Post-Harvest Profile of Groundnut

Directorate of Marketing and Inspection
Ministry of Agriculture and Farmers Welfare, GOI

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1. Introduction

India is the second largest producer of groundnut after China that accounts for 10.13 % share in the world production as of 2019. Groundnut accounts for 29.96 % of the total oilseed production in the country during 2019-20. Among states, Gujarat is the largest producer contributing 40.39 % of the total production in the country followed by Rajasthan (18.92%), Tamil Nadu (9.22%), Andhra Pradesh (7.55%), Karnataka (6.57%), and Madhya Pradesh (5.59%) during 2020-21. Groundnut contains on an average 40.1% fat, 25.3% protein, and is a fairly rich source of calcium, iron and vitamin B complex like thiamine, riboflavin, niacin and vitamin A. It has got multiple uses. It is not only used as a major cooking medium for various food items but also utilized for manufacture of soap, cosmetics, shaving cream, lubricants, etc. In fact, it plays a pivotal role in oilseed economy of India.

Table 1. Nutritional value of edible portion of Groundnut per 100 grams

Type of Groundnut	Energy (cal.)	Protein (g)	Fat (g)	Ca (mg)	Fe (mg)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vit. A (mcg)
Groundnut	567	25.3	40.1	90	2.8	0.90	0.13	19.9	37
Roasted Groundnut	570	26.2	39.8	77	3.1	0.39	0.13	22.1	0

Source: *Nutritive value of Indian Foods, by Gopalan, L., et al., Indian Council of Medical Research Publication, 1971, pp.60-114.*

1.1 Botanical Description

Groundnut is botanically known as *Arachis hypogaea* belongs to Leguminosae family. Groundnut is a self-pollinated, annual, herbaceous legume crop. A complete seed of groundnut is called as pod, and contains one to five kernels, which develops underground in a needle like structure called as peg. After the pollination, aerial pegs grow into the soil and then convert into a pod. Groundnut has tap root system, which has many nodules, present in root and lateral roots. These nodules contain *Rhizobium* bacteria, which are symbiotic in nature and fixes atmospheric nitrogen.

Outer layer of groundnut is called as shell. The shell constitutes about 25-35 percent of the pod. The seed accounts for the remaining portion (65-75 percent). The colour of the testa varies from red, brown, purple to white depending on the type and variety. The kernel and germ are normally white in colour.

There are four botanical types of groundnut namely Virginia runner, Virginia bunch, Valencia and Spanish bunch and they differs in their chemical composition and oil quality. Virginia

bunch type seeds are richer in oil and chemical contents followed by Spanish bunch. Protein content is higher in Valencia, while soluble sugars are higher in Virginia runner seeds. Highest oleic acid has been observed in Valencia type. The ratio of oleic to linoleic acid is higher in runner type, with good oil keeping quality. The nutritional quality is higher in Valencia types. In general, it can be stated that Virginia runner types have better chemical composition with balanced oil quality.

1.2 Origin

Cultivated groundnut was reported to be originated in South America and then spread to Brazil, Southern Bolivia and North-western Argentina. Groundnut was introduced by the Portuguese from Brazil to West Africa and then to South-western India in the 16^{th} century.

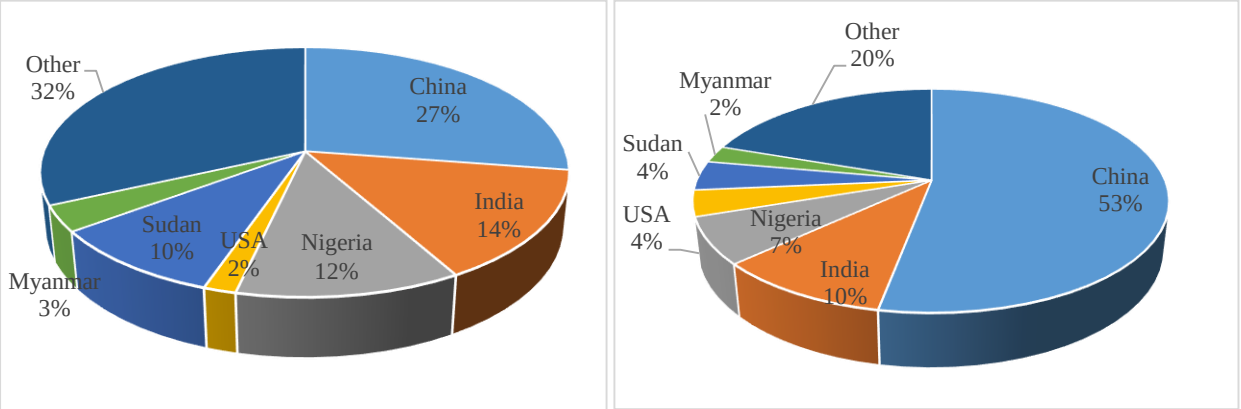
1.3 Importance

Groundnut is called as the 'king' of oilseeds. It is one of the most important food and cash crop of the country. Being a valuable source of all the nutrients, it is a low priced commodity. Groundnut is also called as wonder nut and poor men's cashew nut. Almost every part of groundnut has commercial value. Economically, groundnut is a very valuable oil seed crop of India. Due to source of good quality edible oil, groundnut oil is intensively used for cooking purposes both as refined oil and vegetable oil (*vanaspati ghee*). Groundnut is widely used for table purpose as a snack. Groundnut is consumed as fresh, roasted, dried, boiled and in so many recipes. It is also used in the manufacturing of soaps, beauty creams, medical ointments and creams, paints, lubricants and many other industrial products. India exports Groundnut kernels, in shell, HPS Groundnut and oil cake. Groundnut haulms and leaves serve as a rich source of cattle feed and raw material for preparation of silage. Being a leguminous crop, groundnut also grow in crop rotation as it synthesizes atmospheric nitrogen and adds about 100-120 kg of nitrogen in the field per hectare per season. It maintains the fertility of soil and helps in reducing soil erosion. Groundnut oil cake is used as animal and poultry feed as well as an organic fertilizer. Groundnut shell is used for the manufacture of industrial products like card-board boxes etc., and also for fuel purpose.

2. PRODUCTION

2.1 Major producing countries in the world

Groundnut is widely cultivated in almost all the tropical and subtropical countries of the world. The total groundnut production in the world is about 66.32 million tonnes in the year 2019. Five major groundnut producing countries are China, India, Nigeria, USA and Sudan. China is leading in the production of Groundnut with a share of 53 % of the world production. India and China together accounts for 63.11 percent of the world production. The scenario of groundnut production in the world are given in the Figure 1. The country wise production during the period 2016 – 2019 have been presented in Table 2.



A. Area share of major countries B. Production share of major countries

Figure 1. Major groundnut producing countries in the world

Table 2. Groundnut: Major countries in terms of area and production

Countries	2016	2017	2018	2019
Area (million ha)				
China	8.93	9.25	9.28	9.0
India	5.31	5.33	4.88	4.73
Nigeria	3.45	3.59	3.77	3.87
USA	0.62	0.71	0.55	0.56
Sudan	2.31	2.21	3.06	3.13
Myanmar	0.98	1.03	1.05	1.10
World	33.92	34.34	34.10	32.85
Production (million tonnes)				
China	32.84	34.31	34.78	35.14
India	7.46	7.46	9.25	6.72
Nigeria	4.36	4.52	4.6	4.45
USA	2.53	3.22	2.49	2.49
Sudan	1.82	1.64	2.88	2.82
Myanmar	1.57	1.58	1.56	1.61
World	62.18	65.15	68.28	66.32

Source: FAO Statistics

2.2 Trends in area, production and productivity at national level

Globally, India stands second in terms of Groundnut area and production. But the area under groundnut in India has been declining persistently from the beginning of 90s. India produces 9.95 million tonnes of groundnut from an area of 4.82 million hectares as of 2019-20 (Directorate of Economics and Statistics, Govt. of India). The area, production and productivity of groundnut has grown at a rate of -1.33 per cent, 0.29 per cent and 1.65 per cent respectively during the period, 1980-81 to 2018-19 as in Table 3.

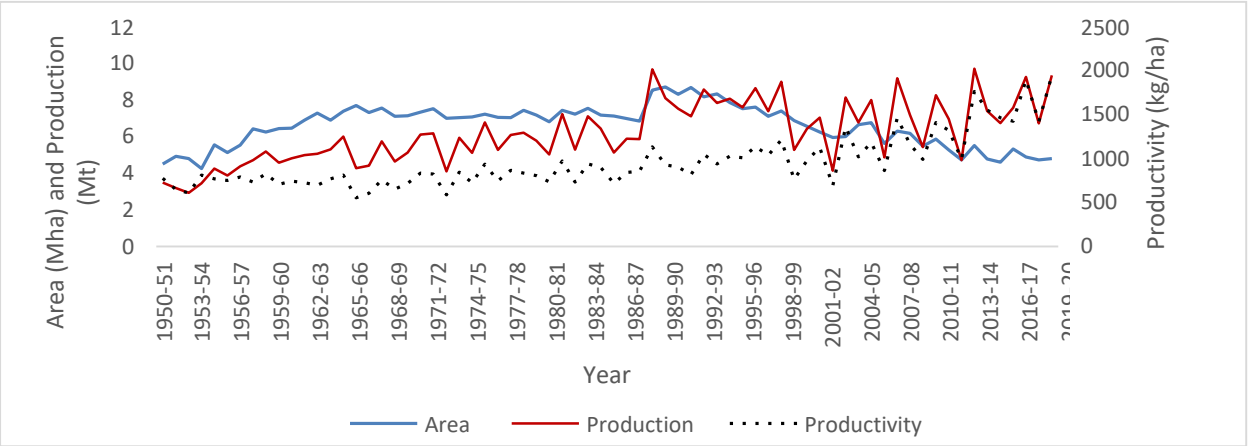


Figure 2. Trends in area, production and productivity of groundnut in India (1950-51 to 2019-20)

Table 3. Period-wise growth rates (%) in area, production and productivity of Groundnut at all-India level (1980-81 to 2018-19)

Particulars	1980-81to 1989-90	1990-91 to 1999-00	2000-01 to 2009-10	2010-11 to 2018-19	1980-81to 2018-19
Area	0.68	-2.15	-1.08	-1.70	-1.33
Production	2.22	-0.35	1.69	1.03	0.29
Productivity	1.53	1.84	2.80	2.77	1.65

Source: *Based on data of Directorate of Economics and Statistics, Government of India.*

In order to understand the decadal growth pattern in the oilseed sector, period-wise annual growth rates were computed. In the case of area, there was negative growth observed in all decades except 80s. The positive trend of area, production and productivity of groundnut during the 1980s could be due to government initiatives such as Technology Mission on Oil seeds (TMO) as well as price and marketing support for oilseeds growers. Except, 90s production has reported positive growth in all decades under consideration, and productivity also has grown positively throughout the periods which is a welcome trend. The state wise area, production and productivity are presented in Table 4.

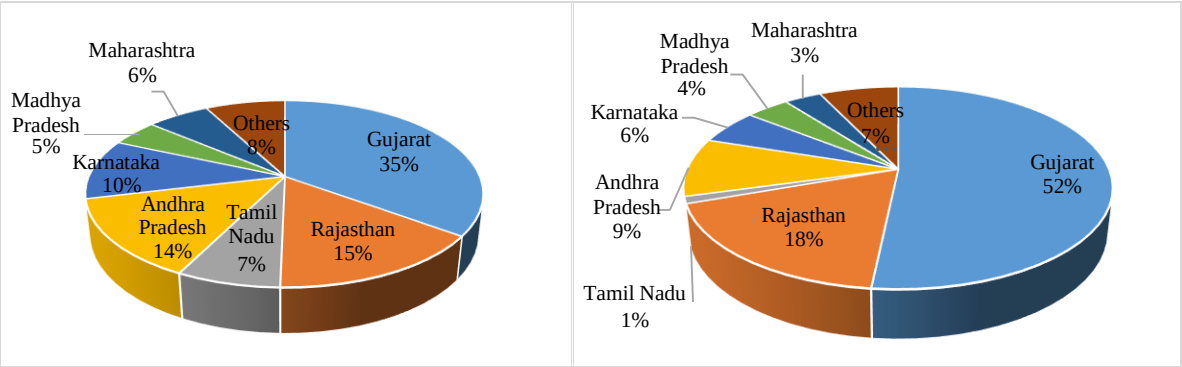
Table 4. Area, Production and Yield of Groundnut (2019-20 and 2020-21*)

	Area ('000 Hectares)			Production ('000 Tonnes)			Yield (Kgs./Hect.)		
States / UT	2018-19	2019-20	2020-21	2018-19	2019-20	2020-21	2018-19	2019-20	2020-21
Gujarat	1594.2	1688.7	2162.9	2202.8	4645.5	4133.6	1382	2751	1911
Rajasthan	673.4	739.0	855.7	1382.3	1619.3	1930.6	2053	2191	2256
Tamil Nadu	335.5	346.7	409.0	911.4	1033.0	1023.4	2717	2980	2502
Andhra Pradesh	748.0	661.0	870.0	462.0	848.8	775.1	618	1284	891
Karnataka	514.9	504.0	721.0	391.0	502.8	720.6	759	998	999
Madhya Pradesh	223.0	221.0	293.0	412.0	350.7	523.4	1848	1587	1786
Maharashtra	244.1	290.8	309.0	238.6	309.0	407.2	977	1063	1318
Telangana	126.0	111.0	127.0	313.8	265.4	290.3	2491	2391	2286
West Bengal	67.4	71.0	71.3	188.0	156.1	168.5	2788	2198	2363
Uttar Pradesh	101.0	94.0	91.0	100.4	88.5	110.0	994	942	1209
Odisha	27.9	29.4	38.5	35.6	43.3	77.8	1277	1471	2023
Chhattisgarh	30.1	27.4	20.8	40.3	41.8	31.6	1338	1524	1524
Jharkhand	30.1	26.1	25.5	31.0	28.8	28.0	1032	1103	1098
All India	4730.8	4825.2	6014.9	6727.2	9952.0	10244.1	1422	2063	1703

Source: *Directorate of Economics & Statistics, Govt. of India*

2.3 Major producing states of India

Gujarat holds major share in terms of area (35 % of the total Ground nut area) and production (52 % of the total Groundnut production) of Groundnut. Rajasthan (15 %), Andhra Pradesh (14 %), Karnataka (10%) and Tamil Nadu (7%) are the other major states in terms of area, whereas, other top producing states are Rajasthan (18%), Andhra Pradesh (9 %) and Karnataka (6%). Tamil Nadu ranks first in terms of productivity (2980 kg/ha), followed by Gujarat (2751 kg/ha) and Telangana (2391 kg/ha). The productivity of ground nut at national level is 2063 kg/ha during the year 2019-20. Area, Production and Yield of major Groundnut producing states during 2017-18 and 2020-21 are presented in Table 4.



A: Area share of major states B: Production share of major states

Figure 3. Major Groundnut producing states in India

Period -wise growth in area, production and productivity of major states

Period -wise growth in area, production and productivity of major states are presented in Table 5,6 and 7 respectively. We can see the same trend as observed at all India level in case of area for major states also. Except 80s, the growth in area was consistently negative for almost all states. But Gujarat, the major producing state reported negative growth during 80s also. In the case of production, Gujarat is performing better with positive growth rates during last two decades with an overall growth rate of 2.83 % during 1980-81 to 2018-19, while all other states reported negative growth. In the case of productivity growth also Gujarat stand out with an overall growth of 3.35 % followed by Tamil Nadu with a growth of 2.80 %.

Table 5. Period-wise growth rates (%) in area of major groundnut producing states: 1980-81 to 2018-19

State	1980-81 to 1989-90	1990-91to 1999-00	2000-01 to 2009-10	2010-11 to 2018-19	1980-81 to 2018-19
Gujarat	-3.92	0.15	-0.24	-0.33	-0.51
Andhra Pradesh	4.55	-2.52	-1.36	-9.59	-1.70
Tamil Nadu	1.64	-1.74	-4.37	-2.44	-3.50
Karnataka	4.08	-1.04	-1.26	-4.26	-1.35
Other states	-0.07	-5.33	---	---	---
India	0.68	-2.15	-1.08	-1.70	-1.33

Table 6. Period-wise growth rates (%) in production of major groundnut crop-producing states: 1980-81 to 2018-19

State	1980-81 to 1989-90	1990-91 to 1999-00	2000-01 to 2009-10	2010-11 to 2018-19	1980-81 to 2018-19
Gujarat	-0.18	-5.62	7.00	2.54	2.83
Andhra Pradesh	0.27	6.01	-0.33	-8.50	-1.92
Tamil Nadu	-2.02	3.17	-2.89	-1.14	-0.81
Karnataka	0.24	6.78	-4.44	-4.11	-1.62
Other states	-2.21	2.98			
India	2.22	-0.35	1.69	1.03	0.29

Table 7. Period-wise growth rates (%) in yield of major groundnut crop-producing states: 1980-81 to 2018-19

State	1980-81 to 1989-90	1990-91 to 1999-00	2000-01 to 2009-10	2010-11 to 2018-19	1980-81to 2018-19
Gujarat	-1.77	5.94	7.26	2.87	3.35
Andhra Pradesh	1.4	-0.76	1.04	1.23	-0.22
Tamil Nadu	1.51	4.34	1.54	1.30	2.80
Karnataka	2.59	0.76	-3.23	0.12	-0.28

Other states	3.05	-0.22			
India	1.53	1.84	2.80	2.77	1.65

2.4 Zone-wise groundnut varieties released

Table 8. Zone-wise groundnut varieties released

Zone	State	Varieties
Northern Zone	Punjab, Haryana, Uttar Pradesh	M-13, M-37, M-145, MA-10, T-64, T-99, TE-1, ICCV-86564, Punjab-1, C-501, T-28, M-197, PC-1, ICCS-1, ICCS-5, DRC-17, M-1, M-2, Chitra Amber, Amber mikta
Western Zone	Gujarat, Rajasthan	ICCS-44, CC-11, CAUC-10, ICCS-37, RSB-87, Punjab-1, CC-20, Somnath, M-13, RS-1, CC-7, BAU-13, CC-5, SB-11, TC-10, ICCS-479, ICCS-86564, TAC-24
Central Zone	Maharashtra, Madhya Pradesh	Phale-Pragati, Copergoan-1, Faizapur-5, Prakash, Koynavikram, TAG-24, J(E)3, AK-12, AK-24, TG-17, ICGS-37, M-13, SG-84, HNG-10, AK-22, ICGS-11, TE-1, TAG-24, Jyoti
Eastern Zone	Orissa, Bihar, West Bengal	BG-1, BG-2, B-30, M-13, B-31, BAU-13, BG-3, BP-1, BP-2, Birsa Bold, GG-2, Kisan, Jawan
Southern Zone	Andhra Pradesh, Tamil Nadu, Karnataka	ICGS-11, TMV-2, S-206, Pondicherry-8, JL-24, TMV-1, TMV-4, Kadiri-2, Kadiri-3, TMV-10, IEGV-87160, ICGV-86143, TMV-6, DRE-1, ICGV-86564, DH-8, DH-3-30, K134, VRI-2, HG-10, TMV-8, TMV-9, TMV-12, TMV-12, KRG-1, CO-3, CP-4

Table 9. BARC Groundnut varieties released and notified for commercial cultivation

Name	Maturity (M) Yield (Y)	Released for states	Characteristics
TG-1	M: 130-135 days Y: 2400-2500 kg/ha	Maharashtra, Gujarat	Large seed
TG-17	M: 115-120 days Y: 1700-2000 kg/ha	Maharashtra	Less branches
TG-3	M: 110 days Y: 2000-2500 kg/ha	Kerala	More branches
TGS-1	M: 110-125 days Y: Kharif 2000 kg/ha	Gujarat	Large seed, Spreading habit
TAG-24	M: Kharif:100-105 days Summer:112-117 days Y: Kharif: 1300 kg/ha Summer: 2500 kg/ha	Maharashtra Karnataka West Bengal	Semi dwarf, Early maturity, High harvest index, High partitioning efficiency, High water use efficiency
TG-22	M: Kharif:115-120days Y: Kharif:1677 kg/ha	Bihar	Medium-large seed, Fresh seed dormancy
TKG-19A	M: 120-125 days Y: Summer 2000-2500 kg/ha	Maharashtra	Large seed, Fresh seed dormancy

