grains varied from 17 to 20 per cent over the years, while production ranged from 6 to 15 per cent. Most interestingly, share of pulses production compared to food grain production started declining from 11 per cent in 1970-71 to7 per cent in 2000-01 to 2002-03 and in 2005-06.

Productivity of Pulses vis-a-vis Food Grains

Productivity of pulses vis-à-vis food grains during 1960-61 to 2006-07 is indicated in Table 4 .

Table 4: Productivity of pulses vis-à-vis food grains during 1960-61 to 2006-07

Year	Food grains	Index (Base 1960-61)	Pulses	Index (Base 1960- 61)
1960-61	710	100	539	100
1970-71	842	119	524	97
1980-81	1023	144	473	88
1990-91	1380	194	578	107
2000-01	1626	229	544	101
2001-02	1734	244	607	113
2002-03	1535	216	543	101
2003-04	1727	243	635	118
2004-05	1652	233	577	107
2005-06	1715	242	598	111
2006-07	1750	246	612	114

Source: Directorate of Economics and Statistics, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Productivity of food grains increased by 146 per cent compared to pulses by 14 per cent during 1960-61 to 2006-07. Table 4 exhibited indices of food grains and pulses. This reflects the fact that Indian pulses sector has a long way to go in terms of productivity.

Share of Irrigated Area under Pulses vis-a-vis Food grains and Cereals

The low productivity of the pulses can be explained better in terms of its low irrigation coverage. The Table 5 shows the irrigated area under pulses vis-a-vis that of total food grains and cereals.

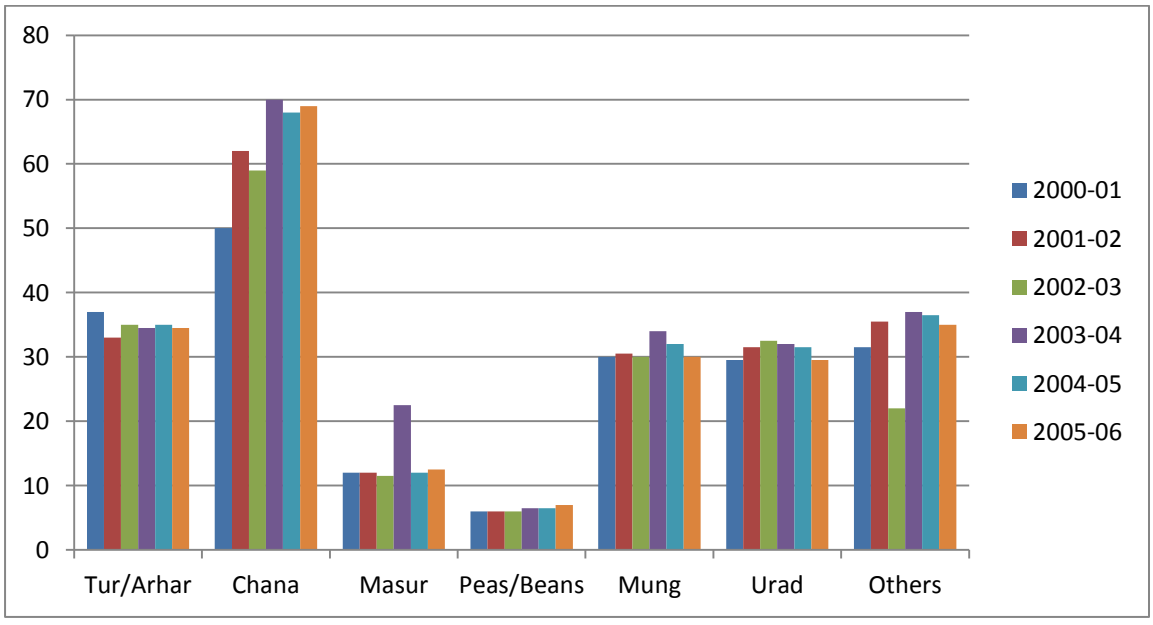
Table 5: Irrigated area under pulses vis-a-vis that of total food grains and cereals.

Year	Total cereals	Total pulses	Total food grains
1970-71	27.6	8.8	24.1
1980-81	34.1	9.0	29.7
1990-91	41.0	10.5	35.1
2000-01	50.4	12.5	43.8
2001-02	50.4	13.4	43.5
2002-03	50.4	14.1	43.4
2003-04	49.7	13.7	42.6
2004-05	51.4	14.0	44.1
2005-06	52.3	15.0	45.5

Source: Directorate of Economics and Statistics, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

The percentage of irrigated area to the total area under pulses went up from 8.8 per cent during 1970-71 to 15 per cent during 2005-06, while it was 27.6 per cent to 52.3 per cent for cereals and 24.1 per cent to 45.5 per cent for total food grains. This reiterates the fact that pulses are cultivated mainly in the rain-fed areas.

Figure 3: Area under major pulses production (lakh Ha.)



Source: Directorate of Economics and Statistics, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI

Table 6: Production of major varieties of pulses in India during 2000-01 to 2005-06 (lakh tons)

Pulse	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06
Tur/Arhar	22.65 (618)	22.6 (679)	21.06 (651)	23.56 (670)	23.47 (667)	27.38 (765)
Chana	38.55 (744)	54.73 (835)	42.37 (717)	57.17 (811)	54.69 (815)	56.00 (808)
Masur	9.15 (619)	9.74 (664)	8.73 (634)	10.38 (743)	9.94 (675)	9.46 (629)
Peas/Beans	5.36 (819)	6.08 (906)	5.92 (891)	7.25 (1022)	7.86 (993)	7.1 (896)
Mung	10.23 ((340)	11.11 (360)	8.67 (288)	17.02 (480)	10.58 (317)	9.46 (304)
Urad	12.96 (431)	14.99 (454)	14.73 (415)	14.71 (430)	13.27 (419)	12.45 (419)
Others *	12.03	14.44	9.77	18.95	11.49	11.99
Total	110.93 (544)	133.69 (607)	111.25 (543)	149.04 (635)	131.00 (577)	133.84 (598)

***Figures in the parentheses indicates the productivity of pulses**
***Others includes moth, lathers, kulthi**

Source: Directorate of Economics and Statistics, MoA, GoI

Among the major varieties of pulses, productivity of peas was highest at 896kg/ ha. in 2005-06, while it was lowest at 304 kg/ha.forMung. Productivity of Chana was recorded at 808 kg/ha followed by 765 kg/ha. forTur, 629 kg\ha for Musur and 419 kgs /ha.forUrd. Productivity of all pulses except Mug and Urad increased during 2000-01 to 2005-06.

State wise Scenario

Area, production and yield of major varieties of pulse growing States in 1995-96 & 2006-07 is indicated in Table 7

Table 7: Area, production and yield of pulses in major States in India in 1995-96 and 2006-07

	1995 -1996			2006—2007		
State	Area (Million Ha)	Production (Million Tons)	Yield (Kg/ha)	Area (Million Ha)	Production (Million Tons)	Yield (Kg/ha)
Maharashtra	3.3	1.67	503	3.83	2.30	602
Madhya Pradesh	5.1	3.1	604	4.11	3.20	780
Uttar Pradesh	2.9	2.3	770	2.72	1.98	725
Rajashtan	3.6	1.5	409	3.21	1.48	462
Andhra Pradesh	1.5	0.6	416	1.98	1.35	679
Karnataka	1.5	0.7	474	2.37	0.89	377
Gujarat	0.8	0.5	543	1.00	0.59	593
Chhattisgarh				0.91	0.49	543
Bihar	0.9	0.6	620	0.61	0.44	722
Odisha	2.2	1.2	537	0.79	0.35	445
Timal Nadu	0.9	0.4	374	0.54	0.29	541
Jarkhand				0.38	0.26	686
West Bangel	0.2	0.1	641	0.22	0.15	703
Haryana	0.4	0.4	972	0.17	0.14	824
Others	0.4	0.2	-	0.35	0.29	-
All India	23.70	13.27	552	23.19	14.20	612

Source: Directorate of Economics and Statistics, MoA, GoI

It is revealed from the data presented in Table 7 that there is difference in quantum of pulses produced across the States due to variation in productivity. Yield per ha is lowest (377 kg per ha) in Karnataka and highest in Haryana (824 kg per ha) in 2006-07. Country-wise area, production and yield of tur/ arhar is indicated in Table 8.

Global scenario of Tur/Arhar (red gram)

World area, production, and yield of Tur/Arhar in India in 2005 is depicted in Table 8

Table 8: Area, production and yield of Tur/Arhar across the country in world in 2005

Country	Area(in ha)	% share	Production (in tons)	% share	Yield (kg/ha)
India	**3500000**	**76.3**	**2400000**	**73.2**	**685**
Kenya	200000	4.4	105000	3.2	525
Malawi	123000	2.7	79000	2.4	642
Myanmar	540000	11.8	500000	15.3	925
Nepal	29000	0.6	26000	0.8	896
Tanzania	68000	1.5	50000	1.5	735
Uganda	84000	1.8	84000	2.6	1000
Others	43042	0.9	33995	1.0	810
World	**4587042**	**100**	**3277995**	**100**	**714**

Source: FAO Statistics.

It could be seen from Table 8 that India is the main country producing tur/arhar with more than 76 per cent of world area and more than 73 per cent of world production. However, India's productivity per ha is 3rd lowest after Kenya and Malawi. The highest productivity per ha is Uganda and Myanmar. The average productivity of world is 714 kg/ha against 685 kg/ha in India.

