Post Harvest Profile of Wheat

C O N T E N T S

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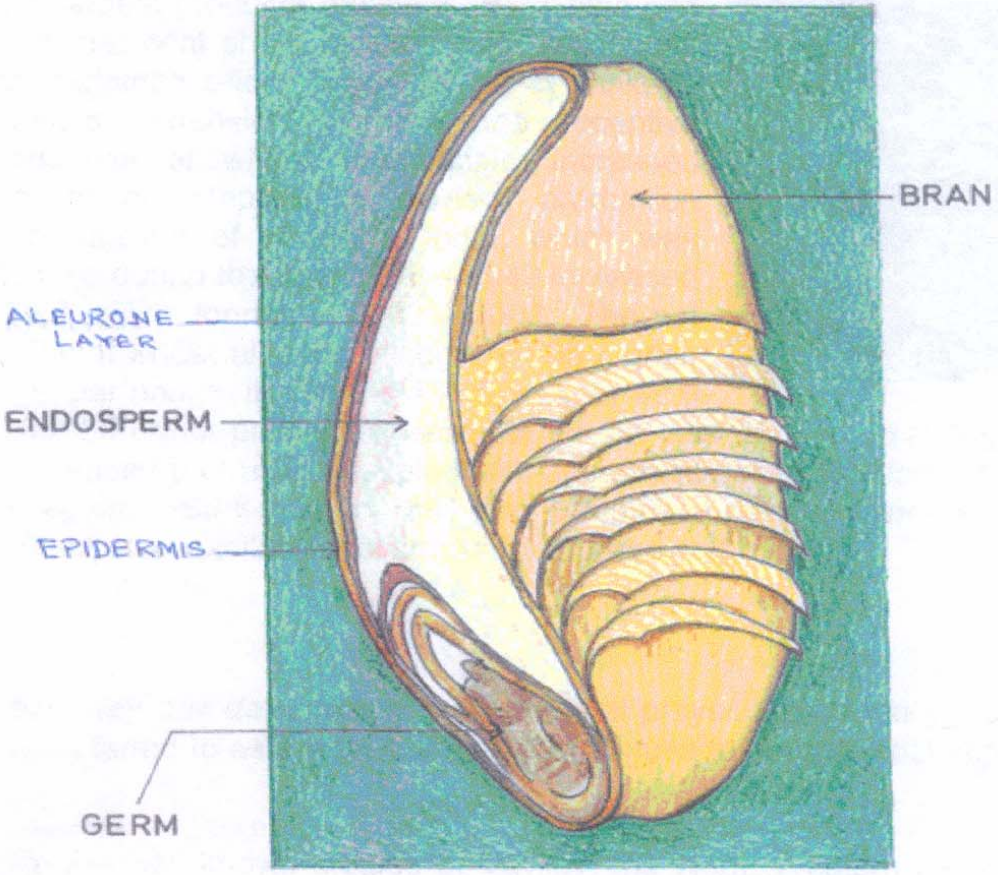
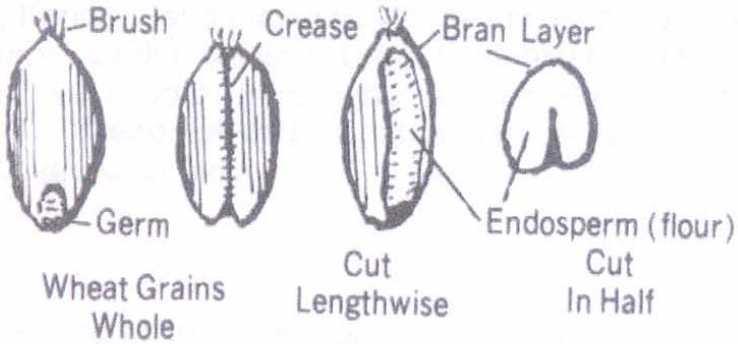
WHEAT KERNEL





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POST HARVEST PROFILE OF WHEAT

1.0 INTRODUCTION :

Importance of wheat world wide as main food can be understood by use of stylized wheat spike as a symbol of FAO. Wheat is a major cereal in India after rice.The total estimated production of foodgrains in India during the year 2000-2001 was 195.92 million tonnes and the share of wheat was 68.76 million tonnes i.e. about 35 per cent. India has emerged as the 2nd largest producer of wheat after China and accounted for 12.06 per cent share of total world production of wheat. Due to sustained efforts made by policy makers, agricultural scientists, extension workers and receptive farmers, the production of wheat dramatically increased manifold on account of adoption of modern production technology. The production of wheat in India, which was merely 4 million tonnes during the year 1948 – 1949 increased spectacularly to 72.8 million tonnes in 2002 – 2003. The net per capita availability of wheat also increased from 65.7 gms. per day or 24.0 kgs. per annum in 1951 to 135.8 gms. or 49.6 kgs. in the year 2001.

1.1 Origin :

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"Give us this day our daily bread" is an eternal prayer. Bread made from wheat has, from ancient times, been referred to as the stuff of life. It continues to be, the most important food grain of the world.

According to the well known studies of Vavilov, the North Western parts of the Indian Sub-continent together with contiguous region of Afganistan was the centre of origin of bread wheat. Archaeological investigations at Mohenjo-daro have shown that wheat was being grown in that region about 5000 years ago. In fact, wheat was grown in India from pre-historic times. The wheat belongs to the Genus *Triticum* of family *Graminae*. The wheat is having different names in regional languages viz., Gehun, Kanak, Gandham in Hindi, Gehun, Gahang in Marathi, Godhumalu in Telugu, Godhi in Kannad, Godumai, Godumbairisi in Tamil, Gendhkum, Godamba in Malayalam. Although, as many as 25 species of wheat have been recognized in the world, only three species of wheat namely; T-aestivum / vulgare Linn **(Bread wheat),** T.durum **(Macaroni wheat)** and T.dicoccum **(Emmer wheat)** are commercially grown in India.

1.2 Importance :

Wheat kernel consists of four main parts – Seed coat (10 per cent of the kernel weight); aleurone layer (6 per cent); starchy middle, the endosperm (81 per cent) and the germ (3 per cent).

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Consumption of wheat became popular in all the states of country due to greater flow of marketable surplus, spread of knowledge that whole meal atta contains double the quantity of proteins and five times the quantity of calcium compared to consumption of equal quantity of rice. Another factor which has been responsible for widespread consumption of wheat is its gluten content, making it most versatile cereal with multifarious usage. It is responsible for rheological features of dough. It absorbs and retains moisture, traps the gases in dough and improves the crust colour. The proximate principles of wheat are as follows:

Moisture	12.8 gms	Carbohydrate	71.2 gms
Proteins	11.8 gms	Energy	346 K cal
Fat	1.5 gms	Calcium	41 mg.
Minerals	1.5 gms	Phosphorus	306 mg.
Fibre	1.2 gms	Iron	5.3 mg.

All the values as per 100 gms. of edible portion.

SOURCE : Nutritive Composition of Indian Foods, NIN (ICMR), Hyderabad.

Average composition (percentage) of wheat according to S.B.Pingale, ICAR, New Delhi is as follows.

Moisture	13.3	Crude Fibre	2.4
Protein	12.7	Fatty acids	22.5 mg.
Total Ash	1.4	Gluten	8

The different products of wheat commonly used are Atta (whole meal), which is rich in Vitamin-A and Vitamin-B, whereas Maida (white flour) contains lesser Vitamin-B and protein contents. Suji (coarse semolina), Rawa (fine semolina), Vermicelli, noodles are other products in common use.

2.0 PRODUCTION :

2.1 Major Wheat Producing Countries in the World

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The wheat is cultivated in about 120 countries of the world. The major wheat producing countries are China, India, USA, Russian Federation, Canada, Australia, etc. The China has emerged as the largest producer of wheat and accounted for 15.7 per cent share followed by India, which shared 12.06 per cent in world production of wheat during the years 2001-2003. Although, India occupied largest area estimated at 12.08 per cent of total area under wheat in the world followed by China which occupied 11.08 per cent, the productivity of wheat in China, was appreciably higher at 3830 kgs. compared to 2696 kgs. per hectare in India. World area, production and yield of wheat is summarized in the following table.

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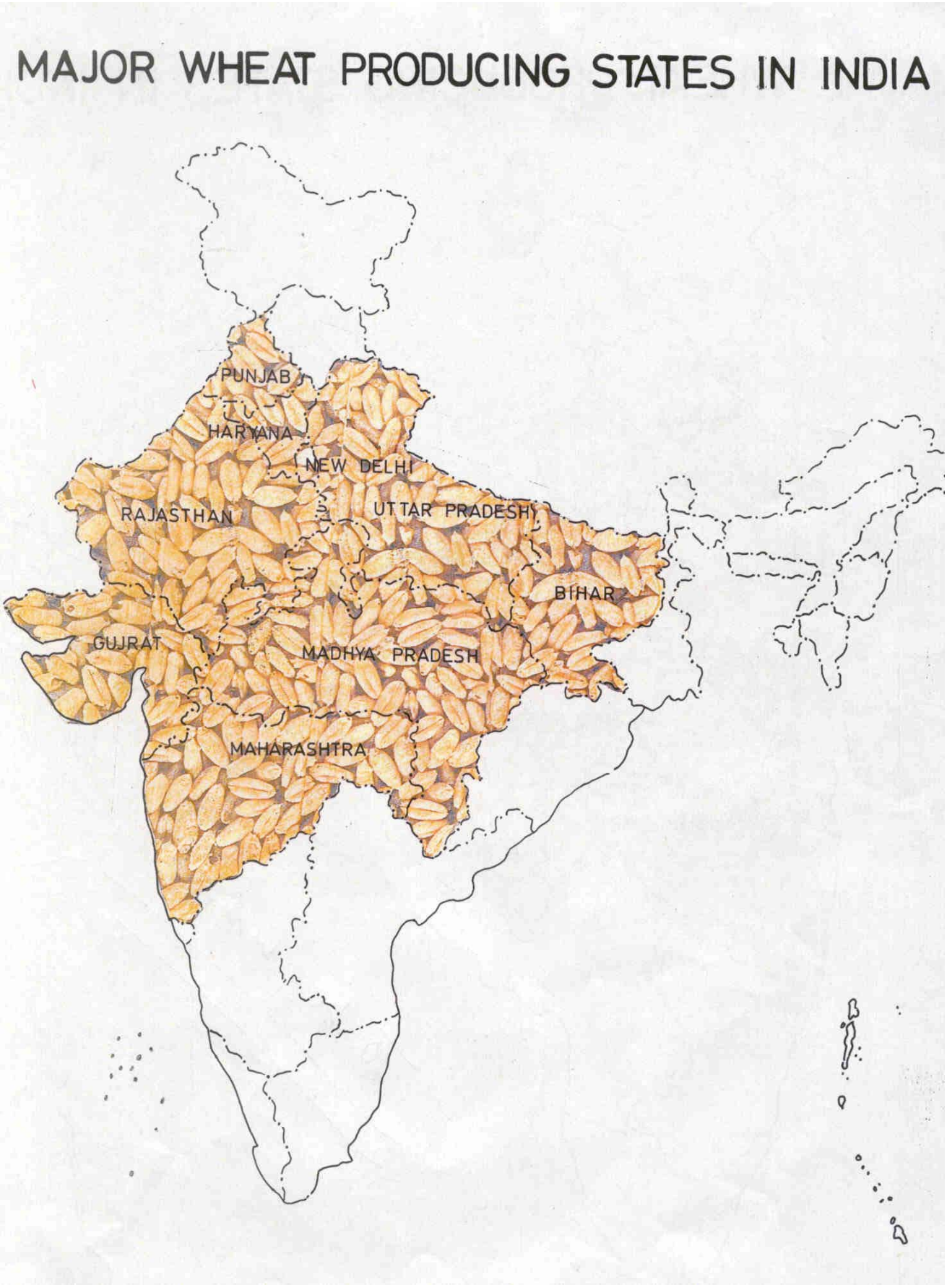
MAJOR WHEAT PRODUCING STATES IN INDIA
PUNJAB
HARYANA
NEW DELHI
RAJASTHAN
UTTAR PRADESH
BIHAR
GUJRAT
MADHYA PRADESH
MAHARASHTRA

