



Groundnuts and Groundnut-based products (*Arachis hypogaea* L.)



Prepared by the
Short-term Expert
Alok Kumar Srivastava
on behalf of the German project implementation consortium of



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Introduction

Groundnut (*Arachis hypogaeae* L.Fabaceae) certainly deserves a closer look as an export commodity. India exported 6.38 lakh tonnes [0.63 million MT] having worth of Rs 5381 crore [US\$ 717 million] groundnuts during 2020-21. The groundnuts are exported to mostly countries such as Indonesia, Vietnam, Philippines, Malaysia, Thailand, China, Russia, Ukraine, United Arab Emirates and Nepal Indian exporters. India has exported 266 MT worth of Rs. 2.23 crore [USD\$ 0.3 million]. To maintain the consistence export level, farmers need to ensure food safety by preventing and controlling mycotoxin contamination of products, while adapting to supplies of groundnut varieties that are best suited to demands of specific end-users. Further, owing to competing crops, resultant from domestic price competitiveness, also limits the farmer from taking up exports of groundnut, or its processing. This has led to considerable concern to assess the export bottlenecks and give the necessary impetus to boost exports of groundnut.

Groundnut, also known as peanut, earthnut, goober, pinder, and manila nut, is believed to be a native of Brazil before it moved to other parts of the world. In India, it was introduced from one of the Pacific Islands of China in the first half of the sixteenth century. At present, the crop ranks as the thirteenth most important food crop of the world. Shelled groundnuts are basically used as seed, consumed as raw edible groundnuts or after transformation into “prepared” groundnuts (roasted, salted, flavoured, etc.) or into groundnut butter/ paste. The seeds can also be crushed for oil and a by-product, viz. groundnut meal (animal feed). Groundnut oil is used as quality cooking oil with a high smoke point (440°F) and neutral flavour and odour. Presently, India along with China accounts for half of the world’s groundnut production. Grown in tropical and subtropical areas, groundnut thrives between 25-28°C and under 500-mm rainfall in loamy and black soil.

Groundnut is the fourth largest oilseed being grown in world after soybean, rapeseed and mustard and oil palm. In terms of economic importance among the food legumes, groundnut is second only to soybean. Cultivation, processing, and trade in groundnut products impact directly on the socio-economic development of a large number of developing and least developed countries. As a basic food crop, they play a central role with respect to poverty reduction and food security; their local value addition through processing to oil, food products and animal feedstock is essential for the development of national industrial fabric and the increase in value of national exports.

Global Groundnut Production Scenario

Groundnut is grown in close to 50 countries in the world. As per FAO statistics, India, till 1991 was the largest producer of groundnuts in the world, but by 2001 China overtook India and now holds the first position.

Annual world production of groundnut averages 35 - 40 million MT cultivated on over 25 million ha. Of the total global groundnut production, 65 % of groundnut production originates from Asia, 26% from Africa, 8% from the Americas and barely 1% from Europe and Oceania.

Global Groundnut Area and Production Trend

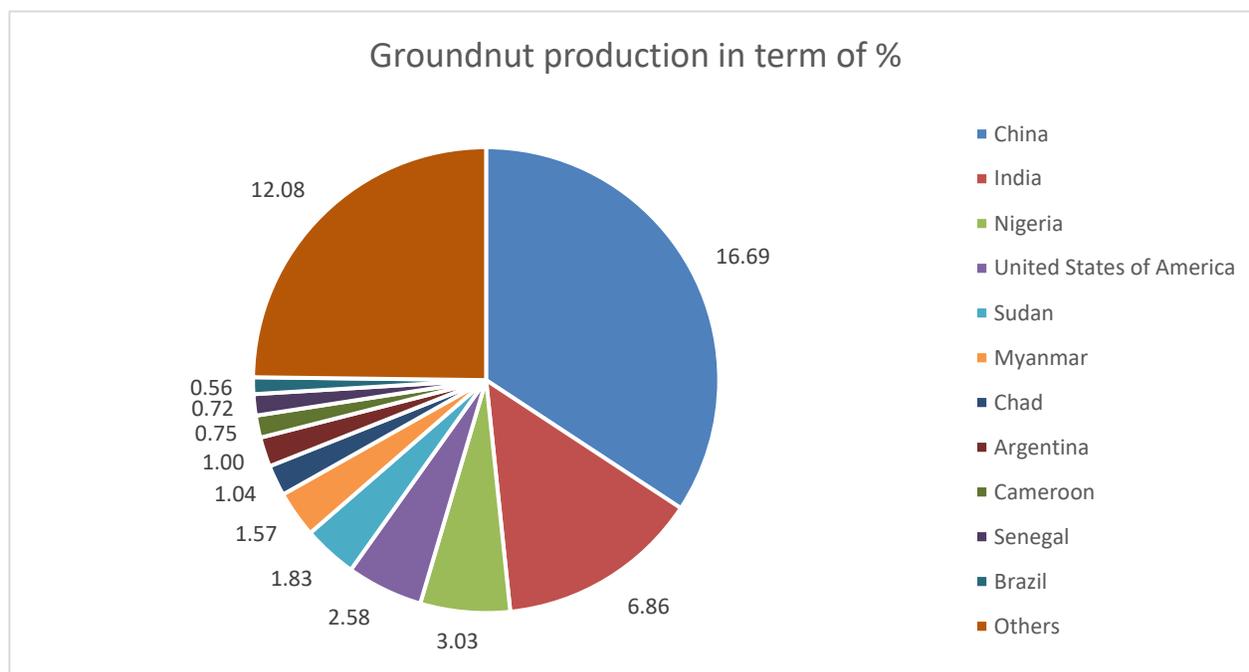
Year	Area (mn. ha)	Production (mn MT)	Yield (MT/ha)
2004-05	23.2	35.9	1.5
2005-06	23.2	35.8	1.5
2006-07	21.0	32.6	1.6
2007-08	21.9	34.0	1.6
2008-09	24.0	37.3	1.6
2009-10	23.3	36.2	1.6
2010-11	25.0	39.9	1.6
2011-12	24.1	38.5	1.6
2012-13	24.4	40.5	1.7
2013-14	25.3	41.2	1.6
2014-15	23.7	39.6	1.7
2019-20	29.5	48.7	1.6

Source: USDA & FAOSTAT

Area cultivated under groundnut has increased by 27% during the 2004-05 to 2019-20. However, increase in production has been 36%, from around 36 million tonnes to 49 million tonnes. This may be attributed to the increase in average yield from 1.5 to 1.6 tonnes /hectare. Yield of groundnut varies widely from 2 MT/ha in the United States to 1.8 MT/ha in China and Argentina to 1tonnes/ha in India.

Major Groundnut Producing Countries

China, India, Nigeria, United States, and Sudan are the top 5 producers contributing almost 75% of total production. China is the largest producer of groundnut with more than 34% share in



global production.