TG-26	M: 110-120 days Y: Summer 2500 kg/ha	Gujarat, Maharashtra, Madhya Pradesh	Semi dwarf, Early maturity, High harvest index, High partitioning efficiency, Fresh seed dormancy
TPG-41*	M: 120 days Y: Summer 2407 kg/ha	All India	Large seeded (65g/100 kernel), O/L ratio 3.2

*Identified for release by ICAR Varietal Identification Committee
Source: *www.barc.ernet.in*

Table 10. Varieties released by the Directorate of Groundnut Research at Junagarh (Gujarat)

Type of Varieties	Name of Variety
Large seeded varieties with reduced aflatoxin risk for export promotion	BAU 13, B 95, Somnath TKG 19 A and GG 20
Disease resistant varieties for endemicareas	
Multiple foliar disease resistant for rain-fed kharif	ALR 1, ALR 2, Girnar 1, ICG (FDRS) 10, ALR 3, ICGV 86590
Field tolerance to PBND under rabi/summer situation.	ICGS 11 (ICGV 87123), ICGS 44
Resistant to rust	ICG FDRS 10, ICGV 86590, R 8808, R 9201
Nematode tolerance (kalahasti melody)	Tirupati 2, Tirupati 4
Pests resistance	Girnar 1 (Jassid), ICGV 87160 (Aphid), Kadiri 3, BG 2 (Spodoptera)
Varieties for regional and multi-regionalimportance	
High yielding and early maturing spanish bunch varieties	DRG 17, K 134, DRG 12, Dh 86, JL 220, SR 1, VRI 2, VRI 3, VRI 4, Co 4, AK 159, GG7
High yielding and early maturing virginia varieties	CSMG 884, CSMG 84-1, HNG 10, LGN 2, JSP 21
High harvest index (about 50 percent)	TAG 24, TG 26, GG 2
Fresh seed dormancy	TG 17 (30 days), TG 26 (12-15 days), VRI 1(7 days), BSR 1 (21 days), Dh 40 (30 days)
Tolerant to acidic soils	TG 3, TG 22
Tolerant to salt affected soils	TG 32, K 1224, RHRG 104
Confectionery types	BAU 13, B 95, TKG 19A, GG 20, Somnath
High water use and partitioningefficient	TAG 24, TMV 2, ICG 2730, ICG 5263, NCAc 343, Somnath
Drought tolerant varieties	ICGS 37, CSMG 84-1, CSMG 8784, TAG 24, K 134
Paddy fallow residual moisture situations in Orissa and coastal Andhra Pradesh for rabi/summer season	RSHY 1, VRI 3, Dh 40, BSR 1
For rice based cropping systems in North-eastern States	BSR 1, TG 26, R 8806, Dh 40
For spring situations in Punjab and U.P.	ICGS 1, SG 84

Source: *www.nrcg.guj.nic.in*

2.5 Groundnut price movement

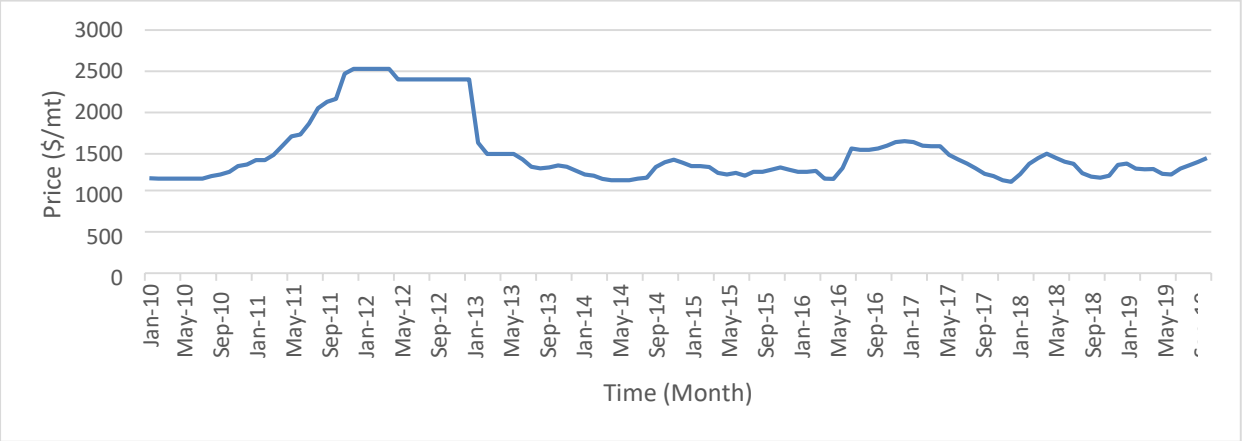


Figure 4. Monthly International groundnut weighted average price (Jan. 2010 to Dec. 2019)
*(**Source**: World Bank Commodity Price Data (The Pink Sheet))*

Prices trends in major markets/states

In India, major groundnut producing states are Gujarat, Rajasthan, Andhra Pradesh, Tamil Nadu, Madhya Pradesh etc. Time plots of monthly groundnut modal prices of some markets are presented in Figure 5, Figure 6 and Figure 7 represent monthly groundnut weighted average price in Gujarat, Rajasthan and Madhya Pradesh for the period, January 2010 to August 2019). Based on the arrival of groundnut, major markets are Gondal, Bikaner, Jamnagar, Rajkot etc.

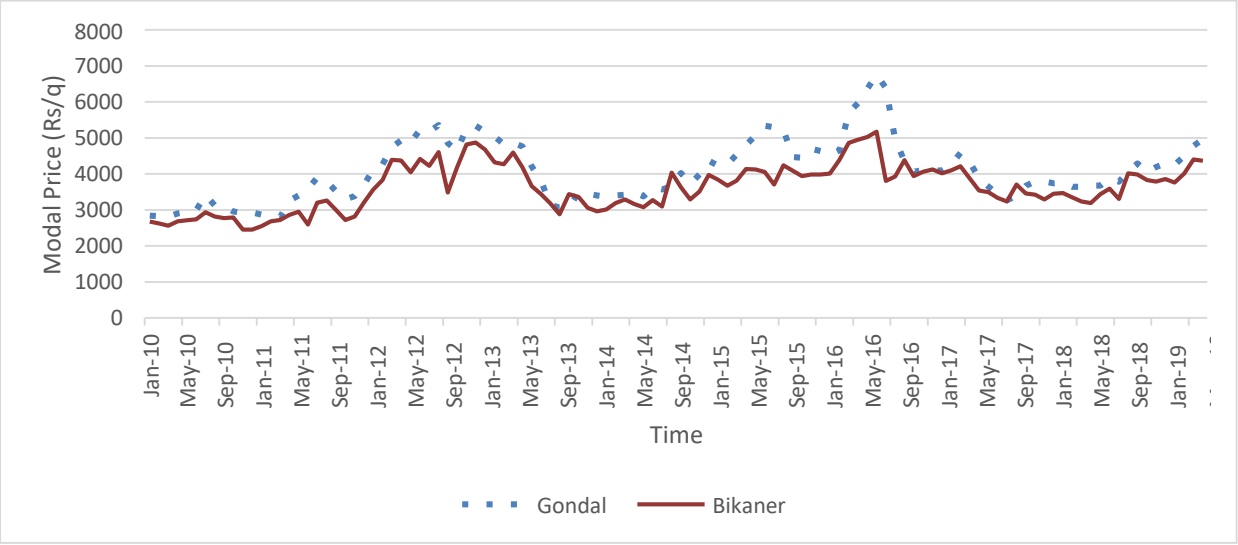


Figure 5. Monthly groundnut modal prices of Gondal and Bikaner markets

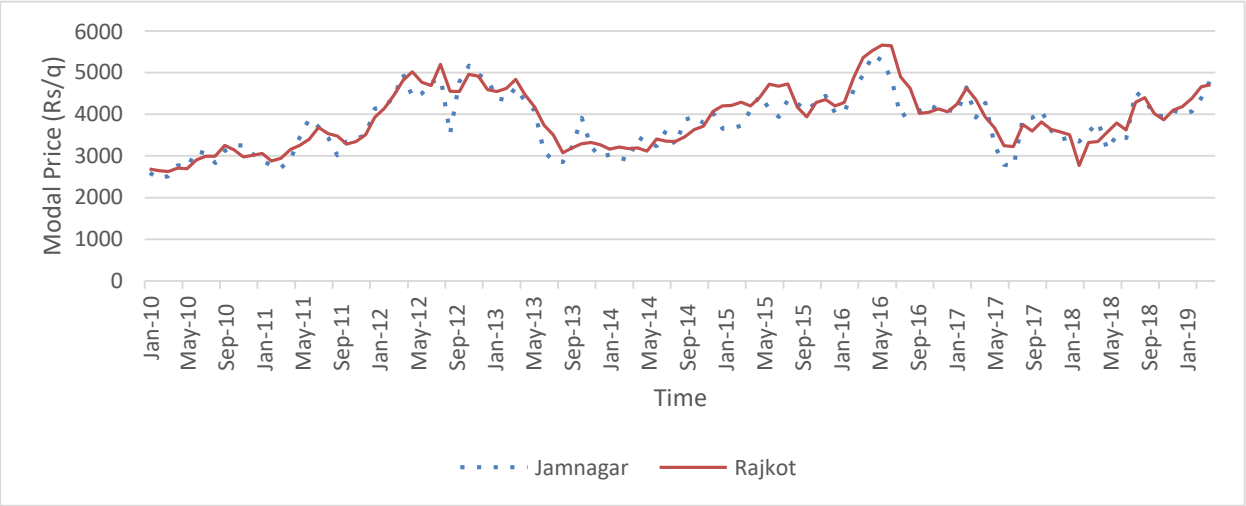


Figure 6. Monthly groundnut modal prices of Jamnagar and Rajkot markets

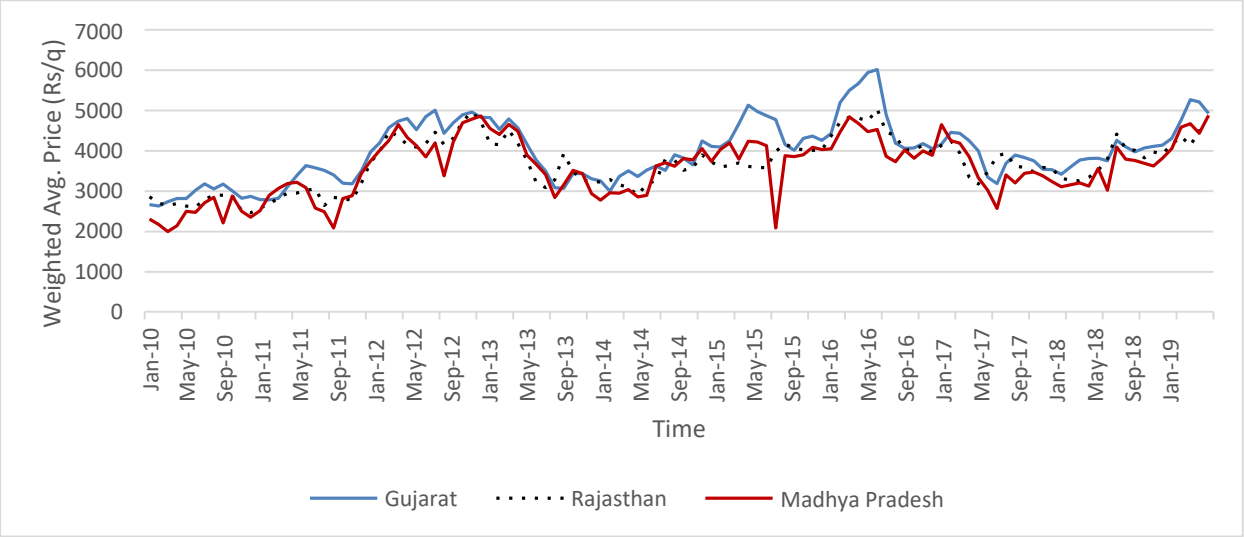


Figure 7. Monthly groundnut weighted average price of Gujarat, Rajasthan and Madhya Pradesh (Jan. 2010 to Aug. 2019)

2.5.1 Behaviour in prices of groundnut oil

The prices of groundnut oil have shown a steady upward trend over time. The wholesale price indices (WPI) for groundnut oil have been presented in Table 11. During the period 2005-06 to 2016-17, the indices of wholesale prices show a generally upward trend. Only in three years, 2008-09, 2009-10 and 2014-15, a decline occurred in the WPI. The coefficients of variation in the WPI during the period 2005-06 to 2016-17 is 22.51, indicating a moderate degree of variability. Figure 8 indicate time plot of WPI of groundnut.

Table 11. Trend and variability in wholesale price indices (base year 2004-05) of Groundnut oil: 2005-06 to 2016-17

Year	Groundnut oil
2005-06	97.03
2006-07	109.45
2007-08	133.59
2008-09	131.23
2009-10	127.82
2010-11	145.25
2011-12	163.83
2012-13	192.58
2013-14	181.59
2014-15	167.32
2015-16	192.29
2016-17	214.37
CV(%)	22.51

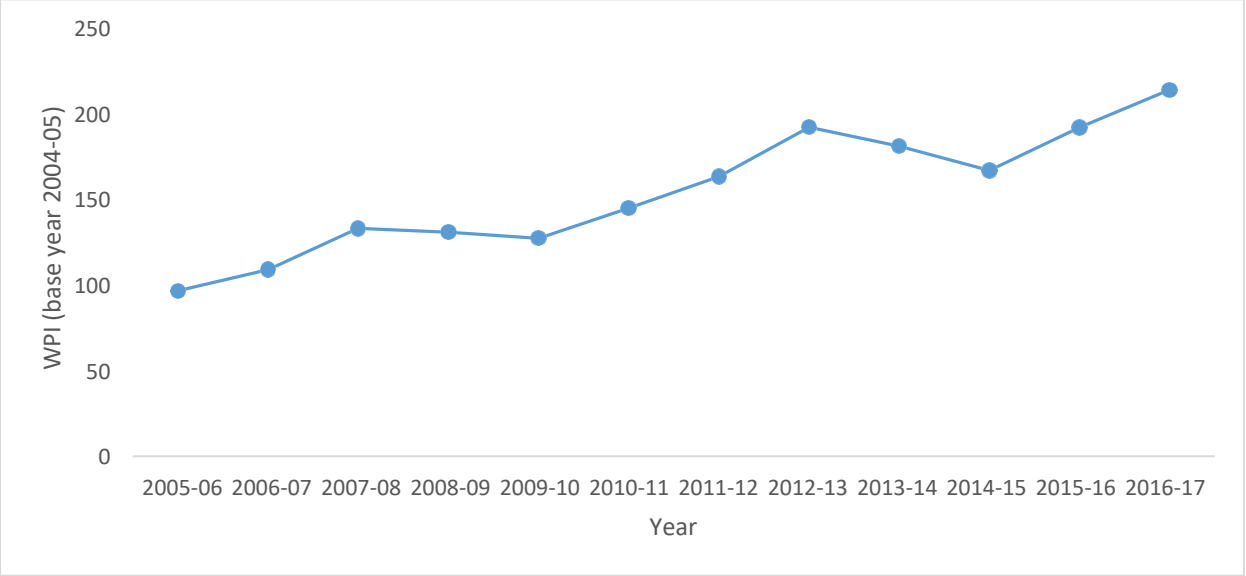


Figure 8. Time plot of WPI (Wholesale Price Index) of Groundnut

2.5.2 Price policy -related to groundnut

With the aim to ensure remunerative prices to the growers for their produce that encourages higher investment and production, and safeguards the interests of consumers by assuring adequate supplies, the Government of India announces minimum support prices (MSPs) for major agricultural commodities in each season based on the advice of the Commission for Agricultural Costs and Prices (CACP). Groundnut is covered under the system of minimum support prices. The comparison of farm harvest price and cost of production (cost C_2 revised) with MSPs in Gujarat over time is given in the Table 12. Gujarat is a major groundnut producing state of the country. The plot of minimum support prices (MSP), farm harvest prices

(FHP) and cost of production (COP) of groundnut in Gujarat are given in figure 9, which shows gradual increase of MSP, FHP and COP over time. During the period under consideration, the MSP has not covered the cost of production consistently throughout the years. But from 2013-14 onwards the MSP announced was enough to cover the cost of production.

Table 12. Minimum Support Prices (MSP), Farm Harvest Prices (FHP) and Cost of Production (COP) of groundnut in Gujarat (Rs/quintal)

Year	MSP	FHP	COP
1992-93	750	999	832
1993-94	800	1112	1090
1994-95	860	1189	789
1995-96	900	1326	1209
1996-97	920	1266	998
1997-98	980	1369	1027
1998-99	1040	1360	1097
1999-00	1155	1344	1586
2000-01	1220	1339	1998
2001-02	1340	1338	914
2002-03	1375	1582	1652
2003-04	1400	1661	1041
2004-05	1500	1682	1534
2005-06	1520	1550	1286
2006-07	1520	1627	1690
2007-08	1550	2055	1567
2008-09	2100	2345	1921
2009-10	2100	2555	2494
2010-11	2300	2899	2036
2011-12	2700	3727	2935
2012-13	3700	4286	4905
2013-14	4000	3518	2859
2014-15	4000	3573	3414
2015-16	4030	3681	3289
2016-17	4220*	4147	3212
2017-18	4450**	3500	3429
2018-19	4890	4045	3984
2019-20	5090		3959
2020-21	5275		
2021-22	5550		

* Including bonus of Rs 100 per quintal
** Including bonus of Rs 200 per quintal

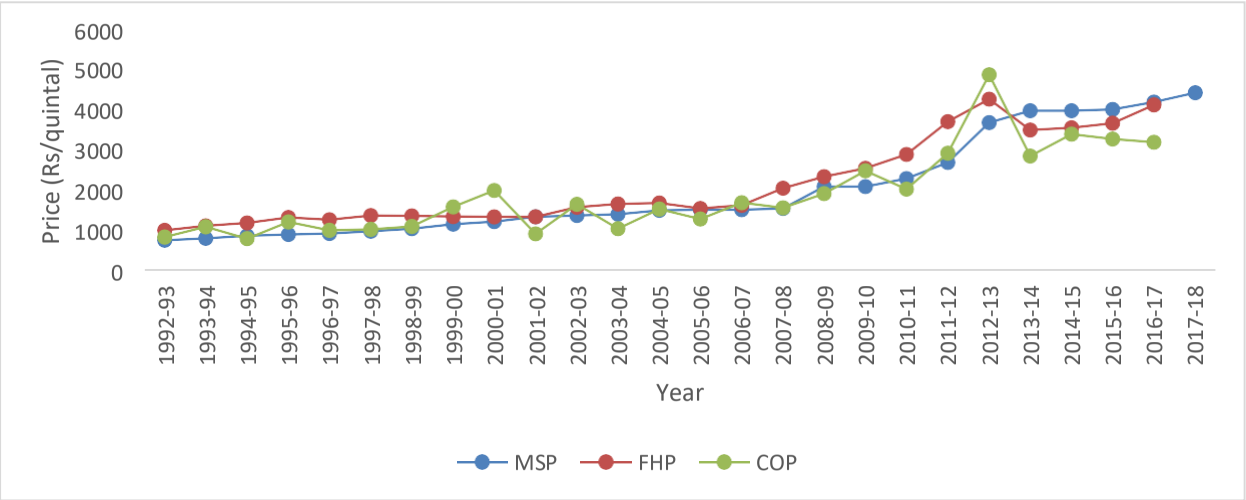


Figure 9. Plot of Minimum support prices (MSP), farm harvest prices (FHP) and cost of production (COP) of groundnut in Gujarat (Rs/quintal)

3. POST-HARVEST MANAGEMENT

Groundnut is different from other oilseeds since the fruit grows in the ground. The moisture content of the pods is 40 to 50 percent when they are dug up, which has to be reduced to 10 percent before threshing is possible. Natural drying in small heaps can take weeks, during which the insects that have already started their work in the fields will continue their inroads, not to mention the danger of moulds. During storage, Trigoderma will cause more damage than weevils, which normally stay on the surface of the stored groundnuts. Long-term storage therefore necessitates fumigation under tarpaulin or in airtight storehouses.

