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## Global trends in production and trade of major grain legumes

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### ABSTRACT

Production trends in grain legumes — pulses, groundnuts and soybean — have followed an increasing trend with the global production doubling from 148 million tons in 1980-82 to 310 million tons in 2004-06. The increase was led by increases in soybean production which increased from 87 million tons to 214 million tons due to an increase in the demand for protein meals and oils from the EU and the US feed sectors and the appearance of new producers like India, China, Argentina and Brazil. Consequently, the share of developing countries in global grain legume production has increased from 55% in 1980-82 to 65% in 2004-06. Growth in the global production of pulses has been the slowest among the grain legumes, growing at 1.05% per annum between 1980 to 2006. The emergence of countries such as Canada and Australia, the area expansion under pulses in Africa, and the export oriented production of the South East Asian countries have contributed to the increase in the global pulse production. The largest pulse producers are still the developing countries and their share of the global pulse production is largely unchanged at around 70%. However, yield levels and yield growth rates are considerably higher in the developed countries. Grain legumes are traded in different forms such as kernels/seeds, cakes and meals, and oils. Trade in seeds/kernels of grain legumes has increased with nearly 20% of production quantities being traded in 2000-05. However, this figure masks the contrary trends in the trade patterns of individual legumes and between regions. Among the legumes, exports in soybean have increased with 31% of soybean being traded, owing to increased demand from the feed sector, with Argentina, Brazil and Paraguay emerging as major exporters. In this paper, an analysis has been made on the global and regional production, yield trends, global trade and price trends of grain legumes.

### Introduction

Grain legumes are an important source of protein and essential oils in the human diet, supplying protein for vegetarian population. Spurred by sustained growth in per

capita income, increasing population, and urbanization, the demand for grain legumes has been growing rapidly in the world. However in the developing countries, which are large consumers of grain legumes, production of grain legumes has been growing more slowly than demand putting pressure on per capita availability. The slower growth of grain legume production in developing countries in the past was due to food security policies of governments that directed agricultural research and extension to emphasize staple cereals like rice and wheat (Parthasarathy Rao and von Oppen 1987; Kumar et al. 2007). These policies succeeded in raising cereals production enabling many countries, notably Asian countries, to become self-sufficient in cereal production and even occasional exporters (FAOSTAT <http://www.faostat.fao.org>). However, in this process grain legumes were, by and large ignored, resulting in low yields and stagnant production leading to increased dependence on imports to meet the growing domestic demand, particularly in the developing countries of Asia and Africa.

### **Production Trends**

Production trends in grain legumes –soybean, groundnut, and pulses— have followed an increasing trend with the global production doubling from 148 million t in 1981-83 to 310 million t in 2004-06. This increase can be attributed to the dramatic increases in global soybean production which accounts for 69 percent of the grain legumes in the world. Pulses come second, accounting for 20 percent of the grain legumes production and groundnut accounts for the remaining 11 percent. In the early eighties, grain legumes production was more or less evenly distributed between the developed and the developing countries. However, with the phenomenal increase in soybean production in Latin America, the increased production of pulses and groundnut in Asia and Africa has tipped the balance in favour of the developing countries. Consequently, the share of developing countries in global grain legume production has increased from 54 percent in 1981-83 to 65 percent in 2004-06.

**Soybean:** Soybean production increased from 87 million t in 1981-83 to 214 million t in 2004-06 owing to a combination of both demand and supply factors. These include increase in the demand for protein meals and oils from the EU and the US feed sectors, the appearance of new producers like Argentina and Brazil, and the rapid adoption of genetically modified herbicide-tolerant soybean seeds in the major growing countries. Soybean can be grown in different environments throughout the world, but its cultivation is largely concentrated in Latin America and North America, which together occupy over three-fourths of the global soybean area (Table 1). United States, Brazil and Argentina are important soybean growing countries, and account for 30, 23 and 16 percent of the global soybean area, respectively. In Latin America, soybean production expanded spectacularly, from 20 million t in 1981-83 to 94 million t in 2004-06 at an annual rate of about 7 percent (Table 1). Soybean production also increased in North America, which

accounts for 89 million t in 2004-06 but not as much as in Latin America (for disaggregated growth rates see Appendix 1)

Globally, soybean yields have increased from 1.7 t per ha in 1981-83 to 2.3 t per ha in 2004-06 at a growth rate of 1.5 percent per annum between 1981 and 2006. However, the increase in area, particularly in Latin America, was the main driving factor behind the trebling of global soybean production between 1981-83 and 2004-06.

**Table 1: Regional and country-wise production and yield and growth rates of soybeans**

Region / Country	Production			Yield		
	1981-83	2004-06	1981-2006	1981-83	2004-06	1981-2006
	(million t)		Growth rate (% per year)	(t/ha)		Growth rate (% per year)
<b>World</b>	<b>87.2</b>	<b>214.0</b>	4.1	<b>1.7</b>	<b>2.3</b>	<b>1.5</b>
<b>Developed</b>	<b>56.3</b>	<b>91.7</b>	<b>2.4</b>	<b>1.9</b>	<b>2.8</b>	<b>1.5</b>
<b>Europe</b>	1.2	3.1	1.1	0.8	1.7	2.5
<b>North America</b>	55.0	88.6	2.5	2.0	2.9	1.4
USA	52.9	85.4	2.3	2.0	2.9	1.4
<b>Oceania</b>	0.1	0.1	-2.6	1.7	2.1	0.8
<b>Developing</b>	<b>31.0</b>	<b>122.4</b>	<b>5.9</b>	<b>1.4</b>	<b>2.0</b>	<b>1.8</b>
<b>Africa</b>	0.4	1.3	5.6	0.8	1.1	1.3
<b>Asia</b>	10.9	27.0	3.7	1.1	1.4	0.9
China	9.4	16.4	2.6	1.2	1.7	1.8
India	0.5	8.0	13.1	0.7	1.0	1.9
<b>Latin America</b>	19.7	94.1	6.8	1.7	2.3	1.9
Brazil	14.1	51.1	5.7	1.7	2.3	2.2
Argentina	4.0	36.8	9.3	1.9	2.5	1.2

Approximately 85 percent of the soybean produced in the world is crushed to produce edible oil, and the rest is used as food, feed and seed. Soybean oil production has increased from 13 million t in 1981-83 to 33 million t in 2004-06 (Appendix 2) in response to the increased demand for edible oils due to rising incomes and population. Production increased more dramatically in developing countries, particularly after the mid-nineties. This increase can be attributed to the increased share of China, Argentina, and Brazil in the global soybean markets with soybean oil production in developing countries increasing nearly fourfold from 4.8 million t in 1981-83 to 20.8 million t in 2004-06. In line with soybean production its oil production also grew impressively by more than 5% between 1995 and 2006 (Appendix 3).