Top Five groundnut producing countries

Countries	Production in Million MT	Production Area in Million Ha	Productivity MT/Ha
China	16.69	4.54	3.67
India	6.86	5.8	1.18
Nigeria	3.03	2.68	1.13
United States of America	2.58	0.63	4.12
Sudan	1.83	2.32	0.79

Groundnut Usage & Major Varieties

About half of world's groundnut produce (48%) is used as food, and half (52%) is used in production of groundnut oil and cake. Consumption patterns differ from developed to developing countries or across geographies. In the USA, a major proportion (60%) is processed as food products, 10% is used for oil production and 20% is exported. In both USA and European countries groundnut is primarily consumed as salted, roasted and specialty nuts (chilli-flavoured, smoked, honey roasted), peanut butter and chocolate-based products. Groundnut cultivation in Argentina is export oriented and it exports more than two third (71%) of its production in form

of either edible nuts or processed groundnut oil and cake. In Asian countries (Indonesia in particular) large amount of groundnut produced is consumed as sauces and gravy. The major groundnut products are raw peanuts, Hand Picked Sorting (HPS) Peanuts, Whole roasted peanuts, salt roasted, split peanuts, blanched peanuts, and peanut butter.

Major groundnut varieties grown worldwide are Java/Spanish, Bold/Runner, Virginia, and Valencia.

Globally Important Groundnut Varieties



Source: American Peanut Council

Virginia kernels (large sized) are preferred for salted nuts, Runner (medium sized), Spanish varieties (small size) are suited for peanut butter, oil, and confectionery purposes. Long shell Valencia variety with three to four kernels is preferred for roasted nuts.

Attributes of Globally Important Groundnut Varieties

Particular	Java/Spanish	Bold/Runner	Virginia	Valencia
Major Cultivation Locations	Southern Africa, California, Texas and Oklahoma and India	Southern USA	India, Virginia, North Carolina, Tennessee, and parts of Georgia	New Mexico
Attributes	Smaller kernels covered with a	High yield, attractive	Large kernels	Small, sweet kernels

	reddish-brown skin	kernel size range		
Major use	Salted nuts and peanut butter	Peanut butter	Salted nuts, other processed items	large, smooth, & bright with red, white, pink or purple, sweet, flavoured nuts with 3-4 seeds / pod

Source: American Peanut Council

Groundnut Exports Scenario

The world trade market for groundnut may be considered as residual market, in the sense that only a small proportion of the world production is traded and most of the production is domestically utilized. The average share of world groundnut traded is approx. 5% of global production.

Source: FAOSTAT, UNCOMTRADE

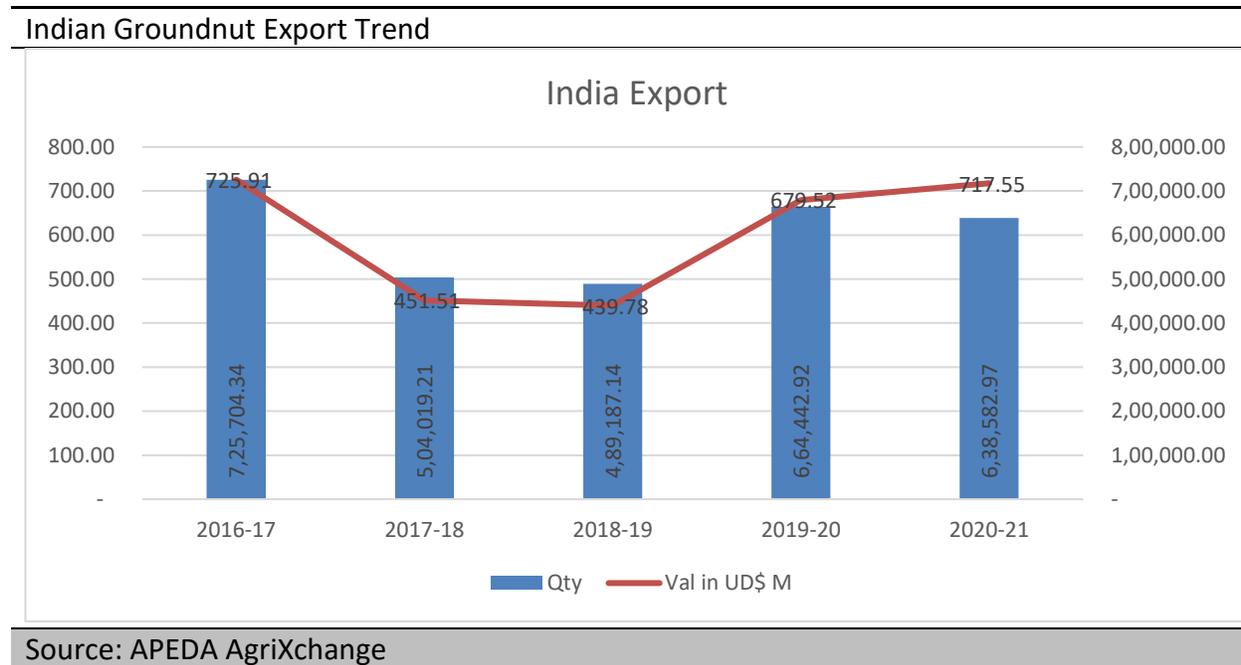
Top five groundnut importing countries¹ are Netherlands, Indonesia, Germany, Mexico, Russia, and Canada. Status of import of groundnut (HS Code) of Germany.

QTY in MT
Value in US\$ Million

Sl. No.	Product with HS Code	2016		2017		2018		2019		2020	
		QTY	Val								
1	Groundnut, not roasted or otherwise cooked, whether or not shelled or broken-in shelled whether or not broken (120242)	1,16,524.0 0	154.2 8	1,08,339.0 0	174	1,17,031.0 0	171.7 2	1,02,912.0 0	147.8 9	1,18,597.0 0	177.4 5
2	Groundnuts, prepd./presvd., whether or not cont. added/sugar/oth. Sweeteni ... (200811)	33,874.00	80.77	42,744.00	112.3 1	40,376.00	110.5 6	38,831.00	102.7 4	42,667.00	120.2 9
3	Groundnut, not roasted or otherwise cooked, whether or not shelled or broken-in shell (120241)	21,395.00	37.81	18,908.00	33.84	19,444.00	35.78	18,978.00	33.37	18,803.00	33.34
4	Groundnut, not roasted or otherwise cooked, whether or not shelled or broken-seed (120230)	18	0.04	21	0.05	40	0.08	37	0.07	45	0.1
Total		1,71,811.0 0	272.9 0	1,70,012.0 0	320.2 0	1,76,891.0 0	318.1 4	1,60,758.0 0	284.0 7	1,80,112.0 0	331.1 8

Groundnut Exports from India

India exports groundnut kernels, groundnut in shell, handpicked selected (HPS) groundnut and oil cake. India is the fourth largest exporter of groundnut (value wise) and ranks second quantity wise. India exported 638 thousand MT groundnuts (US\$ 717.55 million value wise) in 2020-21, which accounted for more than 20% of total world exports.