3.1 Harvest and post-harvest losses

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 post- harvest pod losses in harvesting varies from 16 to 47 percent, in curing / drying 5 to 50 percent. However, in transportation, the losses occur on account of pilferage, leakage of gunny bags and rough handling. The losses during storage are mainly due to driage loss and through damage by rodents and pests. Damage also occurs due to dampness which develops the moulds, leading to contamination with Aflatoxin.

To minimize post-harvest losses, the following measures should be followed;

1) Timely harvest when soil contains sufficient moisture.
2) Use of proper method of harvesting.
3) Collection of the left-out pods from the soil.
4) Striping pods properly by adopting better mechanical methods.
5) Drying the wet pods immediately after harvest.

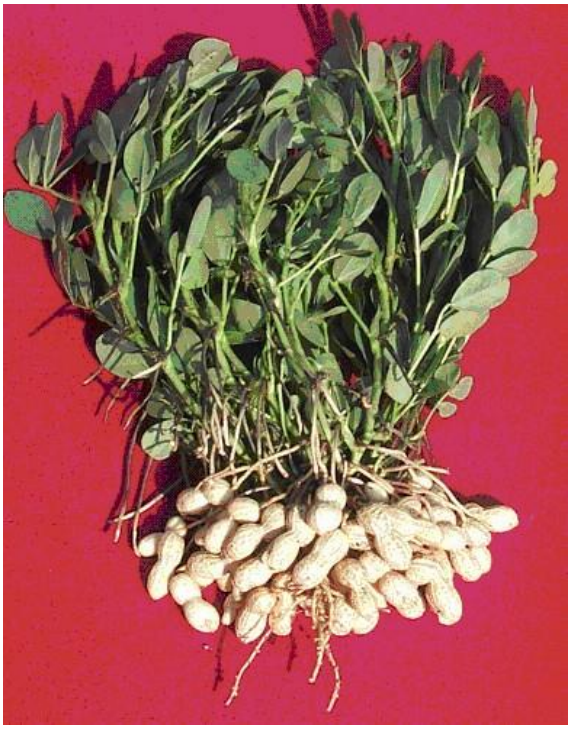
6) Avoiding dampness of stored pods to avoid mould formation.
7) Avoiding the losses in threshing and cleaning, to minimize damaged pods.
8) Adopting grading practices to get more profit.
9) Using good packaging in storage and transportation.
10) Using was proper scientific technique in storage for maintaining optimum moisture content of pods.
11) Using pest and rodent control measures before and after the storage.

12) Storing the Groundnut in the form of pods and avoid in the kernel forms.
13) Providing aeration to stored pods and stir bulk pods occasionally to avoid dampness and pest infestation.

3.2 Harvesting care

Harvesting of Groundnut comprises digging, lifting, windrowing and stacking of pods. Groundnut is harvested when plant foliages show yellowness. The pod is matured when it becomes hard and tough, and when there is dark tan discolouration inside the shell and the kernel become unwrinkled. Usually, the bunch varieties mature in about 100-105 days and the semi spreading and spreading varieties in about 125-135 days.

The following harvesting care should be taken:



1. Harvesting before maturity increases the free fatty-acid content in oil and with lesser shelling percentage, oil and protein content.
2. Immature Groundnut should not be harvested, as are more susceptible to fungal attack.
3. Delay in harvesting results in retention of more pods in soil and less yield.
4. Premature and delay in harvesting reduces viability of the seed kernel.
5. Harvest Groundnut in bright sunny day and avoid during humid/wet weather conditions.
6. Harvest Groundnut, when there is adequate moisture in the soil.
7. Protect the harvested Groundnut, from rain and excessive dew by covering.
8. Avoid heaping of harvested Groundnut to avoid mould formation, which leads in Aflatoxin contamination.
9. Stripped the pods from the plants after the harvest. If the stripping is delayed, spread the harvested plant for few days, which facilitates the drying of pods and air circulation.
10. Keep the harvested Groundnut separately for each variety, to get true to type variety i.e. kernel.
11. Dry the pods for 7-10 days, up to a safe moisture percent.
12. Usually the spreading and semi spreading varieties may be up rooted by harrowing, while bunch varieties may be up rooted by hand operation i.e. manually.

13. Harvesting should be done by adopting proper method harvesting.
14. Keep the proper moisture in the field of Groundnut during expected harvesting time.

3.3 Post-Harvest Equipments

a) Harvesting

#	Equipment	Specifications (Capacity)	Photograph
1	Udaipur Animal Drawn Groundnut Digger	0.16 ha/h	

b) Stripper

#	Equipment	Specifications (Capacity)	Photograph
1	Groundnut Stripper (Drum Type)	18 kg/ha	
2	Groundnut Stripper (Comb Type)	40 kg/ha (with 4 person)	

c) Decorticator

#	Equipment	Specifications (Capacity)	Photograph
1	TNAU Groundnut Decorticator	100 kg/h	
2	CIAE Groundnut cum Castor Decorticator	68 kg/h	

d) Pod Stripper

#	Equipment	Specifications (Capacity)	Photograph
1	Groundnut Pod Stripper	120 kg/h	

e) Groundnut Thresher

#	Equipment	Specifications (Capacity)	Photograph
1	PAU Axial Flow Groundnut Thresher	170-220 kg/h	
2	TNAU Groundnut Thresher	146-168 kg/h	

3.4 Grading

Grading is the process of sorting of a given product according to the stipulated grades or classes or grading means the sorting of the homogenous lots of the produce according to the fixed grade standards. Produce is graded in accordance with the various quality factors. The grading of Groundnut is beneficial to the farmers, traders as well as to the consumers.

Groundnut is chiefly used for the extraction of oil and to a small extent as spice. The quality of seeds is therefore, judged by certain factors, which yield the quality i.e. mainly pungency of the oil etc. There are a number of other factors which have a direct bearing on the yield and quality of the oil obtained from the Groundnuts i.e. size, colour, nature of damage of kernels, impurities and moisture content etc. Groundnuts, grown in India falls under four main commercially important varieties, though they are marketed under a number of trade names. In some cases, the same variety is known by different names in different states.

Advantages of Grading:

- It brings confidence between the buyer and the seller.
- It facilitates interstate and international marketing.
- Disputes in the market can be solved amicably.
- Stability of the price is ensured.
- Farmers can take loans easily from the banks on the basis of grades of produce stored in the godown.
- Arbitrary fixation of price by middlemen is eliminated.
- Brings about improvement of the crop.
- Reduces risk of producer and seller in transactions.
- Future marketing is facilitated. Grades become a commercial measure of quality.
- It also helps in implementation of contract farming.

Important commercial type of varieties:

(i) Coromondal: The nuts are smaller than those of the bold types and the pods have somewhat ill-defined constriction in the middle. The shell is thicker than in the case of the peanuts type but thinner than that of the bold types. The kernels are big in size, oval in shape and are covered with light, red-coloured skin, darkening withage.

(ii) Bold: The pods are larger than those of the coromondal types and the constriction is more well-defined. The shell is thicker than that of coromondal types. The kernels are oval, larger than those of the coromondal types and covered with light red-coloured skins which speedily darken.

(iii) Peanuts: The pods are smaller than those of coromondal and Bold types and have well pronounced constriction in the middle. The shell is thin and the kernels are small and round, and covered with light rose-coloured skin, which peels off easily and darkens withage.

(iv) Red natal: These are generally of the same size as that of peanuts types. The constriction in the pods is less pronounced than in the case of peanuts types. The kernels are round and have deep dark red coloured skin.

Factors to be considered for grading:

The grading factors are the same for all the varieties both in respect of unshelled (pods) and shelled (kernels) Groundnuts. There are as follows:

A) Unshelled Groundnuts: (i) Foreign matter, (ii) Damaged pods, (iii) Shrivelled and immature pods, (iv) Pods of other varieties, (v) Shelling percentage.

B) Shelled Groundnuts: (i) Foreign matter, (ii) Damaged kernels, (iii) slightly damages

kernels, (iv) Shrivelled and immature kernels, (v) Splits and brokens, (vi) Nooks, (vii) Admixture of other varieties.

In addition to above, the produce shall have (a) the characteristic shape, configuration and appearance of the variety. (b) the season's crop, (c) not moist to touch, (d) not showing visible signs of insects and moulds, (e) free from extraneous matter and obnoxious smell.

Steps to be followed for grading:

Steps	Groundnut pods	Groundnut kernels
1. Cleaning and sorting	After arrival, entire produce should be cleaned and sorted manually/mechanically to separate the foreign matter, dust, dirt and stone particles, immature, brokens, shriveled, damaged and diseased pods.	After threshing of pods, entire kernels should be cleaned and sorted manually/mechanically to separate the foreign matter, dust, dirt and stone particles, immature, brokens, shriveled, damaged and diseased kernels and nooks.
2. Packing and sealing	The cleaned and sorted homogeneous pods should be filled in gunny bags and then packed and sealed.	The cleaned and sorted homogeneous kernels are to be filled in gunny bags and then packed and sealed.
3. Sampling	Grading of a lot, the drawing of truly representative sample is essential and it must represent the exact composition of the commodity. The sample should then be packed, coded and sealed.	Grading of a lot, the drawing of truly representative sample is essential and it must represent the exact composition of the commodity. The sample should then be packed, coded and sealed.
4.Analysis	The analysis of the sample should be done as per prescribed grade specifications.	The analysis of the sample should be done as per prescribed grade specifications.
5. Grading and certification	Grade is confirmed by analytical method and certificate is given on the basis of result of the analysis.	Grade is confirmed by analytical method and certificate is issued on the basis of result of the analysis.

Salient features of sampling:

1. **Primary sample:** Each sample drawn from the heap or bag by parkhi or tube sampler from a single position of the lot.
2. **Composite sample:** Primary samples drawn from the same lot shall be thoroughly

mixed and blended to form homogeneous composite sample in a sample divider.

3. **Test sample:** One portion of composite sample weighing 500 gms is packed in cloth bag.

4. **Sample for moisture:** Part of the composite sample weighing about 150gms packed in polythene bag and heat sealed kept in airtight container.

5. **Labeling of sample:** Appropriate labels are affixed with cloth bags and polythene bags samples showing the following particulars:

a) Name of the commodity and variety, b) Lot number,

c) Quantity, whether in bags or in bulk, d) Place and date of sampling,

i) Details of wagon/truck/warehouse in the case of bulk samples,

ii) Name of sampling officer,

iii) Signature.

Sampling procedure:

The Groundnut falls under the medium oilseed crop. The sample of Groundnut consignment may be taken from bulk and bags. The consignment should be broken in lots and sub-lots to get representative sample of the same species, variety, type, grade, source and the year of production. Depending on the size and uniformity of the lot, the number of sub-lots may be two or more as indicated for consignments in bags and in bulk as in Table 14.

One representative gross sample shall be obtained from each sub-lot. Thus, there will be as many gross samples as the number of sub-lots in a lot. The samples for tests shall be prepared from the gross sample. In order to achieve randomness in selection of bags, the following procedure may be adopted:

"Starting from any bag count them in one order as 1, 2, 3….. up to r, r being the integral part of N/n, where 'N' is the total number of bags and 'n' the number of bags to be selected. Every r^{th} bag thus counted is withdrawn to constitute the sample". The number of bags to be selected from each sub-lot shall be in accordance with the specifications in Table 13. In the case of unbagged Groundnut, the sub-lots should be indicated by suitably marking the line of demarcation on the surface of a lot. The surface of each sub-lot should be then leveled to a height of less than 1.5 metres in various parts. A minimum of 50 samples shall be drawn with the help of the appropriate sampling

instrument.

All the primary samples drawn from the same sub-lot shall be thoroughly mixed and blended to constitute a homogeneous composite sample. The minimum size of the gross sample shall be at least 2.5 kg. The composite sample shall be divided into three final samples for laboratory examination and three samples for determination of moisture. The weight of samples for laboratory examination and for moisture determination should be 600gm and 150 g respectively.

Table 13: Number of sub-lots for Groundnut in bags/bulk and scale of sampling

Number of sub-lots for Groundnut in		**Number of sub-lots for Groundnut in bulk**		**Scale of sampling for bagged Groundnut**	
No. of bags in a lots	Minimum no. of sub-lots	Weight of Groundnut in a lots	Minimum No. of sub-lots	No. of bags in the lots	No. of bags to be sampled
Up to 300	2	Up to 30 tonnes	2	Up to 50	8
301 to 1,000	3	31 to 100 tonnes	3	51 to 100	13
1,001 to 3,000	4	1001 to 300 tonnes	4	101 to 150	20
3,001 and over	5	Over 300 tonnes	5	151 to 300	32
				301 & above	50

Source: Handbook on Grading of Food grains and Oilseeds, (Marketing Series-185), Directorate of Marketing & Inspection, Govt. of India

3.4.1 Grade Specifications

A) AGMARK specification

Under the Agricultural Produce (Grading and Marking) Act 1937, the grade specifications for Groundnut have been notified under Groundnut (Grading and Marking) Rules, 1965. Agmark standards for Groundnut are given below:

I. Grade Specification of Groundnut pods (unshelled) known commercially as Red Natals (*Arachis hypogaea*)

i) General characteristics:

The Groundnut pods shall have the characteristics shape, configuration and appearance of the variety commercially known as 'Red Natal", shall be of the season's crop, not moist to touch, shall not show visible, signs of insects and moulds and shall not have excessive dirt.

ii) Special characteristics:

Grade designation	Maximum limit of tolerance				
	Foreign matter %	Damaged pods %	Shrivelled and Immature pods %	Pods of other varieties %	Shelling % (kernels/pods) minimum
Special	1.0	0.50	2.0	1.0	74
Standard	2.0	1.00	3.5	2.0	70
General	3.0	2.00	5.0	5.0	68

Explanation:

1. "Foreign matter" means dust, dirt, stones, lumps of earth, chaff, stem, straw or any other impurity.
2. "Damaged pods" are those pods that are damaged mechanically or by mould, weevil or any other insect attack those showing internal discolouration of kernels materially affecting the quality of the pods.
3. "Shrivelled and immature pods" are those pods which are imperfectly developed.

Note:

For accidental errors, a tolerance is permissible up to 0.25, 0.50 and 1.00 per cent in excess of the tolerance specified each of the columns 2, 3 and 4 for Special, Standard and General grades, respectively and a tolerance of 1.0, 2.0 and 3.0 percent in excess of the specified tolerance in column 5 for Special, Standard and General grades respectively

II. Grade Specification of Groundnut pods (unshelled) known commercially as bold (*Arachis hypogaea*)

i) General characteristics:

The Groundnut pods shall have the characteristics shape, configuration and appearance of the variety commercials known as 'Bold' shall be of the season's crop, not moisture to touch, shall not show visible signs of insects and moulds and shall not have excessive dirt.

ii) Special characteristics:

Grade designation	Maximum limit of tolerance				
	Foreign matter %	Damaged pods %	Shrivelled and Immature pods %	Pods of other varieties	Shelling % (kernels/ pods)
Special	1.0	0.5	3.0	1.0	69
Standard	2.0	1.0	3.5	2.0	66
General	3.0	2.0	5.0	5.0	62

Explanation:

1. "Foreign matter" means dust, dirt, stones, lumps of earth, chaff, stem, straw or any other impurity.
2. "Damaged pods" are those pods that are damaged mechanically or by mould, weevil or any other insect attached or those showing internal discolouration of kernels materially affecting the quality of the pods.
3. "Shrivelled and immature pods" are those pods which are imperfectly developed.

Note:

For accidental errors, a tolerance is permissible upto 0.25, 0.50 and 1.00 per cent in excess of the tolerance specified in each of the columns 2,3 and 4 for Special, Standard and General Grades respectively and a tolerance of 1.0, 2.0 and 3.0 per cent in excess of the specified tolerance in column 5 for Special, Standard and General gradesrespectively.

III. Grade Specification of Groundnut pods (unshelled) known commercially as 'Coromondal' (*Arachis hypogaea*)

i) General characteristics:

The Groundnut pods shall have the characteristic shape, configuration and appearance of the variety commercially known as 'coromondal' shall be of the season's crop, not moist to touch, shall not show visible, signs of insects and moulds and shall not have excessivedirt.

ii) Special characteristics:

Grade designation	Maximum limit of tolerance				
	Foreign matter %	Damaged pods %	Shrivelled and Immature pods	Pods of other varieties	Shelling % (kernels/ pods) minimum
Special	1.0	0.5	2.0	1.0	70
Standard	2.0	1.0	3.5	2.0	67
General	3.0	2.0	5.0	5.0	64

Explanation:

1. "Foreign matter" means dust, dirt, stones, lumps of earth, chaff, stem, straw or any other impurity.
2. "Damaged pods" are those pods that are damaged mechanically or by mould, weevil or any other insect attack are those showing internal discolouration of kernels materially affecting the quality of the pods.
3. "Shrivelled and immature pods" are those pods which are imperfectly developed.

Note:

For accidental errors, a tolerance is permissible upto 0.25, 0.50 and 1.00 per cent in excess of the tolerance specified in each of the columns 2, 3 and 4 for Special, Standard and General grades, respectively and a tolerance of 1.0, 2.0 and 3 per cent in excess of the specified tolerance in column 5 for Special, Standard and General grades respectively.

IV. Grade Specification of Groundnut pods (unshelled) known commercially as Peanuts' (*Arachis hypogaea*)

i) General characteristics:

The Groundnut pods shall have the characteristic shape, configuration and appearance the variety commercially known as 'peanut' shall be of the season's crop, not moist to touch, shall not show visible, signs of insects and moulds and shall not have excessive dirt.

ii) Special characteristics:

Grade designation	Maximum limit of tolerance				
	Foreign matter %	Damaged pods %	Shrivelled and Immature pods %	Pods of other varieties %	Shelling % (kernels/ pods) minimum
Special	1.0	0.5	2.0	1.0	72
Standard	2.0	1.0	3.5	2.0	69
General	3.0	2.0	5.0	5.0	66

Explanation:

1. "Foreign matter" means dust, dirt, stones, lumps of earth, chaff, stem, straw or any other impurity.
2. "Damaged pods" are those pods that are damaged mechanically or by mould, weevil or any other insect attack are those showing internal discolouration of kernels materially affecting the quality of the pods.
3. "Shrivelled and immature pods" are those pods which are imperfectly developed.

Note:

For accidental errors, a tolerance is permissible upto 0.25, 0.50 and 1.00 per cent in excess of the tolerance specified in each of the columns 2, 3 and 4 for Special, Standard and General grades, respectively and a tolerance of 1.0, 2.0 and 3 per cent in excess of the specified tolerance in column 5 for Special, Standard and General grades respectively.

V. Grade Specification of Groundnut kernels commercially known as 'Red Natal/ Peanuts' (*Arachis hypogaea*)

i) General characteristics:

The kernels shall have be obtained from pods of the variety 'Red Natal'/'Peanuts', shall have characteristics shape, configuration and appearance of the variety shall be of the season's crop, not moist to touch, shall not show visible signs of insects and moulds and shall be

free from dirt and obnoxious smell.

ii) Special characteristics:

Grade designation	Maximum limit of tolerance						
	Foreign matter %	Damaged pods %	Slightly damaged kernels %	Shrivelled and Immature kernels %	Splits and broken kernels	Nooks %	Admixture of other varieties
Special	1.0	0.5	0.5	2.0	5.0	1.	1.0
Standard	2.0	1.0	1.0	4.0	10.0	2.	2.0
General	3.0	2.0	2.0	6.0	15.0	3.	5.0

Explanation:

1. "Foreign matter" means pieces of particles of any extraneous substance other than Groundnut kernels and includes unshelled nuts, if any, which have to be shelled.
2. "Damaged kernels" are those kernels which are internally discoloured, discolouration materially affecting the quality.
3. "Slightly damaged kernels" are those kernels, which are discoloured only externally or partly without affecting the quality.
4. "Shrivelled and immature kernels" are those kernels which are imperfectly developed.
5. "Splits kernels" are those kernels broken into two halves/lengthwise and "broken kernels" are those kernels which are smaller than splits but bigger than Nooks.