**Groundnut :** Groundnut is grown in over 100 countries across the world under different agro-ecological environments on about 23 million hectares. Groundnut production has increased from 19 million t in 1981-83 to 36 million t in 2004-06, with developing

countries producing most of it (Table 2). Its cultivation, however, is largely confined to developing countries of Asia and Africa, which account for a bulk of the total groundnut area as well as production. Asia contributed 67 percent of total production while Africa accounted for 24 percent in 2004-06. Over the period 1981-2006, global production of groundnut has increased by 3% per annum (Table 2), led by growth in acreage and yields in Asia, due to the policies in China to increase its domestic oilseed production. Africa also contributed significantly to the global growth in groundnut production through area expansion. Unlike soybean, yields have contributed more than 50% of the growth in groundnut production in the eighties and nineties (Appendix 4).

**Table 2: Regional production and yield and growth rates of groundnut in shell**

Region / Country	Production			Yield		
	1981-83	2004-06	1981-2006 Growth rate (% per year)	1981-83	2004-06	1981-2006 Growth rate (% per year)
	('000 t)			(t/ha)		
<b>World</b>	<b>19,257</b>	<b>36,260</b>	<b>3.1</b>	<b>1.0</b>	<b>1.6</b>	<b>1.9</b>
<b>Developed</b>	<b>1,690</b>	<b>1,955</b>	<b>0.2</b>	<b>2.8</b>	<b>3.2</b>	<b>0.7</b>
<b>Europe</b>	24	9	-5.5	2.1	0.8	-4.6
<b>North America</b>	1,620	1,910	0.3	2.9	3.3	0.7
USA	1,685	1,827	0.3	2.9	3.3	0.7
<b>Oceania</b>	46	36	-0.8	1.3	1.6	2.2
<b>Developing</b>	<b>17,567</b>	<b>34,305</b>	<b>3.3</b>	<b>1.0</b>	<b>1.5</b>	<b>2.1</b>
<b>Africa</b>	4,243	8,808	4.1	0.7	1.0	1.6
Nigeria	532	3,713	9.2	0.9	1.6	2.0
<b>Asia</b>	12,452	24,419	3.3	1.1	1.9	2.6
China	4,305	14,074	6.1	1.7	3.1	2.7
India	6,268	6,501	0.3	0.9	1.0	1.0
Indonesia	839	1,471	2.1	1.7	2.0	0.7
<b>Latin America</b>	872	1,078	0.8	1.4	2.2	1.6

Nearly 50 percent of groundnut is crushed to produce high quality oil. Global production of groundnut oil has increased from 3 million t in 1981-83 to 5.3 million t in 2004-06 (Appendix 5). Developing countries, particularly Asia and Africa account for the increasing demand and production for groundnut oil. China specifically accounts for nearly 40 percent of total production. However, in the years 1995 to 2006, the growth of production of groundnut oil has slowed down, especially in China and in India, despite the growth in production of edible oils. This can be attributed to the availability of cheaper palm and rapeseed oil imports which make groundnut oil unattractive to domestic consumers and producers in these countries. This is reflected in the decline in the growth rate of global groundnut oil production from 3.6% between 1981-1994 to 1.3% between 1995 and 2006 (Appendix 6).

**Pulses:** Dry beans, which include *Phaseolus* species (kidney beans, lima beans, and tepary beans) and *Vigna* species (azuki bean, mung bean, black gram) comprise the largest category of pulses grown in the world. Dry pea and chickpea are the second and third most popular pulses, respectively, followed by cowpea, broadbean and lentil (Figure 1). Pulses production increased from 42.7 million t in 1981-83 to 59.8 million t in 2004-06 globally (Table 3).

Developing countries are the largest producers of pulses, accounting for around 70 percent of the global production. There is, however, a large difference in the productivity of pulses between developed (1.8 t/ha) and developing countries (0.8 t /ha) (Table 3). This is probably due to differences in the use of inputs, technology, and infrastructure. Owing to low and stagnant yields in developing countries, pulses production also did not grow as rapidly as that of cereals and oilseeds. India is the single largest producer of pulses, accounting for about quarter total pulses production, with China and Canada contributing 9 and 7 percent respectively in 2004-06 (Table 3).