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Table No. 1

Average Area, Production and Yield of Wheat in the Major Producing Countries of the World

Sl. No.	Country	Area (000' Hect.)				Production (000' M.T.)				Yield (Kg./Hect.)			
		2001	2002	2003	Average	2001	2002	2003	Average	2001	2002	2003	Average
1.	2.	3.	4.	5.	6.	7.	8.	9.	10	11.	12.	13.	14.
1.	India	25731	26345	24886	25654 (12.08)	69681	72766	65129	69192 (12.06)	2708	2762	2617	2696
2.	China	24664	23908	22040	23537 (11.08)	93873	90290	86100	90088 (15.71)	3806	3777	3906	3830
3.	USA	19681	18582	21383	19882 (9.36)	53262	44063	63590	53638 (9.35)	2706	2371	2974	2684
4.	Russian Federation	22833	24478	19960	22424 (10.56)	46982	50609	34062	43884 (7.65)	2058	2068	1706	1944
5.	Australia	11597	11045	12456	11699 (5.51)	24854	10059	24900	19938 (3.48)	2143	911	1999	1684
6.	Canada	10585	8866	10467	9963 (4.69)	20567	16198	23552	20106 (3.51)	1943	1833	2250	2009
7.	Others	99598	100522	97573	33231 (46.72)	281301	289528	259016	276615 (48.24)	2824	2880	2655	2786
	World	214689	213716	208765	212390 (100%)	290520	573513	556349	573461 (100%)	2751	2683	2665	2700

SOURCE : **FAO Production Year Book Vol.54 – 2000.**

2.2 Major Wheat Producing States in India :

India has made tremendous progress in production of wheat. During the year 1950-1951, its production was merely 6.46 million tonnes, which increased to 65.12 million tonnes in 2003. In India, Uttar Pradesh, Punjab, Haryana, Rajasthan, Madhya Pradesh and Bihar together contributed 93.31 per cent of production. The share of Uttar Pradesh alone was 34.89 per cent of total production in India followed by Punjab, Haryana, Madhya Pradesh, Rajasthan and Bihar with the share of 21.55, 13.20, 8.81, 8.57 and 6.2 per cent respectively. The area, production and yield are presented in Table – 2.

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Table No. 2

Average Area, Production and Yield of Wheat of Major Producing States in India

Sl. No.	State	Area (000' Hect.)				Production (000' Tonnes)				Yield (Kg./Hectares)		
		1999-2000	2000-2001	2001-2002	Ave-rage	1999-2000	2000-2001	2001-2002	Avera-ge	1999-2000	2000-2001	2001-2002
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
1.	Uttar Pradesh	9400	9240	9080	9240 (35.02)	25976	25170	25070	25405 (34.98)	2764	2724	2755
2.	Punjab	3388	3410	3420	3406 (12.91)	15910	15550	15500	15653 (21.55)	4696	4563	4532
3.	Haryana	2317	2360	2300	2326 (8.82)	9650	9670	9440	9587 (13.20)	4165	4106	4103
4.	Rajasthan	2650	2310	2290	2417 (9.16)	6732	5550	6390	6224 (8.57)	2540	2402	2739
5.	Madhya Pradesh	4662	3310	3430	3801 (14.41)	8685	4870	5630	6395 (8.81)	1863	1471	1642

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1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.
6.	Bihar	2145	2070	2130	2115 (8.02)	4687	4440	4380	4502 (6.20)	2126	2146	2056
7.	Gujarat	0482	0290	0470	414 (1.57)	1020	0650	1140	937 (1.29)	2116	2268	2435
8.	Maharashtra	1049	0750	0780	860 (3.26)	1436	0950	1080	1155 (1.59)	1369	1257	1388
9.	Others	1393	1990	2020	1801 (6.83)	2273	2830	3180	2761 (3.81)	1632	2427	1574
	All India Total	27486	25730	25920	26380 (100)	76369	69680	71810	72619 (100)	2778	2708	2770

SOURCE : Department of Agril. & Co-operation, New Delhi.

2.3 Zone-wise Commercial Varieties of Wheat :

The wheat growing area of the country can be divided into 5 agronomic divisions **(i) the Gangetic alluvium of Uttar Pradesh and Bihar (ii) the Indus alluvium of Punjab and Haryana (iii) the black soils of Central and Southern India (iv) the hilly soils of the Himalaya and elsewhere and (v) the desert soils of Rajasthan**. The first two divisions are most suitable for wheat cultivation.

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About 190 high yielding varieties of wheat have been released so far, as suitable to different zones and cropping sequences. The improved wheat varieties suitable to various wheat zones are as under:

Sl. No.	Zone / State / Hills	Varieties
1.	2.	3.
1.	North Hills Zone (Hills of H.P., Uttaranchal & J& K)	V1, 616, HS277, V1, 421, UP 1109, HD 2380, HS 240, HT 46(T, HS 295, HS 207.
2.	North Western Plains Zone (Punjab, Haryana, Western U.P., Delhi, Rajasthan)	Normal sown, Irrigated HD 2329, HD 2428, CPAN 3004, POW 215(d), OBD 34(d), PBW 154, 3077 Raj, 1.4 KRL, WH 542, UP 2338, HUW-468, PBW 343, HD 2687. Late sown, Irrigated HD 2285, HD 2270, PBW 226, WH 291, Raj 2184, Raj 3077, Raj 3765, UP 2336, PBW 377, Kundan, PBW 65,IWP-72. Normal sown, rainfed PBW 175, PBW 299, WL 410, PBW-65, WL-2265, WH-533, K-9465, HDR-77
3.	North Eastern Plains Zone (Eastern U.P., Bihar, West Bengal, Orissa, Jharkhand, Assam)	Normal sown Irrigated HP 1102, UP 262, HUW 206, K 7410, HD 2402, K 8804, DL 784-3, K 9006, K 9107, HP 1731. Late sown, Irrigated HD 2307, HUW 234, HP 1633 Normal sown, rainfed K 8027, HDR 77, K 8962.

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1.	2.	3.
4.	Central Zone (M.P., Chhattisgarh, Gujarat and Kota & Udaipur (Rajasthan)	Lok 1, WH 147, HD 2236, WH 1077, Raj. 1555(d), HI 838(d), DL 803-3, GW 190, J 405, Swati, HD 2327, Sujata, JU 12, Meghdoot (d), Narmada 4, Hyb 65.
5.	Peninsular Zone (Maharashtra, Karnataka)	HD 2189, HD 4502(D), HD 2380, DWR 39, DWR 162, MACS 2496, HI 977, HD 2502, HD 2610, DWR 195, HI 5439, MACS 1967(d)
6.	Southern Hill Zone (Nilgiri and Palni Hills)	HW 741, HW 971, HUW 318, NP 200(d), NP 200(d)

SOURCE: **Indian Farming, October, 2001.**

Durum wheat (T.durum) occupies nearly 10% of the wheat area in the country. Earlier, its cultivation was confined to rainfed areas of Central and Peninsular India. But now, semi dwarf variety is cultivated in irrigated areas also. Recently evolved durum varieties, such as HI 8381, and HI 8498 are not only high yielding and resistant to yellow rust and Karnal-bunt but also suit the export requirements. These durum varieties are hardest in texture with long and amber coloured Kernel. High gluten content with granular structure and its non-binding properties make it suitable for pasta industry. Pasta made from durum is firm with consistent cooking quality. Yellow endosperm gives a desirable golden hue.

3.0 POST HARVEST MANAGEMENT :

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The farmer's risk does not end when the crop matures, grain may be lost during harvest because of shattering and spillage or birds, rodents and insects may consume/damage it in the field or in storage. Whereas, early harvesting results in the grains with higher moisture content, which in turn may attract mould infestation resulting into development of aflatoxin. The post-harvest losses can be reduced to half with the use of available technology viz., timely harvest, use of proper harvesting and threshing equipments, safe storage, prophylactic and curative measures to check infestation. However, farmers are not fully aware of the post-harvest losses during harvesting and storing etc.

3.1 Post Harvest Losses :

The post-harvest losses of wheat are estimated to the tune of 8 per cent of production. There are different estimates on post harvest losses in foodgrains. According to one estimate, the harvest and post harvest losses are as follows:

Sl. No.	Losses (during and other causes)	Percentage (of Losses)	Sl. No.	Losses (during and other causes)	Percentage (of Losses)
1.	Threshing	1.0	5.	Birds	0.5
2.	Transport	0.5	6.	Insect	3.0
3.	Processing	-	7.	Moisture	0.5
4.	Rodents	2.50		Total :	8.0

SOURCE : **Report of the Committee on Post Harvest Losses of Foodgrains In India, Ministry of Food and Agriculture, Govt. of India, 1971.**

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As per Directorate of Marketing and Inspection recent survey, the estimated total post-harvest losses at producer's level has been 1.79 per cent (unpublished).

Loss of 7 million tonnes @ 10 per cent of wheat production is colossal, which country can ill afford. In terms of the value, this works out to Rs.35 million by conservative estimates @ Rs.5 per kg. However, following measures should be followed to minimize the post-harvest losses;

- **Immediate drying of wet grain after harvest.**
- **Uniform drying to avoid hot and wet spots.**
- **Use of proper techniques of processing to avoid losses in threshing and winnowing by mechanical methods.**
- **Proper sanitation during drying and storing to avoid contamination of grains and protection from insects, rodents and birds.**
- **Use of efficient and good packaging for storage and transportation.**
- **Use of proper scientific techniques in storage for maintaining optimum moisture content.**
- **Use of pest control measures (fumigation) prior and during storage.**
- **Providing aeration to stored grains and stir grain bulk occasionally.**
- **Moving stocks in sacks to discourage pest incidence and its multiplication.**
- **Proper handling of wheat with suitable transportation facilities helps in reduction in losses at farm and market level.**

3.2 Harvesting Care :

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The time of harvesting plays a vital role. The following harvesting care should be taken.