Note:

For accidental errors, a tolerance is permissible upto 0.25, 0.50 and 1.00 per cent in excess of the tolerance specified each of the columns 2, 3, 4, 5, 7 and 8 for Special, Standard and General grades, respectively and a tolerance of 1.0, 2.0 and 3 per cent in excess of the specified tolerance in column 6 for Special, Standard and General grades respectively.

VI. Grade Specification of Groundnut kernels commercially known as BOLD/ Coromandal (Arachis hypogaea)

i) General characteristics:

The kernels shall have be obtained from pods of the variety 'BOLD/Coromandal', shall have characteristics shape, configuration and appearance of the variety, shall be of the season's crop, not moist to touch, shall not show visible signs of insects and moulds and shall be free from dirt and obnoxious smell.

ii) Special characteristics:

Grade designation	Maximum limit of tolerance						
	Foreign matter %	Damaged pods %	Slightly damaged kernels	Shrivelled and Immature kernels %	Splits and broken kernels	Nooks %	Admixture of other varieties %
Special	0.5	1.0	0.5	2.0	5.0	1.0	1.0
Standard	1.0	1.5	1.0	4.0	10.0	2.0	2.0
General	2.0	2.0	2.0	6.0	15.0	3.0	5.0

Explanation:

1. "Foreign matter" means pieces or particles of any extraneous substance other than Groundnut kernels and includes unshelled nuts, if any, which have to be shelled.
2. "Damaged kernels" are those kernels which are internally discoloured, discolouration materially affecting the quality.
3. "Slightly damaged kernels" are those kernels, which are discoloured only externally or partly without affecting the quality.
4. "Shrivelled and immature kernels" are those kernels which are imperfectly developed.
5. "Splits kernels" are those kernels which are broken into two halves/lengthwise and "broken kernels" are those kernels which are smaller than splits but bigger than Nooks.
6. "Nooks' means small parts of kernels, measuring $1/16^{th}$ or less of a whole kernel.

Note:

For accidental errors, a tolerance is permissible upto 0.25, 0.50 and 1.00 per cent in excess of the tolerance specified each of the columns 2, 3, 4, 5, 7 and 8 for Special, Standard and General grades, respectively and a tolerance of 1.0, 2.0 and 3.0 per cent in excess of the specified tolerance in column No. 6 for Special, Standard and General grades respectively.

Hand Picked Selected Groundnuts Grading and Marking Rules, 1982

VII. Grade specification of Hand Picked Selected (HPS) Groundnut pods commercially known as BOLD AND COROMANDEL

i) General characteristics:

The Hand Picked Selected Groundnut Podsshall:

(a) be the pods obtained from the plant *Arachis hypogaea*:

(b) have characteristics shape, size, appearance and configuration of the Bold/Coromandel variety;

(c) be free from fungus and insect attack, live and/or dead insects, obnoxious smell, rodent

contamination and excreta, larvae and pupae.

ii) Special characteristics:

Grade designation	Definition of quality					
	Special characteristics					
	Extraneous matter percent by weight (max)	Immature and shriveled pods percent by weight (max)	Damaged and discolured pods percent by weight (max)	Pods of other varieties percent by weight (max)	Shelling percent by weight (min)	Moisture percent by weight (max)
Special	0.5	2.0	0.5	1.0	69	8.0
Standard	1.0	3.0	1.0	2.0	66	8.0
General	2.0	4.0	2.0	4.0	62	8.0

Explanation:

1. **Extraneous matter :** means dust, lumps of earth, shell, dirt, stones, stem, straw or any other impurity or any other edible/non-edible oilseeds.
2. **Immature and shriveled pods:** are those pods which are imperfectly developed and/or shrunken.
3. **Damaged and discoloured pods:** are those pods that are damaged mechanically or by mould, weevil or any other insect attack or those showing internal discolouration materially affecting the quality.
4. **Pods of other varities :** means the pods of other than the principal variety/type of groundnut.
5. **Shelling percent:** means the weight of kernels found in 100 grams of pods.

VIII. Grade specification of Hand Picked Selected (HPS) Groundnut pods commercially known as peanuts

i) General characteristics:

The Hand Picked Selected Groundnut Podsshall:

(a) be the pods obtained from the plant *Arachis hypogaea*:

(b) have characteristics shape, size, appearance and configuration of the Peanuts variety;

(c) be free from fungus and insect attack, live and/or dead insects, obnoxious smell, rodent contamination and excreta, larvae and pupae.

ii) Special characteristics:

Grade	Definition of quality

designation	Special characteristics					
	Extraneous matter percent by weight (max)	Immature and shriveled pods percent by weight	Damaged and discolured pods percent by weight	Pods of other varieties percent by weight (max)	Shelling percent by weight (min)	Moisture percent by weight (max)
Special	0.5	2.0	0.5	1.0	72	8.0
Standard	1.0	3.0	1.0	2.0	69	8.0
General	2.0	4.0	2.0	4.0	66	8.0

Explanation:

1. **Extraneous matter:** means dust, lumps of earth, shell, dirt, stones, stem, straw or any other impurity or any other edible/non-edible oilseeds.
2. **Immature and shriveled pods:** are those pods which are imperfectly developed and /or shrunken.
3. **Damaged and discoloured pods:** are those pods that are damaged mechanically or by mould, weevil or any other insect attack or those showing internal discolouration materially affecting the quality.
4. **Pods of other varieties:** means the pods of other than the principal variety/type of groundnut.
5. **Shelling percent:** means the weight of kernels found in 100 grams of pods.

Note:

Hand Picked Selected Groundnut pods shall be subject to Aflatoxin test only if there is specific demand from the foreign buyer.

IX. Grade specification of Hand Picked Selected (HPS) Groundnut pods commercially known as Red Natal

i) General characteristics:

The Hand Picked Selected Groundnut Pods shall:

(a) be the pods obtained from the plant *Arachis hypogea*:

(b) have characteristics shape, size, appearance and configuration of the RED NATAL variety;

(c) be free from fungus and insect attack, live and/or dead insects, obnoxious smell, rodent contamination and excreta, larvae and pupae.

ii) Special characteristics:

Grade designation	Definition of quality					
	Special characteristics					
	Extraneous matter percent by weight (maximum)	Immature and shriveled pods percent by weight (maximum)	Damaged and discolured pods percent by weight (maximum)	Pods of other varieties percent by weight (maximum)	Shelling percent by weight (minimum)	Moisture percent by weight (maximum)
Special	0.5	2.0	0.5	1.0	75	8.0
Standard	1.0	3.0	1.0	2.0	70	8.0
General	2.0	4.0	2.0	4.0	68	8.0

Explanation:

1. **Extraneous matter:** means dust, lumps of earth, shell, dirt, stones, stem, straw or any other impurity or any other edible/non-edible oilseeds.
2. **Immature and shriveled pods:** are those pods which are imperfectly developed and/or shrunken.
3. **Damaged and discoloured pods:** are those pods that are damaged mechanically or by mould, weevil or any other insect attack or those showing internal discolouration materially affecting thequality.
4. **Pods of other varieties:** means the pods of other than the principal variety/type of groundnut.
5. **Shelling percent:** means the weight of kernels found in 100 grams of pods.

Note:

Hand Picked Selected Groundnut pods shall be subject to Aflatoxin test only if there is specific demand from the foreign buyer.

X. Grade specification of Hand Picked Selected (HPS) Groundnut pods commercially known as BOLD and COROMANDEL (*Araaaaachis hypogaea*)

i) General characteristics:

The Handpicked Selected Groundnut kernelsshall:

(a) be obtained from the pods of the Bold/Coromandel variety;

(b) have characteristics shape, colour configuration and appearance of the variety;

(c) be dry, free from extraneous matter, living and/or dead insects, weevils, larvae, pupae, any visible mould and rodent contamination, and excreta,

(d) be free from rancidity, bitter taste obnoxious smell and deleterious substances; and

(e) be free from nooks.

ii) Special characteristics:

Grade designation	Definition of quality			
	Special characteristics			
	No. of kernels per 25gm. maximum by count	Damaged and slightly damaged rnels percent by weight (maximum)	Broken including split kernels percent by weight (maximum)	Moisture percent by weight (maximum)
Special	50	0.5	0.50	7.0
Standard	55	0.5	1.00	7.0
Good	60	0.5	2.00	7.0
General*	As per contract between the buyer and the seller	0.5	2.00	7.0

Definition:

1. **Damaged Kernels:** are those kernels that are damaged mechanically or by mould, weevil, or any other insect attack or those showing internal discolouration of kernels materially affecting the quality,
2. **Slightly damaged:** are those kernels which are superficially affecting to the extent as to impair its appearance only.
3. **Broken Kernels:** means the kernels smaller than splits but bigger than nooks.
4. **Split Kernels:** means the kernels separated lengthwise into two complete halves only.
5. **Nooks:** means very small pieces of the kernels which are $1/8^{th}$ or less than $1/8^{th}$ of a whole kernel.
6. **Extraneous matter:** means dust, dirt, stones, lumps of earth, shell stem, straw or any other edible or non-edible seeds or any other impurity.

***** This grade has been provided to cover the buyers requirement in respect of no. of kernels per 25 gm. not covered under the other grades. HPS Groundnut under this grade shall be packed/exported only against specific order from the foreign buyer indicating the number of counts (kernels) per 25 gm.

Note:

HPS Groundnut meant for export shall be subject to Aflatoxin test only when there is specific demand from the foreign buyer.

XI. Grade specification of Hand Picked Selected (HPS) Groundnut pods commercially known as Peanut (*Arachis hypogea*)

i) General characteristics:

The Hand Picked Selected Groundnut kernelsshall:

(a) be obtained from the pods of the peanut variety;

(b) have characteristics shape, colour configuration and appearance of the variety;

(c) be dry, free from extraneous matter, living and/or dead insects, weevils, larvae, pupae, any visible mould and rodent contamination, and excreta,

(d) be free from rancidity, bitter taste obnoxious smell and deleterious substances; and

(e) be free from nooks.

ii) Special characteristics:

Grade designation	Definition of quality			
	Special characteristics			
	No. of kernels per 25gm. maximum by count	Damaged and slightly damaged kernels percent by weight	Broken including split kernels percent by weight	Moisture percent by weight (maximum)
Special	70	0.5	0.50	7.0
Standard	75	0.5	1.00	7.0
Good	80	0.5	2.00	7.0
General*	As per contract between buyer and seller	0.5	2.00	7.0

Explanation:

1. **Damaged Kernels:** are those kernels that are damaged mechanically or by mould, weevil, or any other insect attack or those showing internal discolouration of kernels materially affecting the quality,
2. **Slightly damaged:** are those kernels which are superficially affected to the extent as to impair its appearance only.
3. **Broken Kernels:** means the kernels smaller than splits but bigger than nooks.
4. **Split Kernels:** means the kernels separated lengthwise into two complete halves only.
5. **Nooks:** means very small pieces of the kernels which are $1/8^{th}$ or less than $1/8^{th}$ of a whole kernel.

6. Extraneous matter: means dust, dirt, stones, lumps of earth, shell stem, straw or any other edible or non-edible seeds or any other impurity.

***** This grade has been provided to cover the buyers requirement in respect of "no. of kernels per 25 gm." not covered under the other grades. HPS Groundnut under this grade shall be packed/exported only against specific order from the foreign buyer indicating the number of counts (kernels) per 25 gm.

Note:

HPS Groundnut meant for export, shall be subject to Aflatoxin test only when there is specific demand from the foreign buyer.

XII. Grade specification of Hand Picked Selected (HPS) Groundnut kernels commercially known as Red Natal (*Arachis hypogea*)

i) General characteristics:

The Hand Picked Selected Groundnut kernelsshall:

(a) be obtained from the pods of the Red Natal variety;

(b) have characteristics shape, colour configuration and appearance of the variety;

(c) be dry, free from extraneous matter, living and/or dead insects, weevils, larvae, pupae, any visible mould and rodent contamination, and excreta,

(d) be free from rancidity, bitter taste obnoxious smell and deleterious substances; and

(e) be free from nooks.

ii) Special characteristics:

Grade designation	Definition of quality			
	Special characteristics			
	No. of kernels per 25gm. maximum by count	Damaged and slightly damaged kernels percent by weight (maximum)	Broken including split kernels percent by weight (maximum)	Moisture percent by weight (maximum)
Special	65	0.5	0.50	7.0
Standard	75	0.5	1.00	7.0
Good	80	0.5	2.00	7.0
General*****	As per contract between the buyer and the seller	0.5	2.00	7.0

Definition:

1. Damaged Kernels: are those kernels that are damaged mechanically or by mould,

weevil, or any other insect attack or those showing internal discolouration of kernels materially affecting the quality,

2. **Slightly damaged:** are those kernels which are superficially affecting to the extent as to impair its appearance only.
3. **Broken Kernels:** means the kernels smaller than splits but bigger than nooks.
4. **Split Kernels:** means the kernels separated lengthwise into two complete halves only.
5. **Nooks:** means very small pieces of the kernels which are $1/8^{th}$ or less than $1/8^{th}$ of a whole kernel.
6. **Extraneous matter:** means dust, dirt, stones, lumps of earth, shell stem, straw or any other edible or non-edible seeds or any other impurity.

***** This grade has been provided to cover the buyers requirement in respect of "No. of kernels per 25 gm." not covered under the other grades. HPS Groundnut under this grade shall be packed/exported only against specific order from the foreign buyer indicating the number of counts (kernels) per 25 gm.

Note:

HPS Groundnut meant for export shall be subject to Aflatoxin test only when there is specific demand from the foreign buyer.

Source: *Agricultural Produce (Grading and Marking), Act, 1937 with Rules, made from 1st January,1980 to 31st March, 1985 (Compendium – Volume - II), embodying all amendments finally notified up to 31st March, 1985, (Marketing Series No.193), and Hand Picked Selected Groundnuts Grading and Marking Rules, 1982 Directorate of Marketing and Inspection*

B) NAFED grade specifications of groundnut – in – shell for price support operations during 2004 – 2005 marketing season

NAFED is the nodal agency of the Government of India for procuring Groundnut in different states under the Price Support Scheme (PSS). The concerned State Co-operative Marketing Federations are the procuring agents for NAFED. All the purchases under the PSS by NAFED are made in accordance with thesespecifications.

Table 14. NAFED specification for groundnut

Sl. No.	Special characteristics	Maximum limits of tolerance (Percent by weight per qtl.) for	
		Bold	Ginny
		FAQ	FAQ
1.	Foreign matter	2	2
2.	Damaged pods	2	2

3.	Shrivelled & immature pods	4	4
4.	Pods of other varieties	4	4
5.	Shelling (kernels / pods)	65 & above	70 & above
6.	Moisture contents	8	8

Source: *Action plan and operational arrangements for Price Support Scheme in Rabi, 2004, NAFED, New Delhi.*

Definitions:

1. Foreign matters means dust, dirt, stones, lumps of earth, chaff, stem, straw or any other impurity.
2. Damaged pods are those pods that are damaged mechanically or by mould, weevil or any other insect attack or those showing internal discolouration of kernels materially affecting the quality of the pods.
3. Shivelled and immature pods are those pods which are imperfectly developed.

Specification under Prevention of Food Adulteration Rules, 1955.

Groundnut Kernel (deshelled) for direct human consumption commonly known as Moongphali are obtained from the plant *Arachis hypogaea*. The kernels shall be free from non-edible seeds such as mahua, castor, neem or argemone, etc. It shall be free from colouring matter and preservatives. It shall be practically free from extraneous matter such as stones, dirt, clay etc. The kernels shall conform to the following standards, namely:-

(a) Moisture	Not more than 7.0 per cent
(b) Damaged kernel including slightly	Not more than 5.0 per cent by weight damaged kernel
(c) Aflatoxin content	Not more than 30 parts per billion

Source: *The Prevention of Food Adulteration Act, 1954,*

C) Tradable parameters of groundnut for trading under e-NAM:

Groundnut shall be

- Clean, wholesome, reasonably uniform in size, shape and colour characteristic to the variety
- Free from obnoxious smell and fungus infestation

Table 15. e-NAM specification for groundnut

#	Tradable Parameters	Reference Results		
		Range-I	Range-II	Range-III
A	Essential			
1	Moisture (% by wt)	Upto 8.00	Upto 10.00	Upto 12.00
2	Foreign matter (% by wt)	Upto 1.00	Upto 2.00	Upto 3.00
3	Damaged Pods (% by wt)	Upto 2.00	Upto 3.00	Upto 5.00

4	Pods of other varities (% by wt)	3.00	5.00	7.00
B	Optional			
1	Shelling (% by wt)	Not Less Than 62		

D) FSSAI Standards

1. Groundnut oil (moongh-phali-ka tel) means the oil expressed from clean and sound groundnuts (Arachis hypogoes). It shall be clear, free from rancidity, suspended or other foreign matter, separated water added colouring or flavouring substances or mineral oil. It shall conform to the following standards:

Butyro-refractometer reading at 40 °C	54 to 57.1
Or	
Refractive Index at 40°C	1.4620-1.4640
Saponification value	188 to 196
Iodine value	85 to 99
Unsaponifiable matter	Not more than 1 per cent
Acid Value	Not more than 6.0
Bellier Test (Turbidity Temp. Acetic acid method)	39°C to 41°C

However, it may contain food additives permitted in these Regulations and Appendices Further, if the oil is obtained by the method of solvent extraction and the oil imported into India whether obtained by solvent extraction or otherwise, it shall be supplied for human consumption only after refining and shall conform to the standards laid down under regulation 2.2.1 (16). The oil so refined shall not contain Hexane more than 5.0 ppm.

2. Peanut Butter means cohesive, comminuted food product prepared from clean, sound, shelled peanuts or groundnuts (*Arachis hypogaea L.*) by grinding roasted mature kernels from which the seed coats have been removed. It may contain sugar, liquid glucose and edible oils and fats permitted in these regulations. It shall conform to the following standards, namely:-

Moisture	Not more than 3.0 per cent by weight
Fat	Not less than 40.0 per cent by weight(ondry basis)
Protein	Not less than 25.0 per cent by weight(on dry basis)
Total ash	Not more than 5.0 per cent by weight(on dry basis)
Acid value of extracted fat	Not more than 4.0
Salt as NaCl	Not more than 2 per cent by weight

Test for argemone oil shall be negative.

Food Additives: The product may contain food additives permitted in Appendix A.

Contaminants, Toxins and Residues: The product shall comply with the Food Safety and Standards (Contaminants, Toxins and Residues) Regulations, 2011.

Hygiene: The products shall be prepared and handled in accordance with the practices prescribed in the Schedule 4 of the Food Safety and Standards (Licensing and Registration of Food Businesses) Regulations, 2011 and any other such practices prescribed from time to time under the provisions of the Food Safety and Standard Act, 2006.

Labelling: The provisions of the Food Safety and Standards (Packaging andLabelling) Regulations, 2011 shall apply.

Methods of Sampling and Analysis: As provided in the relevant Food Safety andStandards Authority of India Manual of Methods of Analysis of Food.

3. Nuts

Groundnut kernel (deshelled) for direct human consumption commonly known as moongphali are obtained from the plant Arachis Hypogaea. The kernels shall be free from non- edible seeds such as mahua, caster, neem or argemone etc.

It shall be free from colouring matter and preservatives. It shall be practically free from extraneous matter, such as stones, dirt, clay etc. The kernels shall conform to the following standards, namely:—

Moisture	Not more than 7.0 %
Damaged kernel including slightly damaged kernel	Not more than 5.0 % by weight.