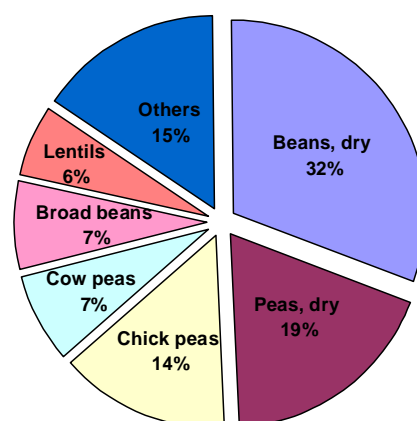


Figure 1: Composition of global pulse production, 2004-06

**Table 3: Regional and country-wise production trends and growth rates of pulses**

Region / Country	Production			Yield		
	1981-83	2004-06	1981-2006	1981-83	2004-06	1981-2006
	(million t)			(kg / ha)		
			Growth rate (% per year)			Growth rate (% per year)
<b>World</b>	<b>45.0</b>	<b>59.8</b>	<b>0.9</b>	<b>707</b>	<b>851</b>	<b>0.7</b>
<b>Developed</b>	<b>11.1</b>	<b>15.5</b>	<b>0.5</b>	<b>1,147</b>	<b>1,817</b>	<b>1.7</b>
<b>Europe</b>	9.0	7.8	-2.0	1,099	2,113	2.7
<b>North America</b>	1.6	6.1	6.6	1,572	1,899	0.6
Canada	0.3	4.2	14.2	1,516	1,938	0.9
<b>Oceania</b>	0.4	1.6	6.1	1,048	969	0.2
<b>Developing</b>	<b>33.9</b>	<b>44.3</b>	<b>1.1</b>	<b>628</b>	<b>718</b>	<b>0.6</b>
<b>Africa</b>	5.7	10.6	2.8	569	567	-0.1
Nigeria	0.6	2.9	7.4	414	669	1.3
<b>Asia</b>	23.1	27.5	0.6	657	771	0.8
China	6.3	5.2	-0.7	1,255	1,568	1.0
India	11.6	13.6	0.7	457	596	1.0
Myanmar	0.5	2.6	8.6	654	994	0.6
<b>Latin America</b>	5.1	6.2	1.1	581	839	2.0
Brazil	2.3	3.2	1.2	455	800	2.9

Growth in the production of pulses has been the slowest among the grain legumes, growing at 0.9 percent per annum during 1981 to 2006 globally (Table 3). The rise in export-oriented pulse production in Canada, Australia and Myanmar, and the area expansion under pulses in Africa have contributed to the modest increase in global pulses production.

There is a marked difference between the yield levels in the developed and the developing countries. Despite having a smaller area under pulse crops, yield levels are considerably higher in the developed countries (Table 3). However, yield growth rates have been stagnant in the latter period of 1995-2006 in the developed countries, but are increasing at 1.1 percent in developing countries (Appendix 7) in contrast to the earlier period where yield growth in these regions was stagnant. In Africa, for example, production expansion can be attributed to increased cultivation of pulses rather than the increased use of high yielding varieties. Yield growth rate in Africa in fact decreased slightly at -0.9 percent in the years 1995 to 2006, while production grew at 3.1 percent over the same years. It is only in the latter period of 1995 to 2006 that yield improvements have contributed significantly to production growth. However, area increases are still the dominating influence on production in the African continent.

### Trade in grain legumes and trends

Grain legumes are traded in different forms such as kernels/seeds, cakes and meals, and oils. Trade in seeds/kernels of grain legumes has increased, with nearly 20 percent of production quantities being traded in 2000-05. However, this figure masks the diverging trends in the trade patterns of individual legumes and between regions. Soybean and its processed products such as soybean oil and cake are the most traded, both in value and quantity. Groundnut trade is the thinnest among the three and trade flows have further reduced in recent years owing to several factors, ranging from concerns of aflatoxin contamination and a loss of competitiveness to substitutes such as palm oil.

**Soybean:** Soybean is one of the most traded agricultural commodities in the international market. In 2001-05, 31 percent of the global soybean production entered the international market in one form or another. Soybeans (beans form) accounted for about half of the total value of the soybean trade. This was followed by oilcake meal (34 percent) and oil (17 percent) (Figure 2). The share of soy foods such as tofu, was negligible.

International trade in soybean and its products has expanded rapidly especially during the last decade. Rapid growth occurred in trade of soybeans and soybean cake. Developing countries contributed to the spectacular growth

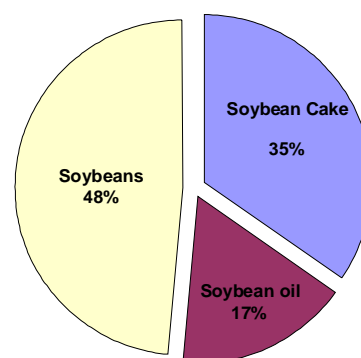


Figure 2: Composition of soybean trade by value, 2001-05

in exports — their share increased from around 14 percent in 1981-85 to 50 percent in 2001-05 (Table 4 ). One important feature of soybean exports is their concentration in Latin America (Brazil and Argentina) and North America (USA). Together, these account for 95 percent of the global exports of soybeans. United States, which used to be dominant exporter, now faces stiff competition from Brazil and Argentina (Table 4).

**Table 4: Regional and country-wise trade trends for soybean (million t).**

Region/ Country	Exports		Imports	
	1981-85	2001-05	1981-85	2001-05
<b>World</b>	26.7	59.9	26.7	61.0
<b>Developed countries</b>	21.7	30.4	16.6	19.9
<b>Northern America</b>	21.5	28.6	0.3	0.8
USA	21.4	27.7	0.0	0.1
<b>Europe</b>	0.1	1.9	16.2	19.1
Netherlands	0.1	1.6	2.9	5.4
Germany	0.0	0.0	3.1	4.2
<b>Oceania</b>	0.0	0.0	0.0	0.0
<b>Developing countries</b>	5.0	29.5	10.1	41.1
<b>Africa</b>	0.0	0.0	0.0	0.9
<b>Latin America</b>	4.5	29.0	2.2	6.6
Brazil	1.7	18.6	0.5	0.8
Argentina	2.3	7.7	0.0	0.4
Paraguay	0.5	2.3	0.0	0.0
Mexico	0.0	0.0	1.3	4.1
<b>Asia</b>	0.6	0.4	7.9	33.6
China	0.5	0.3	1.5	20.9
Japan	0.0	0.0	4.6	4.7

Although developing countries account for nearly two-thirds of the total exports of soybeans, they also import huge quantities of soybeans. Imports by developing countries quadrupled during the last two decades, from 10.1 million tons in 1981-85 to 41.1 million tons in 2001-05, raising their share in global imports from 34 to 71 percent (Table 4). China is the largest importer of soybeans, accounting for close to 35 percent of the global imports. On the other hand, imports by developed countries have remained almost unchanged at around 17-20 million tons, largely concentrated in Europe.