Figure 4

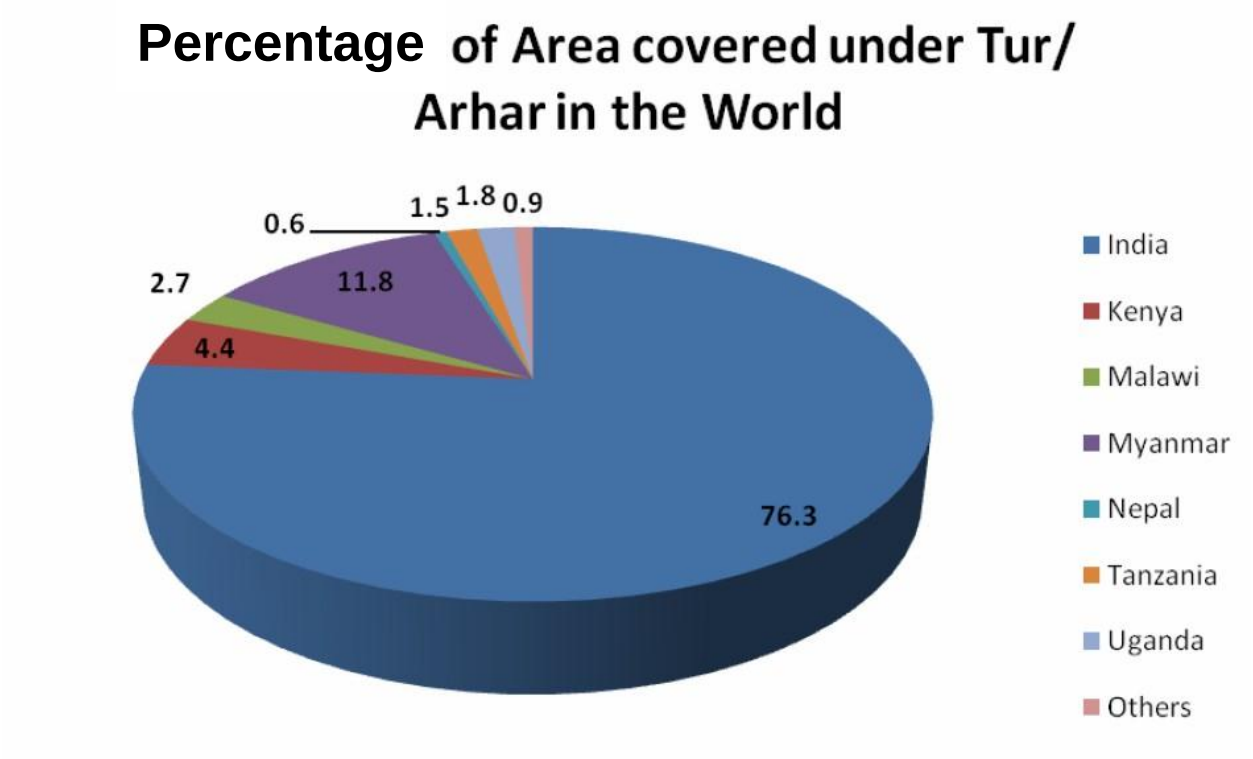
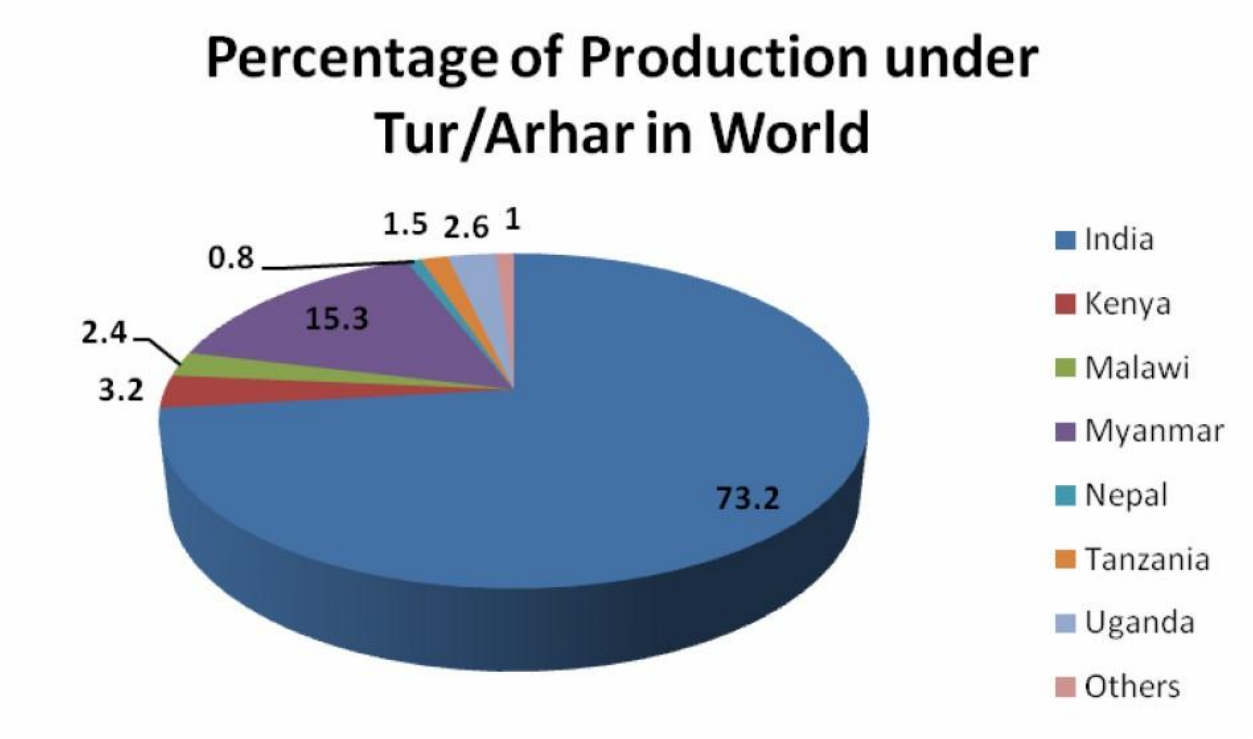


Figure 5



Source: FAO Statistics.

World area, production and yield of Chana/ Gram across the country in 2005 are depicted in Table 9

Table 9 Area, Production and Yield of Chana/Gram across the country in world in 2005

Country	Area (in ha)	% share	Production (in tons)	% share	Yield (Kg/ha)
India	**7290000**	**65.3**	**5770000**	**67.2**	**791**
Australia	113000	1.0	114000	1.3	1008
Ethiopia	168089	1.5	135930	1.6	808
Iran	755000	6.8	310000	3.6	410
Mexico	150000	1.3	240000	2.8	1600
Myanmar	208000	1.9	230000	2.7	1105
Pakistan	989000	8.8	548000	6.4	555
Turkey	630000	5.6	650000	7.6	1031
Others	855336	7.7	585209	6.8	684
World	**11155425**	**100**	**8583139**	**100**	**769**

Source: FAO Statistics.

Data presented in Table 1.9 states that India produces 67 per cent of chana /gram of the world. However, the productivity is third lowest (791 kg/ha) after Iran (410kg/ ha) and Pakistan (555 kg/ha). The highest productivity per ha is in Mexico (1600 kg/ ha) followed by Myanmar (1105kg/ ha), Turkey (1031 kg/ha) and Australia (1008 kg/ha) . The average productivity of world is 769 kg/ha against 791kg/ha in India.

Figure 6

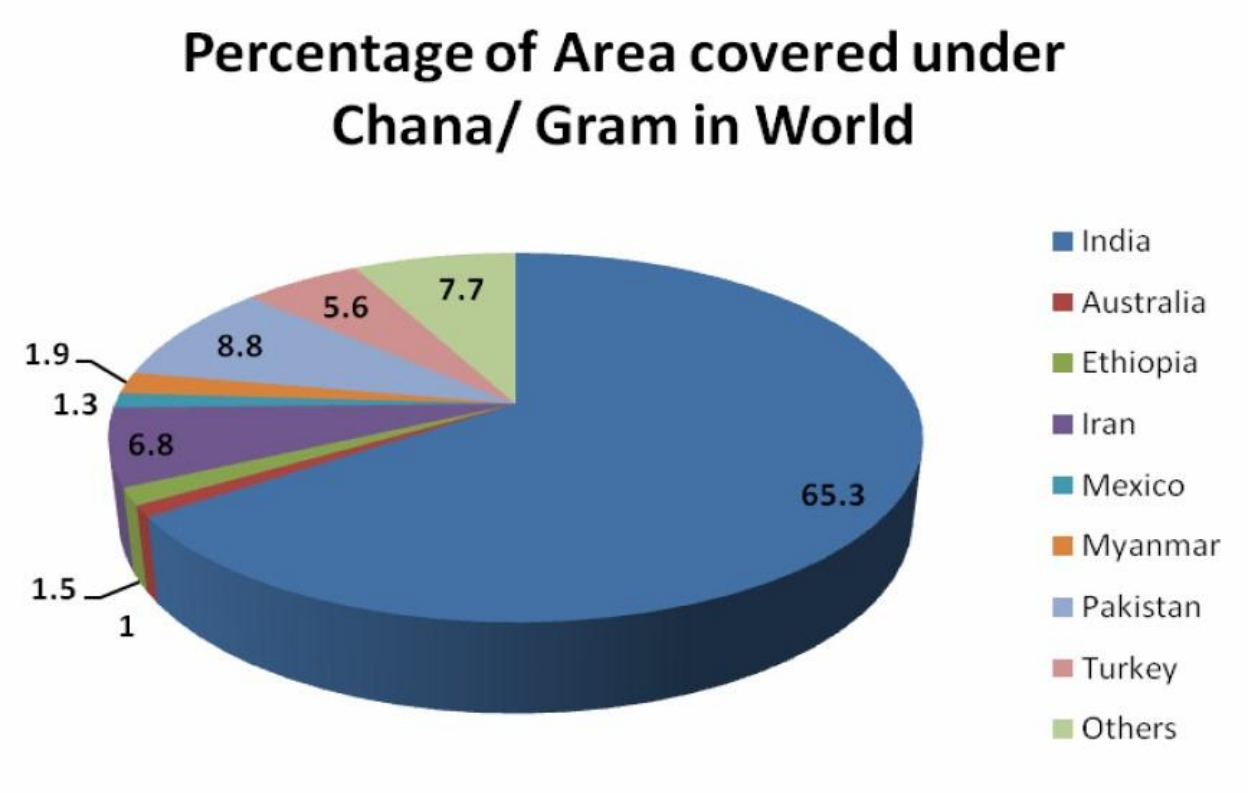


Figure 7

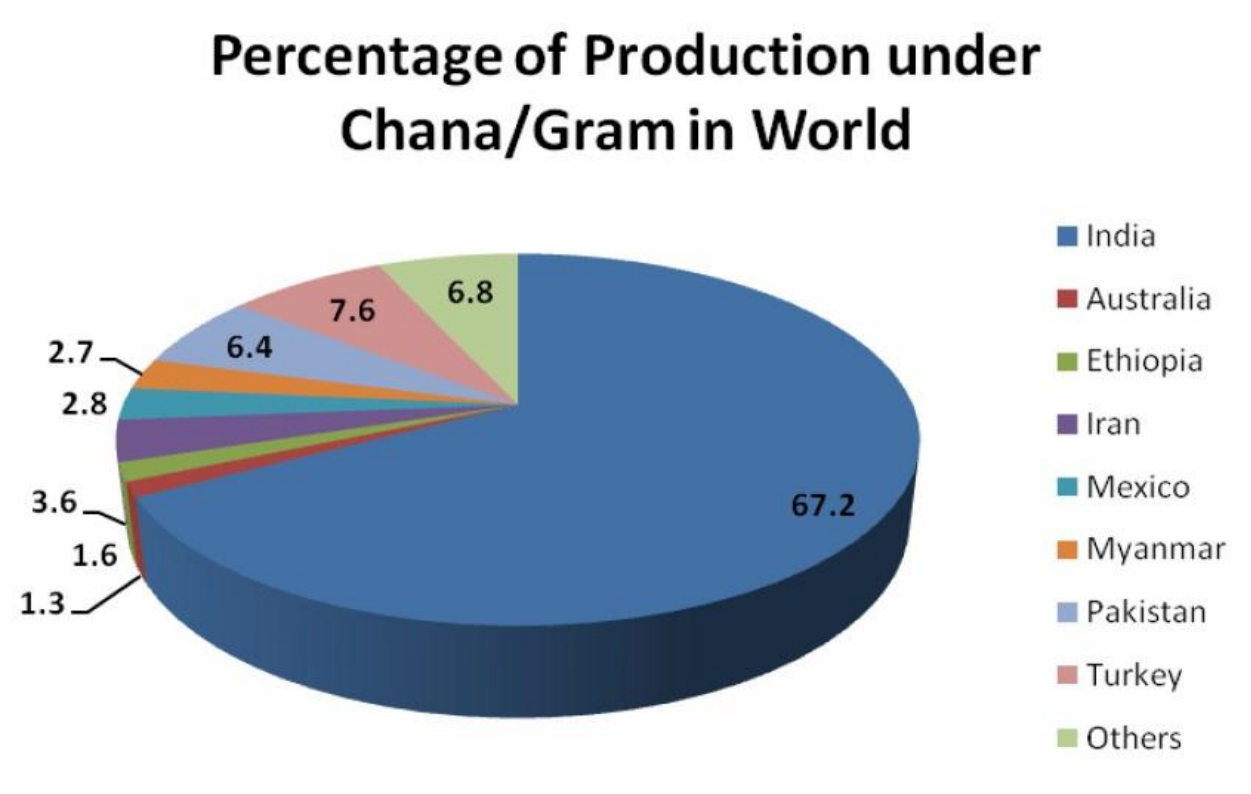


Figure 6 and 7: Area, Production and Productivity of Chana in India

Source: FAO Statistics.

India is the largest producer of chana/gram in the world. The data relating to area, production and yield of chana in India during 1950-51 to 2007-08 is given in Annexure-1.

It is observed from Annexure-1 that during 1950-51 to 1959-60 area under chana jumped up from 7.57 million hectares to 10.33 million hectares showing an increase of 36.5 per cent. However, the same trend was not observed in subsequent period. Area got reduced to 7.58 million hectares in 2007-08 from 9.28 million hectare in 1960- 61. The growth of area was 1.3 per cent during last 57 years. During this period, production has increased from 3.65 million tons (1950- 51) to 6.91 million tons (2007-08) witnessing a growth of 89.3 percent and yield improved from 482 kg/ha in 1950-51 to 780 kg/ha in 2007-08 registering a growth of 61.8 per cent. Growth in production was solely due to productivity gain and not because of area expansion. This productivity gain could be attributed to increased area under irrigation from 12.5 per cent in 1950-51 to 32.1 per cent in 2002-03.