4. Solvent Extracted Groundnut Flour means the product obtained from fresh, clean, degermed groundnut kernels which have been decuticled after mild roasting.The kernels shall be first expelled followed by solvent extraction with food grade hexane or bydirect extraction of kernels. It shall be whitish to light brown in colour of uniform compositionand shall be free from rancid and objectionable odour, extraneous matter, insect, fungus, rodent hair and excreta. It shall be free from added colour and flavour. It shall conform to the following standards namely-

a) Moisture	Not more than 8.0 per cent by weight
b) Total ash	Not more than 5.0 per cent by weight on dry basis
c) Ash insoluble in dilute HCL	Not more than 0.38 per cent by weight on dry basis

d) Protein (Nx6.25)	Not more than 48 per cent by weight on dry basis
e) Crude Fibre	Not more than 5.0 per cent by weight on dry basis
f) Fat	Not more than 1.5 per cent by weight on dry basis
g) Total bacterial	Not more than 50,000 per gm count
h) Coliform bacteria	Not more than 10.00 per gm
i) Salmonella bacteria	Nil in 25 gm
j) Hexane (Food Grade)	Not more than 10.00 ppm

3.4.2 Adulterants and Toxins:

A) Adulterants:

Although, Groundnut adulterated by some interior quality foreign matter and poisonous chemical, fungal as well as natural contamination are the major factor of adulteration.

Table 16. Common adulterants found in Groundnut

Adulterants	Health effects
1. Admixture: sand, stones etc.	Damages in digestive tract.
2. Chemicals: Residues on contaminated kernels like arsenic, lead, copper, zinc, tin cadmium, mercury and pesticide residues (beyond safe limit.)	Diarrhea, vomiting, paralysis, damage to brain, kidney and leaver.
3. Fungal: mycotoxins in moist kernels due to mould formation from aspergillums, fusarium, penicillium etc.	Causes carcinogenic, mutagenic immunosuppressive effects on health.
4. Microbiological :	
I. E.Coli (occasional contaminant)	Severe diarrhea, vomiting and abdominal pain.
II. Salmonella (rare contaminant)	Injurious to health, symptoms of fever and chills.
III. Bacterial Soft rot. Erwinia carotovora and related spp. IV. Gray moldrot – Botrytis cinerea V. Rhizopus softrot – Rhizopus nigricans VI. Cottony leak of beans	The diseases caused by pathogens and the decompositions caused by other organisms are of chief interest although clear – distinction between these types of organisms is not possible. There is moreover, an array of microbial diseases in the field that affect the pods and perhaps the seeds, e.g. anthracnose, blights, wilts, scab, rust etc. cottony leak or wilt caused by phythium butleri which gives the pods

B) Toxins:

Aflatoxins are the type of mycotoxins, which are derived from the fungi and affect human health. Usually, Aflatoxins in Groundnut are produced by *Aspergillus flavus,* and *Aspergillus parasiticus*. Contamination of Aflatoxins occurs at any stage from field to storage,

whenever environmental conditions are conducive for fungi. The fungi, are generally regarded as storage fungi, which grow under conditions of relatively high moisture/humidity. It has been reported to cause liver damage and both liver and intestinal cancer in humans.

Groundnut is one of the crops, which is vulnerable to attack of Aflatoxin. Aflatoxin may grow on Groundnut kernels, if the moisture content is above 8 to 9 percent. Aflatoxin often grows in ships cargo during transit of more than 4 to 6 weeks. Aflatoxin contamination of Groundnut is a major health hazard to human and animals and it is one of the most important constraints in Groundnut trade.

The main reason for the contamination in Groundnut is due to poor pre-harvest and post-harvest practices like moisture stressed crop, stacking the pods/kernels in high humid conditions, which leads to growth of the fungus. Groundnut is usually stored in the pod, which facilitate insects to damage the pods and ultimately it encourages development of the fungus.

3.4.3 Grading at producer's level

In order to ensure proper price to the producers as well as gaining confidence of the consumers the groundnut should be graded at producers' level. In order to ensure the correctness of description of particular variety, the grading should be done at producer's level. Grading not only facilitates the dissemination of market information but also facilitates the distribution at various stages. The scheme of 'Grading at Producer's level' was introduced in 1962-63 by the Directorate of Marketing and Inspection (DMI). The main objective of the scheme is to subject the produce to sample tests and assign the grade before it is offered for sale.

Grading at producers' level

Year	Qty (MT)	Value (Lac)
2018-19	11197.00	4808.60
2019-20	8178.90	4288.81

3.5 Packaging:

Good packaging provides convenience in handling during transportation and storage. It is essential to maintain the quality and to avoid spoilage in Groundnut. Groundnuts generally, pack in pod form because kernel forms losses viability early than the pod form. Only Groundnut used for table purposes as well as for seed purposes are packed in kernel form. National Agricultural Co-operative Marketing Federation of India Limited (NAFED) usually packs Groundnut pods in DW/B-Twill jute bags with the capacity of 35 Kg. Sometimes polythene impregnated jute bags and HDPE/pp bags are also used for packing. Domestic

consumption purpose and for roasted Groundnut, poly pouches and paper packages are used while; cloth bags are used for seedkernels.

Criteria for selection of packaging material: Packaging material should be;

1) Suitable according to transportation and storage method.
2) Suitable according to climatic and environmental conditions.
3) Safe to handle during transportation.
4) Cheap, economical, readily available, easy to handle and store.
5) Convenient and suit the need of the customer.
6) Attractive for display.
7) Environment friendly and biodegradable.
8) Convenient to stack.
9) Protective to the produce.
10) Conform to the requirements as laid down under PFA standards as amended from time to time.

3.6 Transportation:

Groundnut usually transported in bulk at farm level, while at market level, it is transported both in bulk and bags. Inadequate and inefficient transportation system increases the qualitative and quantitative losses and increases the cost of marketing. The following means of transportation are used at different stages ofmarketing.

Table 17. Means of transportation used at different stages of marketing.

Stage of Marketing	Transportation by	Means of Transport
1. From field to the village market or primary market.	Farmer	By Head load, Pack animal, Bullock cart or Tractor's
2. From primary market to secondary whole sale market and	Traders / millers	By Trucks, Railway wagons.
3. From miller and wholesale markets to retailer	Millers / retailers	By Trucks, Railway wagons, Mini trucks.
4. From retailer to consumer	Consumer	By Head loads, Pack animal, Bullock / Hand cart, Rickshaw.
5. For Export	Exporter/trader	By Ship, Air Cargo

Availability of cheaper and convenient modes of transport:

Road and rail transport are normally used for internal markets, whereas, for export

markets, the mode of transport is by Sea. The most common modes of transportationare;

Road: Road transport is the most popular means for movement for Groundnut to the assembling markets as well as to the distribution centers. The following means of road transport are employed in different parts of the country to transport Groundnut.

a) Bullock / camel carts:

Benefits

1. Cheap and easily available.
2. Good for small quantity of produce.
3. Easy transport for short distance.
4. Operational cost is low.
5. Easily manufactured by village artisan.
6. It can be operated on *kaccha* road, muddy or sandy path.

b) Tractor trolley:

Benefits

1. Carry larger quantity of produce than bullock carts in less time.
2. Suits to carry produce in primary assembling markets in the absence of proper *pucca* road connecting the villages and market.

c) Trucks: The movement of Groundnut from assembling markets to the secondary markets and consuming markets is invariably by trucks. The truck is the most convenient mode of transport throughout the country for longer distances for bulk quantity than railway wagons.

Benefits

1. Easy availability.
2. Time saving.
3. Quick movement.

d) Rail:

Benefits

1. Suit for carrying larger quantity of produce.
2. Suit for long distances throughout India.
3. Comparatively cheaper and safer mode of transport.

3.7 Storage:

Storage provides protection against weather, moisture, insects, micro- organisms, rats, birds

and any type of infestation and contamination. Usually farmers sell out their produce immediately after harvesting. Some farmers store the Groundnut for some period to get remunerative price and for seed purposes. Pods are stored, in bulk, loose and in gunny bags, whereas kernels are stored in bags or any other container. Kernels kept in bags are more susceptible to damage by dampness and pests. Pods are shelled few days before it is for crushing or edible purpose. The filled bags are stacked on wooden planks or plastic sheets spread over the floor to avoid dampness.

3.7.1 Major storage pests and their control measures:

Considerable both qualitatively and quantitatively losses occur in Groundnut due to damage by number of pests. The major stored pests of Groundnut along with their control measures are given below.

Table 18. Major storage pests and their control measures

Name of pest	Figure of pest	Damage	Control measures
1. Groundnut borer/bruchid *Caryedon serratus* (oliver)		Larvae bore the pod wall and feed on the kernels and continue eating during transportation and storage.	1. Maintenance of optimum moisture content (not >5%) is always critical in preventing the development of storage pests. 2. For protection against storage pests, except for the groundnut bruchid, groundnuts should be stored unshelled. 3. Fumigation with celphons - 3g tablet per sack of groundnut (40 kg) - and covering the sacks with a polythene sheet for 5 days can effectively control bruchids without affecting seed viability.
2. Red rust/ Confused flour beetle *Tribolium castaneum (Herbst.)* *Tribolium confusum (J.du V.)*	 **Red rust Confused Flour Beetle Flour Beetle**	Beetle and larvae both do not cause damage to whole pod but feed on broken and damaged pod/ kernel produced by milling and handling or attacks on infested/ damaged pods of other insects.	
3. Rice moth *Corcyra cephalonica*		Larvae feed on broken and damaged pods and kernels. Larvae produce dense webbings. Whole	

		kernels are bound into lumps.	4. If groundnuts are stored as seed, care should be taken to avoid breakage. 5. Broken seeds should not be stored for long periods. 6. Dusting with an inert substance such as attapulgite- based clay dust (ABCD) can help to minimize storage insect problems.
4. Pod sucking bug *Elasmolomus sordidus*		Nymphs perforate the pod and feed on the kernels. Kernels shrivel it increases the free fatty acid content of the oil.	
5. Rodents		Rodents eat whole pods and kernels. They spill more pods and kernels than they consume. Rodents also contaminate Groundnut by hair, urine and feces, which cause diseases like cholera, food poisoning, ringworm, rabies etc	**Rat cage :** Different types of rat cages are available in the market. Caught rats can be killed by dipping into water. **Poison baits :** Anti-coagulant pesticide like Zinc Phosphide is mixed with bread or any other food stuff used as bait. Keep baits for a week. **Rat burrow fumigation:** Put tablets of Aluminum Phosphide in each hole and burrow and block that hole by mud mixture to make it airtight.

3.7.2 Storage structures:

1. Metal drums - Made up with iron sheets in cylindrical and square shape with various sizes.

2. Improved bins - Different organisations developed and designed improved storage structures for scientific storage, which are moisture resistant and rodent-proof. These are:

a) Pusa Kothi c) Nanda bins e) PKV bins

b) PAU bins d) Hapur Kothi f) Chittore stone bins etc.

3. Pucca godown - These are made by brick-walls with cemented flooring for storing Groundnut in bulk and bags.

3.7.3 Storage facilities:

3.7.3.1 At producers' level:

Producers store Groundnut in pod and kernel form at farm godown or in their own house using various types of traditional and improved structures. Generally, these storage containers are used for short period. Different organisations/institutions developed improved structures for Groundnut storage with various capacities like Hapur Kothi, Pusa bin, Nanda bin, PKV bin, etc. Some producers also pack Groundnut in jute gunny bags or in gunny bags lined with polythene and stack in room.

3.7.3.2 Rural godowns:

Considering the importance of rural storage in marketing of agricultural produce, the Directorate of Marketing and Inspection initiated a Rural Godowns Scheme in collaboration with NABARD and NCDC. Its objective is to construct scientific storage godowns with allied facilities in rural areas and to establish a network of rural godowns in the States and Union Territories. The main objectives of Rural Godowns Scheme are as under:

1. Creation of scientific storage capacity with allied facilities in rural areas to meet the requirements of farmers for storing farm produce, processed farm produce, consumer articles and agricultural inputs;
2. Strengthen agricultural marketing infrastructure in the country by paving the way for the introduction of a national system of warehouse receipts in the respect of agricultural commodities stored in such godowns;
3. Prevention of distress sale immediately after harvest by providing the facility of pledge financing and marketing credit; and
4. Reverse the declining trend of investment in the agriculture sector by encouraging the private and co-operative sectors to invest in the creation of storage infrastructure in the country.

3.7.3.3 Mandi godowns:

Generally, Groundnut is stored in bags quantity in every Mandi. Most of the States

and Union Territories have enacted Agricultural Produce Marketing (Regulation) Acts. The APMCs constructed storage godowns in the market yards. At the time of keeping produce in godown, a receipt is issued indicating the quality and weight of produce stored. The r e c e i p t is treated as negotiable instrument and eligible for pledge finance. The CWC and SWCs were also allowed to construct godowns in the market yards. Co-operative societies also constructed godowns in the market yards, in producing and consuming areas/markets. Traders/millers also have their permanent storage godowns orwarehouses.

3.7.3.4 Central warehousing corporation

Central Warehousing Corporation, the largest public warehouse operator in the country, was established during 1957. As on March 2021, CWC operated 422 warehouses in the country, with a total storage capacity of 124.54 lakh tonnes. This included custom bonded warehouses, CFCs/ ICDs and ACCs/AFS. State-wise storage capacity with CWC as on 31st March 2021 is given on Table 19 below.

Table 19. State-wise storage capacity with CWCs as on 31.03.2021

State	Region	Warehouses	Total Capacity (MT)
Andhra Pradesh	Hyderabad	26	837890
Arunachal Pradesh	Guwahati	1	3340
A&N Island UT	Chennai	1	2700
Assam	Guwahati	12	109007
Bihar	Patna	16	167095
Chandigarh UT	Chandigarh	1	12217
Chhatisgarh	Bhopal	10	232750
Delhi	Delhi	8	144442
Goa	Mumbai	2	36396
Gujarat	Ahmedabad	24	725604
Haryana	Chandigarh	26	745052
Himachal Pradesh	Chandigarh	3	8850
Jharkhand	Patna	5	77696
Karnataka	Bangaluru	24	478058
Kerala	Kochi	11	169460
Madhya Pradesh	Bhopal	25	684026
Maharashtra	Mumbai	25	616828
Maharashtra	Mumbai (CFS, IRT, logistic)	5	731773
Manipur	Guwahati	2	7140
Nagaland	Guwahati	1	13000
Odisha	Patna	23	395443
Puducherry UT	Chennai	1	7350
Punjab	Chandigarh	25	899668
Rajasthan	Jaipur	30	798068
Tamil Nadu	Chennai	24	690794
Telangana	Hyderabad	17	1941598
Tripura	Guwahati	2	25403
Uttar Pradesh	Delhi	8	235880
Uttar Pradesh	Lucknow	36	861093
Uttarakhand	Lucknow	7	77617
West Bengal	Kolkata	23	695294
Total		422	12454422

Source: Annual Report, 2020-21, Central Warehousing Corporation, New Delhi.

3.7.3.5 State warehousing corporation

Different States have set up their own warehouses in the country. The area of operation of the State Warehousing Corporations is district places of the State. The total share capital of the State Warehousing Corporations is contributed equally by the Central Warehousing Corporation and concerned State Government. The SWCs are under the dual control of the State Government and the CWC. As on March, 2021, SWCs were operating 2203 warehouses in 19 States of the country with the total capacity of 439.12 lakh tonnes. The State-wise storage capacities with SWCs as on 31st March, 2021 are given on Table 20 below.

Table 20. State-wise storage capacity with SWCs as on 31.03.2021

State	No. of Centres	Capacity in Lakh MT
Andhra Pradesh	149	15.72
Assam	42	2.03
Bihar	63	8.39
Chhatisgarh	135	19.69
Gujarat	45	4.56
Haryana	111	19.15
Karnataka	154	18.05
Kerala	55	2.45
Madhya Pradesh WLC	276	171.49
Maharashtra	204	21.33
Meghalaya	6	0.18
Odisha	69	5.35
Punjab	120	55.74
Rajasthan	93	14.74
Tamil Nadu	60	7.77
Telangana	311	23.88
Uttar Pradesh	157	39.61
Uttarakhand	13	1.31
West Bengal	140	7.68
Total	2203	439.12

Source: Annual Report, 2020-21, Central Warehousing Corporation, New Delhi.

3.7.3.6 Co-operative storage facilities

Cooperative storage facilities are provided to the producer at cheaper rates, which reduces the storage cost. These cooperatives also provide pledge loan against the produce and storage is more systematic and scientific than traditional storage. Financial assistance and subsidies are provided by Government organisations/banks to build cooperative storage.

To meet the increasing need for storage capacity, the National Cooperative Development Corporation (NCDC) encourages construction of storage facilities by cooperatives, particularly at rural and market level. The number and capacity of cooperative godowns assisted by NCDC in major states are given below.

Table 21. State-wise storage capacity with Cooperatives as on 31.03.2021

State	Rural level (No.)	Market level (No.)	Capacity in MT
Andhra Pradesh	4013	899	728304
Arunachal Pradesh	5	7	3250
Assam	770	265	299550
Bihar	2455	496	557600
Chhattisgarh	80	121	351550
Gujarat	1868	456	731410
Haryana	1490	457	1315789
Himachal Pradesh	1644	210	205815
J&K	133	45	23200
Jharkhand	139	4	14292
Karnataka	5223	966	1194921
Kerala	2142	145	362025
Madhya Pradesh	5497	1121	1528495
Maharashtra	3864	1528	2323090
Manipur	158	18	26130
Meghalaya	90	59	35500
Mizoram	124	9	14286
Nagaland	116	14	16400
Odisha	1951	595	486780
Punjab	3887	830	1987690
Rajasthan	4793	396	575820
Tamil Nadu	4759	411	983728
Telangana	5	0	6030
Tripura	186	19	24185
UTs	0	5	10900
Uttar Pradesh	9300	797	2107190
Uttarakhand	60	42	88800
West Bengal	2837	473	485360
NAFED	0	9	40200
NCCF	0	1	10000
Total	57590	10398	16538290

Source: Annual Report 2020-21, NCDC, New Delhi.

3.7.4 Pledge finance

It is a well-known fact that the prices of agricultural commodities immediately after harvest, tend to be low compelling the farmers specially the small and marginal farmers with low or no holding capacity, to resort to distress sale. There has been a felt need to provide the farming community with pledge finance to enable the farmers to avail credit when the prices are low and to sell their produce when the prices are favourable. Initially, pledge finance facility was extended through the State and Central Warehousing Corporations' warehouse receipts by the financing banks. However, since the godowns of State & Central Warehousing Corporations

were limited and located at division or district level involving transportation charges, the facility was not much available to the farmers. Therefore, to facilitate the farmers with credit when the agricultural prices are low, the Agricultural Marketing Departments/ Boards of various States have started implementing the pledge finance scheme, through their APMCs. However, due to limited storage infrastructure available with the APMCs and also since the APMCs are distantly located, not many farmers were benefitted through the pledge finance schemes of the Agricultural Marketing Departments/ Boards. The pledge finance schemes being implemented by the State Agricultural Marketing Departments/ Boards, State and Central Warehousing Corporations and Collateral Management Service providers in various States.

Further, the banks extending post-harvest loans under pledge finance had problems of assessment of the quality of the agricultural produce, security of the produce pledged and also the security of the loan. This gave rise to the emergence of Collateral Management Service providers like National Collateral Management Services Ltd., (NCMSL), National Bulk Handling Corporation Ltd., (NBHC), etc., which are being promoted by a consortium of banks and other related organisations. These Collateral Management Service providers assay the quality of the produce, issue the warehouse receipts, maintain and manage the produce and also offer collateral security of the produce stored, to the banks on behalf of the farmers who store the produce. They in turn charge their margin for the services provided. The banks extend pledge finance to the farmers based on the warehouse receipts issued by the Collateral Management Service providers.

3.7.5 WDRA/ NWRs

The Government of India constituted the Warehousing Development and Regulatory Authority (WDRA) on 26th October, 2010 under the Warehousing (Development and Regulation) Act, 2007. The main objectives of WDRA are to implement the Negotiable Warehouse Receipt (NWR) system in the country, improve the fiduciary trust of the depositors and the banks on the NWRs issued by the registered warehouses, increase liquidity in the rural areas, encourage scientific storage and warehousing, lower the cost of financing, promote shorter and efficient supply chains, enhance rewards for standardization and grading, and ensure better price discovery of the produce. The NWRs can be traded as well as endorsed by the holder of the receipt. As far as financial institutions are concerned, NWRs issued by public warehouses constitute at least a possessory pledge, which is superior to the pledging of the assets in the borrowers' possession.