Soybean oil is the second most important edible oil traded in the international market, after palm oil. Trade flows (exports and imports) of soybean oil have largely remained confined to developing countries. Globally, over 9 million tons of soybean oil was exported in 2000-05, and the bulk of exports were from Latin American countries (Table 5). Consequently, exports from developing countries increased fivefold over the last two decades while exports from developed countries remained stagnant. Asia and Africa account for the bulk of global imports; 57 and 14 percent, respectively.

**Table 5: Regional and country-wise trade trends for soybean oil (million t).**

Region / Country	Exports		Imports	
	1981-85	2001-05	1981-85	2001-05
<b>World</b>	3.5	9.2	3.6	8.8
<b>Developed countries</b>	2.2	2.4	1.0	1.5
<b>Northern America</b>	0.9	0.7	0.0	0.1
USA	0.8	0.7	0.0	0.0
<b>Europe</b>	1.4	1.7	0.9	1.3
Netherlands	0.3	0.5	0.0	0.1
Germany	0.2	0.5	0.2	0.1
<b>Oceania</b>	0.0	0.0	0.0	0.0
<b>Developing countries</b>	1.3	6.8	2.6	7.3
<b>Africa</b>	0.0	0.0	0.4	1.2
Morocco	0.0	0.0	0.1	0.3
<b>Latin America</b>	1.3	6.3	0.6	1.3
Argentina	0.3	4.0	0.0	0.0
Brazil	1.0	2.3	0.1	0.1
<b>Asia</b>	0.1	0.5	1.6	4.8
China	0.0	0.0	0.0	1.4
India	0.0	0.0	0.5	1.2
Iran	0.0	0.1	0.4	0.8
Bangladesh	0.0	0.0	0.0	0.4

Trade in soybean meal has increased tremendously accounting for 77 percent of all oilseed cake trade in 2001-05. Europe is the largest importer followed by Asia, particularly China. Between 1981-85 and 2001-05, global exports of soybean meal increased from 21 million tons to 48.9 million tons (Table 6). Demand for oilseed cake is derived from demand for livestock and poultry products. The expanding demand for livestock and poultry products has been the main driver behind the growth in trade in soybean meal. The exports originate largely from Brazil and Argentina, which together account for 60 percent of the global exports. Asia contributes a small share to the global exports of soybean meal with India as the largest exporter, accounting for 6 percent of global exports.

Developed countries are the main importers of soybean meal. Imports by them have grown considerably, from 18 million tons in 1981-85 to 29 million t in 2001-05 (Table 6). Imports by developing countries have also increased, with their share in global imports increasing from 14 percent in 1981-85 to 40 percent in 2001-05. Europe accounts for the bulk of developed countries' imports with France and Netherlands being the largest importers. Asia accounts for about a quarter of the global imports of soybean meal, mostly Southeast Asian countries like Indonesia, Thailand, Philippines and Vietnam.



**Table 6: Regional and country-wise trade trends for soybean meal (million t).**

Region / Country	Exports		Imports	
	1981-85	2001-05	1981-85	2001-05
<b>World</b>	21.1	48.9	20.9	48.4
<b>Developed countries</b>	10.4	12.8	17.6	29.2
<b>Northern America</b>	5.7	5.4	0.5	1.2
USA	5.6	5.3	0.0	0.1
<b>Europe</b>	4.7	7.1	17.1	27.7
Netherlands	1.7	3.5	1.5	3.8
France	0.0	0.1	3.3	4.5
Spain	0.4	0.1	0.5	3.0
Italy	0.1	0.2	1.3	2.8
Germany	1.2	1.5	2.8	2.5
<b>Oceania</b>	0.0	0.0	0.0	0.3
<b>Developing countries</b>	10.8	36.4	3.3	19.1
<b>Africa</b>	0.0	0.0	0.5	2.4
<b>Latin America</b>	10.0	32.6	1.0	4.5
Argentina	1.6	17.6	0.0	0.0
Brazil	8.3	13.3	0.0	0.3
<b>Asia</b>	0.8	3.7	1.7	12.2
India	0.2	2.7	0.0	0.0

**Groundnut:** Groundnut is traded as edible nuts, edible oil and oilcake meal, but edible nuts account for two-thirds of the total trade. Amongst different forms, shelled groundnut is the most traded, having a share of 51 percent in the total trade in groundnut products in 2001-05, followed by groundnut oil at 30%, while groundnut in shell and oilcake account for about 10% each (Figure 3). In absolute terms however, international trade in groundnut and its products is thin; only 5 percent of world's groundnut production (in shell equivalent) is traded in international markets (Diop et al. 2004). In recent years (2001-05), trade in groundnut oil and cake has further reduced. Among the important reasons for the decline in trade in groundnut products (oil and oilcake meal) are their declining competitiveness in relation to their substitute products, and increasing consumer concern over aflatoxin contamination, especially when agri-food markets are globalizing and food safety and quality standards are becoming stringent in international trade.

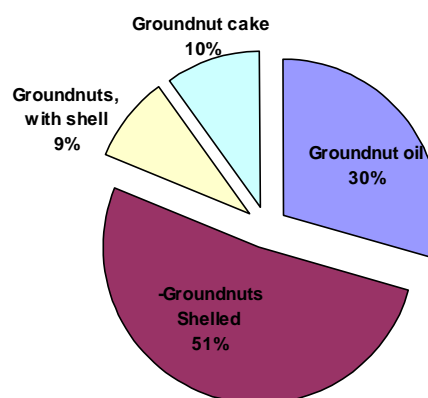


Figure 3: Composition of groundnut exports by value, 2001-05.