Export Outlook

There has been a shift in importers of Indian groundnut over period of time. While UK and Netherlands used to be one of the major importers of Indian groundnut in pre-liberalization period, their share has been declining in the post WTO period. The high standards of level of aflatoxin fixed by European Union and Netherlands and inability of Indian exports to meet their standard have resulted in India losing these major markets. Now India exports most its groundnut to East-Asian countries like Malaysia and Indonesia as these countries are not so particular about aflatoxin content. While in short run our policies should aim to broaden our markets and capture markets where India's export shares are likely to increase, in long run India should aim towards quality production to meet the requirements of international market. European Union, Indonesia, Canada, Singapore, Malaysia, and Philippines are the five largest net importers of groundnut. Though India's export shares to Indonesia are considerably high, they are also likely to decline by the end of the decade. India should strive to improve its export shares to these two major importers by improving upon the quality of groundnut exported, especially by having a

check on the aflatoxin content and also by improving the productivity which is much below the world average. Besides, in order to avoid dependency on a single market, there is a need to identify the consumer preferences of the new markets where India's exports are currently low.

Groundnut Exports – India's competitiveness in the global market

As discussed above, South-East Asian countries, Indonesia, Vietnam, Malaysia, Philippines, and Thailand are major markets for Indian groundnut. These countries contribute more than 75% of Indian groundnut export. In these markets, other competing countries are China and Myanmar. Even Thailand is also a major exporting (re-export) country in the region. From the perspective of prices, India holds an advantage over other exporting countries. Overall, prices in global markets for groundnut are consistently declining. Therefore, the current advantage may not remain same. However, given that the yield levels are much lower in India, compare to other major exporting countries, there is scope for sustaining this advantage.

For South-East Asian markets, India also has logistic advantage over major exporters such as Argentina and USA. However, emergence of South Africa and other African countries will pose challenge for India in coming future.

Most of the exports from India are in the form of shelled Kernel (75-80%), there is not much value addition to the base product. This holds a big opportunity for Indian exporters, wherein major markets of west can be targeted. Price advantage can play a critical role in this segment.

Biggest challenge for India is quality of groundnut, wherein aflatoxin has become a major threat to the Indian exporters. Stringent quality controls, not only from the west but also from South-East Asian countries need to be tackled appropriately. There is need to work on backend at the production level to combat this challenge. If aflatoxin can effectively be controlled, yield is improved and price levels are controlled, India can target to become top groundnut exporter in the world. In long term, country should focus on 'sustaining markets in East and expanding in west'.

Domestic Production of Groundnut

Groundnut is the second most important oilseed crop grown in the country after Soybean in terms of total production. India is one of the largest producers of oilseeds in the world and occupies an important position in the Indian agricultural economy. Groundnut is the major oilseed of India. It accounts for around 25 per cent of the total oilseed production of our country. The annual production of seed is 10.1 million tonnes. About 80 per cent of the total groundnut produced in India undergoes processing so that it can be utilized as oil or cake. Around 75 per cent of the crop is produced in kharif season (June-September) and remaining 25 per cent in rabi

season (November-March). The southwest monsoon is the most important factor that determines the area sown, production and prices.

Area, Production and Productivity

Year	Area (Mn Ha.)	Production (in Mn MT)	Productivity (in MT/Ha)
2011-12	5.26	6.96	1323
2012-13	4.72	4.7	995
2013-14	5.51	9.71	1764
2014-15	4.77	7.4	1552
2015-16	4.6	6.73	1465
2016-17	5.34	7.46	1398
2017-18	4.89	9.25	1893
2018-19	4.73	6.73	1422
2019-20	4.89	10.1	2065

State-wise production of Groundnut in India (2019-20) *		
State	Area (Mn Ha.)	Production (Mn MT)
Gujarat	1.69	4.64
Rajasthan	0.74	1.62
Tamil Nadu	0.35	0.98
Andhra Pradesh	0.66	0.85
Karnataka	0.57	0.68
Madhya Pradesh	0.22	0.35
Maharashtra	0.28	0.32
Others	0.38	0.65
All India	4.89	10.1

Groundnut Uses

Every part of groundnut is of commercial value.

Groundnut oil: The groundnut oil has several uses, but it is mainly used as cooking oil. It is used in many preparations, like soap making, fuel, cosmetics, shaving cream, leather dressings, furniture cream, lubricants, etc. Groundnut oil is also used in making vanaspati ghee and in fatty acids manufacturing. It is also used as a medium of preservation for preparation of pickles, chutney, etc. The groundnut oil is used in making different types of medicated ointments,

plasters, syrups and medicated emulsion. It is also used to make various food preparations like butter, milk, candy and chocolate, chutney, groundnut pack, laddu, barfi (chukii), etc.

Kernels: Whole kernels are used for table purpose by frying, soaking, roasting and boiling and in different types of namkeens. Roasted groundnut is the most popular way of eating. Kernels are also used as a spice in vegetables and as sprouts for salad.

Groundnut cake: It is a good feed for animals and poultry due to its nutritive value and palatability.

Groundnut shell: Groundnut shell has great potential for commercial use. It is used as a fuel, filler in cattle feed, hard particleboard, cork substitute, activated carbon, etc.

Groundnut straw: It is mainly used as animal feed and fuel and in preparation of compost. The green leaves and stems of plants are used as animal feed. The shells of pods obtained during threshing are also used as cattle feed.

Major Groundnut Production Zones in India	
Zone	States / Regions
Northern Zone	Uttar Pradesh, Punjab, Haryana, Rajasthan
Western Zone	Gujarat, Southern Rajasthan
Central Zone	Madhya Pradesh, Maharashtra
South Eastern Zone	Bihar, West Bengal, Odisha, Coastal Andhra Pradesh
Peninsular Zone / Southern Zone	Karnataka, Andhra Pradesh, Southern Maharashtra, Tamandu, Kerala
Source: Improved Groundnut Varieties of India by M S Basu, Ratjmarkumar, Chunni Lal	

India ranks second in the world (after China) in groundnut production. The three southern states of Andhra Pradesh, Tamil Nadu, Karnataka and the western state of Gujarat together account for close to 80% of the annual output in India. About 70-75% of the crop is Kharif, grown during rainy season (planted during May-July and harvested in September-mid December). In the Rabi (winter) season planting is during mid September to November and harvesting during March and April. Crop failures occur periodically due to inadequate or excessive rain or unfavourable rainfall distribution. Thus, being largely a kharif crop, monsoon variation fluctuates groundnut production in the country.