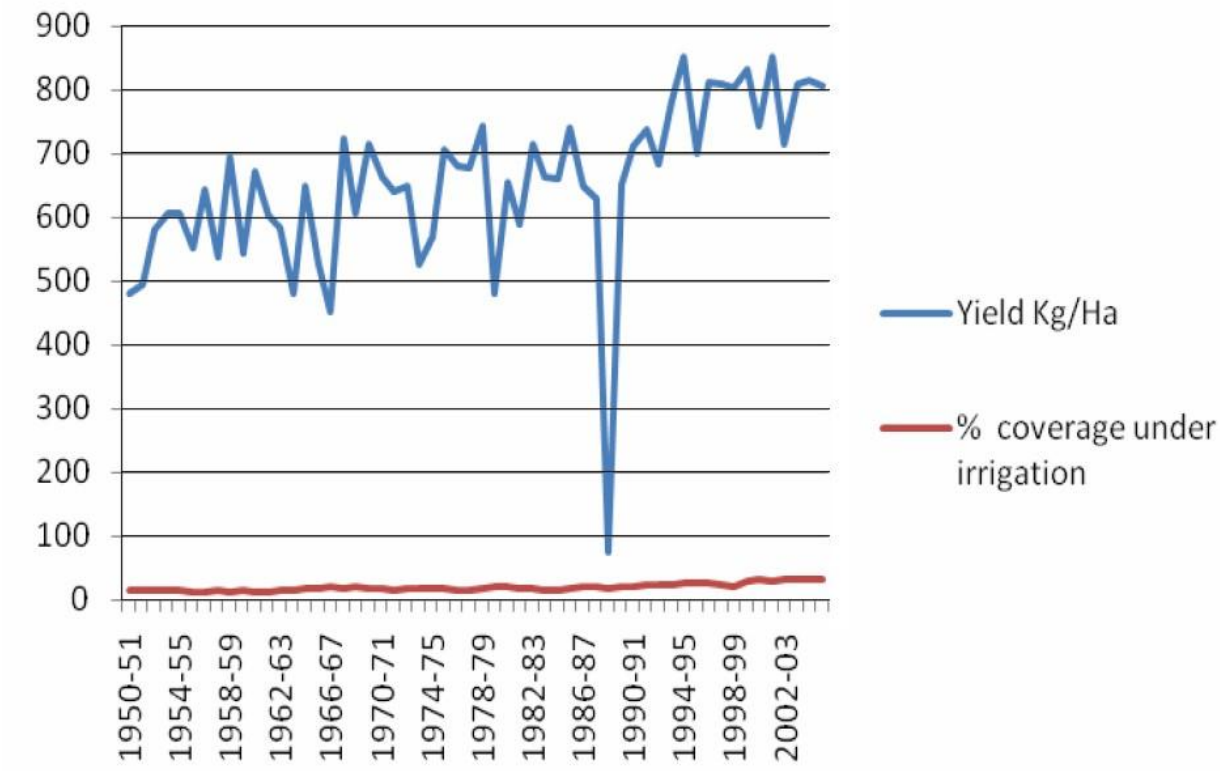


Figure 8: Yield of Chana and percentage area irrigated to total area during 1950-51 to 2005-06

Source: Directorate of Economics and Statistics, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

State Wise Scenario

The major chana growing States are Madhya Pradesh, Maharashtra, Rajasthan, Uttar Pradesh, Andhara Pradesh and Karnataka. Area, production and yield of chana in major States during 2006-07 are indicated in Table 10.

Table 10 Area, production and yield of chana in major States in India during 2006-07

State	Area		Production		Yield
	Million ha	% to all India	Million Tons	% to all India	Kg/ha
Maharashtra	1.31	17.49	0.92	16.20	706
Madhya Pradesh	2.46	32.84	2.41	22.54	980
Rajasthan	1.01	13.48	0.87	13.94	863
Uttar Pradesh	0.68	9.08	0.50	9.51	742
Karnataka	0.65	8.68	0.31	6.27	473
Andhra Pradesh	0.60	8.01	0.65	10.42	1085
Haryana	0.11	1.47	0.09	1.42	843
All India	7.49	100	6.33	100	845

Source: Directorate of Economics and Statistics, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

It could be seen from Table 10 that maximum area covered under Chana was to the extent of 32.84 per cent in MP followed by Maharashtra (17.49 per cent). Share in production was 22.54 percent in Madhya Pradesh followed by Maharashtra (16.20 per cent). Highest yield was registered at 1085 kg/ha in Andhra Pradesh followed by Madhya Pradesh (980 kg/ha.), Rajasthan (863 kg/ha), and Haryana (843kg/ha).

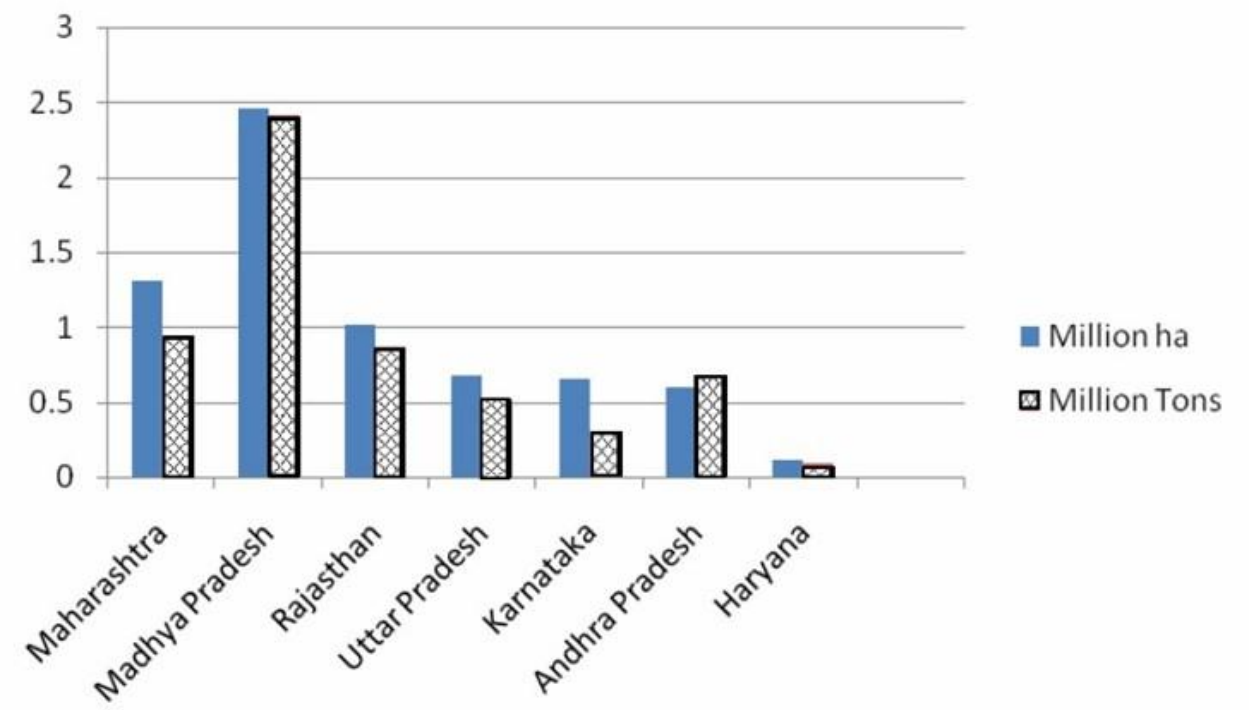


Figure 9: Area and Production of Chana across the States in India during 2006-07

Source: FAO Statistics.

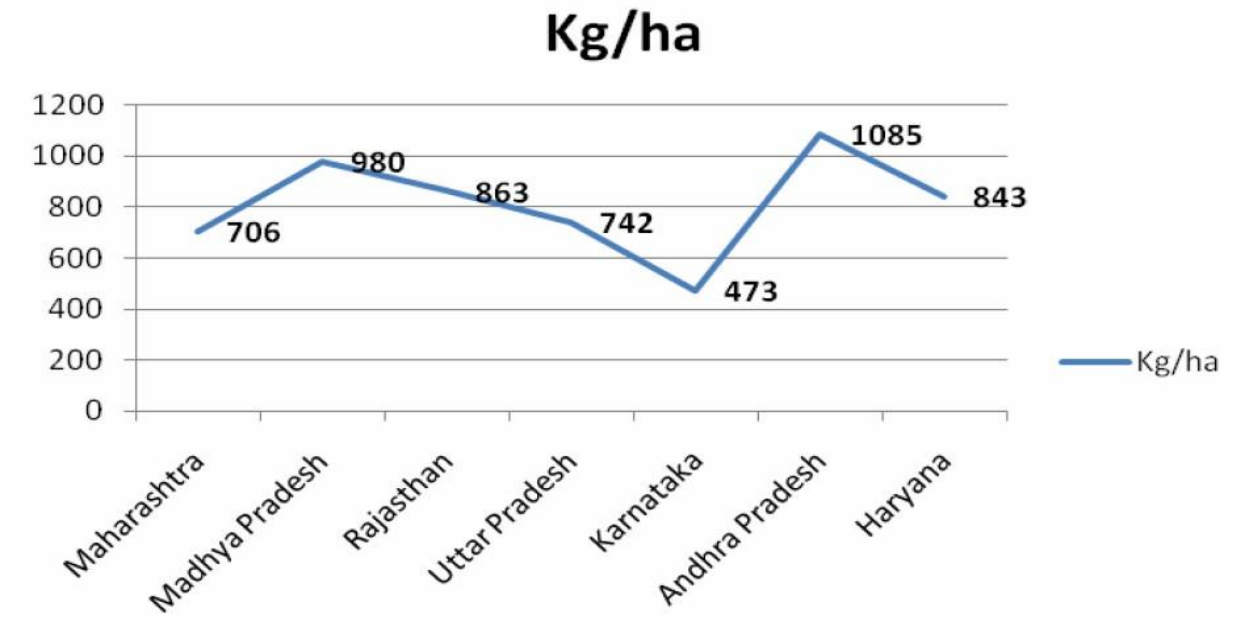


Figure 10: Yield of Chana across the States in India during 2006-07

Source: Directorate of Economics and Statistics, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Per Capita Net Availability of Pulses

The fluctuation in production has cast an impact on the net availability of pulses in the country as can be seen from Table 11.

Table 11: Per capita net availability of pulses and Cereals in India during 1950-51 to 2005-06 (Grams/day)

Year	Cereals	Pulses	Total food grains
1950-51	334.2	60.7	394.9
1960-61	**399.7**	**69.0**	**468.7**
1970-71	417.6	51.2	468.8
1980-81	417.3	37.5	454.8
1990-91	468.5	41.6	510.1
2000-01	386.2	30.0	416.2
2001-02	458.7	35.4	494.1
2002-03	**408.5**	**29.1**	**437.6**
2003-04	426.9	35.8	462.7
2004-05	390.9	31.5	422.4
2005-06	412.1	32.5	444.5

Source: Directorate of Economics and Statistics, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Despite the fact that India is the largest producer of pluses in the world with 25 per cent of total production, 30 per cent of total consumption and 33 per cent of global acreage under pluses, the per capita domestic consumption /availability of pluses has declined from 69.0 grams/day in 1960-61 to 32.5 grams/day in 2005-06. Lowest per capita net availability stood at 29.1 grams/day was during 2002-03. Per capita net availability of food grains in India during 1951 to2007 (rice, wheat, others cereals, cereals, gram and other pulses) are indicated in Annexure-1

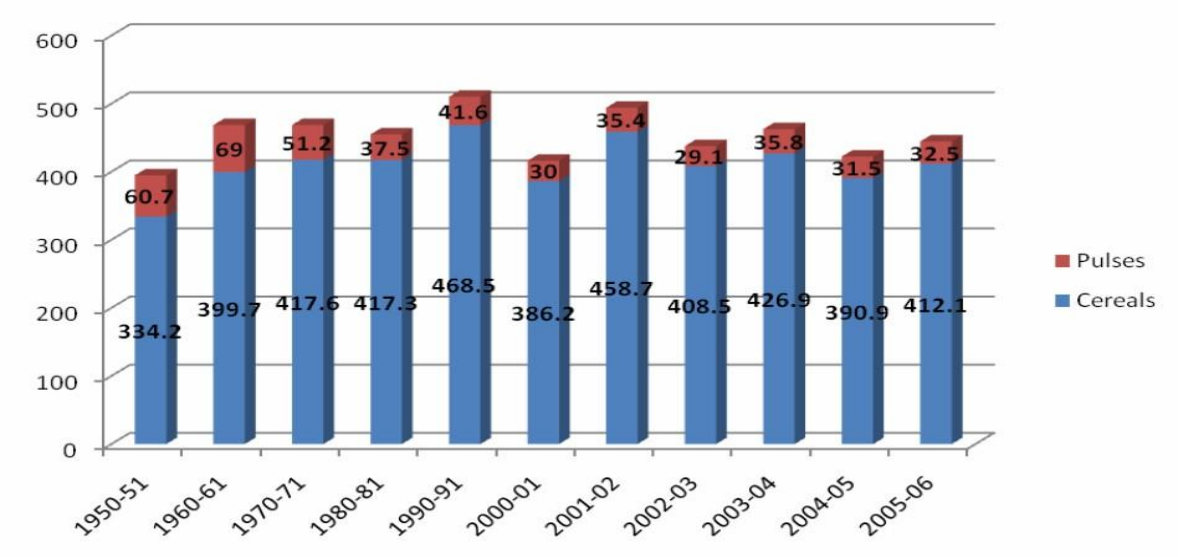


Figure 10: Per capita availability of cereals and pulses in India during 1950-51 to 2005-06

Source: Directorate of Economics and Statistics, Dept. of Agriculture and Cooperation, Ministry of Agriculture

Global Overview

India, China, Canada, Brazil and Myanmar are the top five countries accounting for 50% of global production. The world acreage for pulses was estimated at 72 Mn Ha in 2007. Global production of pulses in 2007 was 56 mntonnes. India is the world leader, with 25% share of world production. The global production of pulses has also remained practically stagnant over the last decade - primarily due to the flat growth in India's production. India consumes 30% of global pulses production. China and Brazil are a distant second in consumption, with 6% share each.