4. MARKETING PRACTICES AND CONSTRAINTS

4.1 Assembling

4.1.1. Major assembling markets

The major assembling markets of groundnut are located in Gujarat, Rajasthan and Andhra Pradesh. Some of the major assembling markets of groundnut in major producing states in India are listed below in Table 22.

Table 22. Assembling markets of Groundnut in major producing states

State	District	Major assembling markets/ mandies
Gujarat	Banaskanth	Palanpur, Panthawada, Thara, Vadgam
	Bhavnagar	Mahuva(Station Road)
	Botad	Botad
	Jamnagar	Dhrol, Kalawad
	Junagarh	Bhesan, Kopdinar
	Morbi	Vankaner
	Patan	Siddhpur
	Rajkot	Dhoraji, Gondal, Jasdan, Morbi, Rajkot
	Sabarkantha	Himatnagar, Modasa, Talod
	Surendarnagar	Halvad
	Vadodara	Bodeli
Rajasthan	Bikaner	Bikaner(Grain), Lunkaransar, Nokha,
	Chittorgarh	Barisadri, Nimbahera
	Churu	Sardar Shahar
	Dausa	Lalsot
	Hanumangarh	Nohar
	Jaipur	Bagru, Chaksu, Chomu, Jaipur(Bassi)
	Tonk	Niwai
	Swai Madhopur	Gangapur City
	Udiapur	Fateh Nagar
Andhra Pradesh	Kurnool	Adoni, Kurnool
	Cuddapah	Cuddapah

Source: compiled by authors on the basis of data collected from Agmarknet

4.1.2 Arrivals

The total arrivals of groundnut in major assembling markets of Gujarat was 627452.70 tonnes during the year 2020-21 followed by Rajasthan 234068.95 with tonnes and markets of Andhra Pradesh with 49323.80 tonnes. The detailed information about the quantity of arrivals of groundnut in major assembling markets of main producing states from 2014-15 to 2020-21 is shown in Table 23.

Table 23. Arrivals of Groundnuts in main markets of major Groundnut producing states

S. No.	Year	Total Arrivals (Tonnes)			
		Gujarat	Rajasthan	Andhra Pradesh	India
1	2014-15	1158718.19	302760.86	62892.40	2293215.38
2	2015-16	403267.01	294228.63	67985.22	1171629.56
3	2016-17	436523.64	315429.43	63371.69	1207836.89
4	2017-18	463661.56	285765.32	49131.09	1235187.40
5	2018-19	431830.29	244183.75	23646.71	1297762.83
6	2019-20	601601.12	250697.63	28004.41	1452177.28
7	2020-21	627452.70	234068.95	49323.80	1570071.13

Source: AGMARKNET

Groundnut arrivals and prices in major states

State	Sept 2018 to Aug 2019		Sept 2019 to Aug 2020		Sept 2020 to Aug 2021	
	Arrivals (Tonnes)	Weighted Avg. Modal Price (Rs./Qtl.)	Arrivals (Tonnes)	Weighted Avg. Modal Price (Rs./Qtl.)	Arrivals (Tonnes)	Weighted Avg. Modal Price (Rs./Qtl.)
Gujarat	393138	4312	601303	4875	636732	5080
Rajasthan	242715	4099	249317	4492	237286	4849
Telangana	187365	4295	197252	4691	293699	5271
Uttar Pradesh	113418	4431	146783	4368	234197	4680
Karnataka	125204	4262	122420	4831	204338	4911
Madhya Pradesh	131508	3766	58340	3994	37254	4485
Tamil Nadu	34905	5872	38721	6273	25519	7479
Maharashtra	10210	4939	32709	4698	50391	5038
Andhra Pradesh	27971	4492	27455	4673	60096	4873
Chattisgarh	1457	4168	4255	3762	5225	3109
All India	1278309	4282	1481749	4752	1786415	5006

4.2 Distribution

Assembling and distribution system of marketing are closely related. The producer makes the movement of Groundnut from the farm to the assembling centers, while a number of market functionaries can be involved in the distribution dealing with its subsequent movement to the final consumer. The purchase of Groundnut for processing units is mainly done by the commission agents in all major assembling markets. As such,

commission agents are the important distributing agency for Groundnut. In the assembling markets, processing units also purchase and dispatch Groundnut to their own units. The distribution for retail sale in the non-producing states is mainly done by wholesalers. The Groundnut is distributed through different ways i.e. wholesale distribution, retail distribution, direct marketing to miller etc. The following agencies are engaged in the distribution of Groundnut at various stages of marketing.

~ Producers
~ Village traders
~ Itinerant traders
~ Retailers
~ Wholesale merchants
~ Commission agents
~ Groundnut millers/processors
~ Co-operative organisations
~ Government organisations
~ Exporters and importers

Trends in prices and arrivals at major markets

The marketing year for groundnut is October to September with peak arrivals from October to March. During this period, there is a slump in prices as shown in Figure 10

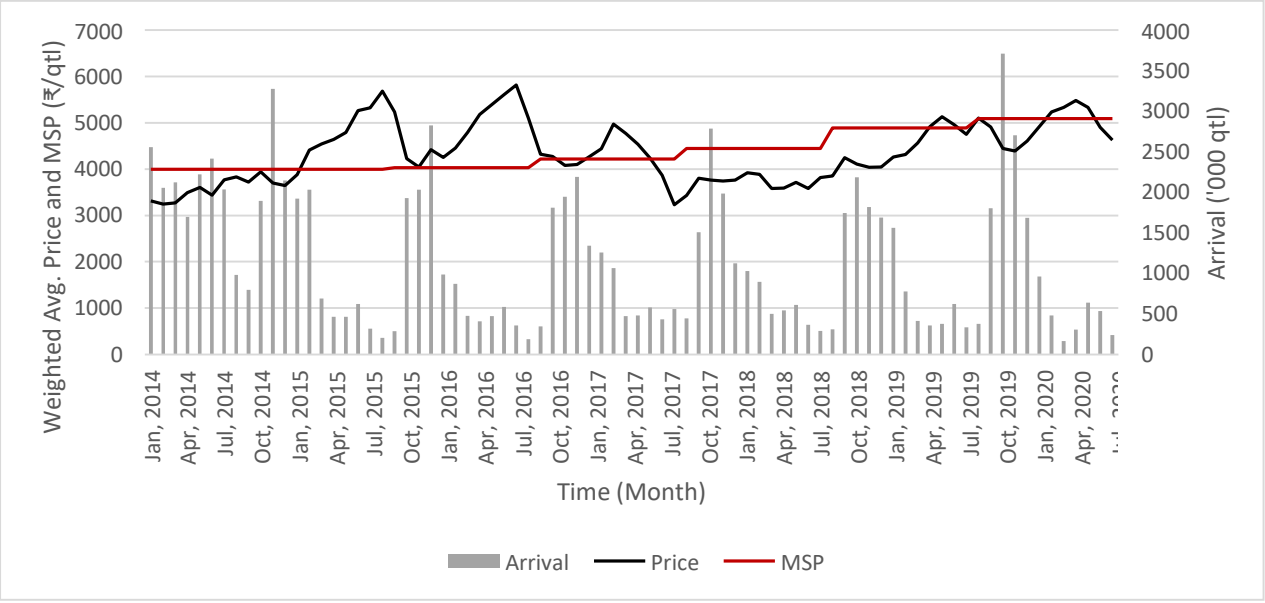


Figure 10. Monthly groundnut arrival, MSP and weighted average price of India (Jan. 2014 to Aug. 2020)

4.3 Export & Import

India exports groundnut seed, groundnut in shell and shelled groundnut in which shelled groundnut occupies the major share. The export earnings from these three products categories for the period 2016-17 to 2018-19 is given in Table 24. The edible type traditionally known as Hand Picked and Selected (HPS) groundnut is the major exported product from India constituting 95 percent of the total groundnut export.

Table 24. Export of different categories Groundnut during 2016-17 to 2018-19 (values in Rs lakhs)

HS code	Commodity Description	Year				
		2017-18	2018-19	2019-20	2020-21	2021-22
12023010	Groundnut seed, H.P.S.	290	107.6	54.2	53.83	96.18
12023090	Groundnut seed, other	2617.32	2840.87	2361.86	776.11	565.1
	Sub-total of groundnut seed	**2907.32**	**2948.47**	**2416.06**	**829.94**	**661.28**
12024110	Groundnuts in shell, H.P.S	81.81	486.99	496.56	877.37	664.41
12024190	Groundnuts in shell, Other	8,720.02	4985.18	6722.04	5,589.95	5,254.64
	Subtotal of groundnuts in shell	**8801.83**	**5472.17**	**7218.6**	**6467.32**	**5919.05**
12024210	Shelled Groundnuts kernel, H.P.S	321298.15	313956.76	492,110.74	521,242.47	455,797.45
12024220	Shelled Groundnuts kernel, Other	4853.83	5584.55	5,734.66	6,319.47	4,954.34
12024290	Other	768.73	1770.3	2,158.67	3,165.11	2,366.21
	Subtotal of shelled Groundnuts	**326920.71**	**321311.6**	**500,004.07**	**530,727.05**	**463,118.00**
	Total of Groundnuts	**338629.86**	**329732.3**	**509,638.73**	**538,024.31**	**469,698.33**

Source: *Ministry of commerce and Industry, GoI*

The major export destinations of groundnuts in shell during 2020-21 are Nepal, Afganistan and Bangladesh constituting around than 80 per cent of the export (Table 25). Around 5 per cent of shell groundnut is being exported to three African countries like Yemen and South Africa.

Table 25. Country wise export of groundnuts in shell from India during 2020-21 to 2021-22 (Value in Rs. Lakhs and Quantity in tonnes)

S. No.	Countries	2020-21		2021-22	
		Values	Quantity	Values	Quantity
1	Nepal	2,863.83	5,722.28	2,714.85	4,901.61
2	Afghanistan	1,833.50	2,868.00	1,246.83	1,760.32

3	Bangladesh	148.97	270.00	847.47	1,498.45
4	Indonesia	417	522	309.61	342
5	Yemen	55.54	73.34	121.03	174.00
6	Oman	1.54	1.66	110.15	122.07
7	Pakistan	0.00	0.00	102.20	149.20
8	Serbia	22.57	30.00	84.19	98.50
9	Spain	70.9	82	62.2	62.5
10	Others	1,053.46	1,344.12	320.52	349.01
	Total	6,467.31	10,913.40	5,919.05	9,457.66

Source: *Ministry of commerce and Industry, GoI*

Country wise export of shelled groundnut is given in Table 26. Major beneficiaries of Indian shelled groundnuts are South East Asian countries. Indonesia is the major destination followed by Vietnam, China, Philippines, Malaysia and Thailand.

Table 26. Country wise export of shelled groundnut from India during 2020-21 to 2021-22 (Value in Rs. Lakhs and Quantity in tonnes)

S. No.	Countries	2020-21		2021-22	
		Values	Quantity	Values	Quantity
1	Indonesia	177,009.46	211,338.18	239,051.32	260,773.74
2	Vietnam	112,908.07	129,880.00	50,820.33	54,763.97
3	China	56,864.70	72,850.67	303.19	388.75
4	Philippines	39,619.85	45,751.51	43,316.41	46,369.93
5	Malaysia	31,575.41	35,350.48	41,206.81	43,730.47
6	Thailand	31,367.54	33,762.60	14,527.27	14,541.10
7	UAE	11,462.42	13,933.31	16,494.25	18,553.07
8	Russia	10,233.25	12,072.50	1,055.37	1,202.00
9	Ukraine	9,939.87	10,794.00	3,400.91	3,457.30
10	Bangladesh	5,439.59	9,309.57	7,697.40	12,891.26
11	Nepal	4,214.91	5,970.98	5,198.65	6,670.89
12	Others	40,091.97	40,046.08	45,345.30	40,318.08
	Total Shelled	530,727.04	463,117.99	626,359.10	503,660.56

Source: *Ministry of commerce and Industry, GoI*

Import

Being a major exporter, occasionally India imports shelled groundnut from countries like Bahrain, Taiwan, Hong Kong, Indonesia, etc. which is given in the Table 27.

Table 27. Import of shelled groundnut by India during 2020-21 to 2021-22 (Value in Rs. Lac and Quantity in Thousand tonnes)

S. No.	Countries	2020-21		2021-22	
		Value	Quantity	Value	Quantity
1	Baharain	293.57	432	264.99	364
2	Taiwan	183.5	229	-	-
3	Hong Kong	58.85	80	0	-
4	Indonesia	50.53	57	267.84	33.5

5	Iran	48.56	63	-	-
6	Jordan	25.7	25.05	55.95	50
7	Thailand	-	-	57.37	53.5
8	UAE	-	-	53.51	54
	Total shelled	794.77	1036.1	936.96	748.1

Source: *Ministry of commerce and Industry, GoI*

4.3.1 Sanitary and phyto-sanitary requirements

The sanitary and phytosanitary (SPS) measures are an integral part of export trade as per agreement made under GATT (General Agreement on Trade and Tariffs), 1994. As per provisions made under this agreement, the standards framed should be such that the minimum level of protection required by an importing country may be fulfilled. Codex Alimentaris Commission (Codex) was set up in 1963 by the Food and Agriculture Organisation (FAO) and World Health Organisation (WHO) to develop food standards by laying down guidelines and related texts such as code of tactics under the joint aegis of FAO/WHO. Food standards programme is aimed at protecting health of the consumers and ensuring fair trade practices in the food trade as well as to promote coordination of all food standards work undertaken by international governmental and non-governmental organizations. The SPS measures thus adopted safeguard the risks arising from;

- The entry, establishment or spread of pest, disease or any disease causal organism.
- The additives, contaminants, toxins or disease causing organism on foodstuff.
- The disease carried by animals, plants or their products.

During export, in order to make the plant/seeds free from any quarantine pests and diseases, the exporter should give a disinfection treatment by keeping the viability of the plant/ seeds unaffected. The disinfection treatment before shipment should be carried out by authorized expert/ technical personnel since this process is hazardous. To assure the pest free product, the disinfection treatment should be done just before shipment of produce.

In this process, the exporter has to apply to the officer in-charge for Phyto Sanitary Certificate (PSC) in the prescribed form at least 7 –10 days in advance of the export. Before submitting the application for PSC, it is to be ensured that the cargo is treated properly by any licensed PCO to avoid any last minute detention by the Plant Quarantine Authority who is authorized to issue P.S.C.

4.3.2 Export procedures

Foreign Trade Policy 2015-2020 describes the following mandatory documents for import and export.

- Bill of Lading/ Airway bill

- Commercial invoice cum packing list
- Shipping bill/ bill of export/ bill of entry (for imports)

(Other documents like certificate of origin, inspection certificate etc may be required as per the case.) (for details see http://www.indiantradeportal.in/, http://plantquarantineindia.nic.in/PQISPub/html/Export.htm)

A number of IT initiatives have been introduced for providing secured online services to the exporters. These include facility for online filing of documents/ applications, a simplified system for issuance of Importer Exporter Code (IEC) online and setting up of a Complaint Resolution System for resolution of FDI related issues. In addition, an online system has been put up in place to resolve complaints received through public grievances portal of Department of Administrative Reforms and Public Grievances.

4.4 Marketing constraints

I) Processing: There is a need of improved technologies for Groundnut processing. At present, age-old techniques were used in processing, which reduces the output.

II) Improved Technology: Producers were not using improved Technologies in producing Groundnut right from the selection of improved high yielding seeds to use of improved equipments and post-harvest operational techniques.

III) Aflatoxin: Groundnut is vulnerable to attack *by Aspergillus flavus* fungus, which produces Aflatoxin. An Aflatoxin level up to certain limit is acceptable but beyond that the produce is not suitable for consumption.

IV) Marketing Information: Due to lack of market information regarding prevailing prices, arrivals etc., most of the producers market the Groundnut in the village itself, which deprives them of getting remunerative returns.

V) Adoption of Grading: Grading of Groundnut at producers' level ensures better prices to producers and better quality to consumers. However, most of the markets are lagging behind in providing grading service at producers' level.

VII) Inadequate storage facilities: To avoid the distress sale, storage facilities in villages are found to be inadequate. Due to lack of storage facilities at rural stage, substantial quantity is lost.

VIII) Transportation facilities: Due to inadequate facilities of transportation at village level, in most of the states, producers are forced to sell Groundnut in the village itself to itinerant merchants or traders directly at low prices.

IX) Training of Producer: The farmers are not trained in marketing system. Training shall improve their skill for better marketing of their produce.

X) Malpractices: Many malpractices prevail in the markets of Groundnut i.e. excess weighment, delay in payment, high commission charges, delay in weighing and auction, different kinds of arbitrary deductions for religious and charitable purposes etc.

XI) Financial problems: Lack of market finance is one of the major marketing problems in the smooth running of marketing chain.

XII) Infrastructure facilities: Due to inadequate marketing infra-structural facilities with producers, traders, millers and at market level, the marketing efficiency is affected adversely.

XIII) Superfluous middlemen: The existence of a long chain of middlemen reduces the producer's share in consumer's rupee.

5. MARKETING CHANNELS, COSTS AND MARGINS

5.1 Marketing Channels

Private: The following are the important marketing channels existing in the marketing of Groundnut

i. Producer - Merchant – Commission Agent- Wholesaler – Oil Miller
ii. Producer – Merchant – Commission Agent – Oil Miller – Wholesaler – Retailer – Consumer
iii. Producer – Oil Miller – Wholesaler – Retailer – Consumer
iv. Producer – Merchant – Commission Agent – Oil Miller – Retailer – Consumer
v. Producer – Merchant – Commission Agent – Oil Miller – Wholesaler – Retailer (for Kernels)

Common Institutional Channels:

Groundnut is also purchased by the public and co-operative sector agencies. It plays a very significant role in the procurement and distribution of Groundnut. National Agricultural Co- operative Marketing Federation of India Limited (NAFED) is the nodal agency for procurement of Groundnut. The main institutional marketing channel for Groundnut is as under;

i. Producer- Village Co-operative Society – Processing Units of Co-operatives, State Co- operative Federation – Co-operative Retail Stores – consumers.
ii. State Co-operative Marketing - Oil Miller (Private/Co-operative) - Co-operative Retail Store/ Fair Price Shop - Consumer.
iii. Producer – Village Co-operative Society – Oil Miller – Oil Wholesaler – Retailer – Consumer.
iv. Producer - NAFED – NAFED Processing Unit – Retailer – Consumer.

Criteria for selection of channel: Selection of channel by buyer and seller both depends on efficiency of the channel, which is judged on the basis of efficiency in providing services at minimum cost and time in completing the transaction. NAFED purchase either directly from the farmer or through farmers' co-operative, which may have branches at village level. No purchase is done through traders or other intermediaries. There are many marketing channels involved in marketing of Groundnut. The following are the criteria for the selection of efficient marketing channels.

- The channel, which ensures reasonable return to producer, is considered to be good or efficient.

- Transportation cost in that channel.
- Commission charges and market margins received by the intermediaries, such as trader, commission agent, wholesaler and retailer.
- Financial resources with producer.

5.2 Marketing costs and margins

Marketing Cost:

Marketing costs includes all the marketing charges paid by different agencies from farm gate (local assembling) to the consumers. It includes the following:

- Handling charges at local points
- Assembling charges
- Transportation and storage costs
- Handling by wholesalers and retailer charges to consumers
- Expenses on secondary services like financing, risk taking and market intelligence
- Profit margin taken out by different agencies

The marketing charges i.e. the charges which are to be paid by buyers and sellers, includes the marketing fee, agent/ Arthiya commission, loading and unloading charges, and other charges. These charges vary across commodity groups and states.