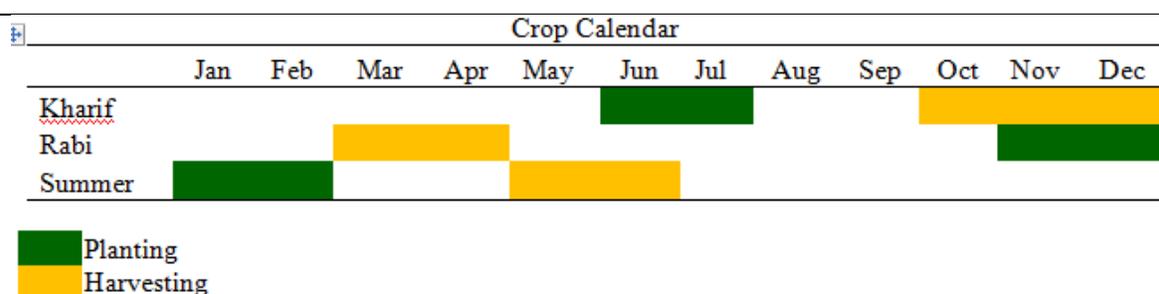
Seasonal Distribution

Though groundnut is an all season crop, it is primarily grown as Kharif crop in India and accounts for 80% of the total production. More than 90% of the area sown with groundnut is rainfed, and

cultivated during June- Sep (South West Monsoons). Groundnut is also grown as a Rabi crop in South India.

Sometimes bumper harvests, glut in market, and bearish edible oil markets result in poor realization from groundnut crop and farmers tend to shift to alternative oilseed crops like castor and cotton which fetch equal or greater returns. Increased of castor and cotton oil/seed meal in industries and as livestock feed have resulted in their derivatives performing better in export market than groundnut oil. Castor seed is seen replacing groundnut in Gujarat. Characteristics like sturdiness, lesser irrigation and inputs requirement have made castor a more preferred crop. However, bearishness in cotton markets also effect in increased acreage of groundnut crop.

Groundnut Crop Calendar



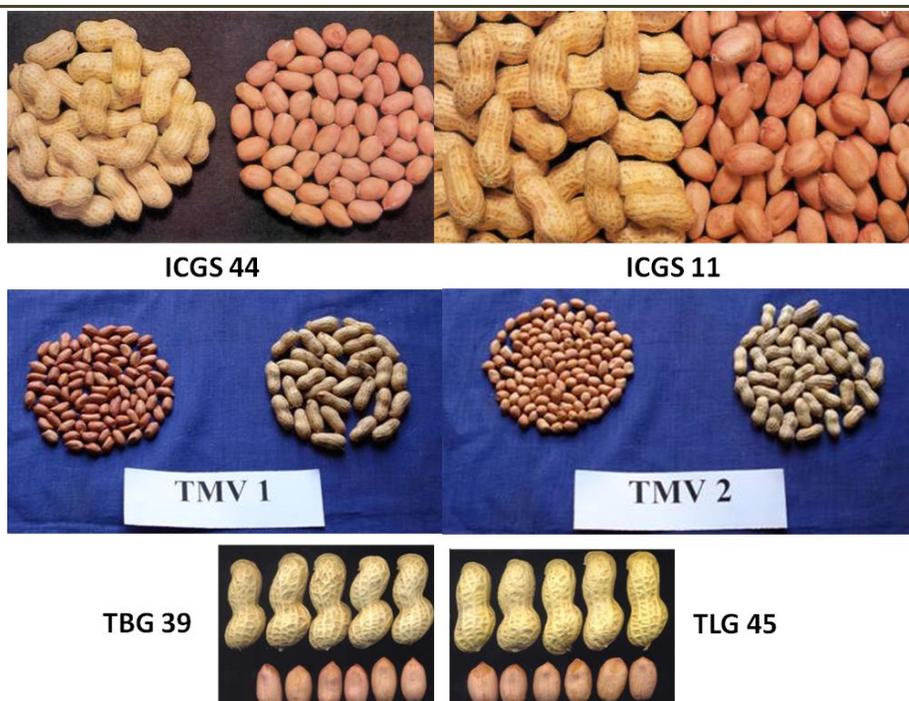
Reasons for Low Productivity

- Rainfed cultivation of the crop – Lack of irrigation during critical growth phase and breaks in rainfall during monsoon adversely affects the output.
- Unaffordable cost of seed by resource poor growers– As a rainfed crop, chances of crop failure are high along with uncertain yield. Hence small and marginal farmers are reluctant to use quality seeds that come at a premium price. Mostly poor-quality local seeds are used.
- Lack of recommended package of practices – Non adoption of seed treatment against seed borne diseases and cultivation in poor soils coupled with insufficient application of plant nutrients, leading to multi-nutrient deficiencies, have also resulted in decreased yields.
- Small scale cultivation and lack of mechanization

Usage and Varieties

As per estimates, approximately 65-70% of groundnut produced in the country is used for production of edible oil. Other uses include seed, feed and food and a small percentage under goes processing, primarily for exports. In India the primary processed products are Hand-picked and selected (HPS) groundnuts, Roasted & Salted Peanuts and edible oil. The cake or meal, a by-product during oil extraction, is used as animal feed. Groundnut shell is also used as fodder. European Union is the major importer of Indian HPS groundnut. India also supplies HPS groundnut to Indonesia, Japan and the USSR. Indian groundnuts are popular because of crunchy and crispy attributes, which is decided by the oil quantity.

Most popular cultivated Java groundnut varieties in India



Source: ICRISAT, Directorate of Groundnut Research, Gujarat Agricultural University, Tamil Nadu Agricultural University

Trade in HPS groundnuts is determined by the size of the groundnut kernel termed as “Count”. Groundnuts are graded and sorted into various categories, e.g. 20-30 to 70- 80, etc. depending on kernel size. Larger size kernels are high priced with lower count and vice versa. HPS groundnuts are widely used by processors producing salted peanuts, chocolate manufacturers, peanut butter manufacturers, etc.

Constitution of consumption of groundnut by various segments in the country has remained more or less same during last decade. Variations are more of market driven and not because of any major shift.

Varieties cultivated in India are Bold, Java, Spanish, and Virginia Bunch or Virginia Runner type. Some of the popular varieties include Vemana (K 134), TPT 1, TPT 2, TPT 4, JCG 88, K5, Narayani, JL 24, and TMV 2 for Kharif crop and TPT 2, K 134, TPT 4, K3, ICGS 11, ICGS 44, DRG 12, DRG 17 and K6 for Rabi cultivation. Indian varieties are preferred for crunchy and crispy characteristics, because of high oil content.