Canada is the largest exporter of pulses in the world with 26% share, valued at USD 1.2 billion in 2007. Nearly 27% of Canada's exports are to India. Other major pulses exporting countries include China, Myanmar, Australia and the US. The Indian government has banned exports of pulses, except for a particular type of chickpeas, to ensure availability in the domestic market.

Average global yield was 819 kg/ha (average of 2005, 2006, 2007) with Canada and the US having yields of 1900 kg/ha – about three times the Indian average. Subsistence farming in developing countries versus a market driven approach in developed countries, as well as

climatic conditions and level of mechanization and infrastructure development, have resulted in wide variation in yields across countries.

There are quite a few factors affecting yield of pulses, viz., Climate / Soil / Timely availability of inputs / Usage of high yielding variety (HYV) seeds and short duration pulses varieties / Investment in mechanization, irrigation, pest management and other crop specific farm practices / changes in cropping pattern like double cropping or intercropping / Level of development / Infrastructure / Efficient supply chain and Market mechanisms.

Reasons for Low Production in India

India Pulses Production: While population has grown at 2% CAGR, pulses production has grown at a meagre 0.7% CAGR from FY 1971-2008.

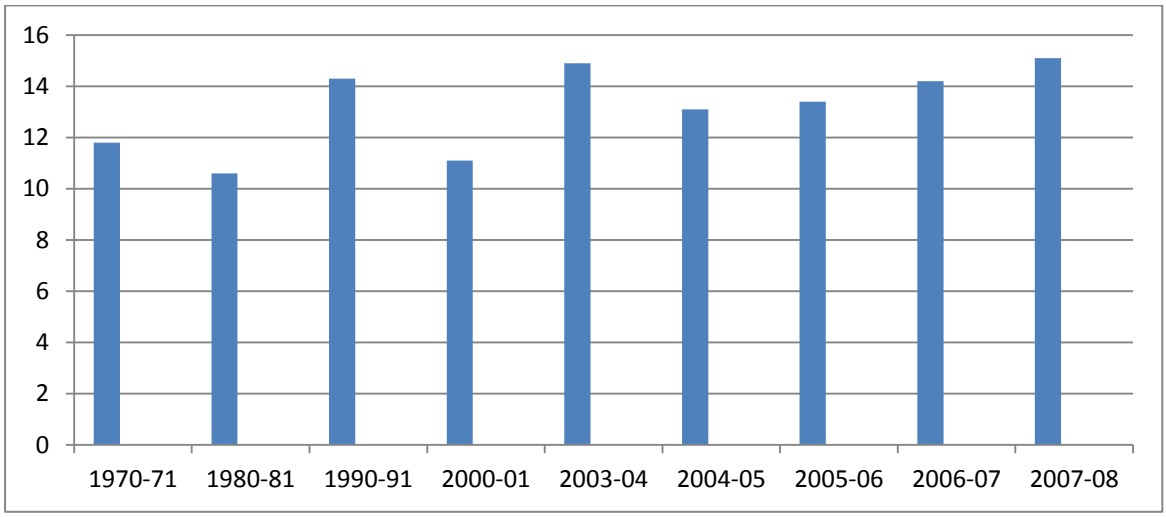


Figure 11: India's Pulses Production (in million tonnes)

Source: FAO Statistics.

1) Pulses in India are considered a residual crop and grown under rain-fed conditions in marginal/ less fertile lands, with very little focus on pest and nutrient management.

2) Pulses were not the beneficiary of the Green Revolution and the post-Green revolution era has also witnessed most of government thrust on wheat and rice.

3) There has been no technology breakthrough in any of the pulse crops.

4) Farmers perceive pulses as having a lower cost benefit ratio vis-à-vis other crops like wheat and rice.

5) Penetration and adoption of high yielding varieties (HYV) seeds are also low.

6) Only 15% of the pulses crop receives any irrigation - as against an average 46% for all food grains combined (90% for wheat and 56% for rice).

7) Heavy weed infestation, blue bull and pod borers cause substantial damage to standing crops. Over 30% of standing crops are destroyed by pests before harvest. In addition, there are post-harvest losses during storage, due to excessive moisture and attack by stored grain pests especially the pulse beetle.

8) Seed replacement rate in India is very low, estimated at 2-7% compared to the recommended 25-30%. Timely availability of genuine certified quality seeds is another critical issue. Deviation from timely agronomic practices / application of inputs results in sub-optimal yields.

9) Absence of assured off-take has also been an issue for pulses cultivation.

Individually and collectively, these factors have resulted in pulses being considered as risky crops, with yield levels amongst the lowest in the world. It is, therefore, paramount to examine the challenge of high pulses prices by looking at the relevant issues more closely for an affirmative action to ensure that pulses are available to all at affordable prices and the farmers get remunerative returns on their investments.

LITERATURE REVIEW

Introduction

Pulses, the food legumes, have been grown by farmers since millennia, and these have contributed in providing nutritionally balanced food to the people of India. While pigeonpea, black gram, green gram, lablab bean, moth bean, and horse gram have definitely originated and domesticated in the Indian subcontinent, there is a probability that chickpea and lentil (Indian type) were also domesticated in the Indian subcontinent. Pea, grass pea, and cowpea were introduced in India millennia ago. Only faba bean was introduced in medieval times. This paper briefly describes how the pulses constituted an important item of food, how these were cultivated, and how food preparations evolved. Though substantial progress has been made in evolving techniques to obtain high yields of pulses, their production per hectare has remained the same for the last two centuries. Lessons learned from this review have been listed. Pulses have been grown since millennia and have been a vital ingredient of the human diet in India. Even "balanced food" – as defined over 1000 years ago – consisted of pulses, besides cereals, vegetables and fruits, and milk products (Ayachit, 2002). Today, nutritionists tell us that pulses are important because they provide the essential proteins.

Mankind began as a carnivorous species (and still is), but people who wanted to avoid killing animals for food, found out the utility of milk and milk products, and thus obtained nourishment with proteins of animal origin. Even today, pulses and milk provide the full complement of proteins to people who avoid eating meat. Including broad bean or faba bean (Viciafaba), which never became popular except in some areas, India has been growing 12 different pulse crops. The others are: chickpea (Cicerarietinum), pigeonpea (Cajanuscajan), lentil (Lens culinaris), black gram (Vignamungo), green gram or mung bean (Vignaradiata), lablab bean (Lablab purpureus), moth bean (Vignaaconitifolia), horse gram (Dolichosuniflorus), pea (Pisumsativum var. arvense), grass pea or khesari (Lathyrussativus), and cowpea (Vignaunguiculata). Any discussion on the history of a crop usually begins with the currently held view about its geographical origin and domestication. Conclusions regarding the origin and domestication of these major pulses have been drawn by plant explorers and botanists on the basis of three main criteria – archaeological findings, presence of wild relatives of a species in a region, and available documentation. All these three criteria suffer from severe limitations. For example, one could ask a simple question, "How extensive

have been the archaeological investigations?" Botanists have jumped to conclusions too often, and one extreme example is that of the finding of a single carbonized seed, which looked like pigeonpea, in an Egyptian tomb (2400–2200 BC) leading to the claim that pigeonpea originated in Eastern Africa (van der Maesen, 1990). A similar question can be asked about the findings of wild species, because the exploratory expeditions have been too few, covering some regions more thoroughly than others. Available documentation the world over of course is limited.

Pulses represent important crops in most agricultural systems, and legumes have been domesticated for their seeds in several centres of origin. In traditional Indian subsistence, pulses are particularly important, providing a primary source of protein for vegetarian castes as well as for poorer classes without regular access to meat (Kachroo and Arif 1970; Smartt 1990). The role of pulses in double-cropping systems and crop rotations is also well known for helping to maintain or increase soil nitrates. After the large seeded cereals (wheat, barley, rice), pulses are the most commonly recovered charred plant remains in South Asian archaeobotany (Kajale 1991; Weber 1992; Saraswat 1992; Fuller 2002). Pulses recovered in Indian archaeology include species from the Near Eastern 'founder crops' (sensu Zohary 1996; 1999), as well as species native to Africa and to South Asia. Pulses have been reported from 90 sites in South Asia, across a wide geographical area Criteria for the identification of pulse species in South Asia are outlined, as a review of the literature suggested that there has been some inconsistency between reports (Fuller 2002, 282–3). Problems and prospects for inferring domestication are discussed with reference to the example of mungbean (Vignaradiata). In order to interpret finds of pulses, possible routes to archaeological preservation need to be considered, and therefore a provisional model of alternative pulse crop-processing models is outlined. Then in the light of this background, the available archaeobotanical evidence for pulses in South Asia is reviewed and discussed (based on the sites reviewed in Fuller 2002, with supplemental references). A distinction can be drawn between regions in which sites yield abundant archaeological evidence for pulses and those where pulse finds are relatively rare and some possible explanations are proposed.

Identification criteria for South Asian pulses

The focus of this section will be major agronomic pulses in India that originated in the Old World tropics. Although these taxa have been reported in Indian archaeobotany in the past,

detailed consideration of identification criteria has not always been presented and illustrated, and there have been some possible misidentifications in the literature. Several pulses of South-west Asian origins are also reported from South Asian sites, but identification of these is likely to be more straightforward as they have relatively few congeric relatives in South Asia. The present identification criteria are based on modern comparative material and illustrated with reference to archaeological examples drawn from Neolithic sites from South India (the states of Karnataka and Andhra Pradesh) and North India (Orissa and Uttar Pradesh). The taxonomy of pulses used here follows Smartt (1990). Identification criteria are suggested which are normally preserved in archaeological material. As the most common form of archaeological preservation, charring must be understood in terms of its effects on potential identification of pulses. Nevertheless, there have been relatively few experiments on the effects of charring on pulses. Most\published charring experiments have been restricted to the major cereals, wheat and barley (e.g. Hopf1955; Renfrew 1973; Boardman and Jones 1990; Viklund 1998), and Near-eastern/European legumes, such as broad bean (Viciafaba), pea (Pisumsativum), and lentils (Lens culinaris) (Kislev and Rosenweig 1991). The few reported figures for pulses suggest similar extents of shrinkage in which the length is shortened by 10–20% or perhaps somewhat more but the width is less affected, generally closer to 10% (Kislev and Rosenwieg 1991; Lone et al. 1993; Braadbharrt et al. 2004). These experiments suggest that good analogues for archaeological specimens can be achieved by experimental charring in the 200–300uC range. Recent open fire experiments have shown that open fires may reach much higher temperatures and still preserve pulses (Jupe 2003). Another important experimental result is evidence that destruction of the seed coat is a threshold condition after which shrinkage rates are greatly increased in pulses. For this reason specimens with intact seed coats should to be considered metrically apart from the more common archaeological pulses that lack their testa.