Global exports of shelled groundnut (confectionary groundnut) increased from 0.7 million t to 1 million t between 1981-85 and 2001-05 (Table 7). China is the largest exporter of confectionary groundnut in the world accounting for 35 percent of global exports while the USA comes second with 13 percent. India has emerged as an important exporter in the recent years accounting for nearly 10 percent of global exports and is rapidly increasing its share in the global market.

**Table 7: Regional and country-wise trade trends for groundnut (shelled equivalent) ('000 t).**

Region/ Country	Exports		Imports	
	1981-85	2001-05	1981-85	2001-05
<b>World</b>	728.1	1,083.2	708.2	1,278.9
<b>Developed countries</b>	234.5	227.2	503.5	777.0
<b>Northern America</b>	209.9	144.8	63.5	93.5
USA	209.9	144.4	0.7	16.9
Canada	0.0	0.4	62.8	76.6
<b>Europe</b>	21.0	76.3	430.3	667.1
Netherlands	13.1	58.8	77.1	227.9
United Kingdom	2.4	0.8	82.2	92.6
Russia	NA	0.0	NA	82.4
<b>Oceania</b>	3.6	6.1	9.7	16.4
<b>Developing countries</b>	493.6	856.0	204.7	501.9
<b>Africa</b>	128.0	77.6	26.1	86.1
<b>Latin America</b>	83.3	194.7	7.9	97.3
Argentina	71.8	115.2	0.0	0.2
<b>Asia</b>	282.3	583.6	170.7	318.6
China	163.0	385.1	NA	3.3
India	32.6	98.6	0.0	0.0
Indonesia	0.1	0.3	30.3	94.5

Global imports of confectionary groundnut increased by 83 percent between 1981-85 and 2001-05. The growth was fuelled by increases in imports to both developed and developing countries. The share of developing countries in Asia, Africa and Latin America in the global imports increased from 30 percent in 1981-85 to 40 percent in 2001-05 (Table 7). Among the developed countries, Europe accounts for the bulk of imports of confectionary groundnut with Netherlands accounting for over 30 percent of European imports.

International trade in groundnut oil is thin and has been declining, in both value and volume. Since the early 1980s, global market shrunk almost by one third — total exports of groundnut oil declined from 385,000 tons in 1981-85 to 241,000 tons in 2001-05 (Table 8). The declining trend was common to both developing as well as developed countries.

**Table 8: Regional and country-wise trade trends for groundnut oil, ('000 t)**

Region/ Country	Exports		Imports	
	1981-85	2001-05	1981-85	2001-05
<b>World</b>	385.8	241.5	389.2	240.7
<b>Developed countries</b>	214.8	129.3	321.4	205.6
<b>Northern America</b>	11.1	10.9	4.6	32.6
<b>Europe</b>	72.8	50.9	314.9	170.5
Belgium	NA	21.5	NA	21.1
France	10.7	18.4	164.8	60.3
Italy	5.2	1.0	30.9	40.3
<b>Oceania</b>	0.3	0.3	1.9	2.4
<b>Developing countries</b>	301.6	179.5	67.9	35.2
<b>Africa</b>	141.7	78.2	19.9	7.3
Senegal	102.0	56.3	2.6	0.7
<b>Latin America</b>	92.6	64.7	1.8	1.1
Argentina	35.2	52.2	0.0	0.0
<b>Asia</b>	67.3	36.6	46.1	26.8
China	54.0	16.9	4.2	4.0
Hong Kong	3.6	3.5	30.1	17.2

International trade in groundnut meal is small and has fallen sharply particularly since the mid-1990s. The global export market for groundnut meal shrank from 638,000 t during 1981-85 to 243,000 t during 2001-05 (Table 9). Developing countries control 90 percent of the global exports; in 2001-05 Asia and Africa accounted for 72 and 10 percent of the global exports, respectively. There has been a significant decline in exports of groundnut meal from both Africa and Asia, but at a faster rate from Africa. China is the largest producer of groundnut oilcake meal, and all of it is consumed domestically as animal feed. On the other hand, India is its largest exporter, accounting for over two-thirds of the global exports in 2001-05. India's exports were steady until the mid-1990s, but declined drastically afterwards, reaching only 110,000 tons in 2001-05. This can be attributed to stringent aflatoxin regulation norms by importing countries, especially Europe.

The big change, however, is Asia's emergence as the largest importer of groundnut oilcake meal displacing Europe that used to be a major market until the mid-1990s. In fact, Europe accounted for over 90 percent of the global imports in 1981-85, which declined to 20 percent in 2001-05. On the other hand, Asia's share increased to 60 percent in 2001-05, from a mere 7 percent in 1981-85. China, Thailand, and Indonesia were the main importers of groundnut oilcake meal in 2001-05. The increasing demand was driven by a fast-expanding livestock industry there (Birthal and Parthasarathy Rao 2009).

**Table 9: Regional and country-wise trade trends for groundnut cake ('000 t).**

Region/ Country	Exports		Imports	
	1981-85	2001-05	1981-85	2001-05
<b>World</b>	638.9	242.7	624.4	256.0
<b>Developed countries</b>	49.3	13.1	569.0	105.4
<b>Northern America</b>	24.8	4.4	0.0	11.1
<b>Europe</b>	24.6	8.7	569.0	92.6
France	7.2	0.7	34.5	65.2
<b>Oceania</b>	0.0	0.0	0.0	0.2
<b>Developing countries</b>	589.5	229.6	55.4	152.1
<b>Africa</b>	213.7	72.7	8.7	21.7
Senegal	119.5	61.9	0.1	0.0
<b>Latin America</b>	71.9	30.6	0.4	22.7
Argentina	36.4	17.8	0.0	0.0
Nicaragua	0.0	12.7	0.0	0.0
<b>Asia</b>	304.0	126.3	46.3	107.7
India	282.6	110.7	0.2	0.2
China	6.6	11.0	NA	38.7
Thailand	0.0	0.0	2.3	38.3
Indonesia	0.0	0.2	6.9	26.2

**Pulses :** Pulses trade has increased to 15 percent of its production owing to the increased grain consumption demand from developing countries and the entry of Myanmar, Australia and Canada as significant trading countries since the late 80s. Dry peas and beans are the most traded pulses in the world market, each commanding 33 percent of the market share. Lentils come in third accounting for 13 percent (Figure 4).