Major Groundnut Production Clusters

Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka, Rajasthan, and Maharashtra are the leading producers of groundnut in India with more than 90% share of area and production. Gujarat followed by Andhra Pradesh and Tamil Nadu together produce more than 65% of India's groundnut (3.5 million tonnes approximately). Productivity of the crop is high in Tamil Nadu (2.3 tonnes/ha), Rajasthan and Gujarat (1.8-2 tonnes/ha) which is not just above the national average but global average.

Within these states, the major production clusters and their production details are summarized in the table below:

State	Cluster	Districts
Gujarat	Saurashtra	Junagadh, Jamnagar, Rajkot, Surendranagar, Porbandar, Bhavnagar, Amreli
Gujarat	North Gujarat	Banaskantha, Sabarkantha
Gujarat	Kutch	Kutch
Tamil Nadu	Coastal Tamil Nadu	Cuddalore, Kancheepuram
Tamil Nadu	North-Central Tamil Nadu	Ariyalur, Dharmapuri, Erode, Krishnagiri, Pudukkottai, Thiruvannamalai, Vellore, Villupuram, Namakkal

Andhra Pradesh	Rayalaseema	Kurnool, Cudappah, Anantapur, Chittoor
Karnataka	North Karnataka	Bagalkote, Belgaum, Bijapur, Dharwad, Gadag, Gulbarga, Koppal, Raichur
Maharashtra	Marathwada	Kohlapur, Pune, Sangli, Satara
Maharashtra	Central Maharashtra	Nashik, Dhule
Rajasthan	West Rajasthan	Bikaner, Chittorgarh, Churu, Dhausa, Jodhpur, Nagaur, Sikar, Tonk

Major Clusters for exports

The top four seaports from where groundnut is being exported from India are Chennai, Mundra, Pipavav and Nhava Sheva. From the interactions with stakeholders, it has come to light that the major clusters from where groundnuts are exported are North-Central Tamil Nadu, Saurashtra, North Karnataka and Rayalaseema.

While groundnuts from Saurashtra get exported through Mundra and Pipavav ports, those from Tamil Nadu and North Karnataka majorly get exported through Chennai. There is considerable inter-state movement of groundnut between Karnataka and Tamil Nadu. The exports from Rayalaseema get routed equally through Nhava Sheva and Chennai.

National Groundnut Balance Sheet

Production of groundnut in the country has been fluctuating between 4900 Thousand MT to 5850 thousand MT. Various factors, such as market demand and price of Groundnut, price and markets of competing crops such as Cotton and Maize, weather conditions, specifically situation of monsoon etc. Use of groundnut, which is mainly for groundnut oil extraction, is slowly shifting towards domestic consumption and exports.

Exhibit 1: Groundnut Balance Sheet for India (2010-11 to 2015-16) (Quantity in 000 MT)- **(To be updated)**

Country	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Beginning Stocks	108	174	111	18	287	47
Production	5,850	5,500	5,000	5,650	4,900	4,700
MY Imports	0	1	3	1	0	0
Total Supply	5,958	5,675	5,114	5,669	5,187	4,747
MY Exports	864	1,059	526	787	850	600
Crush	3,900	3,500	3,575	3,600	3,325	3,150
Food Use Dom. Cons.	620	625	615	615	615	615
Feed Waste Dom. Cons.	400	380	380	380	350	330
Total Dom. Cons.	4,920	4,505	4,570	4,595	4,290	4,095
Ending Stocks	174	111	18	287	47	52
Total Distribution	5,958	5,675	5,114	5,669	5,187	4,747
Stock to consumption %	3.54%	2.46%	0.39%	6.25%	1.10%	1.27%
Stock to Production %	2.97%	2.02%	0.36%	5.08%	0.96%	1.11%
Source: FAOSTAT						

Groundnut Value Chain

It has emerged from the previous chapters that groundnut is one of the most important and widely cultivated oil seed crops in the country. Consolidation is happening at different levels in the value chain. However, the trade is still dominated by traders in the markets, focused on the various clusters in the country. There is an urgent requirement for enhancing the efficiency in the value chain in terms of marketing infrastructure, warehousing and primary processing, especially at the trader level.

For the purpose of this study, consultant team has done detailed value chain analysis of groundnut from specified production, marketing and export clusters of Gujarat, Tamil Nadu, Andhra Pradesh and Rajasthan. The supply chain of groundnut, right from farmers to the level of exporters has been covered, as per the scope of the assignment.

At the farmer level, while harvesting the crop, it has to be ensured that the soil is moist enough to enable easy uprooting of the pods. To this end, farmers provide one round of irrigation prior to harvesting. Although this practice helps in easy harvest, either by hand or by mechanical means, it results in providing conducive condition in the soil for development of aflatoxin fungi. Harvesting before maturity increases the free fatty-acid content in oil and with lesser shelling percentage, oil and protein content. Delay in harvesting results in retention of more pods in soil and less yield. After harvesting the plants along with the pods, the pods are stripped off using groundnut strippers. The pods are stored mostly on the ground in heaps. This practice is not recommended for getting groundnuts of export quality since there is every chance of aflatoxin infestation from the field. However, inadequate near-farm infrastructure has led to this practice.

In all the clusters, the pods are sold in the local market by the farmers. There is limited processing at farmer level, although some farmers in Gujarat and Maharashtra sell kernels in the local market after de-shelling them at local shelling units.

Post-harvest losses in Groundnut occur at different stages at harvesting, threshing, cleaning, winnowing, packaging, transportation, storages, processing and marketing. The losses during harvesting are due to left out pods in the soil. It has been estimated that postharvest pod losses in harvesting varies from 16 to 47 percent, in curing / drying 5 to 50 percent. However, during transportation, the losses occur on account of pilferage, leakage of gunny bags and rough handling. The losses during storage are mainly due to drying loss and through damage by rodents and pests.

Gujarat

Gujarat accounts for 41% of the acreage under groundnut in India. Although the crop is cultivated throughout the state, the districts of Junagarh, Jamnagar, Rajkot, Amreli, Bhavnagar and Kutch

are the major clusters where the crop is cultivated. Groundnut is cultivated in the kharif and summer seasons with major area coming under kharif season. The value chain of groundnuts in Gujarat consists of various stakeholders starting from Farmers, Village-level aggregators, Traders, Shelling Units and Exporters, who add different number of values to the supply chain.

Farmers after harvesting and stripping off the groundnut pods, dry the pods in the field itself. Due to irrigation just before harvest, the moisture content of the pods would be as high as 20-25%. This has to be brought down to 12-15% which will have sufficient demand at the market level. Drying the groundnut in heaps in the field is a common practice. This practice however leads to infestation of fungi from the soil, which affects the quality of the exported produce in terms of aflatoxin levels.

Farmers incur transport cost for transporting the pods to the local market. Traders in the market buy the pods from the farmers through commission agents. Most of the exporters in Gujarat are in direct trade relationship with the traders who buy from the farmers.