- **Wheat crop should be harvested, when the grains become hard.**
- **Harvesting before maturity means low recovery of grain, higher proportion of immature seeds, broken and poor quality and disease prone during storage.**
- **Delay in harvesting means shattering and spillage of grains. Its exposure to birds, rodents and insect and pest attack.**
- **Harvesting should be done in dry summer season.**
- **Harvesting should be done by using proper method and improved equipments.**
- **Harvested wheat should be kept separately to avoid mixing of varieties.**
- **Direct sun drying and excessive drying should be avoided.**
- **Threshing and winnowing should be done in the fields. The grains should be packed in sound clean gunny bags to minimize the losses during transportation.**

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3.2.1 Post – Harvest Equipments :

Some modern, developed equipments with efficiency and cost are give below.

POST HARVEST EQUIPMENT

Sl. No.	Equipment (with code no.)	Capa-bility Ha./Hr.	Effici-ency %	Labour required man. Hr./ Ha.	Price Rs. 'x'	Cost Rs. /Ha. 'x'	Pictures
1.	2.	3.	4.	5.	6.	7.	8.
A.	SOWING AND PLANTING EQUIPMENT						
1.	PAU Tractor Mounted Seed-cum-fertilizer drill for oilseed (Also useful for wheat sowing) SP – 21	0.3 – 0.4	75 – 80	5	7000	300	
B.	PLANT PROTECTION EQUIPMENT						
1.	Battery powered low volume knapsack spinning disc sprayer PP – 1	0.20	-	5	80	95	
C.	HARVESTING EQUIPMENTS						
	Vaibhav Sickle HV – 3	0.011		89	20	334	
	Self Propelled Vertical Conveyor Reaper HV – 8	0.20 – 0.23	65	13	665	1400	
	Self Propelled Rice Harvester (Also used for wheat) HV – 9	0.175	68.5	6	60000	320	

'x' – Approximate price.

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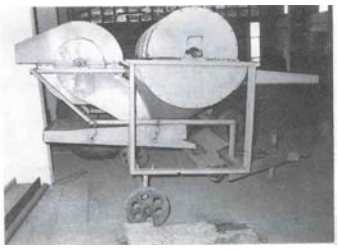
1.	2.	3.	4.	5.	6.	7.	8.
4.	Power Tiller Operated Vertical Conveyor Reaper Windrower HV – 10	0.25	-	4	20000	600	
5.	CIAE Tractor Front Mounted Vertical Conveying Reaper Windrower HV – 12	0.31	74	46	30000	400	
6.	PAU Tractor Front Mounted Vertical Conveyor Reaper Windrower	0.3 – 0.4	55 – 70	30 – 40	30000	750	
D	THRESHING / SHELLING EQUIPMENT						
1.	Pantnagar Axial Flow multicrop Thresher TH – 25	312 kg. per hours	TE - 99.0%` CE- 99.2%	MH per qtl. 1.0	25000	Rs.10 per qtl.	
E	MISCELLANEOUS EQUIPMENT						
1.	APAU Seed Treating Drum MC – 1	10 kg at a time 100 kg.per hour	90%	1	1200	Rs. 1.7 per kg.	

TE=Threshing Efficiency CE=Cleaning Efficiency

SOURCE : **Farm Machinery Research Digest – Central Institute of Agril. Engineering (CIAR), Bhopal**

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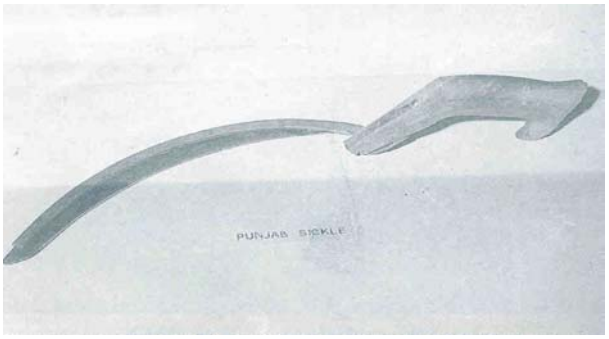
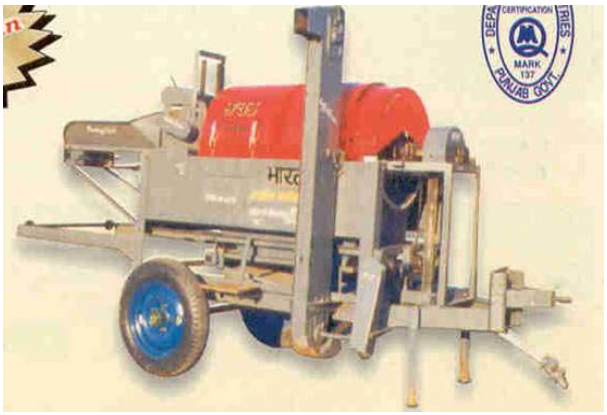
Punjab Sickle HV-II



Naveen Sickle HV-I

Wheat Thresher



Multicrop Thresher

3.3 Grading:

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There is no need to emphasize that bold size grains free from chaff, brokens, immature, shrivelled and weevil damaged free from admixture of other varieties, foreign matter, fetch higher prices. In the modern urban market, ready to cook items are in demand with increased purchasing capacity. Since the wheat is produced in varying agro-climatic conditions, heterogeneous quality is unavoidable. Hence, it is necessary to have one national language for defining the quality characteristics to facilitate marketing without physical inspection. Grading provides following marketing benefits –

- ★ **Low expenditure in transport and storage.**
- ★ **Knowledge of prevailing price, and right markets.**
- ★ **Easy financial assistance, and future trading.**
- ★ **Widens the market for farm products.**
- ★ **Consumers get wide choice of quality at a reasonable price.**
- ★ **Promotes competitive marketing.**

3.3.1 Grade Specifications :

(A) Grading is undertaken by different agencies following various criteria depending upon its end use. The bulk of the commodity may be simply classified on the basis of kernel texture as **(i) hard (ii) semi hard (iii) soft and on colour namely (i) white (ii) amber and (ii) red.**

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The various factors which constitute quality are **(i) impurities, which together with damaged grain may seriously affect milling quality, (ii) bushel and kernel weight, (iii) nature and structure of the kernel, and (iv) moisture content**. The merchants in India consider mainly physical characters like impurity or refraction and general appearance of the grain. Refraction comprises of any one or a combination of the following:-

- **Dirt or foreign matter including oilseeds and non food grains,**
- **Admixture of other food grains,**
- **Damaged and 'touched' grains,**
- **Shrivilled or immature grains,**
- **Weevilled grains,**

(B) Grading Equipments :

(1) Sampler – Tube or Scoop, Sample Divider Wheat Sample-50 gm. (2) Cleaning and Grading System Machine (3) Dust Collection Plant (4) Screen Air Separation (5) Clean-o-Graders (6) Destoners (7) Gravity Separators (8) Air Classifiers (9) Pre-cleaning and Silo Storage System (10) Aflatoxin Detection Kit – CFTRI.

3.3.2 Grading at Producers Level :

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The grading of wheat at producer's level is carried out in accordance with National Grade Standards since 1965. The produce brought by farmers is inspected and sampled by qualified and trained graders of APMCs. The quantity and value of wheat graded increased in the year 2000-2001 as compared to previous year. The share of Northern Region accounted for as much as 95 per cent in 2002. As per the provisional estimate, the quantity and value of wheat graded at market level prior to sale maintained increasing trends during the year 2002 – 2003.

Table N0.3

I) Progress of Grading at Producer's Level

Sl. No.		2000 – 2001	2001 – 2002	2002 – 2003 (P)
1.	Quantity (M.T.)	1283916.50	1253716	1447094
2.	Value (Rs.Lakhs)	83157.72	80932.57	90133.15

SOURCE : Directorate of Marketing and Inspection, Faridabad.

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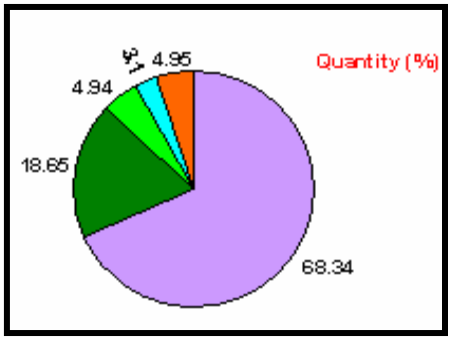
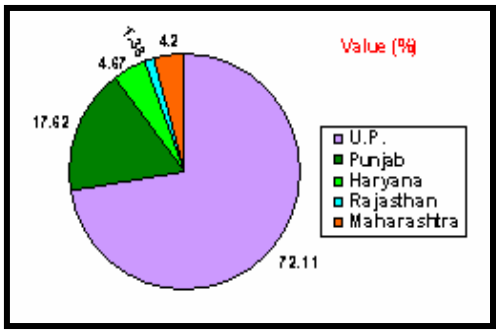
Table No.4

Region-wise / State-wise Grading of Wheat at Producer's Level (2001 – 2002)

Sl. No.	State / Region	Quantity (M.T)	Value (Rs.L)
1.	Uttar Pradesh	856816	58362.51
2.	Punjab	233825	14261.08
3.	Haryana	62000	3782.00
	Northern Region	1191558	77522.01
4.	Rajasthan	38917	1116.42
5.	Maharashtra	61998	3399.71
6.	Gujarat	147	9.91
	Western Region	62145	3409.62
7.	Karnataka	13	0.94
	Southern Region	13	0.94
	All India	1253716	80932.57

Quantity and Value of Wheat Graded at Producer's Level in Major Wheat Producing States (in percentage)





SOURCE : **Agmark Grading Statistics, 2002-03**

II) Directorate of Marketing and Inspection (DMI) :

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The DMI under Ministry of Agriculture, Government of India has laid down grade specifications of wheat, which are known as the National Grade Standards. These are generally adopted in warehouses and regulated markets for grading. The Agmark grade specifications have been under Agricultural Produce (Grading & Marking) Act. 1937.

Agmark Grade Designation and Definition of Quality of Wheat

A. General Characteristics :

- wheat shall be the dried grains of Triticum vulgare and Triticum durum Desf;
- have uniform size, shape and colour;
- be sweet, hard, clean, whole-some and free from moulds, weevils obnoxious smell, discolouration, admixture of deleterious substances and all other impurities except to the extent indicated in the Schedule;
- be in sound merchantable condition; and
- not have moisture exceeding 12 per cent.

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B. Special Characteristics :

Grade desig-nation	Special characteristics						
	Maximum limits of tolerance 1% by weight						
	Foreign Matter	Other Food Grains	Other Wheats	Damaged Grains	Slightly Damaged Grains	Immature shriveled and broken grains	Weevilled grains
I	1.5	1.6	5.0	1.0	2.0	2.0	1.0
II	2.5	3.0	15.0	2.0	4.0	4.0	3.0
III	3.5	6.0	20.0	4.0	6.0	10.0	6.0
IV	4.0	8.0	20.0	5.0	10.0	10.0	10.0

C. Definition :

Foreign matter : It includes, dust, stones, lumps of earth, chaff, stem of straw and any other impurity including non-edible seeds.

Other Food Grains : Edible foodgrains other than wheat.

Other Wheats : For this purpose wheat would be divided into two classes – (1) Durum or Macroni wheat and (2) Vulgare or common wheat; Durum again would be sub-divided into two groups (i) amber and (ii) red ; and Vulgare would be sub-divided in to three groups – (i) white (ii) amber and (iii) red.