The volume of trade increased three-fold between 1981-85 and 2001-05, from 3 million tons to 9 million tons (Table 10). Although developing countries dominate the pulses exports, developed countries are increasingly becoming more important, with 36 percent of their pulse production being exported. Canada, Australia and France have emerged as important exporters since the late 1980s (Table 10). India, on the other hand, continues to be a net importer of pulses, accounting for 2.5 million tons or 25% of the global pulse imports in 2001-05.

### Global price trends

In line with agricultural commodity prices, the real prices<sup>1</sup> of all grain legumes have registered an increase in the recent years, after nearly two decades of decreasing prices. The price rise after 2005 is a reflection of the overall increase in prices of all commodities due to reasons such as increased bio-fuel production from grains/edible oils, depletion of global stocks of all food crops, and spikes in crude oil prices.

Global trends in production and trade of major grain legumes

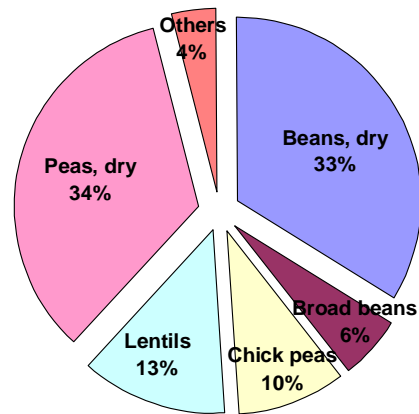


Figure 4: Composition of pulses trade in the world, 2001-05

**Table 10: Regional and country-wise trade trends for pulses ('000 t).**

Region / Country	Exports		Imports	
	1981-85	2001-05	1981-85	2001-05
<b>World</b>	<b>3,211</b>	<b>8,998</b>	<b>3,348</b>	<b>8,892</b>
<b>Developed countries</b>	1,707	5,543	1,399	2,990
<b>Northern America</b>	812	2,999	51	326
Canada	192	2,329	20	90
<b>Europe</b>	814	1,693	1,328	2,637
France	366	759	67	71
Spain	0	0	73	763
Italy	0	0	147	428
<b>Oceania</b>	82	851	21	28
Australia	40	785	0	0
<b>Developing countries</b>	1,504	3,455	1,949	5,902
<b>Africa</b>	158	259	330	1,094
Egypt	0	0	73	429
<b>Latin America</b>	336	525	693	960
<b>Asia</b>	1,010	2,671	926	3,847
India	5	236	208	1,956
Pakistan	1	73	63	370
Myanmar	81	911	0	0
China	123	857	97	215

International prices of soybean and its products (edible oil and oilseed cake) were on a decline in real terms until 2001 (Figure 5, 6, and 7). Soybean prices started showing an upward trend since 2001. Prices of all soybean products exhibit a similar trend, indicating

that markets for soybean and its products tend to integrate vertically. The decline in prices until 2001 can be attributed to rapid growth in soybean production in Argentina and Brazil, and also a significant increase in their trade. The rise in prices after 2001 was due to diversion of area under soybeans to maize in the US, use of edible oils for biodiesel production in Europe and fast increasing imports of soybean and its products by China.

International prices of edible groundnut and groundnut oil declined, in real terms. Prices were higher during the 1980s and earlier when the world groundnut market was dominated by the United States. The decline in prices since the mid eighties can partly be attributed to increasing exports of groundnut from China, apart from domestic and trade policies of the major producing countries. From 2002 onward, prices have shown an increasing trend, particularly for groundnut oil (Figure 6), that is due to a spill-over effect of rising prices in the grain market, increased demand for oilseeds (rapeseed and soybean) for biofuel and tighter global supplies. The gradual increase in groundnut oilseed cake prices since 2000 can be attributable to the increased demand for livestock products (Figure 7).

The global prices of pulses as a group declined for much of the period between 1980 and 2006. The decline was due to increased supply — pulses production grew close to 2 percent per annum during 1981-1994 (Appendix 7). At the global level, the spill over effect of price rise in agricultural commodities did not have a very large impact on pulse prices immediately. However, since 2006 global pulse prices rose sharply, as reflected in the pulse price data for India, which is the largest market for pulses in the world<sup>2</sup>.

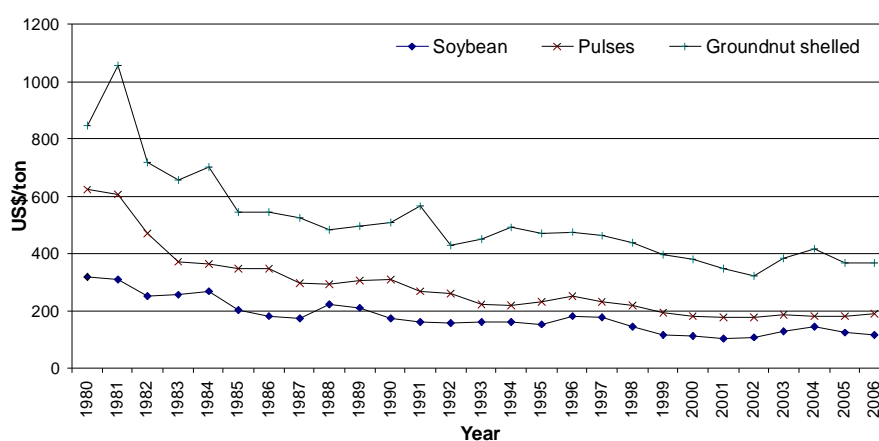


Figure 5: Trends in real export prices for soybean, pulses and shelled groundnut, 1980 to 2006 (1983-84 prices)