Preparing the groundnuts for export after buying from the farmer is a multi-step process. Usually, the groundnuts are shelled at the trader end. In Gujarat, most of the traders have their own facility for shelling the groundnuts. However, there are specialized units in the state focusing on shelling the groundnuts procured by the traders from the markets.

Exporters buy the produce directly from the traders. The groundnuts are stored at the trader level in warehouses. However, over the course of this study, it has been observed that the quality of infrastructure used for storage of groundnuts is not up to the standards that are prescribed for exports. The detailed description of the challenges in value chain is described in the coming chapters.

Groundnuts are exported with the red skin and also in blanched form. The shelled groundnuts are graded and sorted before packing in jute bags for export. The detailed procedure is described in the following chapter. The price premium at each level of the value chain up to the end consumer in the importing country is given in the table below:

Price Premium at various levels of value chain-Gujarat

S.No.	Particulars	Groundnut Type	Rate	Amount (Rs./qtl)
1	Farm-gate Price	In-shell		5,600.00
2	Add Transportation cost	In-shell	Rs. 56/qtl	56.00
3	Add Unloading charges	In-shell	Rs.28/qtl	28.00
4	Add Weighing Charges	In-shell	Rs.15/qtl	15.40
5	Commission Agent Charges	In-shell	2%	112.00
6	Mandi Fees	In-shell	1.50%	84.00
7	Rate at nearest Mandi (4+5+6)	In-shell		5,895.40

8	Loading charges	In-shell	Rs. 28/qtl	28.00
9	Rate to Trader (7+8)	In-shell		5,923.40
10	Transport to Shelling Facility	In-shell	Rs.56/qtl	56.00
11	Rate at shelling facility (9+10)	In-shell		5,979.40
12	Shelling Charges		Rs.30/qtl	30.00
13	Add Loss of weight of shell	Shelled	30%	8,584.86
14	Transport to trader's warehouse	Shelled	Rs. 50/qtl	50.00
15	Rate at Trader's warehouse (13+14)	Shelled		8,634.86
16	Add Warehousing Charges	Shelled	Rs.8/qtl/month	8,642.86
17	Add Traders Margin	Shelled	5%	9,075.00
18	Add Transport to Export Facility	Shelled	Rs. 50/qtl	9,125.00
19	Add Handling Charges	Shelled	Rs.20/qtl	9,145.00
20	Price at exporter facility	Shelled		9,145.00
21	Charges for Processing for Export	HPS groundnut	Rs. 75/qtl	9,220.00
22	Less Wastage	HPS groundnut	10%	10,244.45
23	Add Testing Charges	HPS groundnut	Rs.75/qtl avg.	10,319.45
24	Add Transport to Port	HPS groundnut	Rs. 150/qtl	10,469.45
25	Customs, fees and other charges	HPS groundnut	Rs. 50/qtl avg.	10,519.45
26	Cargo Handling Charges at port	HPS groundnut	Rs. 25/qtl avg.	10,544.45
27	Add Exporter Margin	HPS groundnut	8%	11,388.01
28	Add Freight and Insurance	HPS groundnut	Rs. 225/qtl avg.	11,613.01
29	CIF Price at Destination	HPS groundnut		11,613.01

Port: Mundra Sea

Destination: Indonesia

The above table represents the mark-up price at each level of the value chain. However, there is some degree of scientific measurement of moisture content at the level of exporter. Most importing countries demand moisture content for HPS groundnuts at 7-9%. There is no mechanism to measure the moisture level at the trader level. However, at the exporter level, stocks are supplied only after measuring the moisture content. Merchant exporters who directly

buy HPS groundnuts from other traders and sell to exporting countries do not have much control over the quality of the groundnuts, since they usually order them by looking at the quality of a small sample.

Constraints in Value Chain

The challenges faced by exporters whose major revenue comes from groundnut could be categorized into Farmer-side challenges, Value Chain Challenges, Demand side challenges and Testing and Certification Challenges.

Challenges Faced at Farmer end

- **Competing crops and lack of consistent area of sowing:** Indian groundnut faces stiff competition from other crops like cotton and maize. Groundnut is mainly sown as a summer crop in Gujarat under irrigated condition and as a kharif crop in rainfed condition. In Rajasthan, the crop is mainly grown as a kharif crop mostly under rainfed condition. Groundnut competes with maize in the summer season under irrigated condition and with cotton in the kharif season if the area is rainfed. Pulses are also emerging as a competitor in Rajasthan; however, a change in area due to increased pulse sowing is yet to emerge. In Gujarat, castor is emerging as a competitor, because castor oil has use as industrial oil and there is a good market for castor oil locally. In Southern states like Tamil Nadu, Andhra Pradesh and Karnataka, where groundnut is cultivated as a summer and kharif crop, maize is one of the major competitors. Such variability in the area sown, results in the inability to plan for supply by the exporters. As a result, exporters are under great risk while agreeing to orders of importers in other countries in advance.

- **Cultivation of Aflatoxin infested seed:**

Groundnut is a crop where not much technical advancements have been made in terms of varieties and hybrids. At the exporter-level, the groundnuts having more than acceptable Aflatoxin levels are sorted out using manual or mechanical means. This rejected stock goes back into the field as seeds in the next season. There is virtually no quality control with respect to Aflatoxin when the seeds are sown by the farmers. Although seed treatment and preparing

Reported Aflatoxin levels across states	
State	Total Aflatoxin level (ppb)
Gujarat	10 to 15
Andhra Pradesh	15 to 20
Tamil Nadu	15 to 20
Maharashtra	15 to 20
Rajasthan	10 to 15
Source: Based on discussion	

a sterile field for sowing seeds could be adopted at farmer level, there are not many takers for this type of sowing technology. The presence of aflatoxins at seed level would mean that the produce coming out of the seed would also be infected with aflatoxins.

- **Irrigation just before harvest:** Currently in India, virtually the entire area under groundnut is harvested manually through human labour. For easy harvest of groundnut, it is imperative that the fields have sufficient moisture, which makes it easier to harvest by digging out the groundnut. Such irrigation presents an ambient condition for the fungi to infest and grow in the groundnuts leading to further quality control issues in the supply chain.
- **Pesticide residues from previous crop:** There have been instances where containers were rejected from European Union, because residues of the herbicide Gramoxone was found in the groundnuts that were exported. When the groundnuts were traced back to the field, it was discovered that the residues were from the previous crop, which in this case was paddy. Although crop rotation results in better quality of groundnut produced, the pesticide residues left by the previous crop is becoming a challenge for exporters.