Damaged Grains : Grains that are internally damaged or discoloured, damage and discolouration materially affecting the quality.

Slightly Damaged Grains : Grains that are superficially damaged or discoloured, damage and discolouration not materially affecting the quality.

Immature, Shrivelled & Broken Grains : Immature and shrivelled grains are those that are not properly developed. Broken grains are pieces of whole grains.

Weevilled Grains : Grains that are partially or wholly bored or eaten by weevil or other grain insects.

N.B. – Grades I and II should be free from living insect infestation.

III) Codex Standards :

The **Codex Alimentarius Commission** was set up in the year 1963 by **FAO** and **WHO** to develop food standards, guidelines and related texts such as code of practice under the Joint FAO/WHO Food Standards Programme. The main purposes of this programme are to protect health of the consumer, ensure fair trade practices in the food trade, and promote coordination of all food standards work undertaken by the international governmental and non-governmental organizations. The Commission has developed more than 200 standards in the prescribed format for individual or group of foods including the General Standards for labeling of pre-packed foods, the Codex Central guidelines on claims and the Codex Guidelines on Nutritional Labeling etc.

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IV) Grade Specifications of Central Warehousing Corporation (CWC):

The Central Warehousing Corporation has adopted PFA standards on the basis of gravimetric (percentage by weight) as indicated below :

Foreign matter	Other edible Grains	Damaged Grains	Weevilled Grains	Moisture	Total (1+2+3) shall not exceed
3.0	6.0	6.0	10 by count	14	12.0

Foreign matter : Not more than 3 per cent, of this inorganic matter and poisonous seeds not more than 1.0 per cent and 0.5 per cent respectively. Of the total 0.5 per cent of poisonous seeds, Dhatura and Akra shall not exceed 0.025 per cent and 0.2 per cent respectively.

Damaged Grains : Not more than 6 per cent including Karnal bunt and ergot affected grains, Karnal bunt shall not exceed 3.0 per cent and ergot affected shall not exceed 0.05 per cent.

Uric Acid – **not more than 100 mg. per kg.**
Mycotoxin – **not more than 30 micrograms per kg.**

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Further categorization has been done on weevilled grains as well as the touched / germ eaten grains.

Wheat/Milo/Jowar - on the basis of weevilling percentage

Category	% of wevilled grains by weight
A	Upto 1%
B	Above 1% to 4%
C	Above 4% to 7%
D	Above 7% to 15

V) Grade Specifications of Food Corporation of India (FCI) :

FCI follows two types of grade specifications based on the end use of wheat.

i) **For General Pool :** Specifications are based on PFA standards.

F.C.I. Specifications for Wheat Based on P.F.A. Standards

Grade	Foreign matter	Other Foodgrains	Damaged including Karnal Bunt & ergot	Slightly damaged	Shriveled broken
Grade-I (2001-02)	0.75%	3.0%	3.0%	6.0%	8.0%
Grade-I (2002-03*)	o.75%	2.0%	2.0%	6.0%	7.0%

*** Specified for the crop year 2004-05**

Figures show the percentage limit on weight basis

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Note: Foreign matter- Not more than 1.0 per cent by weight (minerals not more than 0.25 per cent and animal origin not more than 0.10 per cent).

Damaged Grain - **Not more than 6 per cent by weight -**

i) Karnal Bunt affected shall not exceed 3 per cent (by weight)
ii) Ergot affected grains shall not exceed 0.05 per cent (by weight)

Weevilled Grains - Not more than 10 per cent by count and Uric acid not more than 100 mg./kg.

Rodent Hair and Excreta - Shall not exceed 5 pcs/kg. - omitted from PFA standards vide G.S.R.No.165(E), dt.07.03.2001 implemented w.e.f. 07.06.2001.

Other Edible grains - Not more than 6 per cent by weight.

Moisture - Not more than 14 per cent by weight obtained by heating pulverized grains at 13.0-13.3^{0}C for two hrs.

ii) For Defence Personnel : F.C.I. procures for Defence supply on the basis of Army Supply Corp. (ASC) Specifications. Chemical test is also conducted in Central Food Labs. No Chemical Test by FCI.

WHEAT - TEST WEIGHT (Hectoliter basis) in kg.

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Variety	Punjab	Haryana
PV-18	75.3 - 77.6	77.50 - 85.40
Kalyan	73.6 - 77.5	75.40 - 82.60
S-308	75.4 - 81.0	77.40 - 83.40
Deshi	76.4 - 82.1	78.50 - 82.40
RR-21	-	81.70 - 82.30

VI) Grade Specifications of Prevention of Food Adulteration Act, 1955 (PFA) :

Wheat being primary food a total of 8 insects either live or dead per kg. are permitted.

Description - Wheat shall be the dried mature grains of Ttriticum aestivum or Triticum vulgare, Triticum durum, Triticum sphaeercoccum. Triticum dicoccum, Triticum, Compactum. It shall be sweet, clean and wholesome. It shall also conform to the following standards, namely:

- **Moisture** - Not more than 14 per cent by weight (obtained by heating the pulverized grains at 13.0^{0}C – 13.3^{0}C for two hours.
- **Foreign matter** - Not more than 1 per cent by weight of which not more than 0.25 per cent private shall be mineral matter and not more than 0.10 per cent by weight shall be impurities of animal origin.
- **Other edible grains** - Not more than 6 per cent by weight.

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- **Damaged grains** - Not more than 6.0 per cent by weight including Karnal bunt affected grains and ergot-affected grains. The limit of Karnal bunt affected grains, ergot affected grains shall not exceed 3.0 per cent and 0.05 per cent by weight, respectively.
- **Weevilled grains** - Not more than 10 per cent by count.
- **Uric acid** - Not more than 100 mg. per kg.
- **Aflatoxin** - Not more than 38 micrograms per kg.
- **Deoxynivalenol (DON)**- Not more than 1000 micrograms per kg.

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 12 per cent by weight.

Quality Status of Indian Wheat :

Wheat possesses certain unique properties, most important of which include the ability of its proteins, when mixed with water to form a cohesive elastic substance called Gluten. Gluten is that portion of wheat protein, which is responsible for providing the framework for spongy texture of bread and other baked products. On dry weight basis, gluten consists of 75 – 80 per cent protein and 5 to 10 per cent lipids. To form gluten, both gliadin and glutenin are necessary. Glutenin is said impart solidity to the gluten and gliadin is responsible for softness and stickyness. The gliadin sticks to the glutenin and so prevents it being washed away in the process of washing out of the gluten. While gliadin is soluble in 60 per cent aqueous alcohol, the glutenin is insoluble in neutral solvents but soluble in acidic or alkaline solvents.

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Quality characteristics of wheat depend on variety, agro-climatic conditions, production technology, cultural practices, etc. it has been proved beyond doubt that same variety grown in different areas produces wheat with varying quality characteristics. Grains of WH 147 made best chapatti (Score $7.25/_{10}$), when grown at Niphad and poorest [$5.58/_{10}$], when produced at Jobner. Even pre-harvest treatments also influence post- harvest characteristics.

Different quality parameters like, admixture, damaged and shriveled grains, colour, hardness, protein, sedimentation value, spread factor, etc. are considered in different countries. In 1970-71, the parameters for Fair Average Quality (FAQ) of FCI were foreign mater, other food grains, slightly damaged and shrivelled grains. However in 1977-78, the maximum limits were improvised and concept of four grades was developed.

Now in post WTO era, surplus stocks of wheat changed consumer preferences / consumption pattern, emphasis on market driven production, export and value addition. The Market Intervention Scheme (MIS) parameters can not be used for export. In due course of time, quality factors shall get integrated facilitating direct delivery from farm gate to end users saving time, transportation and storage cost.

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International parameters like, hectolitre weight, total defect percentage, moisture, sedimentation value, hardness, protein, etc. and product specific quality factors viz. Alkaline water retention capacity (AWRC – percentage), extraction rate, dough properties, spread factor etc. are to be taken in to account.

An earlier analysis of wheat samples of different varieties grown in different locations / regions of India, revealed that samples from Punjab (65.5 per cent) qualified for Grade – II and III of U.S, followed by Haryana (65.6 per cent) for grades III and IV. It was observed that most limiting factor for Indian wheat was total defect as only 11.7 per cent samples could quality the limit set for US Grade – I. Thus, it is evident that foreign matters, shrunken, broken and damaged Kernels are not properly removed. Wheat Grading Equipment reduced the total defects to 2.25 per cent. Indian wheat can be classed on the basis of parameters like protein percentage, sedimentation value (cc), hardness and score for end product.

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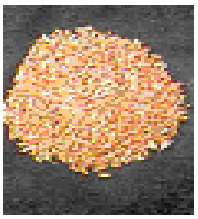

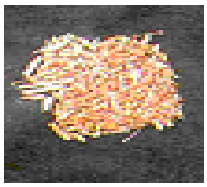

Clean Grains (High density) **Medium Density** **Low Density**

- **Indian Hard Wheat (IHW) for bread,**
- **Indian Medium Hard Wheat (IMHW) for chapatti and other products.**
- **Indian Soft Wheat (ISW) for biscuit.**
- **Indian Durum Wheat (IDUW) for pasta and traditional products.**

Hence, development of product specific varieties and cultivation on product specific locations are important, while planning in present market oriented agriculture. The varieties with weak gluten and protein contents below 10 per cent are suitable for cakes and cookies, whereas for chapaties, noodles and varieties wheat with medium protein (9 to 12 per cent) and gluten are used. However, for Macaroni and white bread, high protein content (above 12 per cent) and strong gluten strength are required.

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Table No.5

Quality Variations of Wheat in Different Markets / States

SL. NO.	MANDI	STATE	ZONE	WHEAT GRADE DATA				TOTAL DEFE-CTS (%)	OTHER CLA-SSES (%)	WHEAT NON-GRADE DATA	
				Hecto-litre weight (kg./hl)	Dama-ged Kernel (%)	Foreign Matter (%)	Shrun-ken and broken (%)			Mois-ture (%)	Pro-tein (%)
1.	2.	3.	4.	5.	6.	7.	8.	9.	10	11.	12.
1.	Almora	Uttara-nchal	NWPZ	79.5	0.69	1.12	5.32	7.14	0.45	11.71	10.04
2.	Pant-nagar	- do -	- do -	77.7	2.87	1.27	1.27	8.30	0.35	11.78	11.09
3.	Sangrur	Punjab	- do -	79.8	4.81	1.64	4.29	10.74	0.67	10.55	11.36
4.	Khanna	Punjab	NWPZ	79.2	3.18	1.06	3.39	7.62	0.84	10.48	11.03
5.	Sirsa	Haryana	- do -	77.8	3.15	1.03	5.45	9.63	1.47	9.39	11.47
6.	Karnal	- do -	- do -	78.3	3.04	0.50	2.65	6.20	0.49	12.19	11.27
7.	Kanpur	U.P.	NEPZ	79.2	0.55	1.67	7.66	9.89	0.89	13.14	11.04
8.	Pusa	Bihar	- do -	76.8	1.97	0.92	4.01	6.90	0.06	9.35	11.38
9.	Ujjain	U.P.	C.Z.	82.7	0.26	0.93	2.13	3.32	0.18	8.94	11.58
10.	Dhar	M.P.	- do -	81.9	0.94	1.71	2.76	5.40	0.75	10.19	11.33
11.	Kota	Rajas-than	- do -	80.0	2.09	2.64	2.53	7.24	0.47	8.86	11.59
12.	Jobener	- do -	- do -	81.7	3.54	0.22	4.63	8.38	0.31	9.86	11.14
13.	Junagadh	Gujarat	- do -	82.5	1.42	0.73	2.79	4.94	0.05	11.23	12.31
14.	Mehsana	- do -	- do -	81.7	0.63	0.58	6.99	8.19	0.20	10.21	12.19
15.	Sangli	Maha-rashtra	PZ	81.2	1.46	0.63	3.84	5.93	0.23	10.69	12.07
16.	Niphad	- do -	PZ	80.2	1.15	1.35	3.22	5.71	0.14	10.70	12.58

SOURCE : **Quality of Indian Wheat, Page No.91- 92.**

3.4 Adulterants and Toxins :

Sources of contamination are soil, water, manure, equipments, transport vehicles and storage conditions. Proper aerations and preventive care should be taken to minimize the contamination.