The size, shape, and placement of the hilum is usually quite characteristic but less often preserved, so emphasis has been placed on overall shape, and the shape and placement of the plumule on spilt cotyledons. Most of these species can be readily identified on the basis of these morphological features and only in the case of certain Vigna spp. has it been found useful to supplement these with statistical considerations and anatomical features studied with the aid of a scanning electron microscope (SEM). As will be seen, the tropical pulses of the tribe Phaseolae generally have large lateral plumules. Members of this group can be readily separated from those of South-west Asian origin, of the tribe Vicieae, which mostly

have small lateral plumules with long radicles that curl around the edge of the cotyledon, and the otherwise distinctive chickpea (Cicerarietinum) of the tribe Cicereae. No clear way exists for distinguishing wild from domesticated morphological forms in the pulse taxa identified, although cultivation has selected for important genetic changes in pulses, including loss of natural pod dehiscence and loss of germination inhibition mechanisms (Zohary and Hopf 1973; 2000). Unfortunately these traits are not readily identifiable in archaeological specimens. Pod dehiscence is not necessarily an absolute character, as is evident in modern cultivars of Vignaradiata and Cajanuscajan, some amount of natural pod dehiscence persists amongst some varieties (Kachroo and Arif 1970; Van der Maeson 1995) and, in any case, pod fragments that might reveal this trait have not been recovered archaeologically. Loss of germination inhibition is tied generally to a thinning of the seed coat (Butler 1989) although a comparative study of this has not been carried out on the Indian pulses under consideration. In addition, pulse testas are rarely preserved in the authors' Indian Neolithic material, although those on Macrotylomauniflorum are more frequent and could repay future SEM study.

Archaeobotanical evidence allows for the identification of the whole range of pulses in India. Unfortunately actual indicators of the domestication process are not yet known. It appears that post-domestication size change, at least for Vignaradiata, was considerably delayed from the earliest cultivation by perhaps 1500–2000 years. Early domesticated pulses can be considered 'primitive' in the sense that they are indistinguishable in size from their wild progenitors. This may have implications for the nature of early pulse fields, which presumably did not have the kinds of conditions that would be expected to select for larger seeds. The role that handpicking of pods may have played in delaying selection for some domestication traits deserves research, although as we have suggested a key factor may be tillage methods, with the presence of deep tillage such as that by animal-drawn ards suggested to be a key factor in selecting for larger seed size. Ladizinsky (1987) argues that selection of 'domesticated' pulses, in terms of pod indehisence, may have needed to have occurred before cultivation was feasible (a hypothesis not accepted by Zohary and Hopf 1973; 2000). The implication of Ladizinsky's observations on wild lentils, in terms of seed production, yield and dispersal, is that they differ from wild cereals, and might therefore need to be considered through a different model of domestication. The evidence for a delay in seed size increase, as seen in Indian Vigna spp., similarly suggests a contrast with the processes of cereal domestication. Data from cereal grains in the Near East suggest that grain-size increase

may have occurred under primitive cultivation and preceded change to tough rachis cereals (Willcox 2004). Pulses might therefore represent a very different evolutionary trajectory in terms of the relative ordering of different aspects of the domestication syndrome.

On most sites that have been sampled systematically in peninsular India (including Maharashtra, Orissa, Karnataka, and Andhra Pradesh), pulses are amongst the more frequent find categories, which seems to be attributable to some distinctive aspect of pulse use. We have suggested that this may result from large scale use of pulse flours in Indian Peninsular culinary traditions, which remain important to the present day, as dry-roasting prior to flour grinding would have provided a recurrent route to accidental carbonization. While agriculture is often discussed in terms of staple cereals, pulses clearly play an important role in modern and ancient agriculture in India. Archaeobotanical research promises to elucidate this role and the part played by pulses in the origins of indigenous agricultural systems and spread of crop packages originating in other regions.

Table 12: Geographical origin and domestication of various pulses grown in India

Crop[1]	Geographical origin and domestication
Chickpea (*Chana*)	Turkey-Syria
Pigeonpea (*Tur, arhar*)	India
Lentil (*Masur*)	Southwest Asia (Turkey-Cyprus)
Black gram (*Urd*)	Indian subcontinent
Green gram (*Mung*)	Indian subcontinent
Lablab bean (*Sem, vaal*)	Indian subcontinent
Moth bean (*Moth*)	Indian subcontinent
Horse gram (*Kulthi*)	Indian subcontinent
Pea (*Matar*)	Southern Europe
Grass pea (*Khesari*)	Southern Europe
Cowpea (*Lobhia, chowli*)	West Africa
Faba bean (*Baqla*)	West Asia

1. Names in parentheses are in Hindi.

Source: Directorate of Economics and Statistics, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Desi chana (*Cicer arietinum*, chickpea)

Kabuli chana (*Cicer arietinum*, chickpea)

Masur (*Lens culinaris*, lentil)

West Asian lentil (*Lens culinaris, masur*)

Tur (*Cajanus cajan*, pigeonpea, *arhar*)

Urd (*Vigna mungo*, black gram)

Mung (*Vigna radiata*, green gram)

Sem (*Lablab purpureus*, lablab bean, *vaal*)

Moth (*Vigna aconitifolia*, moth bean)

Kulthi (*Dolichos uniflorus*, horse gram)

Matar (*Pisum sativum*, pea)

Khesari (*Lathyrus sativus*, grass pea)

Lobhia (*Vigna unguiculata*, cowpea, *chowli*)

Baqla (*Vicia faba*, faba bean) grows wild in Pantnagar area

Figure 12: Various pulses grown and consumed in India

Source: Directorate of Economics and Statistics, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.

Research has been ongoing in various areas to identify the emerging challenges related to imports in the Indian Pulses Industry. Both government-funded as well as independent research has been carried out to understand the economics of the industry. Research conducted by the government of Canada tries to study the consumer trends of pulses in India. The report offers a sector-wise insight into the general consumer trend prevalent in Indian pulses sector. The study is done by basically dividing the industry into three sectors: the yellow and green pea sector, lentil sector, and Chicpea sector.

A study conducted by United States Department of Agriculture talks about the changing dynamics of imports in the Indian Pulses Industry based on the purchasing power of customers and the price sensitivity of the Indian market. The report concludes that most Indian consumers are highly sensitive to prices when making food purchase decisions. Higher relative prices cause consumers to switch to lower priced pulse varieties and grades, and to other food items, such as cereals and vegetables. Another report based on research conducted by CII Expert Group on Pulses talks about the importance of pulses for India while simultaneously trying to touch upon the various factors that have contributed to the low production of pulses in India

An independent research conducted by Dr. R. Rajendran & R. Thamilmani of Department of Economics, Periyar E.V.R. College, Tiruchirappalli, Tamilnadu, tries to touch upon the economic impacts of the pulses crisis. The research concludes that problems of Indian pulses economy can be solved with the increase the sources of production and that continuous effort is needed to increase the area under cultivation as well as the yield of pulses.

One of the active bodies has been Indian Institute of Pulses Research (IIPR). IIPR, located in Kanpur, is a national institute established by the Indian Council of Agricultural Research (ICAR) to carry out basic strategic and applied research on major pulse crops. The institute also develops appropriate production and protection technologies, production and supply of breeder seeds of improved varieties, demonstration and transfer of technologies and strategic coordination of pulse research through wide network of testing centers across the country. The major pulses the institute concentrates on are chickpea, pigeonpea, mungbean, urdbean, lentil, rajmash and fieldpeas.

RESEARCH METHODOLOGY

The source of research is the secondary data obtained from several sources mentioned below. Necessary data for the study are import and export of pulses, area under cultivation of pulses crops, production of pulses, yield of different pulses crops, productivity index of the different pulses and net food grain availability of India.

Time series data for the above said variables have been collected from the publications of The Directorate General of Commercial Intelligence and Statistics (DGCI&S), Ministry of Agriculture and Cooperation, Directorate of Pulses Development, National Bank for Agriculture and Rural Development, Ministry of Commerce and other relevant sources.

Collected data are analyzed with simple analytical tools like percentage, coefficient of variation and trend analysis. Data have been collected generally for an approx. period of five decades staring from 1960-61.

The following reports form the basis of the secondary research done for the project:

1). "Overcoming the Pulses Crisis" by CII Expert Group on Pulses.

2). "Economics of Pulses Production and Processing of India" by Department of Economic Analysis and Research, National Bank for Agriculture and Rural Development.

3). "Consumer Trends – Pulses in India" by the government of Canada.

4). "India's Pulse Sector: Results of Field Research" by United States Department of Agriculture.

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A well-structured research process is vital in order to get the best out of any research. The use of secondary data is more helpful while doing the Exploratory Research of this type. Secondary research, also known as desk research, involves the summary, collation and/or synthesis of existing research rather than primary research, where data is collected from, for example, research subjects or experiments. Such secondary research uses the primary research of others typically in the form of research publications and reports. In a market research context, secondary research is taken to include the re-use by a second party of any data collected by a first party or parties. A key performance area in secondary research is the full citation of original sources, usually in the form of a complete listing or annotated listing. Secondary sources could include previous research reports, newspaper, magazine and journal content, and government and NGO statistics.

Exploratory research

Exploratory research is a form of research conducted for a problem that has not been clearly defined. Exploratory research helps determine the best research design, data collection method and selection of subjects. It should draw definitive conclusions only with extreme caution. Exploratory research often relies on secondary research such as reviewing available literature and/or data, or qualitative approaches such as informal discussions with consumers, employees, management or competitors, and more formal approaches through in-depth interviews, focus groups, projective methods, case studies or pilot studies. The Internet allows for research methods that are more interactive in nature. For example, RSS feeds efficiently supply researchers with up-to-date information; major search engine search results may be sent by email to researchers by services such as Google Alerts; comprehensive search results are tracked over lengthy periods of time by services such as Google Trends; and websites may be created to attract worldwide feedback on any subject.

When the purpose of research is to gain familiarity with a phenomenon or acquire new insight into it in order to formulate a more precise problem or develop hypothesis, the exploratory studies (also known as formulative research) come in handy. If the theory happens to be too general or too specific, a hypothesis cannot to be formulated. Therefore a need for an exploratory research is felt to gain experience that will be helpful in formulative relevant hypothesis for more definite investigation.

The results of exploratory research are not usually useful for decision-making by themselves, but they can provide significant insight into a given situation. Although the results of qualitative research can give some indication as to the "why", "how" and "when" something occurs, it cannot tell us "how often" or "how many". Usually, exploratory research is conducted with the expectation that subsequent research will be required to provide conclusive evi-dence, It is a serious mistake to rush into detailed surveys before less expen-sive and more readily available sources of information have been exhausted.

In an organization considering a program to help employees with childcare needs, for example, exploratory research with a small number of employees who have children might determine that many of them have spouses who also work and that these employees have positive reactions to the possibility of an on-site child-care program. In such a case exploratory research helps to crystallize a problem and identify information needs for future research.

Exploratory research methods

The quickest and the cheapest way to formulate a hypothesis in exploratory research is by using any of the four methods:

1. Literature search
2. Experience survey
3. Focus group
4. Analysis of selected cases

Literature Search

This refers to “referring to a literature to develop a new hypothesis”. The literature referred are – trade journals, professional journals, market research finding publications, statistical

publications etc Example: Suppose a problem is “Why are sales down?” This can quickly be analyzed with the help of published data which should indicate “whether the problem is an “industry problem” or a “firm problem”. Three possibilities exist to formulate the hypothesis.

- The company’s market share has declined but industry’s figures are normal.
- The industry is declining and hence the company’s market share is also declining.
- The industry’s share is going up but the company’s share is declining.

If we accept the situation that our company’s sales are down despite the market showing an upward trend, then we need to analyze the marketing mix variables.

Experience Survey

In experience surveys, it is desirable to talk to persons who are well informed in the area being investigated. These people may be company executives or persons outside the organization. Here, no questionnaire is required. The approach adopted in an experience survey should be highly unstructured, so that the respondent can give divergent views. Since the idea of using experience survey is to undertake problem formulation, and not conclusion, probability sample need not be used. Those who cannot speak freely should be excluded from the sample.