Challenges across Value Chain

- **Improper storage at trader level:** Exporters procure groundnut from traders who may or may not de-shell the groundnut before storage. The content of splits is a determinant of price, and a high percentage of splits will result in a lower price for the produce. To prevent this, groundnuts kept in storage are sprinkled with water by the traders. This not only results in high moisture content after de-shelling, but also results in providing ambient conditions for the development of aflatoxins. Moreover, the hygiene levels in traders' facilities leave a lot to be desired. Groundnuts (shelled and de-shelled) are stored in jute bags, on unpaved surfaces and stacked one over the other in an unscientific manner. This leads to losses due to rejection, once the groundnuts are hand-picked and sorted, mostly at the exporter level.
- **Improper sampling and quality control:** Traders procuring groundnut from the market yards and supplying to exporters are not aware of sampling techniques and usually, trading decisions are taken by visually looking at a 100-150 gm sample from the entire lot being procured. This leads to very little quality control at the market and trader level. Traders are also not aware of the quality standards required for exports. The prices are determined based on moisture content of the HPS groundnuts, but not based on the quality parameters. There is a need to impart awareness and infrastructure for quality control at trader-level.

Demand Side Challenges

- **Lack of price premium for better quality:** Exporters are of the opinion that Indian Java groundnuts cultivated in Gujarat are of better quality in terms of oil content, crispiness and other attributes favourable for processing in the form of snacks and also for oil extraction. However, exporters are not receiving a price premium for this better quality. In some way,

they feel that the excessive focus on food safety standards of Indian groundnuts are a deterrent and this completely overshadows the inherent favourable properties of Indian groundnuts.

- **Increased food quality demand by Indonesia and South East Asian countries:** Indian groundnuts are being exported to South East Asian countries, especially Indonesia for over 25 years. However, from now onwards, Indonesia has placed food quality standards, which conform to EU standards. Aflatoxin levels have been prescribed at 15 ppm. The current infrastructure and facilities that the exporters are having are not sufficient to satisfy the strict criteria.

Permissible Aflatoxin Levels for Exports

Export Purpose	Country	Total Aflatoxin Permissible level (ppb)
Direct Human Consumption	European Union	4
	United States	15
	Indonesia*	15
	Japan and Korea	15
	Others	none
	Use as ingredient in food or for further processing	European Union
	United States	20
	Indonesia*	none
	Japan and Korea	20
	Others	none
Bird and Animal Feed	European Union	50
	United States	100-300 [#]
	Indonesia*	none
	Japan and Korea	none
	Others	none

* Restrictions to come from Feb 2016

Depending on weight of animal, e.g. 100ppb for poultry, 300ppb for swine

Source: International Trade and Food Safety: Economic Theory and Case Studies-USDA, APEDA

- **Competition from South Africa and Mozambique:** Indonesia is the largest market for Indian groundnuts. In Indonesia, Indian groundnuts are starting to face stiff competition from South Africa and Mozambique. These countries are able to provide groundnuts at almost a discount of 15% to Indian groundnuts.
- **Export to China routed to Indonesia:** Indian groundnuts exported to China are beire-routed to Indonesia, which has slightly affected the market for groundnuts directly exported from India in South-East Asian countries like Indonesia, Vietnam and Malaysia.

Testing & Certification related Challenges

- **Variability in test results in India and at destination port:** After testing of groundnuts for exports has become mandatory, there have been many instances where the Aflatoxin levels in groundnuts tested at Indian laboratories and in the levels tested on the same shipment, in European countries have been different. This has led to some shipments being rejected in EU.
- **Inadequate number of testing labs:** Exporters have been facing delays because of the fact that there are less numbers of accredited testing labs. For instance, there is only one accredited testing laboratory in the entire South India (in Chennai). For exporters in South India, the entire testing procedure has become a cumbersome process. They report a 21-day time-frame between the shipment ready for export at their location and the test results to come which leads to valuable time being lost. Thus, they end up bearing extra warehousing and storage expenses at their end.

Ground level Challenges

- Biggest challenge at field level is the absence of advanced practices for cultivation, drying and proper storage. Globally, good quality of groundnuts is produced in the field by adoption of Good Agricultural Practices (GAP). The components of GAP in any crop and specifically in groundnut includes preparation of sterile seed bed, selection of quality seeds, seed treatment, Integrated Pest and Disease Management, scientific crop management, proper harvesting and drying. Indian farmers are not resource intensive to adopt these modern practices. Also, the lack of incentive for supplying higher quality produce also acts as a deterrent in the value chain.
- The infrastructure required for storage is still being developed in the state. At the trader level, it is imperative that the shelled groundnuts are stored at an ambient condition in order to prevent infestation by fungi. It is being observed that a general practice is sprinkling of water over the stored in-shell groundnuts. On the one hand, this prevents the groundnuts from being

split while shelling, but on the other hand, this sprinkling of water presents an ambient condition for the development of fungi.

There are a few exporters in Gujarat, who have invested in their own processing facility. However, the large majority of exporters are small and medium-scale traders or so-called merchant exporters. These merchant exporters are not in a position to ensure the quality of supply to the export markets due to insufficient facilities for storage, processing and testing. Modern storage practices require well-ventilated warehouses with paved flooring and other parameters. However, traders are not having such infrastructure.

Opportunities for intervention in groundnut value chain

Considering the groundnut value chain, existing infrastructure in groundnut clusters in the country and taking cues from international best practices, the opportunities for intervention in the value chain are two pronged:

- Interventions at the field (including farmer, market, and trader level)
- Interventions at the exporter level

Interventions at the field level

Any intervention at the level of farmer, market yard or trader would benefit the large manufacturer exporters immensely. Since such exporters have already invested or are able to invest in their own state-of-the-art infrastructure investment in a common infrastructure would not benefit these exporters.

The pain point for the large exporters is the inability of the lower levels of the value chain to supply quality groundnuts for export. As a result, during sorting, there is a large quantity, which is rejected. The opportunity for intervention by APEDA here is to ensure quality at the field level and at the trader point.

- **Adoption of Good Agricultural Practices in Field:** There is a huge opportunity in developing partnerships with NGOs and private players in the space for promotion of Good Agricultural Practices (GAP). Since APEDA is mandated to be involved in all levels of value chain, it is a great opportunity to engage with peanut growers in clusters in some manner.
- **Yield enhancement:** Internationally, the benchmark yield among developed producers like Argentina and United States are 3.1 MT/ha. In the Indian context, the average yield is 1.07 MT/ha. There is a very good opportunity in the enhancing the yield. Although high yielding varieties and hybrids have been developed by universities and ICAR Institutes, the adoption of quality seeds presents a challenge in the Indian context.