Marketing Costs and Margins:

The movement of products from the producers to the ultimate consumers involves costs, taxes, and cess which is called marketing costs. These costs vary with the channels through which a particular commodity passes through. Eg: - Cost of packing, transport, weighment, loading, unloading, losses and spoilages. Margin refers to the difference between the price paid and received by a specific marketing agency, such as a single retailer, or by any type of marketing agency such as retailers or assemblers or by any combination of marketing agencies such as the marketing system as a whole. Absolute margin is expressed in rupees. A percentage margin is the absolute difference in price (absolute margin) divided by the selling price. Mark-up is the absolute margin divided by the buying price or price paid. The study of marketing costs and margins as well as producer's share in consumer's price are basically intended to assess comparative efficiency of different marketing channels and to identify the scope for improvement in the various marketing functions so that the producers and consumers get remunerative and fair prices respectively

6. MARKETING INFORMATION AND EXTENSION

The prices of groundnut, and oil are published in the leading newspapers of each state and also are being covered in radio and television programmes. The concerned state agricultural marketing department collects the information on arrivals and prices of groundnut on daily basis in all major markets where the commodity is being traded. The information so collected is being regularly uploaded on the website "https://agmarknet.gov.in" and also on the website of respective state agricultural marketing department/ board. The information is also being sent to farmers through SMS in the mobile phone.

Other cooperative and private agencies such as NAFED/ MARKFED/ OILFED/ DGR, Junagarh/ SEA, Mumbai also collects the information on groundnut production, arrivals, prices, stocks, exports, imports, etc. in the country. ITC Ltd. through e-chaupals in the villages provide complete information on groundnut production, marketing and utilization through internet kiosks on a nominal price to the farmers.

This initiative now comprises about 6,100 installations covering over 35,000 villages and serving over 4 million farmers. While the existing e-Choupals and agri-extension programmes of ITC will continue to exist, it will not be expanded any further as the company will move to initiate the new plug and play ready digital platform for agri-startups to build and expand their businesses. E-Choupals, coupled with flagship agri extension programme - "Choupal Pradarshan Khet", has been famed for the dissemination of deep understanding of agricultural practices, collaborations with India's premier research institutes, and a competitive and efficient supply chain that helped ITC deliver immense value across the agricultural value chain. It has helped ITC's agri-business too as it routes its procurement needs almost entirely through such networks. In fact, ITC's strength in agri-business is the extensive backward linkages it has established with the farmers. This networking with the farming community has enabled ITC to build a highly cost effective procurement system.

6.1 Extension

ICAR- Directorate of Groundnut Research, Junagadh, is the national level research institute under Indian Council of Agricultural Research. DGR is playing an important role in sustainable production of groundnut in India through its research and extension activities. It is the main agency to develop, test, validate and recommend improved groundnut production technologies and varieties through AICRPS centres. The groundnut production technology is disseminated by ICAR-DGR to state agricultural departments, state agricultural universities, KVKs, and other stakeholders engaged in agricultural extension at the village level. Agricultural

Universities, KVKs and All India Coordinated Project on Groundnut also promotes cultivation of Groundnut and guides farmers on adoption of improved production technologies.

DGR helps in uplifting income and nutritional security of tribal farmers of Madhya Pradesh and revived cultivation of groundnut in Uttar Pradesh.

- Coordination of applied research to develop location specific varieties and technologies
- Dissemination of technology and capacity building.
- Provide access to information, knowledge and genetic material to develop suitable varieties and technologies
- Basic, strategic and adaptive research on groundnut to improve productivity and quality.

Kisan Call Centre

Department of Agriculture and Cooperation, Ministry of Agriculture and Farmers Welfare, Government of India launched Kisan Call Centres on 21st January, 2004 throughout the country with the objective of providing instant solution for problems faced by the farmers during crop cultivation and marketing under diverse challenging situations and facilitating their full comprehension by the use of local language.

The call centres are acting as composite help centres, which consist of a complex tele-communication infrastructure, computer support and human resources organized to manage effectively and efficiently the queries raised by farmers instantly in local languages. The subject matter specialists using telephone and computer are used to interact with the farmers to understand their problems and answer their queries as soon as possible.

Groundnut farmers can avail this facility calling on a nationwide toll free no: 1551 or 1800 180 151

7. ALTERNATIVE SYSTEM OF MARKETING

In order to bring in reforms in the sector, the Ministry of Agriculture and Farmers Welfare prepared a Model Act in 2003, which it circulated to all the states and UTs for adoption. The Model Act, *inter alia*, provides for direct marketing, contract farming, establishment of markets in private and cooperative sectors, single point levy of market fee, promotion of e-trading and issue of a unified license for traders. These market reforms necessitate reforms in three areas, viz., direct marketing, contract farming and markets in the private and cooperative sectors. In these three areas, so far, only 18 state governments have amended their respective APMC Acts and only 10 states have notified rules thereunder to implement the amended provisions.

To meet the emerging agricultural marketing challenges, Government has formulated the 'Agricultural Produce Market Committee (APMC) Act 2017' which primarily includes: establishment of private market yards/ private markets managed by a person other than a market committee; direct marketing or direct purchase of agricultural produce from farmers; consumers'/farmers' market to facilitate direct sale of agricultural produce to consumers; promote and permit e-trading; single point levy of market fee; single registration/license for trade/transaction in more than one market; removal of provisions of essentiality of shop in market premises; excluding fruits and vegetables from APMC Act, etc. The Model APMC Act 2017, after incorporating inputs from all the stakeholders, has been sent to the State Governments for effective implementation. Government has also approved the implementation of National Agriculture Market (e-NAM) Scheme aimed to provide an online trading portal to farmers and enable them to have an access to transparent sale transactions and price discovery. Besides this other major policy decision like formulation of a model contract farming law will help in providing marketing infrastructure, developing marketing skills and in reducing risks associated with diversity in production.

7.1 Direct marketing

Direct marketing involves marketing of agricultural produce by the farmers directly to the processors/ exporters/ consumers without the involvement of any middlemen. Direct marketing enables producer farmers and processors and other bulk buyers to economize on transportation and other marketing costs and improve price realization. It also provides incentive to large scale marketing companies i.e. export houses/ processing industries to directly procure from the producing areas. Direct marketing by farmers to the consumers has been experimented in the country through farmers' markets popularly known as Apni mandi in Punjab and Haryana, Rythu Bazaar in Andhra Pradesh, Uzhavar Sandhais in Tamil Nadu and Shetkari Bazaar in

Maharashtra. For the development of direct agricultural marketing in the country, the Government of India (GOI) enacted the Scheme for the Development of Agricultural Marketing Infrastructure, Grading and Standardization. Presently, many Indian states have adopted the concept of direct agricultural marketing.

7.2 Contract farming

Contract farming, taking various forms of contract between the farmers and farm produce buyers to reach a win-win situation in terms of better price, assured demand and input/investment support for farms and assured supply of high quality produce has become popular in the recent years. It has been in use for agricultural production for decades, but its popularity has increased in recent years. The use of contracts has become attractive to farmers because this arrangement can offer both an assured market and access to production support. Another major strength of this management solution is found in its effectiveness in the delivery of technology and inputs services, as compared to extension services of the Government. Contract farming maximizes economies of scale and is viewed as an effective approach for solving market access and input supply problems faced by small farmers.

Contract farming involves agricultural production carried out on the basis of an agreement between buyers and farm producers. Sometimes, the buyer specifies the quality required and the price, and the farmer agrees to deliver the produce at a future date. The farmer undertakes to supply the agreed quantities of a crop or livestock product based on the quality standards and delivery requirements of the purchaser. In return, the buyer, usually a company, agrees to buy the product, at a price that is often established in advance. The company often also agrees to support the farmer by supplying inputs, assisting in land preparation, providing production advice and transporting produce from the farmer's field to its premises. One major strength of this management solution is found in its effectiveness in the delivery of technology and inputs services, as compared to extension services of the Government. There are potential benefits for the national economy, as contract farming leads to economies of scale, and has also come to be viewed as an effective approach to solving many of the market access and input supply problems faced by small farmers.

The implementation of the contract farming model, however, faces the serious problem in absence of a legal framework, which exposes the two parties, i.e., the farmers and lessee, to risks of becoming prey to fraudulent conduct by one another. A legal framework is required to prevent farmers from selling land under lease or under input investment contract or the lessee wriggling out of the promised price or quantity of produce or purchase of the produce completely. In this regard, Government of India formulated a model law on contract farming

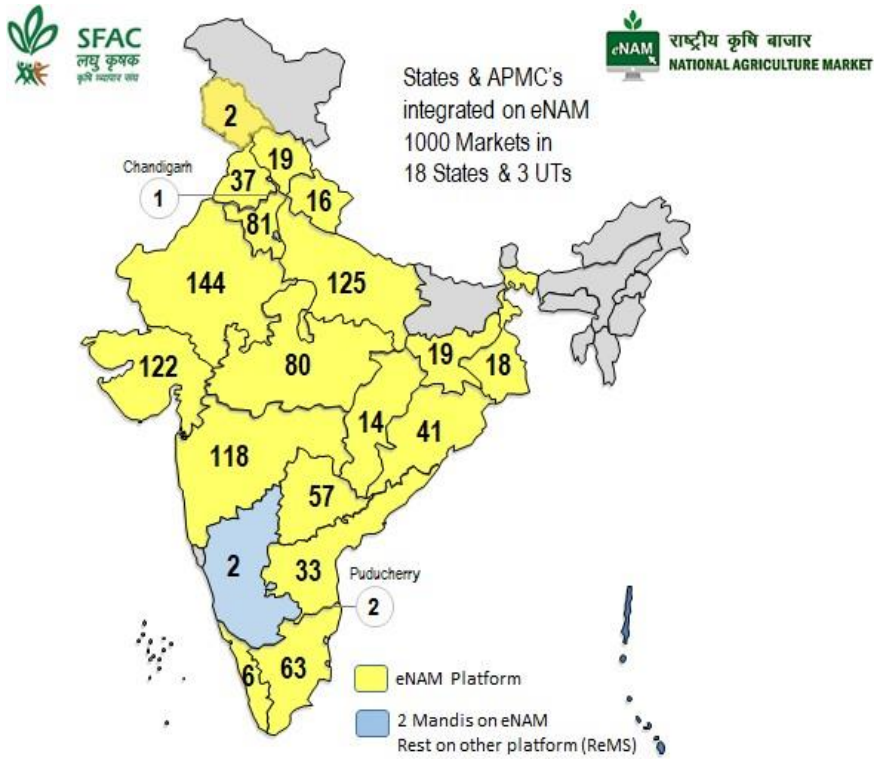
act “The --- State /UT Agricultural Produce & Livestock Contract Farming and Services (Promotion & Facilitation) Act, 2018” and circulated among the States for adoption.

7.3 E-NAM

Government has launched the National Agriculture Market (e-NAM) on 14.04.2016 as a pan-India electronic trading portal with a view to network the existing APMC and other market yards to create a unified national market for agricultural commodities. e-NAM is intended to enhance transparency in transactions, price discovery and farmers’ reach to larger number of markets to sell their produce to buyers of their choice at their convenience. Transparency and competition will fetch better prices to the farmers for their produce and ensure cashless payments directly to their bank accounts. e-NAM creates a national network of physical mandis which can be accessed online. The main objectives of the e-NAM Scheme are to: i) liberalize agri-marketing sector by creation of a unified National Agriculture Market; ii) increase access of farmers to markets beyond the closest APMC market by the provision of inter mandi trade as well as making available prices in all the mandis in the vicinity; iii) enhance competition among traders for better price discovery by farmers; iv) promote digital operations to bring in transparency; and v) real time data for improved reporting on arrivals and prices in integrated markets bringing in information symmetry for informed decision by farmer as well as traders.

Benefits of Trading on NAM

- Transparent Online Trading
- Real Time Price Discovery
- Better Price Realization for Producers
- Reduced Transaction Cost for Buyers
- Stable Price and Availability to Consumers
- Quality Certification, Warehousing, and Logistics
- More Efficient Supply Chain
- Payment and Delivery Guarantee
- Error Free Reporting of Transactions
- Enhanced Accessibility to the Market



The main objective of the scheme is to give access to farmers about prices of various markets

at one place so that the farmers can sell their yield under a transparent system to a buyer who offers the best price. A total of 1000 mandis of 18 States and 3 Union Territories have been integrated with e-NAM.

Groundnut is being traded on e-NAM platform in the Palanpur, Panthawada, Thara, Vadgam, Mahuva(Station Road), Botad, Dhrol, Kalawad, Bhesan, Kopdinar, Vankaner, Siddhpur, Dhoraji, Gondal, Jasdan, Morbi, Rajkot markets of Gujarat; Barisadri, Nimbahera, Sardar Shahar, Lalsot, Nohar, Bagru, Chaksu, Chomu, Jaipur(Bassi), Niwai, Gangapur City, Fateh Nagar markets of Rajasthan and Adoni, Kurnool, Cuddapah markets of Andhra Pradesh state.

7.4 Co-operative marketing

Cooperatives are an important tool of economic development in rural India, when it comes to cooperative marketing of agricultural produce and procurement of inputs, it gives an idea of collective efforts to achieve specific objective to carry out marketing strategy for agricultural products. It is defined as form of organization, where in person voluntarily associate together as human beings, on the basis of equality for the promotion if economic interests of themselves.

Benefits of cooperative marketing in India:

- **Increases bargaining strength of the farmers**: If the farmers join hands and form a cooperative society, they will be able to increase their bargaining strength because their produce will now be marketed by single agency.
- **Direct dealings with final buyers:** It outcast intermediaries which eliminates the exploiters and ensures fair prices to both, the producers and the consumers.
- **Provision of credit:** The marketing cooperative societies provide credit to the farmers to save them from the necessity of selling their produce immediately after harvesting. This ensures better returns to the farmers.
- **Easier and cheaper transport:** This reduces the cost and botheration of transporting produce to the market.
- **Storage facilities**: The cooperative marketing societies generally have storage facilities. Thus, the farmers can wait for better prices; also there is no danger to their crop from rains, rodents and thefts.
- **Grading and standardization**: This task can be done more easily for a cooperative agency than for an individual farmer. For this purpose, they can seek assistance from the government or can even evolve their own grading arrangements.

- **Market intelligence**: The cooperatives can arrange to obtain data on market prices, demand and supply and other related information from the markets on a regular basis and can plan their activities accordingly.
- **Influencing market prices:** While previously the market prices were determined by the intermediaries and merchants and the helpless farmers were mere spectators forced to accept whatever was offered to them, the cooperative societies have changed the entire complexion of the game.
- **Provision of inputs and consumer goods**: The Cooperative marketing societies can easily arrange for bulk purchase of agricultural inputs like seeds, manures, fertilisers, pesticides, etc., and consumer goods at relatively lower prices and can then distribute them to the members.
- **Processing of agricultural produce**: The Cooperative societies can undertake processing activities like crushing oil seeds, ginning and pressing of cotton, etc.

7.5 FPOs

Farmers, especially small producers, are confronted by many challenges such as the small size of landholdings, lack of access to financial and non-financial inputs and services and appropriate technologies and high transaction costs. Farmer producer organizations offer a form of aggregation which lets individual producers hold onto land titles while using the strength of collective planning for production, procurement and marketing to add value to members' produce. They serve as an important link in risk mitigation strategies to overcome the challenges brought about by climate change. Recognizing the centrality of FPOs to meet national agricultural goals, Department of Agriculture and Cooperation, Government of India, had issued detailed Policy and Process Guidelines for Farmer Producer Organization during 2013. SFAC was nominated as a Single Window Agency by Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture and Farmers Welfare, Govt. of India, to support the State Governments in the formation of Farmer Producer Organizations (FPOs). SFAC has promoted FPOs across the length and breadth of country and at present FPOs are operating in 29 States covering wide array of crops. The SFAC has been engaged in the formation of FPOs since 2011. The project, which has been working across 29 states, has so far helped to mobilize approximately 8.13 lakh farmers in 818 FPOs registered. Another 70,000 are under mobilization under 79 FPOs, which are yet to be registered. Farmer producer organizations undertake input supply (seed, fertilizer and machinery), financial and technical support (credit, savings, insurance and extension), provision of marketing linkages (contract

farming and procurement under MSP) and training and networking (HRD, policy advocacy and documentation).

Major services delivery by FPOs

FPCs leverage the benefits of economics of scale for both production and marketing ebaling more efficient production and better price discovery. Some of the major services that is being delivered are as follows:

- **Farm inputs:** The FPOs buys essential inputs such as seed, fertilizer, pesticide in bulk and sells through its retail outlet. The inputs are sold to the members at a price which is far below the market price and thereby help the member farmers to reduce the cost of inputs. This activity also ensures timely delivery of quality inputs.
- **Custom Hiring Centre:** The need for having these machineries available at a local level at an affordable cost has been by realized since long. To address the ever increasing cost of farming by small and marginal farmers many FPOs have established Custom Hiring Centres with assistance from Central/ State Schemes on farm machinery. The FPOs rent out machineries and implements to members at affordable cost (much below the cost charged by private players). In fact, farm mechanization has helped the farmer in increasing the productivity.
- **Output market linkage:** Needless to mention that procuring produces from the farmers and selling them to big traders and companies for realizing better prices has its own set of challenges and opportunities. However, many FPOs have succeeded in creating market linkages for their produce. FPOs have tied with major retailers for selling their produce and have succeeded in getting remunerative prices for their produce. Besides, many of our FPOs, with assistance from State Government, have established retail outlets for marketing their produce.

Some of the FPOs have also gone ahead with value addition, processing and branding of their produce.

7.6 Commodity Futures Trade

A commodity futures contract is an agreement to buy or sell a specific amount of a commodity at a fixed date in the future at a predetermined price. This contract specifies further details, like the quality of the commodity and the delivery location. In 2015, the regulatory body of the commodities trading – Forward Market Commission (FMC) merged with Securities and Exchange Board of India (SEBI). Commodity trading in exchanges requires standard

agreements as per the instructions so that trades can be executed without visual inspection.

Hedgers, speculators and arbitrageurs are the major participants in commodity market. Hedgers are the main players in the market with an underlying risk in a commodity. Speculators are traders or investors who take the benefit or profits based on price fluctuations. They essentially create more liquidity in the futures contracts. Arbitrageurs are other type of experienced group, making profits by exploiting the price discrepancies seen in different exchanges or the spot market. In agriculture commodities, global demand & supply, currency volatility, crop situation, imports & exports, carryover stocks, government policies, climatic conditions etc. will lead to price fluctuation. Groundnut farmers and other value chain stakeholders can also take advantage of trading and risk management through commodity futures trading.

The major commodity trading exchanges in India are listed below.

- Multi Commodity Exchange – MCX
- National Commodity and Derivatives Exchange – NCDEX
- Indian Commodity Exchange – ICEX

The market regulator allowed some of the stock exchanges for commodity trade.

Features of commodity futures

1. **Organised:** Commodity futures contracts always trade on an organised exchange. NCDEX and MCX are examples of exchanges in India. NYMEX, LME, and COMEX are some international exchanges.
2. **Standardised:** Commodity futures contracts are highly standardised. This means the quality, quantity, and delivery date of commodities is predetermined by the exchange on which they are traded.
3. **Eliminate counter-party risk:** Commodity futures exchanges use clearinghouses to guarantee fulfilment of the terms of the futures contract. This eliminates the risk of default by the other party.
4. **Facilitate margin trading:** Commodity futures traders do not have to pay the entire value of a contract. They need to deposit a margin that is 5–10% of the contract value. This allows the investor to take larger positions while investing less capital.
5. **Fair practices:** Government agencies regulate futures markets closely. For example, there is the Forward Markets Commission (FMC) in India and the Commodity Futures Trading Commission (CFTC) in the Unites States. The regulation ensures fair practices in these markets.

6. **Physical delivery:** The actual delivery of the commodity can take place on expiry of the contract. For physical delivery, the member needs to provide the exchange with prior delivery information. He also needs to complete all delivery-related formalities as specified by the exchange.

7.7 Recent Reforms in Agricultural Marketing

The Government of India recently initiated three landmark decisions for helping farmers and transforming the agriculture sector, which include (i). amendment to the Essential Commodities Act, (ii). Farming Produce Trade and Commerce (Promotion and Facilitation) Ordinance, 2020 and (iii). the Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Services Ordinance, 2020.