Focus Group

Another widely used technique in exploratory research is the focus group. In a focus group, a small number of individuals are brought together to study and talk about some topic of interest. The discussion is co-ordinated by a moderator. The group usually is of 8-12 persons. While selecting these persons, care has to be taken to see that they should have a common background and have similar experiences in buying. This is required because there should not be a conflict among the group members on the common issues that are being discussed. During the discussion, future buying attitudes, present buying opinion etc., are gathered.

Most of the companies conducting the focus groups, first screen the candidates to determine who will compose the particular group. Firms also take care to avoid groups, in which some

of the participants have their friends and relatives, because this leads to a biased discussion. Normally, a number of such groups are constituted and the final conclusion of various groups is taken for formulating the hypothesis. Therefore, a key factor in focus group is to have similar groups. Normally there are 4-5 groups. Some of them may even have 6-8 groups. The guiding criteria is to see whether the latter groups are generating additional ideas or repeating the same with respect to the subject under study. When this shows a diminishing return from the group, the discussions stopped. The typical focus group lasts for 1-30 hours to 2 hours. The moderator under the focus group has a key role. His job is to guide the group to proceed in the right direction.

Analysis of Selected Cases/Case Study Method

Analyzing a selected case sometimes gives an insight into the problem which is being researched. Case histories of companies which have undergone a similar situation may be available. These case studies are well suited to carry out exploratory research. However, the result of investigation of case histories arc always considered suggestive, rather than conclusive. In case of preference to "ready to eat food", many case histories may be available in the form of previous studies made by competitors. We must carefully examine the already published case studies with regard to other variables such as price, advertisement, changes in the taste, etc.

This research under consideration employs the case study method of research to provide solution to the problem in context.

Case study research excels at bringing us to an understanding of a complex issue or object and can extend experience or add strength to what is already known through previous research. Case studies emphasize detailed contextual analysis of a limited number of events or conditions and their relationships. Researchers have used the case study research method for many years across a variety of disciplines. Social scientists, in particular, have made wide use of this qualitative research method to examine contemporary real-life situations and provide the basis for the application of ideas and extension of methods. Researcher Robert K. Yin defines the case study research method as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between

phenomenon and context are not clearly evident; and in which multiple sources of evidence are used.

Critics of the case study method believe that the study of a small number of cases can offer no grounds for establishing reliability or generality of findings. Others feel that the intense exposure to study of the case biases the findings. Some dismiss case study research as useful only as an exploratory tool. Yet researchers continue to use the case study research method with success in carefully planned and crafted studies of real-life situations, issues, and problems. Reports on case studies from many disciplines are widely available in the literature.

CASE STUDY

India is the largest importer, producer and consumer of pulses. But, on the other hand, India is also the largest pulses processor, as pulses exporting nations such as Myanmar, Canada and Australia, do not have adequate pulses processing facilities. The reason is that these countries do not have domestic consumption of pulses and therefore, they have never attempted in developing domestic processing industry. Their focus has always been to export whole pulses. This has put India in an advantageous position, by developing its niche in processing.

As a result, Indian processors have been able to enhance their output efficiency, reduce wastage with good quality of output in pulses processing. Elasticity of demand for pulses is highest among grains (cereals and pulses) in the country. Per capita consumption of pulses has been falling constantly due to stagnant production/productivity and low import. The entire scenario is that the show is not worthy in recent years due to disturbed weather pattern and lack of concerted promotional efforts, in spite of pulses being the only source of protein for the majority vegetarians and an important ingredient in food.

Pulses Overview:

1) Main protein sources for large vegetarian Indian population
2) World production is almost stagnant around 60 million tons in last 78 years
3) Largest producers are India, China, Brazil, Australia, Canada and Myanmar
4) Major exporters are Australia, Canada and Myanmar
5) Major importers India, Pakistan and other developing countries
6) Developing countries especially South Asian countries are major consumers
7) World trade is concentrated in South Asia

Indian Overview

India is largest producer, consumer and importer.

1) Cultivated in all three seasons, mostly under rain fed conditions and very vulnerable to weather changes.
2) Nearly 60 percent are produced in rabbi season.
3) Indian production which contributes to nearly 25% of global output is almost stagnant at 1215 million tons in last two decades.
4) According to Assoc ham's Pulse Production Report 2010, pulses production growth registered (CGAR) at 0.27% in last five decades.
5) Average annual pulses output is 13.5 million tons from 1990 to 2010.
6) Major producers are Madhya Pradesh, Maharashtra, Uttar Pradesh, Rajasthan, Karnataka and Andhra Pradesh.
7) Indian pulses output touched ten years high of 15.11 million tons in 2008.
8) Annual domestic pulses consumption is 1718 million tons.
9) India is facing severe shortage of pulses since many decades and dependent heavily on imports.

Table 13: Indian Pulses Scenario 2010 Demand & Supply

Products	Demand	Production	Import
Pigeon peas	2.7 Mill MT	2.30 Mill MT	0.40 Mill MT
Black matpe	1.6 Mill MT	1.06 Mill MT	0.49 Mill MT
Mung beans	1.4 Mill MT	1.00 Mill MT	0.40 Mill MT
Dry Peas	2.3 Mill MT	0.70 mill MT	1.50 Mill MT
Lentils	1.2 Mill MT	0.80 Mill MT	0.40 Mill MT
Chick Peas	6.0 Mill MT	5.80 Mill MT	0.20 Mill MT
Misc	2.5 Mill MT	2.00 Mill MT	0.5 Mill MT
Total	18.4 Mill MT	14.66 Mil MT	3.24 Mill MT

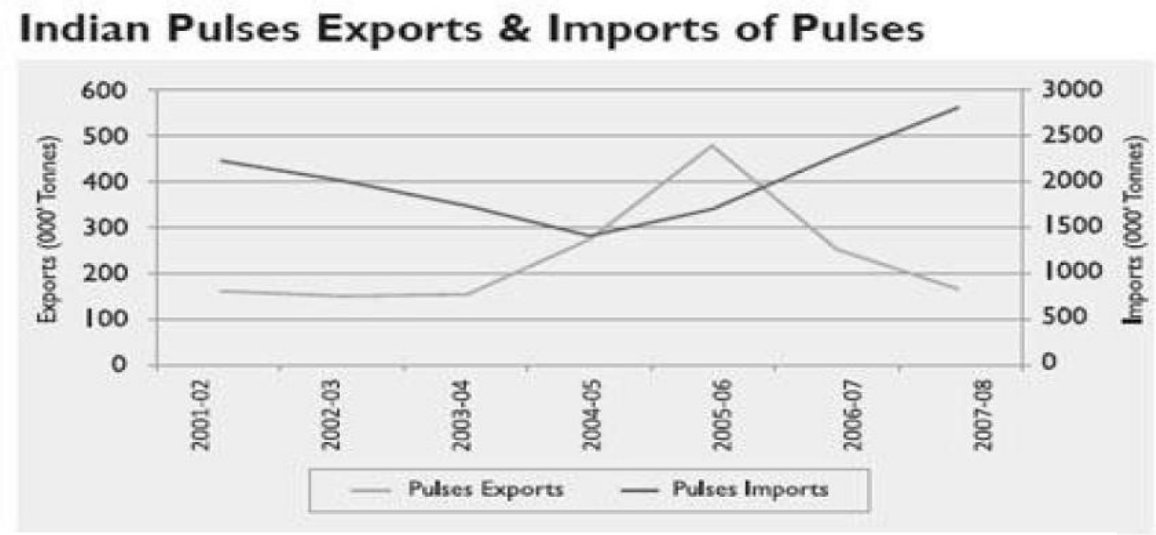
Source: Ministry of Commerce of India

Pulses import by government agencies and traders surged 45.8 per cent to 3.5 million tons in the last financial year, as the domestic production was lower than the demand. The country's pulses production in the 2009-10 crop years was 14.74 million tons against an annual demand

for 1718 million tons. Total import of pulses stood at 3.5 million tons in the past financial year, compared with 2.48 million tons in the previous year. The public sector agencies such as MMTC, STC, PEC & Agricooperative major Nafed have imported 579,000 tons pulses, while rest has been sourced by private traders. Out of this PEC imported 264,000 tons, STC around 114,000 tons, Nafed 110,000 tons and MMTC 90,000 tons, If these PSUs incur any loss, the government reimburses them up to a limit of 15 per cent of the difference between global and local prices.

Imports and Exports

Over the years, India continues to be the world's largest importer of pulses. Despite being the largest producer, the country has to rely upon imports mainly due to the explosive growth in population. A liberal trade regime has kept the Indian imports around 2530 lakh tons per annum i.e. is 20% of the total domestic production. The country meets its domestic needs primarily through imports from USA, Australia, Myanmar, Turkey Tanzania and Canada. India accounts for 30-40%of total world import of pulses. But the year 2009-10 saw an increase in imports by another 20-30% of total world's imports. Also, the production for Kharif pulses declined by 30-40% due to below average rainfall during sowing and growth season of these pulses in major pluses growing areas.



Source: Agriculture Ministry of India

Figure 13: Indian Pulses Exports and Imports of Pulses

As it is quite clear from the above table that the per kg average price of Indian pulses exports have always been greater than per kg average price of its imports, the reason for such a difference is nothing but the yield per hectare is far less than the average yield of the other countries of the world for almost all the pulses. Another important factor to notice in the above table is the rate at which imports and exports have grown over the period. Indian exports of pulses have grown by a mere 0.13% CAGR as against its imports which have grown at the rate of 3.34%. This simply shows the rising demand for pulses by Indians in coming years.

During the last two decades total pulses availability (production & imports) in the country increased only 1.39%, the population has increased by 1.8%. In contrast pulses imports has grown by 10.38% CAGR. If such a trend continues further, there could be a supply shortfall of around 2.26 MM tons by 2011-12, and the shortfall is expected to rise to 6.8 MM tons by the year 2020.

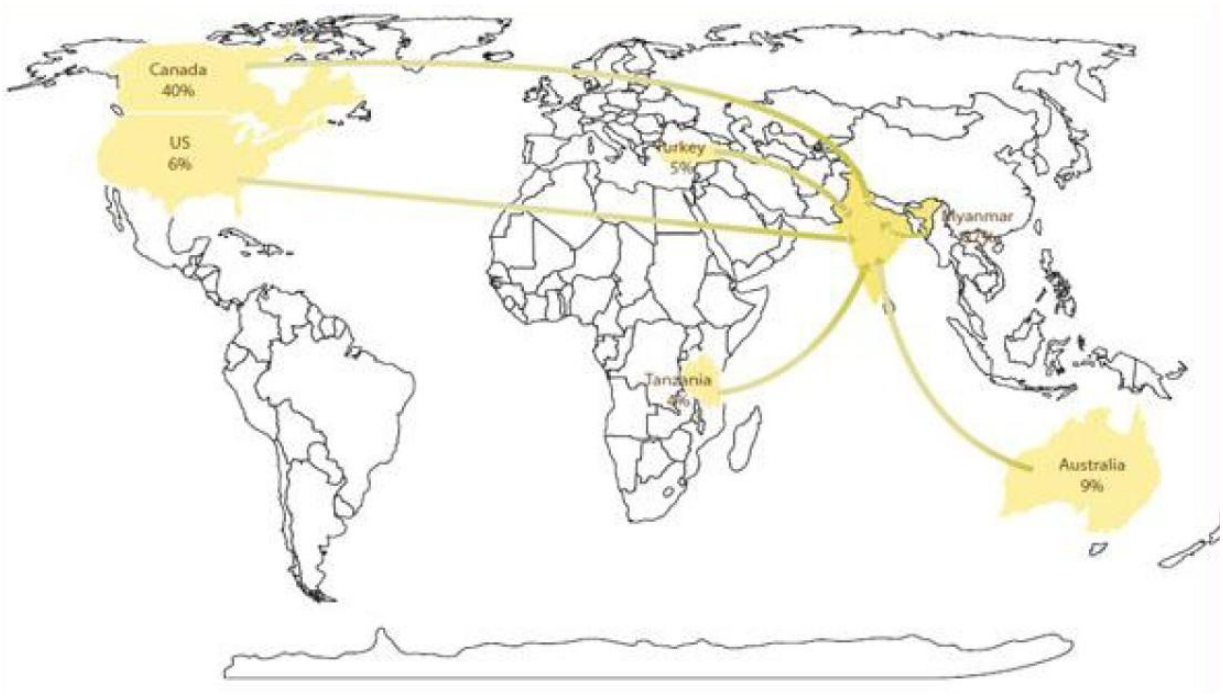


Figure 14: India's import of pulses from various countries

Source: Ministry of Commerce of India

Countries	% Share in Imports
Canada	40%
Myanmaar	27%
Australia	9%
US	6%
Tanznia	4%
Turkey	5%

Source: Ministry of Commerce of India

Table 14: India's import of pulses from various countries

Low import tariffs have helped increase in imports, including the June 8th, 2006 decision of allowing pulses shipment into the country duty free. Canada accounts for 40% of total pulses imports by India (mainly for yellow peas), while Myanmar accounts for 27%, Australia accounts for 9% (desichana), while that of the U.S. is 6%.Tur has huge demand in southern and eastern parts of the country while Chana (chickpea) is consumed mostly in northern part of India. India mostly imports tur & urad from Myanmar and Ghana, and other African countries such as Kenya, Tanzania, and Mozambique.