- **Direct Farmer Procurement:** In all the peanut clusters, the law permits direct farmer procurement and engagements in contract farming. Contract Farming ensures quality at the field level itself and it is the best way in which GAP could be adopted at field level. Direct procurement from the farmer by the large exporters also means that their dependence on traders is reduced, which eliminates the need for investing in infrastructure at the trader level. The role of co-operatives and Farmer Producer Organizations (FPOs) in this context could also be explored.
- **Multi-stakeholder partnerships:** To enable success of the above interventions, it would be imperative for APEDA to engage with multiple stakeholders including state governments, IOPEPC, testing and certification laboratories, research institutions such as Directorate of Groundnut Research, State Agricultural Universities, ICRISAT, other industry bodies and NGOs working on the ground. Also, agri-input companies and dealers could play a major role in this regard with supply of quality inputs.
- **Promotion of emerging clusters:** Although the current levels of production in Rajasthan are lower than those of Gujarat, Andhra Pradesh and Tamil Nadu, there is a huge opportunity in developing the cluster as a hub for export-quality groundnut. The climatic conditions in Rajasthan are conducive for good groundnut yields and the relatively drier atmospheric conditions could be utilized for better drying and post-harvest management of the crop in the state.
- **Branding and Geographical Indication:** Indian groundnuts are known worldwide for their properties such as crispiness and high oil content. It is imperative that Indian groundnuts are branded at global level, considering these parameters. Geographical Indications could also be applied to selected clusters for promotion of Indian groundnuts.

It may be understood that the above opportunities cannot work in isolation and need to be integrated into a system so that it leads to overall capacity building of farmers to meet the stringent export criteria with respect to quality parameters. However, there is huge potential for tapping this opportunity, since adoption of GAP would result in producing good quality groundnuts without much increase in the costs. The marginal increase in costs at field level can be effectively mitigated through trimming of the value chain by eliminating the need for small-scale traders. It would be prudent that the interventions may be piloted in a few clusters or within a limited area. The detailed recommendations are described in the coming chapter.

Interventions at exporter-level

The major pain point at exporter-level is the inability of the small exporters to invest in infrastructure required to meet the stringent export criteria of importing countries. Although India has almost 80% share in exports to Indonesia, mostly by smaller merchant exporters. Also, it has been observed that the current testing facilities need to be upgraded and more facilities need to be added for timely certification of the produce. Under the present conditions, it is best to enhance the ability of the exporters rather than going for mass scale common infrastructure. To this end, the opportunities for intervention at exporter-level are summarized below:

- **Incentivization for setting up infrastructure and contract farming:**
- **Improving awareness about quality:** The traders have limited knowledge about quality at the field level. There is huge scope for knowledge development and dissemination in the value chain.

Rationale for Interventions

For bringing about improvements in the entire value chain, systems should be put in place aimed at reducing cost, improving quality and make exports more efficient. The implementation towards this end may either be through the development of a common infrastructure or through enhancing the existing capabilities of each level in the value chain. Both these scenarios are explained below for better clarity on the recommendations:

Objectives	Common Infrastructure	Enhancing capabilities
Quality Improvement	Although a common infrastructure can ensure that quality is maintained post-arrival of groundnuts at the facility, the major problem in the value chain of groundnut is the aflatoxin content. It has been stated earlier that once the nuts are infested with fungi, which in most cases happen in the field and during post-harvest storage, a common infrastructure would not enable elimination of this risk. Also, since	Currently, the exporters do not have much incentive to invest in infrastructure at lower levels in the value chain. Although they would be in some way forced to undertake steps to improve quality due to the increased standards demanded by almost all importing countries, currently there is a huge knowledge and capability gap at the exporter level. Enhancing the capabilities of exporters in terms of grants and

there is no mechanism currently, which can detoxify the nuts in storage, a common infrastructure, which could include facilities for processing, testing and storage, does not eliminate the problem. other incentives would help in assuring their involvement and investment in enhancing the value chain, which will in turn help in improving the quality of groundnut coming from fields.

Cost Reduction

A common infrastructure has immense scope in reducing the costs at exporter level. However, most of the manufacturer exporters have already invested or started investing in advanced storage and processing capabilities. If and by the time a common infrastructure is created, most manufacturer exporters would have invested into creation of infrastructure of their own. Most of this investment has chances to remain as sunk cost. Thus, the common facility would not be able to gather the required user base and would not be feasible in the long run. Since most of the manufacturer exporters have already invested in infrastructure or are planning to develop capabilities, it is logical that the exporters who have already invested into establishing integrated processing and storage facilities be sufficiently incentivized and existing exporters and entrepreneurs who wish to establish their own facility are supported. This would enable a large base for the current supply to go into processing and would not affect the exporters who have already invested. Support from APEDA would also enable them develop capabilities to reduce costs.

Improving efficiency of exports

Efficiency of exports could mean the growth in dollar value of exports with respect to the costs incurred, including the costs of the required infrastructure. To this end, this factor has to take into account where Indian groundnut stands in terms of meeting parameters related to quality, quantity and price of the produce. A common infrastructure has very little role to play in the base price of Developing capabilities of the exporters and in each level of the value chain improves efficiencies at all the levels. Moreover, since early stages are critical in ensuring quality and improving efficiency, this provides a better framework for developing the value chain from inside out. This also ensures that the existing infrastructure developed by exporters run at full capacity and the amount of produce rejected due to lower

groundnut, except that it reduces the costs at the last stage of the value chain. But the major problem in groundnut lies in pre-harvest and immediate post-harvest stage and efficiency improvement at the final stage of the value chain does little in improving the overall efficiency. quality is minimized. Hence all the members in the value chain stands to get benefitted.

The analysis in the above table clearly shows that **it would be more prudent if exporters, traders and farmers engaged in the groundnut value chain would be benefitted more by enhancing their capabilities rather than by creation of a common infrastructure.** This also holds valid in the light of the emerging trends in the global trade. In the coming years, it would be imperative for Indian agricultural value chains in general and the groundnut value chain in particular to develop capabilities at all levels. The emerging trends which necessitate enhancing the capabilities are summarized below:

- **Increased stress on Food Quality:** As evident from the restrictions on minimum prescribed limits of aflatoxin and pesticide residues even from countries like Indonesia, the future focus should be on food quality parameters. Indian groundnuts do not have a good name in European Union due to the fact that the shipments are consistently rejected due to more than prescribed levels of aflatoxin. The compulsory registration of export houses and certification prior to exports are the right steps to start, but more needs to be done in this regard.
- **Enhancing export Competitiveness:** Currently, the international benchmark price of groundnut (as per 31st December 2015 data from IMF) is at US \$1475-1550 per MT, which translates into Rs. 11610 per quintal (Ave). Indian export prices are much higher and the average prices for shipments to Indonesia. This is despite the fact that the costs at the level up to the exporter are much lower and highly competitive. With countries like Argentina being able to supply better quality groundnuts at a lower price in the international market, it is imperative that India starts building its own capabilities in the value chain to be competitive with such countries.
- **Value Addition:** Value addition is another emerging trend, especially in the European market. Packaging plays a critical role in this regard. Most of the import traders in EU countries have huge demand for groundnut and groundnut products in the packages that are in highest demand at the customer end. It would be prudent to promote infrastructure related to

packaging at the end of manufacturer exporters since this presents tremendous cost savings when it comes to European market.