With the amendment to the Essential Commodities Act, commodities such as cereals, pulses, oilseeds, edible oils, onion and potatoes will be removed from the list of essential commodities. The government says this will remove fears of private investors about excessive regulatory interference in their business operations.

Farming Produce Trade and Commerce (Promotion and Facilitation) Ordinance will promote barrier-free inter-state and intra-state trade and commerce outside the physical premises of markets notified under the state Agricultural Produce Marketing legislations. The ordinance will create an ecosystem where farmers and traders will enjoy freedom of choice of sale and purchase of agri-produce. The ordinance basically aims at creating additional trading opportunities outside the APMC market yards to help farmers get remunerative prices due to additional competition. The ordinance will certainly pave the way for creating One India, One Agriculture Market.

The Farmers (Empowerment and Protection) Agreement on Price Assurance and Farm Services Ordinance will empower farmers for engaging with processors, wholesalers, aggregators, wholesalers, large retailers and exporters on a level-playing field without any fear of exploitation. This Ordinance will act as a catalyst to attract private sector investment for building supply chains for Indian farm produce across global markets. Farmers will get access to technology and advice for high-value agriculture products and get ready market for such produce.

8. INSTITUTIONAL FACILITIES

8.1 Marketing related schemes of public sector

The Government of India has been playing an important role in developing agriculture marketing system in the country. The marketing division of the Department of Agriculture, Cooperation & Farmers' Welfare is entrusted with the implementation of policy and programme related to agricultural marketing. Marketing Division of the Ministry of Agriculture and Farmers Welfare, Government of India is implementing the Integrated Scheme for Agricultural Marketing (ISAM). Marketing Division has following sub-schemes namely:

- Agricultural Marketing Infrastructure (AMI)
- Marketing Research and Information Network (MRIN)
- Strengthening of Agmark Grading Facility (SAGF)
- Agri-business Development through Venture Capital Assistance (VCA) and Project Development Facility

The details of the schemes can be accessed from:
https://dmi.gov.in/Documents/final_guidelines_2014.pdf
http://agricoop.nic.in/sites/default/files/finalopguidelines_1.pdf

The sub-scheme Agricultural Marketing Infrastructure (AMI) of Integrated Scheme for Agricultural Marketing (ISAM), implemented by the Directorate of Marketing & Inspection (DMI), Department of Agriculture, Cooperation and farmers welfare, is meant for holistic development of agricultural value chain critically focussing each linkage of post-harvest value chain including promotion of value addition and processing at farmers level so as to enhance their income by selling more marketable and processed produce in the market. The sub-scheme AMI lays special focus on developing and upgrading Gramin Haats as Gramin Agricultural Markets (GrAMs) through strengthening of infrastructure there for, which may function as farmer-consumer market (retails market) and collection/ aggregation points (spokes) with linkage to secondary market (hub) and also to processing/ exporting and retain chain with participation of FPOs, other farmers' groups and private sector eligible promoters. Farmer-consumer markets for agricultural and allied produce (livestock, fishery, poultry and such other allied produce) devoid of intermediaries and developed elsewhere also by eligible promoters will be focussed and eligible activity under this sub-scheme.

The updated details of these schemes can be accessed from:

https://dmi.gov.in/Documents/AMI_OG_Scheme_hindi.pdf

https://dmi.gov.in/Documents/SchemeGuidelinesAMIFf.pdf

https://dmi.gov.in/Documents/Final_GrAM_Guidelines_final_03012019.pdf

Moreover, several demand driven Schemes are being implemented to develop an efficient agricultural marketing network in the country. These include Integrated Scheme for Agricultural Marketing and other capital investment schemes, like MIDH and RKVY. Besides, NABARD is also promoting development of various types of marketing infrastructures including warehouses, cold storages, etc., under RIDF/WIF. For setting up of integrated cold chain and preservation infrastructure facilities for horticulture and non-horticulture produce without any break from the farm gate to the consumer, the Ministry of Food Processing Industries is implementing a Central Sector Scheme of Cold Chain, Value Addition and Preservation Infrastructure.

8.2 Institutional credit facilities

Agricultural credit is disbursed in the form of short-term, medium-term and long-term loans through the following agencies:

- Commercial banks
- Regional rural banks
- Cooperatives

Type of institutional credit facilities which are available for production, post-harvest operations and marketing of agricultural commodities including groundnut are given on Table 28.

Table 28. Credit facilities

Scheme	Eligibility	Facility
1. Produce Marketing Loan	All type of farmers, who can store the produce either in their own farm/premises itself or in a Warehouse.	This type of loan is given against pledge /hypothecation of agricultural produce (including warehouse receipts), upto 80% of value of produce depending upon the place of storage subject to a maximum of Rs.50 lacs for a period of 12 months.
2. Kisan credit card	• All farmers – individuals/Joint cultivator owners • Tenant farmers, oral lessees and share croppers etc. • SHGs or Joint liability groups	• Quantum of loan for 1st year will be assessed on the basis of Cost of cultivation, post-harvest expenses and farm maintenance cost • For subsequent 5-year loan will be sanction on the basis of increase in scale of finance • Get interest at saving bank rate on credit balance in KCC account

	including tenant farmers.	• Free ATM cum debit card (State Bank Kisan Card) for all KCC borrowers • Interest subvention @2%p.a.is available for loan amount upto Rs. 3 Lacs • Additional interest subvention @3% p.a. for prompt repayments.
3. Credit schemes of commercial banks	Different categories of farmers as per scheme	Provide credit for market infrastructure, contract farming, producer cooperatives, agro-processing, value-chain finance, etc.
4. NBFCs	All stakeholders in the agriculture value chain	Financial services depending on the market opportunities and customer demand on all activities in the commodity value chain

8.3 Organizations/ agencies in agricultural marketing

Table 29. Organizations/ agencies in agricultural marketing

Organization	Services provided
Directorate of Marketing and Inspection (DMI), Faridabad https://dmi.gov.in/ https://agmarknet.gov.in/	• To integrate development of marketing of agricultural and allied produce in the country. • Promotion of grading of agricultural and allied produce. • Market development through regulation, planning and designing of physical markets. • Liaison between the Central and State governments through its regional offices and sub-offices spread throughout the country.
State Agricultural Marketing Directorates/ Boards	• Implementation of the regulation of marketing in the state. • Provide infrastructural facilities for the marketing of notified agricultural produce. • Provide facilities for grading of agricultural produce in the market area, • To coordinate all the agricultural produce market committees for information services • Provide aid to financially weak and needy APMCs in the form of loans and grants • Eliminate malpractices in the marketing system • Promotion of post-harvest management and agri-business activities. • Arrange or organize seminars, workshops/ exhibitions and farmers training programmes on the various aspects relating to agricultural marketing.
State Cooperative Marketing Federations	• Procurement of the produce through local cooperative societies as and when required. • Provide subsidy and crop loan to the groundnut farmers. • Construct godowns to provide scientific storage facilities to the groundnut farmers.

	• Provide agricultural inputs to the member farmers through member societies to increase crop production and productivity.
ICAR- Directorate of Groundnut Research https://www.dgr.org.in/	• Act as the national repository of working collection of groundnut germplasm and information on groundnut research. • Offer consultancy and training. • To organize workshops and trainings on the use and application of various spectroscopic and analytical techniques for students, teachers and personnel from other Laboratories, Universities and Industries. • All India Coordinated Research Project on Groundnut
Central and State Warehousing Corporations	• Provide scientific storage and handling facilities. • Provide disinfestations services. • Training of scientific storage of agricultural produce.
National Cooperative Development Corporation (NCDC), New Delhi www.ncdc.in	• Planning, promoting and financing programmes for production, processing, marketing, storage, export and import of agricultural produce, food stuffs, certain other notified commodities • Supply of consumer goods and collection, processing, marketing, storage and export of produce through cooperatives. • Loans and grants are advanced to State Governments for financing primary and secondary level cooperative societies. • Margin Money assistance to Marketing Federations • Strengthening share capital base of primary / district marketing societies • Margin Money assistance to Processing Units: Food Grains / Oilseeds • Construction of godowns (Normal) • Up gradation/renovation of existing godowns
Securities and Exchange Board of India (SEBI), Mumbai	• Regulating commodity derivatives segment. • Conducting awareness programmes.
Commodity Exchanges	• Provide risk management tool, commodity futures contracts, for groundnut and products.
Director General of Foreign Trade, New Delhi https://dgft.gov.in/	• Provides guidelines/ procedures of export and import of various commodities. • Regulation and promotion of foreign trade through regulation. • Allot export-import code number (IEC no) to the exporters of agricultural commodities.

9. Utilization

9.1 Processing

It has been estimated that about 80 percent of the total groundnut produced in India undergoes processing to utilize as oil or cake. The seed crushing industry may be divided into four categories.

1. Village ghanies or bullock driven kolhus: The use of village ghanies has been gradually reduced and replaced by improved Wardha ghanies, which are considered efficient to the primitive bullock driven ghanies. These ghanies has a mortar and a wooden pestle, where the pestle is rotated by a bullock going around in a circle. Although, these ghanies are not very efficient extractor, they are still a substantial employer of rural labour and save a lot of transportation cost.

2. Rotaries or power operated ghanies: Rotary mills which are an adaptation of ghanies are also popular in the area, where the electricity is available. The extraction through Rotary mills is better than country ghanies and yield 1 to 2 percent higher.

3. Expellers: The mechanization for extraction of oil came with introduction of hydraulic press by the end of the eighteenth century. This was replaced by screw press or expeller towards the end of last century. It consists of a cylindrical cage in which a helical worm shaft moves. The cage contains openings for the drainage of the expelled oil. The flaked and cooked material adjusted to moisture content 2 to 5 percent is fed at one end and subjected to increasing pressure by the screw, which expels the cake through a constricted opening at the far end of cage. Modern expellers can reduce the oil content in the pressed cake to about 4 to 8 percent. The average yield of oil by expellers is comparatively higher than village ghanies or rotary mill.

4. The solvent extraction: This is the most modern and widely uses method. Solvent extraction industry is complementary to seed crushing industry in the sense that it recovers a major portion of oil left in oil cake coming from ghanies, rotaries and expellers. The basic techniques is to dissolve oil in a volatile solvent (N-Hexane) and then to distil the extract recovering solvent and oil separately. The SE (solvent extracted) Groundnut oil is in the refined and purified form and can be stored for longer period.

9.2 Uses

Almost every part of Groundnut has commercial value. Groundnut is an oilseed crop mainly used for edible oil purpose but used by many other ways. The main uses of Groundnut are as follows:

1. Edible Oil: The groundnut oil has several uses but mainly used as a cooking oil. It is used

in many preparations. It is used in soap making, fuel, cosmetics, shaving cream, leather dressings, furniture cream, lubricants, etc. Groundnut oil is also used in making vanspati ghee and in fatty acids manufacturing. It is also used as medium of preservation for preparation of pickles, chutney and other preparations.

2. Medicinal use: Its oil is used in making different types of medicated ointments, plasters, syrups, and in medicated emulsion.

3. Food Preparation: It is also used to make various food preparation like, butter, milk, candy & chocolate, chatni, groundnut pack, laddu, barfi (chukii), etc.

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

5. Groundnut cake: It is the liking feed for animal and poultry due to its nutritive value and palatability.

6. Groundnut Shell: Groundnut shell has great potential for commercial use. It is used as a fuel, filler in cattle feed, hard particle boards, cork substitutes, activated carbon etc.

7. Groundnut straw: Mainly used as animal feed, fuel and in preparation of compost. The green leaves and stem of plants are used as animal feed. The shell of pods obtained during threshing also used as cattle feed.

10. DO'S and DON'TS

DO'S	DON'TS
✓ Harvest the Groundnut when plant foliage show yellowness, pod becomes hard and tough, and there is dark tannin discolouration inside the shell and the seed become unwrinkled	× Harvest Groundnut before the crop matures, which means less shelling percentage, oil and protein content.
✓ Harvest the crop at proper time of maturity.	× Delay harvesting. It results in more pods in soil and reduces yield.
✓ Harvest crop when there is adequate moisture in the soil.	× Harvest crop when there is less or excess moisture in the soil
✓ Harvest in bright sunny dry weather conditions.	× Harvest during humid/wet weather conditions.
✓ Stripe pod properly and immediately after harvesting by adopting better mechanical methods	× Stripe pod late and badly as it may damage pods/kernels.
✓ Immediately dry the wet pods after harvest, preferably up to optimum moisture content i.e. not more than 5 percent.	× Keep high moisture in pods. It may help in fungal attack which leads to development of Aflatoxin infestation.
✓ Protect the harvested produce from rain and excessive dew by covering.	× Store produce in open, pods may absorbed moisture.
✓ Spread the harvested produce to dry pods properly.	× Make heaps of harvested produce to avoid mould formation.
✓ Threshing and winnowing on cemented (*Pucca*) floor to avoid handling losses.	
✓ Market the produce after grading to get higher return.	
✓ Avail the facility of Price Support Scheme during glut situation.	
✓ Get the market information regularly from www.agmarknet.nic.in website, newspaper, T.V., concerned APMC offices etc. before marketing.	
✓ Avail the facility of futures trading and forward contracts to avoid price risk arising due to wide fluctuation in prices.	
✓ Take the benefits of contract farming to insure better price of the produce.	
✓ Store the produce during post-harvest period and sell it when prices are favourable.	
✓ Reap the benefit of 'GRAMIN BHANDARAN YOJANA' scheme for construction of rural godowns and store the produce to minimise losses in qualitative and quantitative terms.	
✓ Provide aeration in storage to avoid dampness and pest infestation.	
✓ Use effective, efficient and proper post-harvest technology and processing techniques to avoid post-harvest losses.	
✓ Select the shortest and efficient marketing channel to get higher share in marketing.	
✓ Use proper and scientific method of storage to avoid aflatoxin attack.	
✓ Select the cheapest and convenient mode of transportation from the available alternatives.	
✓ Use proper packing of Groundnut to protect the quality and quantity during transit and storage.	
✓ Follow the stipulated export rules and regulations.	

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ICAR- Directorate of Groundnut Research

https://www.dgr.org.in/

Directorate of Marketing and Inspection (DMI), Faridabad

https://dmi.gov.in/

https://agmarknet.gov.in/

Appendices

State-wise Progress of AMI (Storage Infrastructure) including Erstwhile GBY

Since inception w.e.f. 01.04.2001& up to 31.03.2022

S. No.	State	No. of projects	Storage Capacity (in MT)	Subsidy Released (Rs. Lakh)
1	Andhra Pradesh	1444	5816670	29303.71
2	Arunachal Pradesh	1	945	6.30
3	Assam	346	1067157	6659.78
4	Bihar	1089	715539	3018.15
5	Chhattisgarh	600	1953611	7372.00
6	Goa	1	299	0.94
7	Gujarat	11970	4964855	27995.05
8	Haryana	2284	6818374	38871.69
9	Himachal Pradesh	88	30826	180.77
10	Jammu & Kashmir	15	88027	709.79
11	Jharkhand	37	183708	814.92
12	Karnataka	4674	3941516	19387.07
13	Kerala	209	105903	539.55
14	Madhya Pradesh	4617	13749757	71724.49
15	Maharashtra	3698	7035176	29225.43
16	Meghalaya	16	21012	186.75
17	Mizoram	1	302	2.52
18	Nagaland	36	32814	354.38
19	Odisha	695	1019830	4191.55
20	Punjab	1761	6814459	23516.33
21	Rajasthan	1594	3123742	10585.51
22	Tamilnadu	1202	1436730	5205.06
23	Telangana	857	5023442	25292.72
24	Tripura	5	28764	296.61
25	Uttar Pradesh	1182	5600154	18074.01
26	Uttarakhand	291	786272	3467.72
27	West Bengal	2565	1619834	5093.98
Total		**41278**	**71979718**	**332076.78**

State-wise Progress of AMI (Other than storage infrastructure) including Erstwhile AMIGS SchemeSince inception w.e.f. 20.10.2004 & upto 31.03.2022

S. No.	State	No. of projects	Subsidy Released (Rs. Lakh)
1.	Andhra Pradesh	379	7102.90
2.	Assam	13	573.52
3.	Chhattisgarh	339	6688.92
4.	Delhi	1	30.41
5.	Goa	1	50.00
6.	Gujarat	8815	22844.76
7.	Haryana	7	137.70
8.	Himachal Pradesh	62	1640.18
9.	Jharkhand	1	0.00
10.	Karnataka	835	8975.19
11.	Kerala	372	6254.84
12.	Madhya Pradesh	1264	33761.78
13.	Maharashtra	1568	43965.50
14.	Manipur	17	0.00
15.	Mizoram	1	2.52
16.	Nagaland	72	1422.33
17.	Odisha	20	852.13
18.	Punjab	2074	26920.31
19.	Rajasthan	557	9853.39
20.	Sikkim	1	15.52
21.	Tamil Nadu	1811	5361.95
22.	Telangana	711	11489.05
23.	Uttar Pradesh	3	872.00
24.	Uttarakhand	7	1002.26
Total		**18931**	**189817.16**

Procurement of Groundnut under Price Support Scheme (PSS)

Year	Qty in Tonnes	Value in Lakhs
2016-17	210731.2	88928.55
2017-18	1046970	465880
2018-19	719829.9	351889.2
2019-20	721205	367090.8
2020-21	286041.6	150849.7
2021-22	153556.7	85163.4

Source: Agricultural Statistics at a Glance 2021, DES, DA&FW, GOI

Details of mandis and traders registered on eNAM, in different States/UTs

State/ UT	*Mandies*	Traders	FPOs	Farmer	No. of Unified licenses issued by State
Andhra Pradesh	33	3483	177	1445806	3,483
Chandigarh	1	114	0	7106	0
Chhattisgarh	14	3126	22	135253	36
Gujarat	122	9444	110	869102	9,444
Haryana	81	14486	243	2725243	35
Himachal Pradesh	19	2015	56	124506	0
Jammu and Kashmir	2	237	4	957	0
Jharkhand	19	2315	120	247554	104
Karnataka	2	662	13	1455	662
Kerala	6	354	7	2792	35
Madhya Pradesh	80	22378	104	3007337	1,070
Maharashtra	118	21548	268	1217277	0
Odisha	41	7504	208	285380	7,504
Puducherry	2	181	2	13529	0
Punjab	37	2611	10	217427	1
Rajasthan	144	82924	189	1500993	82,924
Tamil Nadu	63	6375	108	312051	3,768
Telangana	57	5803	62	1823790	5,803
Uttar Pradesh	125	35157	271	3315390	90
Uttarakhand	16	4738	44	54329	4,738
West Bengal	18	3994	171	49819	33
Total	1000	229,449	2189	17,357,096	1,19,730

Source: https://enam.gov.in/

State wise progress of market reforms

State/ UT	Limiting regulation within APMC Yard	Separation of Powers between Dir(Mktg.) & MD, Mandi Board	Single unified trading license	Single Point levy of Market fee	Private Wholesale market	Direct marketing (Outside mandi)	Declaring warehouse, silos / cold storages, as deemed market	e-trading	Deregulation of marketing of F&V
Andhra Pradesh	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Arunachal Pradesh	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Assam	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bihar	No APMC Act								
Chhattisgarh	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Goa	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gujarat	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Haryana	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
HP	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Jharkhand	No	No	Yes	Yes	Yes	Yes	Yes	No	Yes
Karnataka	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Kerala	No APMC Act								
MP	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Mah.	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Manipur	No APMC Act								
Meghalaya	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mizoram	No	No	Yes	Yes	Yes	Yes	No	Yes	No
Nagaland	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Odisha	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Punjab	No	No	Yes	Yes	Yes	Yes	No	Yes	No
Rajasthan	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Sikkim	No	No	Yes	Yes	Yes	Yes	No	Yes	No
Tamil Nadu	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Telangana	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No
Tripura	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UP	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Uttarakhand	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
West Bengal	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes
Delhi	No	No	No	No	No	No	No	No	Yes
Chandigarh	No	No	Yes	Yes	Yes	Yes	No	Yes	No
Puducherry	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
J&K	No APMC Act								
Laddakh									
A&N Islands									
DNH									
Daman & Diu									
Lakshdeep									

Source: DMI (updated on 14.07.2020)