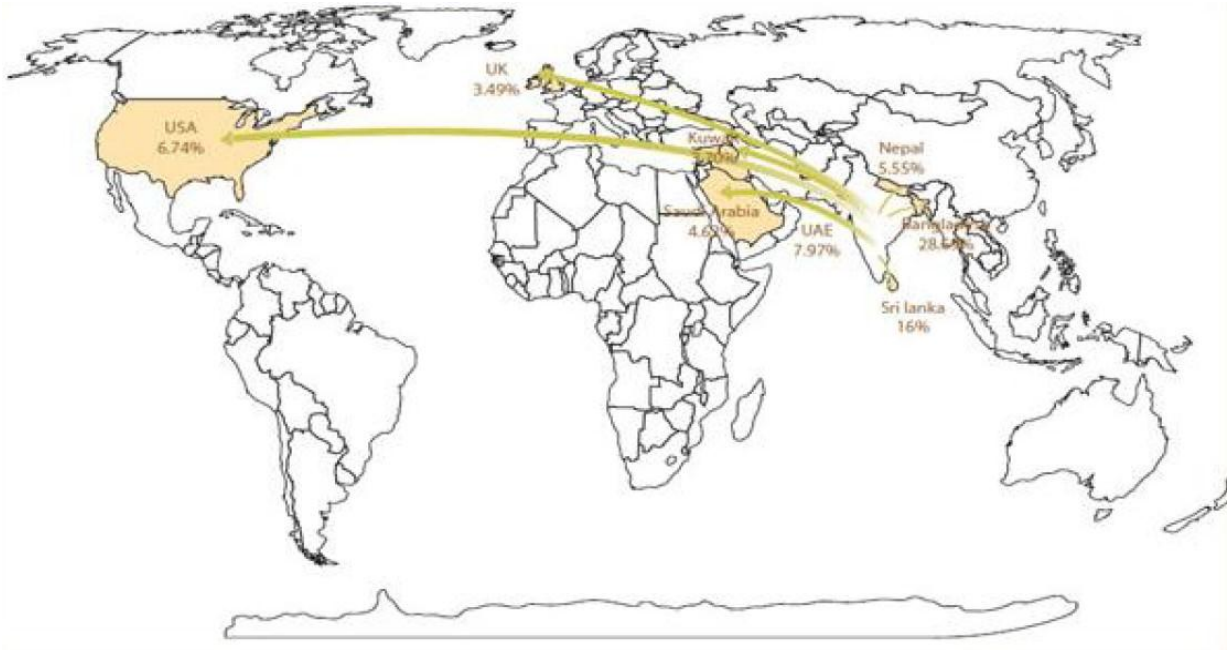


Figure 15: India's export of pulses to various countries

Source: Ministry of Commerce of India

Countries	% Share in Exports
Bangladesh	28.69%
Sri lanka	16%
UAE	7.97%
USA	6.74%
Nepal	5.55%
Saudi Arabia	4.62%
Kuwait	3.70%
UK	3.49%

Source: Ministry of Commerce of India

Table 15: India's export of pulses to various countries

According to the Pulses Meet Resolution of India (2008), on one hand India is the largest importer, producer and consumer of pulses. But, on the other hand, India is also the largest pulses processor, as pulses exporting nations such as Myanmar, Canada and Australia, do not have adequate pulses processing facility. The reason is that these countries do not have much domestic consumption of pulses and therefore, they have never attempted to develop domestic processing industry. Due to this India re-exports a considerable amount of pulses.

The Indian pulse export ban of 2006 occurred on June 28, 2006 when the Finance Minister of India declared a ban on exports of sugar, pulses and wheat until the next harvest, due to domestic shortages. Since then the government has stood by its decision, extending the ban at regular intervals. As per the latest decision, the prohibition on export of pulses is being extended up to March end 2013

Structure and Conduct in Pulses Importing In India

India has about 1215 major pulse importers, with the largest concentration located in Mumbai, followed by Kolkata and Delhi. These players reportedly account for 60-70 percent of total pulse imports. Importers rely primarily on personal networks and contacts with

brokers in supplying countries for market information, obtaining price quotes, and making purchases. Many traders remain with a given exporter when they are able to obtain good market information, a guaranteed supply, and first choice of quality. Due to the limited incomes and price sensitivity of most Indian consumers, a large percentage (about 80 percent) of imported pulses is rated as FAQ. While quality is a consideration, importers are only willing to pay small premiums for better quality. Traders look for the lowest prices at acceptable qualities. The most important quality attributes are cleanliness, uniform size, color, and shape (important for milling). Lower quality levels receive price discounts. Traders use foreign grading systems if they are importing from countries that utilize such standards. Purchases of U.S. and Canadian pulses are usually graded No. 2 or better and imports from Burma.

1) Indian importers prefer to have pulses sorted, graded, and milled in India because the cost of such activities is significantly lower in India than in the exporting countries.

2) Another reason for not importing decorticated and split pulses is that moisture from soaking (prior to milling) may affect quality during shipping. Since pulses are generally consumed quickly in India, moisture is not a concern when pulses are milled domestically.

3) Many importers use short-term credit, which is readily available from Indian institutions at attractive interest rates, to facilitate imports. Indian parastatal trading companies, including the State Trading Corporation and the Minerals & Metals trading Corporation, are competitive sources of financing for Indian importers.

4) The U.S. Department of Agriculture's export credit guarantees programs, GSM102 and GSM103, are not attractive options for Indian importers. Interest rates on U.S. credit are not significantly lower than those available from domestic options. Moreover, use of U.S. credit potentially exposes importers to exchange rate risk. Importers in Delhi, Mumbai, and Chennai offer short term credit to their domestic buyers. This credit is usually for a short period (such as 10 days), but is not always repaid by the deadline.

5) Unlike in the other cities, Kolkata importers do not offer credit and require immediate e-cash payment. Importers are not involved in domestic marketing. They sell their product to wholesalers, either directly or, more commonly, through brokers. Mumbai importers report that there may be as many as 500 wholesale customers for a 5,000 ton shipment. Pulses are typically marketed to wholesalers by quality attributes and origin. Wholesalers exhibit little loyalty toward importers, and significant price competition exists among importers when selling product to domestic wholesalers.

Review of Tender Mechanism followed by Indian Government Agencies:

As per the present policy, the government agencies invite tenders for sale of imported pulses in the domestic market. They invite bids from interested parties and after scrutiny allocate the stock to highest bidder. Normally, the bids are accepted only if the bid quantity is more than a threshold limit, such as 200 MT or 500 MT. The government agencies do not sell in smaller lots of 1020 MT due to operational inconvenience and for various other reasons. While the highest bidder gets the bid quantity, the bids of other interested buyers is rejected. Hence, mostly the stock goes into the hands of a few buyers. Such buyers subsequently sell in the domestic market in terms of 1020MT and hence, the wholesale price is mostly influenced by the price at which such successful bidders sell in the domestic market. It is also observed that since the stock is allocated only to the highest bidder it creates a temporary monopolistic scenario in favor of such successful bidders. In such a case, it is possible for him to take advantage of such a scenario and to jack up the price for a short while to earn handsome profit. Since the government does not have any control on selling price to be quoted by the successful bidder, it goes on uninterrupted. The result is that the basic purpose of keeping prices under control is somewhat defeated. While the government incurs loss in the form of passing on subsidy, still the consumer is not benefited, as he is forced to pay a higher price for pulses. The benefit rather goes to the companies, while are able to buy pulses through the bidding process and then quoting a higher price in domestic market enjoying the temporary monopoly created under the circumstances.

Instead of selling stock through a tender process, the government agencies should sell the entire imported stock through an electronic platform. This will reduce the cost of inviting tender and other administrative costs incurred by the government agencies. In addition, it will encourage participation by smaller players.

Pulses Import Policy of India

Till 2006, pulses import was concentrated in the hands of private importers, processors and a few multinational companies. The commodity was under OGL and so, there was no government intervention. Private importers have been able to develop good trade relations in all the exporting countries, which ensured smooth operation. In 2007, the domestic pulses prices started going up, which forced the government to intervene in the market. In order to keep prices under control, the government decided to import through its own agencies like MMTC, STC, PEC, NAFED, etc. Announcement of such big size import resulted in sending strong signals to the international market. Hence, the basic objective of keeping prices under control could not be achieved. The government then announced a 15 per cent subsidy on import bills of the government agencies, so that prices in the domestic market do not rise. Based on this decision, government agencies, such as MMTC, STC, PEC and NAFED etc. entered the world market for procurement and floated global tenders. Since the international prices had already gone up by that time as a result of the government's announcement for bulk imports, the procurement cost paid by the government agencies was substantially higher.

Through such tender process, the government agencies, having the comfort of 15 per cent subsidy, bought from the lowest bidder and imported pulses in India in huge quantity. Though the basic objective of government's intervention was to stabilize the domestic pulses price by enhancing supply, the real impact has been on the one hand spiraling effect on global prices and on the other hand, prices still ruling high in Indian markets. In order to reduce the cost of import bill, the government agencies may take a policy decision to negotiate directly with the government agencies of Myanmar. In that case, they will be able to avoid the cost of intermediation and profit margins in built by Myanmar traders and Singapore firms and the final price paid by the government agencies will reduce substantially. Another beneficial impact of such government to government negotiation would be that it would not have any spiraling effect on international prices. The market would never know how much quantity is being negotiated and therefore, the prices would not react to any such announcement. Instead of dealing with traders, the government agencies would be more comfortable in dealing with government agencies in Myanmar.

Policy Relating to Subsidy on Import in India

The entry of government agencies armed with 15 per cent subsidy has changed the trade dynamics completely. Private importers are not able to compete with government agencies. Therefore, when some private importers attempted to import, they lost heavily, as the government agencies sold their stock at a price lower than the import parity. As a result, most of the private importers stopped import of pulses. Lot of importers went out of business. The government intervention may be temporary in nature, but it has impacted the pulses importers substantially and it may take time to bring normalcy.

If the basic objective of the government is to ensure regular supply of pulses in domestic price at affordable price, the same can be achieved even through private importers with greater efficiency. For this purpose, the government may monitor the import bill of the importers. They can also monitor the wholesale price realized by the importers. The government can either fix subsidy to be passed on to private importers on a per MT basis or in terms of percentage of import cost. This will enable the importers to remain in business, without affecting the basic objective of keeping the prices under check.

In general, the role of the government should be to formulate policies and to decide the macro level parameters. The government should not enter into business themselves; rather act like a facilitator and regulator. Even without engaging themselves into trading directly, they can regulate the prices by allowing the private importers to import, rather than importing themselves. They can pass on the subsidy to the private importers in a transparent manner and ensure a level playing field. At present, there is no level playing field, because private importers cannot claim subsidy, while government agencies enjoy 15 per cent subsidy. If stabilizing the domestic price is the main objective, then government should offer the same subsidy to private importers and at the same time monitor the wholesale prices to keep a check. At present government agencies issue global tenders for buying pulses. As soon as such tenders are issued, overseas traders are immediately alerted about the demand from India and raise prices by 8 per cent to 10 per cent. The government agencies simply calculate parity after factoring in the 15 per cent loss (to be paid by the government) and go ahead with the deal. Another drawback of the process is that after imports, government agencies issue another tender within India for selling their imported cargo. Local traders get to pick up the

imported cargo at below the international market prices in such tenders and then sell it at a profit to consumers. As a result of this, prices indirectly increase after adding the profits of foreign suppliers and local traders.