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Table No.6

Adulterants in Wheat and their effect on health

Sl.No.	Adulterants	Health effects
1.	**Admixtures :** Sand, Stones, Mud, Grit excess bran.	Adverse abrasive effect in digestive canal / tract
2.	**Chemicals :** Heavy metal residues like Mercury, Copper, Tin, Zinc etc. and pesticide residues (beyond safe limit)	Causes Liver damage and carcinogenic metal poisoning, paralysis.
3.	**Fungal Diseases :** Toxins from Salmonella, Fusarium, Aspergillus Hill bunt (Tilletia foetida), Karnal bunt (Neovassia India), Stem rust (Puccinia graminis), Loose smut (Ustilago tritici)	Vomiting, diarrhea, paralysis, muscular weakness, damage to liver, kidney and brain, leading to death.
4.	**Viral :** Machupo virus; due to rodent's urine	Botivian hemmorrha gic fever.
5.	**Natural contamination**	Disorder in body organs.

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Some Simple Detection Tests for Wheat

Sl.No.	Adulterants	Detection Test
1.	Sand, stone, grit in grains	By visual examination, by using Grading Machines like drum grader etc.
2.	Hidden insect infestation in grains	Put some grains on impregnated Ninhydrin (1 per cent in alcohol) filter paper and fold the filter paper and crush the grains with hammer. A spot of bluish purple colour indicates presence of hidden insect infestation.

PFA had prescribed the tolerance limits (mg./1 kg. ppm) for pesticides residues and other substances. Some of these are given below.

1. **Pesticide Residue :** **Biterrtanol (0.05); Methyl chloro phenoxyacetic Acid (MCPA 0.05); Aldrin dieldrin (0.01); Malathion (4.0); Pyrethriuns (nil); Cypermethrin (0.05); Lindane or HCH (0.10); Ethion (0.025); Carbafuran (0.10); Carbazyl (1.5).**
2. **Toxic Substance :** **Agaric acid (100); Hydrocyanic acid (5); Hypericine (1); Saffrole (10).**
3. **Aflatoxin :** **(0.03)**
4. **Poisonous Metals :** **Methyl Mercury (0.25); Mercury (1.0); Lead (2.5); Arsenic (1.1); Zinc (50.0); Cadmium (1.5).**
5. **Microbiological Load :** **Moulds (10^4/gm); B.cereus (10^5/gm); C.perfringens (10^4/gm);**

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Codex had also prescribed maximum pesticides residue in respect of wheat some are Carbaryl (5 mg/kg.), 2040D (0.5), Eltephon (1)

A number of pesticides are banned / restricted in the west but are in use in agriculture in our country. Some of these are – BHC; Carbofuron; Parquet; Monocrotophos; Methyl parathion; Dimethoate etc.

World Health Organization (WHO) classified Monocrotophos as highly hazardous and E.P.A. considers it highly toxic organophosphate 38 pesticide products have been banned for use in agriculture by Government.

Other functionaries and Indian producers should be careful in selection and use of chemicals for crop/produce protection so that it is acceptable in international market.

Toxins :

Aflatoxin : Aflatoxin are the type of mycotoxins, which occur due to fungi. These are produced by Aspergillus flavour, Aspergillus ochnaceus and Aspergillus parasiticus. The contamination of Aflatoxins occurs at any stage from field to storage, when the condition is conducive for fungus growth.

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Prevention and Control of Aflatoxins :

- **Wheat should be stored at safe place away from moisture.**
- **Prevent the growth of fungi by proper drying of grains.**
- **Use proper and scientific storage method.**
- **Prevent insect infestation and fungus contamination by adopting prophylactic / curative chemical treatment.**
- **Infested grain should be separated.**

3.5. Packaging :

Packaging of food is the vital step to ensure longer shelf life and preservation of quality of the product and provide protection against deterioration and damage during transport and storage. Packaging is closely related to labeling and branding. Now-a-days consumer prefers the product in unit packages. The manifold importance of packed food products lies in availability of the wholesome, cleaned, unadulterated food items. More care is required in packaging of wheat for export. In present age of consumerism, the package is not only the protector of the contents but also attracts the consumer. Different trials have shown that wheat variety **HD-2329** and **HD-2285** treated with carboxin or captan respectively remained above Indian minimum seed certification standard **(1 MSCS)** upto 20 months and 15 months, whereas untreated ones become below 1 MSCS in 9 months. Polylined cloth bag and fungicide dressings enhance grain longevity. For good packaging, the packages must posses following qualities.

- **It must protect wheat in good condition and long lasting.**

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- **It must be clean and convenient to handle and carry out from the store easily.**
- **It must be identifiable and attract consumers.**
- **It must resist spoiling.**
- **It must be informative about wheat i.e. name and address of the packer, pack size, quality / grade, quantity, variety and date of packing etc.**

Method of Packing

- **The graded wheat should be packed in new, clean, sound and dry jute bags, cloth bags, poly woven bag, polypropylene high molecular, high density polyethylene or food grade packaging materials.**
- **The packages should be free from insect infestation, fungus contamination and obnoxious smell.**
- **Each package should be securely closed.**
- **Each package should contain wheat of one grade only.**
- **The wheat should be packed in standard pack size as specified under the provisions of Standards of Weights and Measures (packages commodities) Rules, 1977 as amended from time to time.**

Packaging Material

Recently, a policy decision has been taken by the Government of India to increase the obligatory minimum use of jute bags from 60 per cent for food grains, under the provision of Jute Packaging Materials (compulsory use in Packing Commodities) Act, 1987. Now, Govt. of India has made it obligatory to pack entire food grains in jute bags only. The consumer packing of cleaned wheat in 15 kgs. by retailers and super markets has also been made mandatory in jute bags. (Economic Times, 19.10.2004)

The following packaging material is used :

- **Jute bags**
- **HDPE / pp bags**
- **Polythene impregnated jute bags**
- **Cloth bags.**

3.6 Transportation :

In the distribution of wheat, the means and cost of transport play an important role. The cost of transport is the major factor responsible for the wide differences, which exist between prices in surplus and deficit areas.

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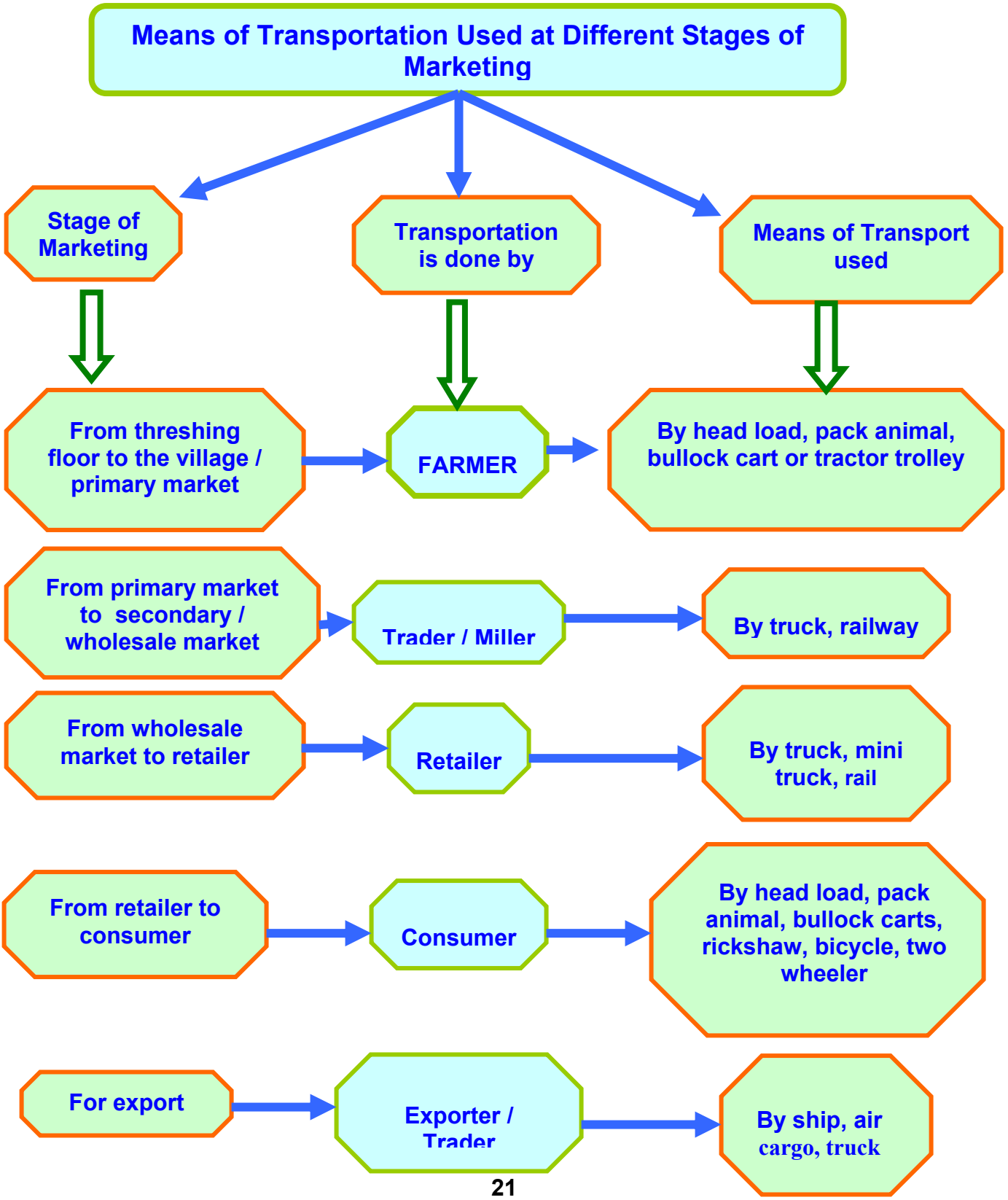
The wheat is transported in bulk and bags from field to market. The following means of transportation are used at different stages of marketing.