### Global trends in production and trade of major grain legumes

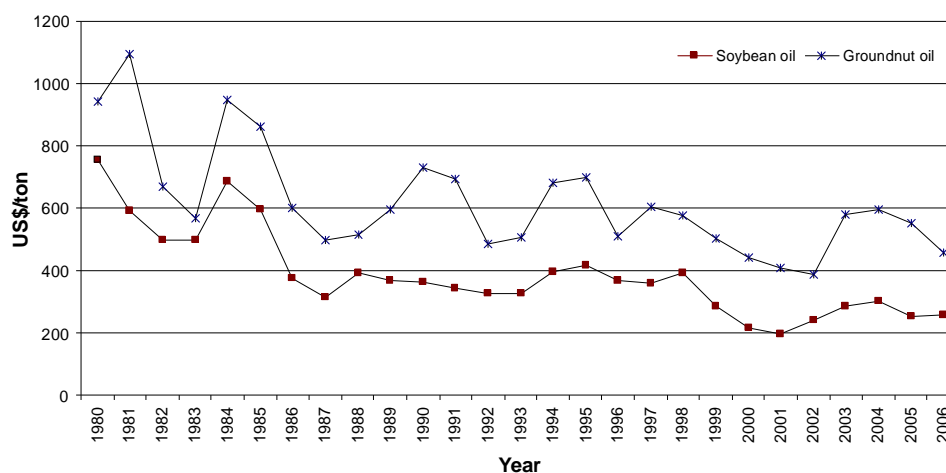


Figure 6: Trends in real export prices for soybean and groundnut oil, 1980 to 2006 (1983-84 prices)

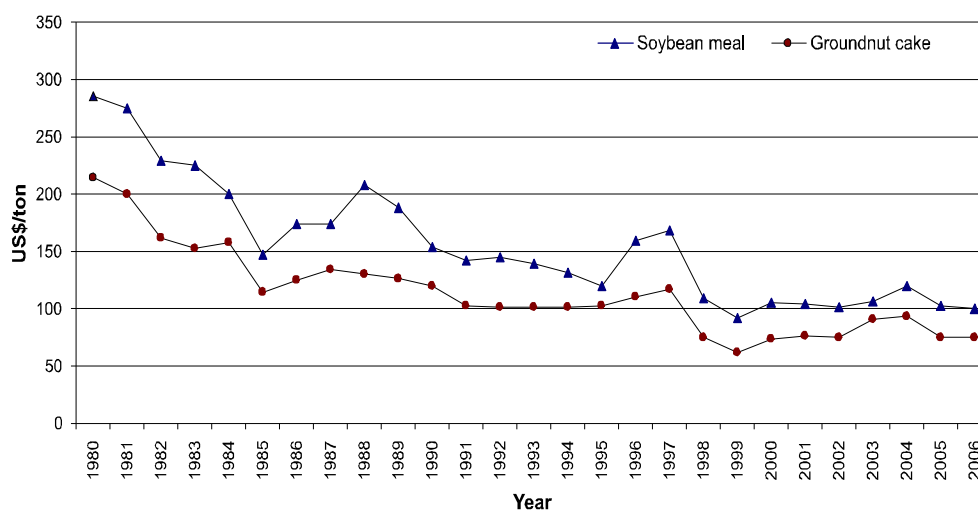


Figure 7: Trends in real export prices for soybean meal and groundnut oilseed cake, 1980 to 2006 (1983-84 prices)

## Conclusion

Owing to a sustained rise in per capita incomes, growing population and changing lifestyles, the demand for grain legumes and their products has been growing rapidly in the world to the extent that the domestic production in most of the countries is unable to meet the rising demand. The factors underlying demand growth for grain legumes have been robust in the recent past, and are unlikely to subside in the near future, implying a

further rise in demand for grain legumes and their products, particularly for the oilseeds. For all the grain legumes, production increases can be attributed primarily to area increases, while yield increases have had a more muted effect, particularly for soybeans whose production was mainly driven by area expansion in Latin America and East Asia. In contrast, yield increase also contributed to groundnut production growth.

A number of technological, institutional, trade related barriers, post harvest constraints and policy issues act as hurdles to their more efficient production and trading. These supply-side constraints can be overcome by generation and diffusion of appropriate technologies for different production environments, and appropriate market and trade policies. Developing traits for drought resistance, breeding for shorter duration and other crop management practices need to be emphasized. Investment in water efficient technologies, such as polythene mulching and drip irrigation should also be emphasized, in order to optimally utilize scarce resources.

Finally, there is a need to correct policy bias against grain legume crops in general. In the past, policy emphasis in most developing countries had been on increasing production of cereals for food grain security, neglecting pulses and oilseeds. Hence, there is a need to improve their profitability by providing remunerative prices, and above all disseminating high yielding, drought tolerant and insect-pest resistant varieties to increase production of grain legumes.

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**Appendix 1: Regional and country-wise production trends for soybean**

Region / Country	Production		Yield	
	1981-94	1995-2006	1981-94	1995-2006
<b>World</b>	<b>2.8</b>	<b>5.0</b>	<b>1.4</b>	<b>0.9</b>
<b>Developed</b>	1.0	2.2	2.0	0.6
<b>Europe</b>	5.7	3.4	5.6	-0.6
<b>North America</b>	0.9	2.2	1.9	0.6
USA	1.0	2.2	2.0	0.7
<b>Oceania</b>	-2.2	-2.8	0.7	0.3
<b>Developing</b>	5.3	7.6	1.5	1.7
<b>Africa</b>	5.1	5.8	-2.5	3.1
<b>Asia</b>	5.1	1.7	1.5	-0.1
China	2.8	1.8	2.1	0.0
India	20.3	3.1	3.4	-0.5
<b>Latin America</b>	5.4	10.1	1.7	1.5
Brazil	4.0	8.8	1.8	1.2
Argentina	8.7	13.4	0.6	2.7