Myanmar is the second largest supplier of beans and pulses to India. India imports around 85 % of the pulses produced in Myanmar. In respect of Tur Dal, 95 to 98 per cent of the Myanmar production is imported into India. Therefore, Myanmar growers don't have any other alternative other than to wait for Indian importers to purchase their goods. But as government Agencies announce the quantity of pulses to be imported from Myanmar in advance, the Myanmar exporters are able to get the prices pushed up. Therefore, only private Indian importers should be allowed to import the goods from Myanmar as they can bargain with the Myanmar suppliers.

Import Risks

Pulse importers face a number of risks that threaten the profitability of their transactions. Many importers forward sell their products before taking physical possession of them. Falling domestic prices prior to delivery provide incentive for buyers to renege on contracts. Domestic market conditions, particularly variability in domestic production and import activities, also affect pulse prices. The volume of business and the prices contracted by other importers serving the same market are key factors affecting an importer's profitability. Multiple impending shipments can flood the market and lead to lower prices, increasing the probability of default by domestic clients. Thus, traders closely monitor competitors' transactions but appear to operate independently, with not much communication between them except through their brokers. Indian importers also face foreign exchange risk because transactions with every country are conducted in U.S. dollar.

India wary of Myanmar pulse import

India is finding it difficult to negotiate imports of pulses from Myanmar as the market in the neighboring country is dominated by private traders and no government agency is involved. Despite soaring prices of matpe (black gram) & mung beans in its domestic market, India's government wants to move cautiously in importing pulses from Myanmar. Private traders in Myanmar tend to increase prices whenever they come to know that the Indian government is

seeking to import the pulses from them. Once government announce the quantity of pulses we plan to import from Myanmar, the prices of pulses gets pushed up.

Costs and Profitability of Imports

There are many costs associated with importing pulses into India. Considering Canadian green peas in June-July 2001, commodity costs were about $120/ton at the foreign port (including inland transportation costs) for No. 2 grade or better. Ocean freight rates ranged from $50-$60/ton for bulk shipments to $80/ton for loose peas in containers (there is typically only a $15/ton difference between the two shipping methods). Importers pay fees equal to 0.5 percent of the shipment value for insurance and export guarantees, which insure payment to the exporting countries. Traders face numerous charges once the pulses reach Indian ports. There are also incidental costs, such as "speed money" to facilitate service at the port. Moreover, penalty charges arise when containers are 18 Economic Research Service, USDA Economic Research Service, USDA 19 kept for more than 14 days, or when a ship is docked for more than 7 days.

Importers try to sell product off the boat in order to minimize handling, transportation, and storage costs, but may choose to store pulses for 23 months if current market prices are unfavorable. Although importers sometimes realize large margins on cheap and well-timed purchases, average margins are reported to be thin, with profits being made on volume. Interviews with several major importers suggest margins of about 1 percent of total shipment value.

CONCLUSIONS

Suggested direction for policies in import of pulses:

1) Given the great crunch faced by the Indian Pulses Industry, the government of India must extend duty free import of pulses by five more years till 2015 next in order to augment the domestic supply and ease pressure on retail prices.

2) The subsidies offered by the government of India are acting like a double edged sword. Price subsidization, if any, taken up before financial ending years as it will cause the prices of pulses to be low at the time of crop arrival during kharif season which can cause farmer backlash. Thus it should be strictly monitored and regularized keeping in mind the different crop seasons.

3) Since the government subsidies are not serving their true purpose, the government should discontinue its current policy for 15 per cent subsidy on imports by government agencies. The government should ask their agencies to obtain the goods from the private importers and then decrease the price by 15 per cent (subsidy from the government) and sell the goods to the Public Distribution System (PDS). This will lead to better stability in terms of pricing as well as availability.

4) According to the guidelines laid down by the government only the public sector agencies are allowed to import the pulses. These government agency importing pulses may not succeed in importing at efficient prices as compared to private sector imports. So, the entry of the private players is paramount for the industry's overall development.

5) The pulses industry is quite vulnerable as far as price stability around the year is concerned. Far months for pulses may be offered at the time of arrivals to cover the peak consumption so that prices do not nose dive. This will ensure better price stability throughout the year.

6) The fact that the state and the center policies vary often end up creating a nuisance. There should be uniform central government & state polices for states in India. This integration of state and central policies will ensure a better control.

7) The future trading of pulses creates instability in the market. Ban on the future trading of pulses and essential commodity act must be implemented. This will help iron out the glitches that arises due to speculations and uncertainties.

8) An e-tendering mechanism should be adopted to make the system more efficient and effective. Instead of selling stock through a tender process, the government agencies should sell the entire imported stock through an electronic platform. This will reduce the cost of inviting tender and other administrative costs incurred by the government agencies. In addition, it will encourage participation by smaller players.

Proposed Long Term Strategy

1) Increase acreage under cultivation, which is absolutely paramount given the rapidly increasing consumption demands.

2) Improve yield per acre as there is a pressing need to improve productivity.

3) Research initiatives for new genetic varieties of seeds as this will automatically result in a better yield.

4) Contract farming to be considered within and outside the country so as to gain the cost benefits.

5) Corporate/contract farming on fallow land as it will help in better utilization of land.

6) Contract farming with Myanmar & Africa can offer a great cost advantage which can be a huge boost.

7) Launch of a national mission mode project on pulses with emphasis on faster execution and powerful communication.

8) Emphasis on Private Public Partnership (PPP) aimed at capacity building as this will infuse the industry with more funds to dispense on areas like R&D.

LIMITATIONS OF THE STUDY

- Since the research solely involved the use of secondary data, the level of control on the research was quite limited.
- The precision of the research revolves around the reputability of the data sources used for the research.
- The project could not cover the entire post-independent era due to the lack of availability of the historical data.
- Due to certain hypothetical assumptions the research may not represent the complete picture.
- The conclusion is drawn based on the assumption that the market as well as climatic dynamics do not alter drastically.
- The measures suggested are strictly based on the reports which form the basis for this research and hence are subjective in nature.

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ANNEXURE-1

Area, production and yield of total pulses during 1950-51 to 2007-08 in India

Year	Area (Million Ha)	Production (Million Tons)	Yield (Kg/Ha)	% coverage under irrigation
1950-51	19.09	8.41	441	9.4
1951-52	18.78	8.42	448	9.7
1952-53	19.84	9.19	463	9.8
1953-54	21.73	10.62	489	9.2
1954-55	21.91	10.95	500	8.8
1955-56	23.22	11.04	476	8.4
1956-57	23.22	11.55	495	7.3
1957-58	22.54	9.56	424	9.1
1958-59	24.31	13.15	541	8.4
1959-60	24.83	11.80	475	8.5
1960-61	23.56	12.70	539	8.0
1961-62	24.24	11.76	485	8.1
1962-63	24.27	11.53	475	8.9
1963-64	24.18	10.07	416	8.9
1964-65	23.88	12.42	520	9.2
1965-66	22.72	9.94	438	9.4
1966-67	22.12	8.35	377	10.9
1967-68	22.65	12.10	534	8.7
1968-69	21.26	10.42	490	9.8
1969-70	22.02	11.69	531	9.4
1970-71	22.54	11.82	524	8.8
1971-72	22.15	11.09	501	8.8
1972-73	20.92	9.91	474	8.1
1973-74	23.43	10.01	427	7.9
1974-75	22.03	10.02	455	8.1
1975-76	24.45	13.04	533	7.9

Year	Area (Million Ha)	Production (Million Tons)	Yield (Kg/Ha)	% coverage under irrigation
1977-78	23.50	11.97	510	7.1
1978-79	23.66	12.18	515	7.9
1979-80	22.26	8.57	385	8.8
1980-81	22.46	10.63	473	9.0
1981-82	23.84	11.51	483	8.5
1982-83	22.83	11.86	519	8.2
1983-84	23.54	12.89	548	7.5
1984-85	22.74	11.96	526	7.9
1985-86	24.42	13.36	547	8.5
1986-87	23.16	11.71	506	9.6
1987-88	21.27	10.96	515	9.4
1988-89	23.15	13.85	598	9.3
1989-90	23.41	12.86	549	10.0
1990-91	24.66	14.26	578	10.5
1991-92	22.54	12.02	533	10.7
1992-93	22.36	12.82	573	10.4
1993-94	22.25	13.30	598	11.3
1994-95	23.03	14.04	610	12.7
1995-96	23.70	13.27	552	12.9
1996-97	22.45	14.24	635	12.7
1997-98	22.87	12.98	567	11.3
1998-99	23.50	14.91	634	12.1
1999-00	21.12	13.42	635	16.1
2000-01	20.35	11.08	544	12.5
2001-02	22.01	13.37	607	13.3
2002-03	20.50	11.13	543	14.4
2003-04	23.46	14.91	635	13.6
2004-05	22.76	13.13	577	13.9
2005-06	22.39	13.39	598	15.0
2006-07	23.19	14.20	612	NA
2007-08	23.86	15.12	622	NA

Source : Directorate of Economics and Statistics, Dept. of Agriculture and Co-operation, Ministry of Agriculture, GOI

ANNEXURE-2

Area, Production and yield of Chana in India during 1950-51 to 2007-2008

Year	Area (Million Ha)	Production (Million Tons)	Yield (Kg/Ha)	% coverage under irrigation
1950-51	7.57	3.65	482	12.5
1951-52	6.83	3.39	496	15.1
1952-53	7.26	4.21	580	14.6
1953-54	7.97	4.83	606	14.0
1954-55	9.25	5.62	608	12.8
1955-56	9.78	5.42	554	12.1
1956-57	9.67	6.23	644	10.8
1957-58	9.09	4.89	538	12.5
1958-59	10.08	7.02	697	12.0
1959-60	10.33	5.62	544	12.4
1960-61	9.28	6.25	674	11.9
1961-62	9.57	5.79	605	12.2
1962-63	9.19	5.3	583	13.7
1963-64	9.35	4.50	481	13.7
1964-65	8.87	5.78	651	15.8
1965-66	8.02	4.22	527	16.4
1966-67	8.00	3.62	453	18.8
1967-68	8.26	5.97	723	15.6
1968-69	7.11	4.31	607	18.8
1969-70	7.75	5.55	715	17.3
1970-71	7.84	5.20	663	15.6
1971-72	7.91	5.08	642	15.0
1972-73	6.97	4.54	651	15.6
1973-74	7.76	4.10	528	15.8
1974-75	7.04	4.02	570	17.8
1975-76	8.32	5.88	707	16.5

Year	Area (Million Ha)	Production (Million Tons)	Yield (Kg/Ha)	% coverage under irrigation
1976-77	7.97	5.42	680	15.2
1977-78	7.97	5.41	678	14.7
1978-79	7.71	5.74	745	15.6
1979-80	6.99	3.36	481	18.6
1980-81	6.58	4.33	657	20.6
1981-82	7.87	4.64	590	17.9
1982-83	7.40	5.29	715	15.6
1983-84	7.16	4.75	663	14.5
1984-85	6.91	4.56	661	14.8
1985-86	7.80	5.79	742	15.6
1986-87	6.98	4.53	649	19.4
1987-88	5.77	3.63	629	19.2
1988-89	6.81	5.13	75	18.3
1989-90	6.47	4.22	652	21.0
1990-91	7.52	5.36	712	20.5
1991-92	5.58	4.12	739	24.2
1992-93	6.45	4.42	684	22.0
1993-94	6.36	4.98	783	24.0
1994-95	7.54	6.44	853	25.3
1995-96	7.12	4.98	700	26.0
1996-97	6.85	5.57	813	25.1
1997-98	7.56	6.13	811	21.8
1998-99	8.47	6.80	803	21.0
1999-00	6.15	5.12	833	29.1
2000-01	5.19	3.86	744	30.9
2001-02	6.42	5.47	853	30.4
2002-03	5.91	4.24	717	32.1
2003-04	7.05	5.72	811	31.0
2004-05	6.71	5.47	815	31.4
2005-06	6.93	5.60	808	31.1
2006-07	7.49	6.33	845	NA
2007-08	7.58	6.91	780	NA

Source : Directorate of Economics and Statistics, Dept. of Agriculture and Cooperation, Ministry of Agriculture, GoI.