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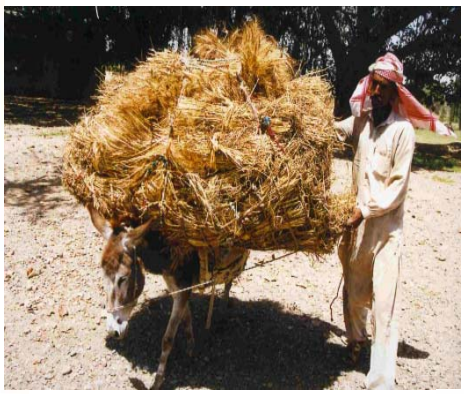
The road and rail transport is generally used for internal markets, whereas for export purpose – waterways are generally used. However, roadways is also used for transport to neighbouring countries connected by road.

The following means of transport are employed in different parts of the country to transport wheat.

a) Head Load

Animal Load



b) Bullock carts

c) Tractor trolley

d) Truck

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(Truck)

Railways : This is most important and cheapest mode of transport for wheat. It is suitable for long distance and for larger quantity. It needs more handling charges as it requires loading and unloading and local transport cost.

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Water / Sea transport : This is one of the oldest and cheapest modes of transport near or on the bank of river, canals or costal areas. This transport is a little bilt slow but cheap and useful for carrying large quantity. Export of wheat is done mostly by ship through sea.

The following points should be considered for selection of mode of transport.

- **It shall be cheaper amongst available alternatives.**
- **It shall protect wheat from adverse weather condition.**
- **It shall be insured.**
- **The delivery shall be made in time to the consignee.**
- **It shall be producer friendly for the payment of transportation.**

3.7 Storage:

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Wheat is main staple food for majority population, hence stored from one season to the other. The shrinkage of cultivable land compounded by exponential growth in population compels to evolve better storage facilities so as to reduce the losses to the minimum. Further, storage facilitates better price realization (+ 25 per cent) by extending marketing duration.

Table No.7

Factors Influencing Storage Loss

Sl.No.	Factors
1.	2.
1.	Moisture
2.	Temperature
3.	Insects, rodents
4.	Quality before storing the grain
5.	Types of bin, storage containers,
6.	Sanitation
7.	Use of pesticide and fumigants

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1.	2.
8.	Type of damage before storing the grain like frass and webbing, exit holes, darkened kernels and degermed kernels.
9.	Mechanical factors.
10.	General condition, location of storage.

Harvested grains normally contain 20 per cent moisture content whereas for storage, around 12 per cent moisture is recommended. The drying is achieved by natural or mechanical resource. Moisture content more than 13 per cent at temperatures 30 to 40^0 C make wheat susceptible to moulds causing musty odour, discolouration and lower flour yield.

Equilibrium moisture content for wheat is 13.5 per cent at 70 per cent RH (relative humidity). For short duration, storage moisture content of desired is 13 to 14 per cent is tolerable, whereas for longer duration storage upto 5 years, it should be 11 to 12 per cent.

3.7.1 Major Stored Grain Pests and their Control Measures :

In India, farmers retain about 50 to 60 per cent of the grains for food, cattle feed and seed purposes. The farmers generally store their grain in simple grainaries constructed from locally available materials like paddy straw, split bamboo, reeds, mud and bricks. Because of favourable and conducive atmosphere, the breeding of insects, micro-organism and rodents causes heavy losses to the foodgrains quantitatively and qualitatively. It also damages seed viability and storage structures. Stored grains are lost or damaged by a number of causal agents viz.,

Birds : Birds proofing can be achieved by placing wire screens on openings like ventilators, windows and doors.

Rodents : Storage building can be made rodent proof by concrete floors and metal shields around wooden doors.

Insects : About 13 species of insects damage the stored wheat. 2 species of weevil, attack whole kernel. Rice weevil is dominant pest causing grain damage to the tune of 2-5 per cent. Whereas, beetles and larvae of moths attack grains or broken kernels.

Insect damaged grain.

Fungi : It causes maximum losses in stored grain. The humidity in grain or storage is conducive for fungal attack and makes the grain ***"Sick Wheat"***

Pests and fungal infestation can be controlled by – **(A) Prophylactic Measures and (B) Curative Treatments**

A) Prophylactic Measures – Preventive measures consist of cleanliness of grains and store houses and by treating the godowns @ 3 litres per square meter area by chemicals like:

> **Malathion (50 per cent EC) –** Mix 1litre malathion in 100 litres of water, spray it every 15 days.

> **DDVP (76 per cent EC) –** Mix one litre in 150 litres of water. Spray walls and floors, as and when required. Avoid spray on stocks.

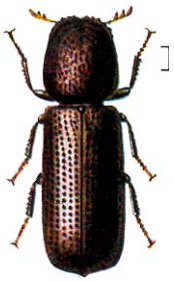
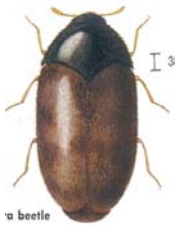
> **Deltamethrin (2.5/wp) –** Mix 1kg in 25 litres of water. Spray on walls and floor.

B) Curative Treatments – Use of chemicals in air tight condition on infested stocks.

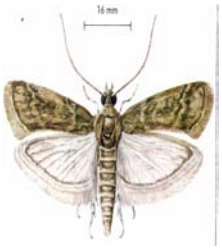
> **Alluminium phosphide –** Use 3 tablets per tonne or 120 – 140 tablets per 100 cubic meter area and cover the stocks with polythene for 7 days.

Table No.8

Important Wheat Pests, Damage Caused and Control Measures

Sl. No.	Name of pest	Figure of pest	Damage	Control measure
1.	2.	3.	4.	5.
1.	**Grain Weevil** *Sitophilus granarius (L.) (Calandra granaria (L.)*		Larvae and beetles feed on grains. Adults feed on flour, mass infestation makes grain moist and warm leading to mould infection.	**Malathion, DDVP, Deltamethrin, Fumigation with Phostoxin or Magtoxin**
2.	**Lesser rice Weevil /** *Sitophilus oryzea (L)/ Greater Rice Weevil S.Zeamais (Motsch)*		Adults and larvae feed on grains and flour. Larvae bore into grains and feed on the grain.	**- do -**
3.	**Lesser grain borer** *Rhizopertha dominica (Fabr.)*		Beetles and larvae bore the grains and feed. The larvae feed on flour. Heavy infestation makes the grain warm and moist, which leads to mould formation	**- do -**
4.	**Khapra beetle** *Trogoderma granarium Ev.*		The larva is a very serious stored product pest, the beetle does no damage. The grains are often hallowed out until only the husk remains.	**- do -**

1.	2.	3.	4.	5.
5.	Rust-red and confused flour beetle *Cryptolestes ferrugineus (Steph.) / Tribolium Confusum J.Du V.*		Beetles and larvae feed on undamaged and broken kernel, common mill pest, flour develops sharp odour if badly infested.	**Malathion, DDVP, Deltamethrin, Fumigation with Phostoxin or Magtoxin**
6.	Drugstore beetle *Stegobium paniceum (L.)*		The larva is omnivorous, feeds on a wide range of plant materials and grain. The badly infested grains are full of small round holes.	**- do -**
7.	Saw Toothed grain beetle *Oryzaephilus surinamensis (L.)*		Both beetle and larvae feed on broken grains and attack grains, already infested by other insects. It is a secondary pest together with other grain pests.	**- do -**
8.	Cadelle *Tenebroides mauritanicus (L.)*		It damages grains.	**- do -**
9.	Angoumois grain moth *Sitotroga cerealella (Oliv.)*		It attacks in field also, but mostly in storage, causing loss of weight upto 50 per cent. Badly infested grain has a sickening smell and taste that makes it unpalatable.	**- do -**
10.	Mediterranean Flour Moth *Ephestia (Anagasta) kuehniella Zell.*		The caterpillars feeds on flour, bran, whole grains.	**- do -**

1.	2.	3.	4.	5.
11.	**Warehouse Moth** *Ephestia elutella (Hubn.)*		The caterpillars attacks grain.	**Malathion, DDVP, Deltamethrin, Fumigation with Phostoxin or Magtoxin**
12.	**Indian Meal Moth** *Plodia interpunctella (Hubn.)*		Attacks grain and grain products, whereby only the grain germs are eaten.	**- do -**
13.	**Rodents** *Rattus norvegiens (Brown rat), R.Rattus Rattus (Black rat) , Bandicota bengalensis (Indian mole rat), Mus musculus (House mouse)*	 	Rodents feed on whole and broken grains, flour etc. They spoil more wheat than they eat by contaminating it with hair, urine and faeces.	**Rat Cage –** By using different types of cages. **Cakes/Baits** anti-coagulants, like zinc phosphide are mixed with bread or any other food used as bait. **Rat burrow fumigation –** Put aluminium phosphide tablets in each hole/ burrow and block the hole by mud to air tight.

3.7.2 Storage Structures :

In villages, foodgrains are stored in traditional structures of the different shape and size with capacity varying from 2 to 5 tonnes.

a) **Underground storage structures –** Underground storage is common in dry parts of Karnataka, Uttar Pradesh, Bihar, Madhya Pradesh, Maharashtra and Andhra Pradesh. The depletion of oxygen in the underground storage structures discourages infestation but seepage of moisture results in mould growth and grain damage by rodent is possible.

b) **Above ground storage –** This can be classified into indoor and outdoor storage structures. These are again classified as **a)** Traditional Storage Structures, which include, mud bin, bamboo-reed bin, the metal drum, gunny bags, petta **b)** Improved storage structures, which include improved bin, brick build godowns, cement plastered, bamboo bin, CAP (Cover and Plinth) storage and silos.

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Bags of 100 kg. capacity are used. The bags are susceptible to moisture, temperature, insect, rodent and microbial spoilage. The bags can be made moisture proof, partially resistant to temperature by giving a lining of polyethylene, painting both inside and out side, with paints to close the pores and also to reflect heat.

The petta and bamboo bins can be made impermeable to moisture by plastering both inside and outside with paper pulp mixed with 2 per cent methi (fenugreek). As per experiments conducted by FCI, such storages can save grains upto six years. Rodent proofing of the traditional structures is done by skirting them to height of 2 feet from ground with metal sheets or treated jute bags, which are brushed periodically or sprayed with a rat repellent like malathion. Bamboo cages, which are also coated with bitumen 10 to 20 and the cage is covered with cast in clay rings to make it moisture, insect and rodent resistant.

CFTRI in collaboration with Central Building Research Institute, Roorkee have experimented for improvement of clay bins, wherein they have suggested that before casting of the bins with the mud puddle, a bituminous mixture to be added @ 2 kgs. / cft. of dried soil. The bitumen was heated to 100^{o} C with creosote oil prior to mixing with clay material. Another findings was that the periphery of rings were coated with 10 to 2- bitumen to arrest moisture and rings were arranged one above the other on the basement and the junctions were sealed well with wet clay.

Metallic Storage Structures :

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The dehydro bin of GI metal of half tonnes capacity was fabricated with dome shaped cover with channel at the periphery to run down the collected water.