**Appendix 2: Regional and country-wise production trends for soybean oil**

Region / Country	Production ('000 t)	
	1981-83	2004-06
<b>World</b>	<b>13,248</b>	<b>32,766</b>
<b>Developed</b>	8,386	11,932
<b>Europe</b>	3,021	2,854
<b>North America</b>	5,354	9,071
United States of America	5,134	6,030
<b>Oceania</b>	11	8
<b>Developing</b>	4,862	20,834
<b>Africa</b>	44	270
<b>Asia</b>	1,746	8,539
China	802	4,113
India	126	775
<b>Latin America</b>	3,072	12,025
Brazil	2,402	3,667
Argentina	641	4,067

**Appendix 3: Growth rates for soybean oil**

Region / Country	Production		
	1981-2006	1981-94	1995-2006
<b>World</b>	<b>4.1</b>	<b>1.8</b>	<b>5.6</b>
<b>Developed</b>	<b>2.3</b>	0.0	1.8
<b>Europe</b>	<b>0.2</b>	-1.4	0.9
<b>North America</b>	<b>3.4</b>	0.6	2.1
United States of America	3.2	2.3	2.1
<b>Oceania</b>	<b>0.2</b>	3.2	-5.3
<b>Developing</b>	<b>6.1</b>	4.5	8.6
<b>Africa</b>	<b>7.2</b>	5.9	10.5
<b>Asia</b>	<b>6.6</b>	4.4	10.3
China	9.3	3.7	16.1
India	13.9	25.6	3.1
<b>Latin America</b>	<b>5.8</b>	4.6	7.5
Brazil	3.9	2.2	4.7
Argentina	12.6	15.8	12.6

**Appendix 4: Region and country-wise growth rates for groundnut**

Region / Country	Production		Yield	
	1981-94	1995-2006	1981-94	1995-2006
<b>World</b>	<b>3.0</b>	<b>2.2</b>	<b>1.6</b>	<b>1.8</b>
Developed	0.5	1.4	-1.2	2.1
<b>Europe</b>	<b>-3.0</b>	<b>-5.3</b>	<b>-5.6</b>	<b>-4.1</b>
<b>North America</b>	<b>0.6</b>	<b>1.5</b>	<b>-1.3</b>	<b>2.1</b>
USA	1.0	1.9	-0.9	2.1
<b>Oceania</b>	<b>-2.1</b>	<b>-0.8</b>	<b>2.6</b>	<b>2.5</b>
Developing	3.2	2.2	1.8	1.8
<b>Africa</b>	<b>2.9</b>	<b>3.4</b>	<b>1.6</b>	<b>2.1</b>
Nigeria	9.7	4.5	2.6	5.9
<b>Asia</b>	<b>3.6</b>	<b>1.9</b>	<b>1.9</b>	<b>1.9</b>
China	5.7	4.1	3.0	1.0
India	2.8	-1.9	1.4	0.1
Indonesia	3.1	2.3	0.2	1.7
<b>Latin America</b>	<b>-2.1</b>	<b>0.7</b>	<b>1.5</b>	<b>2.2</b>

**Appendix 5: Production trends for groundnut oil ('000 t)**

Region / Country	Production ('000 t)	
	1981-83	2004-06
<b>World</b>	<b>3,020</b>	<b>5,300</b>
<b>Developed</b>	154	105
<b>Europe</b>	89	28
<b>North America</b>	63	76
USA	63	76
<b>Oceania</b>	1	1
<b>Developing</b>	2,866	5,195
<b>Africa</b>	557	1,235
Nigeria	69	577
Sudan	88	101
<b>Asia</b>	2,160	3,857
China	482	2,066
India	1,493	1,509
Myanmar	121	165
<b>Latin America</b>	148	103

**Appendix 6: Growth rates for groundnut oil**

Region / Country	• Production		
	1981-2006	1981-94	1995-2006
<b>World</b>	<b>3.0</b>	<b>3.6</b>	<b>1.3</b>
<b>Developed</b>	<b>-0.6</b>	1.2	-4.6
<b>Europe</b>	<b>-2.3</b>	-4.8	-5.5
<b>North America</b>	<b>0.9</b>	5.9	-4.2
USA	0.9	5.9	-4.2
<b>Oceania</b>	<b>0.0</b>	0.3	1.8
<b>Developing</b>	<b>3.1</b>	3.8	1.4
<b>Africa</b>	<b>4.2</b>	4.7	3.2
Nigeria	<b>9.4</b>	18.3	3.5
Sudan	2.3	-3.3	-3.3
<b>Asia</b>	3.1	4.0	1.0
China	<b>7.2</b>	7.1	3.8
India	0.3	2.8	-2.3
Myanmar	1.4	-1.9	3.7
<b>Latin America</b>	-2.0	-5.2	0.0

**Appendix 7: Region and country-wise growth rates of pulses**

Region / Country	Production		Yield	
	1981-94	1995-2006	1981-94	1995-2006
<b>World</b>	<b>2.0</b>	<b>0.7</b>	<b>1.3</b>	<b>0.6</b>
<b>Developed</b>	<b>4.8</b>	<b>-0.9</b>	<b>4.4</b>	<b>0.3</b>
<b>Europe</b>	3.8	-2.9	5.9	0.9
<b>North America</b>	5.2	4.5	1.0	-0.4
Canada	16.6	6.6	1.1	-0.9
<b>Oceania</b>	16.2	-2.9	0.6	-0.5
<b>Developing</b>	<b>0.9</b>	<b>1.4</b>	<b>0.1</b>	<b>1.1</b>
<b>Africa</b>	3.1	3.6	-0.9	1.9
Nigeria	9.8	4.5	2.7	4.3
<b>Asia</b>	0.3	0.7	0.4	0.7
China	-4.5	2.3	0.7	0.8
India	1.3	-0.4	1.4	-0.4
Myanmar	3.6	10.1	-1.3	3.9
<b>Latin America</b>	0.9	0.9	1.1	2.2
Brazil	1.6	1.6	2.3	3.3