New Rural Storage Structures :

CFTRI multipurpose knock-down structures – Multipurpose knock down structures using GI sheet and wooden reaper frames was developed. The comparative ease of fabrication, transportation and erection of structures and its high degree efficiency in performance was established.

3.7.3 Storage Facilities :

i) **Producers Storage Facilities –** Wheat is stored in traditional as well as improved structures of different shapes and sizes of 2 to 5 tonnes for one year.

Code of Practices for Safe Storage of Grain at Farmers' Level

- ☞ **As far as possible, clean the grain prior to storage.**
- ☞ **Dry the grain either in the sun or by the dryer till the moisture is down to a safe limit. (12 to 14 per cent depending upon period of storage)**
- ☞ **Clean the storage structure and disinfect it before filling up the grain.**

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- **Fill the structure upto capacity carefully always from the top.**
- **Stir grain with large stick so that grain settles.**
- **Add recommended doses of pesticides into the grain before closing the cover of the structure.**
- **Close inlet and outlet covers immediately.**
- **Put mud or other binding materials as the case may be on cracks and crevices. This would not allow the weevils and pests to enter the grain or structure to cause damage.**
- **Area around the structure must be cleaned to discourage rats.**
- **Spilled grain around structure should be removed.**
- **Sweep out all debris, dust, grains etc. and disinfect the structure, after emptying.**
- **It is always desirable to consult the local agencies regarding use of chemicals and improved techniques for grain storage.**

ii) **Rural Godowns –** At rural level, farmers store the produce in their own houses and by using different structures. It is a known fact that the marginal and small farmers are not economically sound to retain their produce till the market prices are favourable for sale. Considering the importance of rural storage in marketing of agricultural produce, the **Directorate of Marketing and Inspection (DMI)**, an attached organization of Ministry of Agriculture, Government of India initiated a Rural Godown Scheme in collaboration with NABARD and NCDC to construct Rural Godowns.

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Gramin Bhandaran Yojna - The produce is stored by a scientific method so that the wastage and deterioration of grain are avoided. It helps the farmers to meet the credit requirement without being compelled to sell the produce at a time, when the prices are low.

The construction of 2373 godowns were sanctioned through NABARD and NCDC with the total capacity of 36.62 lakh tonnes upto 31.12.2002. In addition, 973 godowns with storage capacity of 0.956 lakh tonnes were sanctioned under renovation and expansion. The main objectives of the Rural Godown Scheme are as under :

- **To prevent distress sale of food grains and other agricultural produce immediately after harvest.**
- **To reduce quantitative and qualitative losses due to storing of food grains in substandard storage.**
- **To reduce pressure on transport system in the post harvest periods of peak supply.**
- **To help the farmers in getting pledge loans against their stored produce to meet immediate financial requirement.**

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Table No.9

Rural Godowns Capacity in M.T. in different States

Sl.No.	State	M.T.	Sl.No.	State	M.T.
1.	Chhatisgarh	206298	7.	Punjab	157600.0
2.	Gujarat	104312.98	8.	Rajasthan	32500
3.	Haryana	1083995	9.	Tamil Nadu	20618
4.	Karnataka	257993	1.	Uttar Pradesh	526902
5.	Kerala	11059	11.	West Bengal	131206.27
6.	Maharashtra	122136.2			

SOURCE : Sub-offices of DMI.

iii) **Mandi Godowns –** The farmers after harvest transport their produce to the mandis. It is transported in bulk or in bags, but mostly in bags. Most of the states and U.T. have enacted the Agricultural Produce Marketing Regulation Acts. The Agricultural Produce Market Committees have constructed their godowns in the market. In the same yard, private traders, CWC, SWC and Co-operatives Societies were also allowed to construct the godowns. At the time of storing the produce in the godown, a receipt is issued indicating the quality and weight of the produce stored. That receipt can be treated as negotiable instrument and eligible for pledge finance.

The State-wise Storage Capacity at Mandi Level is given in the table.

Table No. 10

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SL.NO.	STATE	M.T.	SL.NO.	STATE	M.T.
1.	Bihar	14300	7.	Maharashtra	4825
2.	Chattisgarh	41900	8.	Orissa	1840
3.	Gujarat	80000	9.	Punjab	21614000
4.	Haryana	129500	10.	Uttaranchal	39945
5.	Karnataka	14000	11.	Uttar Pradesh	10800
6.	Madhya Pradesh	29900	12.	West Bengal	28376

SOURCE : Sub-offices of Directorate.

iv) **FCI, CWC and SWC Warehouses :**

a) **Central Warehousing Corporation (CWC) –** Central Warehousing Corporation was established during 1957. It is the largest public warehousing operator in the country. The CWC is having 475 warehouses in 16 regions covering 225 districts of country (March, 2002). The total capacity under different heads is as follows:

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Table No. 11

Head	Capacity (Lakh M.Tonnes)
Constructed	58.89
Hired	17.33
Open	12.75
Total :	89.17

SOURCE : **Annual Report 2000 – 2001**
Central Warehousing Corporation, New Delhi.

As per the Ministry of Food, Govt. of India, the CWC constructed additional storage capacities of 3.59 **(2002-03)** and 3.11 lakh tonnes **(2003-04)**.

The godowns are used for storage of food grains, fertilizers, etc. 40.88 Lakh metric tonnes capacity was used for storage of foodgrains. The increase in capacity was by 5.26 Lakh tonnes, whereas the storage of food grains showed an increase of 6.84 Lakh tonnes over previous year (2001). Apart from storage, CWC also offers services in the area of clearing and forwarding, handling and transportation, distribution, disinfestations, fumigation and other ancillary activities. The CWC has also introduced scheme, called the Farmers Extension Services at selected centres to educate farmers about the benefits of scientific storage.

Table No. 12

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State-wise Storage Capacity with CWC as on 31.03.2003

Sl. No.	Name of State	Number	Total Capacity (in tonnes)
1.	Andhra Pradesh	49	1259450
2.	Assam	6	46934
3.	Bihar	13	104524
4.	Chhattisgarh	10	259964
5.	Delhi	11	135517
6.	Gujarat	30	515301
7.	Haryana	23	338860
8.	Karnataka	36	436893
9.	Kerala	7	93599
10.	Madhya Pradesh	31	665873
11.	Maharashtra	52	1248510
12.	Orissa	10	150906
13.	Punjab	31	820604
14.	Rajasthan	26	371013
15.	Tamil Nadu	27	676411
16.	Uttaranchal	7	73490
17.	Uttar Pradesh	50	1018821
18.	West Bengal	43	563698
	Others	13	136826
	Total	475	8917194

SOURCE : **Annual Report 2001 – 2002,**
Central Warehousing Corporation, New Delhi.

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b) **State Warehousing Corporation (SWC) –** Different states have set up their own warehouses. The area of operation of SWC is mostly at district places of the state. Central Warehousing Corporation holds 50 per cent share in the equity of 17 SWCs all over the country. The SWCs are under the dual control of Central Warehouse Corporation and concerned State Government. As on 31.12.2002, these SWCs were operating a network of 1597 warehouses with an aggregate capacity of 201.90 lakh M.T as per details given below :

Table No. 13

State-wise Storage Capacity with SWCs as on 31.12.2002

Sl. No.	Name of State	No.	Total Capacity (in Lakh tonnes)
1.	Andhra Pradesh	120	17.14
2.	Assam	44	2.67
3.	Bihar	44	2.29
4.	Chattisgarh	95	6.66
5.	Gujarat	50	1.43
6.	Haryana	113	20.48
7.	Karntaka	107	6.67
8.	Kerala	62	1.85
9.	Madhya Pradesh	219	11.57
10.	Maharashtra	157	10.32
11.	Meghalaya	5	0.11
12.	Orissa	52	2.30
13.	Punjab	115	72.03
14.	Rajasthan	87	7.04
15.	Tamil Nadu	67	6.34
16.	Uttar Pradesh	168	30.42
17.	West Bengal	32	2.58
	Total	95	201.90

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SOURCE : **Central Warehousing Corporation, New Delhi.**

SWCs constructed additional godowns and raised the capacity to 215.84 lakh tonnes in **2003-04** (Ministry of Food, Govt. of India)

c) In Punjab State the Punjab Agro-Food Grains Corporation **(PAFC)** (20.23), Punjab State Warehousing Corporation **(PSWC)** (38.28), Markfed (52.46), Pungrain (Foodsep-16.09), Puncap (32.00) jointly have storage facilities for 159.06 lakh tonnes, inclusive of open storage area.

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d) **Food Corporation of India (FCI) –** The storage capacity for foodgrains available with Food Corporation of India as on 31st March, 1999 was 23341.14 thousand tonnes (covered 19155.97 and open 4185.17 thousand tonnes). Out of this, 14133.31 thousand tonnes was its own, whereas 9207.83 thousand tonnes capacity storage was hired. As on 31.03.2002 the FCI was having godowns with the capacities of 279.01 lakh metric tonnes. The break-up was 127.41 owned and 151.60 lakh metric tonnes hired. The FCI also constructed additional storage facilities of 0.94 in 2002-03 and 1.32 lakh tonnes in **2003-04.**

v) Cooperatives Storage Facilities :

National Cooperative Development Corporation **(NCDC)** is constantly striving to assist cooperatives in creating additional storage capacities for expanded operations of marketing and distribution of inputs, sale of consumer articles. As on 31.03.2001, the storage capacity of cooperatives was 137.63 lakh tonnes. The cooperative storage is assisted by different schemes as given here under :

1. **Centrally Sponsored Schemes :** As on 31.03.2001, 15146 rural and 2584 marketing godowns with a capacity of 27.06 lakh tonnes were sanctioned to comparatively least / under developed states / U.Ts. An amount of Rs.4996.70 lakh was released for the purpose. The organization is also providing 70 per cent loan, 20 per cent subsidy for site preparation, hardware and system and application software the period of loan is 8 years. Assistance is provided for new, repair and maintenance of storage and cold storages.

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2. **NCDC Sponsored Scheme :** As on 31.03.2001, 41378 rural and 6989 marketing godowns with 113.12 lakh tonnes capacity were sanctioned to the states, which have developed cooperative system.

3. **Internationally Aided Projects :** NCDC is also involved in rural godown projects with the assistance of IDA and EEC. Such projects are being implemented in states of Madhya Pradesh, Rajasthan and Bihar. Under these projects, construction of 23,.800 rural godowns and 3441 marketing godowns were sanctioned. The total capacity envisaged was 73.0.73 lakh tonnes.

4. **European Economic Countries (EEC) Assisted Rural Growth Centre Project (Bihar) :** The project – EEC Rural Growth Centres in Bihar commenced in March, 1988 for a period of 8 years i.e. upto March 1996. During this period, assistance for construction of 1500 godowns of 100 Metric Tonnes each was approved at a total cost of Rs.3330.00 lakhs and an assistance of Rs.2832 lakhs sanctioned/ released to State Govt. of Bihar.

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Table No.14

State-wise Cooperative Storage Facilities as on 31.03.2001

Sl. No.	Name of State	Rural Level	Market Level	Total Capacity (in tonnes)
1.	Andhra Pradesh	4003	571	690470
2.	Assam	770	262	297900
3.	Bihar	2455	496	557600
4.	Gujarat	1815	401	372100
5.	Haryana	1454	376	693960
6.	Himachal Pradesh	1634	203	202050
7.	Karnataka	4828	921	941660
8.	Kerala	1943	131	319585
9.	Madhya Pradesh	5166	878	1106060
10.	Maharashtra	3852	1488	1950920
11.	Orissa	1951	595	486780
12.	Punjab	3884	830	1986690
13.	Rajasthan	4308	378	496120
14.	Tamil Nadu	4757	409	956578
15.	Uttar Pradesh	9244	762	1913450
16.	West Bengal	2791	469	478560
17.	Other States	1031	256	312980
	Total	55889	9426	13763463

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SOURCE : Annual Report, 2000-2001,
National Cooperative Development Corporation, New Delhi.

3.7.4 Pledge Finance System :

Micro level studies indicate that about 54 per cent of marketable surplus was generated by small and marginal farmers. Non-availability of adequate storage facilities coupled with immediate need of money compel the farmers to sell the surplus wheat immediately after harvest. Pledge finance is crucial as it enables producer to hold an inventory of graded produce under favourable storage conditions without selling it during the glut period.

According to NABARD, the pledge financing is to the tune of about Rs.1200 crores at present, whereas estimated requirement is Rs.7000 crores by the end of Xth Five Year Plan. At present, Commercial and Co-operative Banks are providing limited credit for marketing of crops as their emphasis is on providing credit for crop production. As per Reserve Bank of India guidelines, the finance against pledge / hypothecation should be provided to the extent of 75 per cent of the value of stored produce, subject to maximum limit of Rs. 1 lakh. The credit is

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provided for a period not exceeding six months with some stipulated terms and conditions. However, there is no bar for extending pledge finance for a period of 12 months. There is no margin for credit upto Rs.10,000/-, whereas the margins are decided by the individual banks in case advance is above Rs.10,000/-

In some states, District Central Co-operative Banks **(DCCBs)** are directly financing individual farmers on the basis of pledge. In states like – Andhra Pradesh, Tamil Nadu, Bihar, Uttar Pradesh, Rajasthan and Haryana, the scheme of pledge finance is being operated by the Market Committees (APMCs). The pledge finance scheme for agricultural produce provided by the Agricultural Produce Market Committees in different states is given in Table No.15.

Benefits of the Pledge Finance

- ★ **Prevent distress sale by producers.**
- ★ **Promotes cleaning, drying and grading at farm gate.**
- ★ **Promotes proper storage facilities.**
- ★ **Facilities better price realization by farmers.**
- ★ **Avoids glut conditions in market.**

Table No.15

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Pledge Finance of Agricultural Produce – Grant of Advance by the Market Committees in different States / U.T(s)

Sl.No.	Name of the State/Union Territory	Details of Pledge finance advance to Producers
1.	2.	3.
1.	Andhra Pradesh	A Scheme under Andhra Pradesh (Agril.Produce & Live Stock) Markets Act, 1966 provides advances against pledge to the producers. The advance is given to the extent of 75 per cent of the value of the produce pledged with the Market Committee subject to maximum limit of Rs.10,000/-. The pledge stocks may be sold within 90 days. The advance is free of interest for the first 30 days. Interest @ 6 per cent per annum shall be charged from the 31st day till the date of disposal. The market committee shall not charge any godown rent for the first 7 days. From the 8th day, the charges shall be as prescribed in bvye-laws subject to a maximum of 90 days.
2.	Tamil Nadu	The scheme for providing short term advance to small farmers, marginal farmers and other farmers against Pledge of Agricultural Produce is being implemented in the State. For small and marginal farmers, the loan amount may be 75 per cent of the produce value subject to a maximum of Rs.10,000/- and for "other farmers", the loan amount may be 50 per cent of the produce value, subject to the maximum ceiling of Rs.10,000/-. The advantage is provided for a maximum period of 6 months – First

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1.	2.	3.
2.	Tamil Nadu	month shall be interest free and for the remaining 5 months, simple interest at the rate of 12 per cent per annum shall be charged uniformly. The amount ear-marked to short term advance to each Rural Godown is Rs.5,00,000/- (Rupees Five Lakhs only)
3.	Uttar Pradesh	A scheme of pledge-finance is being operated through Market Committees. According to the scheme, advance is given to the extent of 75 per cent of the value of the produce pledged with the market committee subject to maximum limit of Rs.5000/- and Rs.2500/- to small and marginal farmers respectively. The advance shall be free of interest for the first 30 days. Interest 6 per cent per annum shall be charged from 31st day till the date of disposal. The Market Committee shall not charge any godown rent for the first 7 days. From the 8th day, the charges shall be 10 paise per bag per month or part thereof. The pledged stocks may be sold in 90 days.
4.	Karnataka	The Government of Karnataka has made a new provision in K.A.P.M. R Act, 1966 to- Provide short-term advances as may be prescribed to producer-sellers in the market area on pledge of notified agricultural produce in favour of the market committee. The above provision came into force on 17.06.1986. However, the scheme for granting and regulating advances is not yet in operation, for want of separate Rules. The scheme of providing transport facility is in operation in the Karnataka State. Only transportation charges are being collected from producers on no profit no loss basis by the Market Committee in providing transport facility.
5.	Bihar	The scheme for providing short term advance to small and marginal farmers against pledge of Agricultural Produce in Insured Godown of the Market Committee is being implemented in the State. Market Committees give short term advances through State Bank of India at 60 per cent of the value of the produce stored upto a maximum of Rs.5000 per individual. The advance is provided for a period of 180 days. Interest @ 13.5 per cent shall be charged. The market committee reserves the right to sell the pledged produce after 180 days through open auction.
6.	Rajasthan	The advance to the extent of 60 per cent of the value of the produce pledged with the Krishi Upaj Mandi Samities may be paid subject to a maximum limit of Rs.15000/-. The advance shall attract concessional rate of interest of 9 per cent for the first 60 days and 12 per cent for the next 90 days. Maximum duration of storage allowable under pledge scheme will be of 150 days (5 months). The pledger will be liable to pay the warehousing charges for the period his goods are stored in the godowns. The Krishi Upaj Mandi Samities will have the right to sell the produce after five months from the date of storage of the stocks and thereafter through open auction. The Government of Rajasthan also operate schemes for *'Pay-back'*, fee collection to small and marginal farmers and for free transport facility to small and marginal farmers for agricultural produce.

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1.	2.	3.
7.	Haryana	The Scheme regarding pledge of agril. produce is being implemented by Haryana Government through Central Bank of India and Punjab National Bank. The Government is also thinking to associate the Cooperative Banks for granting advances to the farmers against Warehouse receipts of Haryana Warehousing Corporation. The Haryana State Agril.Marketing Board is not directly participating in the scheme.
8.	Punjab	As regards schemes for granting loan, to the farmers against their produce, the matter has been linked up with the mechanization of mandi operations. The scheme for partial mechanization of mandi operation is in vogue in 8 mandies on pilot project basis. Its extension alongwith provision of storage facility and grant of loans against such storage will depend upon successful operation of mechanization programme.

4.0 MARKETING PRACTICES AND CONSTRAINSTS :

The wheat is notified commodity and most of the sales by farmers are conducted in various regulated markets. However, under Market Intervention Scheme **(MIS)**, Food Corporation of India and other organizations procure wheat directly from producers at their collection centres. The wheat procured in major producing states during the years is given here under.

Table No. 16

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Procurement of Wheat in Major Producing States

(Lakh tonnes)

Sl. No.	State	1991 - 1992	1995 - 1996	1999 - 2000	2000 - 2001	2001 - 2002	2002 - 2003
1.	Punjab	55.43	72.99	78.31	94.24	105.60	98.63
2.	Uttar Pradesh	3.68	13.02	12.61	15.45	24.46	21.11
3.	Haryana	18.34	31.02	38.70	44.98	64.07	58.88
4.	Rajasthan	0.08	4.54	6.37	5.39	6.76	4.61
5.	Others	0.00	1.70	5.44	3.50	5.41	7.02
	All India	77.53	123.27	141.43	163.56	206.30	190.25

SOURCE : **Deptt. Of Agriculture and Cooperation, Ministry of Agriculture, Govt.of India.**

The stock of wheat possessed by central and state agency was 12.69 million tonnes on 1st January, 2004. The maximum wheat storage was 32.41 million tonnes in the year 2002.

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4.1 Important Markets :

Since wheat is an important food item, its transactions take place in most of the markets of country. Important wheat markets are listed in the following table;

Table No. 17

Important Markets of Wheat in India

Sl. No.	State	Number	Name of markets
1.	Bihar	13	Patna City, Bihta, Ara, Buxar, Goplaganj, Mothihari, chalia, Chhapra, Maharajganj, Nirmati, Tribeniganj, Munger, Raxaul.
2.	Chattisgarh	20	Ambikapur, Vaikunthpur, Raipur, Durg, Bilaspur, Kanker, Surajpur, Dogragadh, Rajnandgaon, Sarguja, Koriya.
3.	Uttar Pradesh	16	Puwayan, Etah, Barreilly, Shahjahnapur, Hardoi, Bulandshahar, Pilibhit, Varanasi, Gorakhpur, Kanpur, Agra.
4.	Haryana	19	Ambala, Panchkula, Yamunanagar, Karnal, Panipat.
5.	Karnataka	58	Bangalore, Belgaum, Bijapur, Dharwad, Gadag.
6.	Punjab	144	Ajnala, Amritsar, Bhikiwind, Khanna,
7.	Madhya Pradesh	5	Ujjain, Guna, Gwalior, Sehore, Sagar
8.	Maharashtra	20	Pune, Kalyan, Solapur, Ulhasnagar, Dhule, Kolhapur, Nagpur, Nadurbar, Ahmednagar,
9.	Gujarat	33	Ider, Kapadganj, Nadiad, Modasa, Himatnagar, Barala, Palanpur, Dhanera, Mehsana
10.	Meghalaya	1	Phulbari
11.	Rajasthan	11	Kota, Alwar, Jaipur, Sriganganagar, Dausa, Hanumangarh, Sikar, Baran, Bundi, Bharatpur.
12.	Uttaranchal	12	Kashipur, Kiccha, Khaima, Sitarganj, Gadarpur
13.	West Bengal	68	Jhant Pakari, Simlapal, Katulpur, Bishnupur, Ahmednagar, Belapur, Dubrajpur
14.	Delhi (NCT)	2	Narela, Nazafgarh.
	All India	444	

SOURCE : **Important Markets of Major Agricultural Commodities in India. (MRPC Report No.32, 2000 of DMI).**

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In the North-East Region wheat is transacted in 9 markets of Arunachal Pradesh, 7 markets of Assam, 8 markets of Manipur and 14 markets of Tripura. Most of the transactions of wheat take place in 3 markets of Goa.

4.1.1 Arrivals in Major Wheat Producing States :

Haryana , Uttar Pradesh and Bihar are the major states for wheat arrivals followed by Madhya Pradesh and Punjab. It is evident from the following table that there were vast fluctuations in quantity of arrivals during 1999-2000 to 2001-2002, as may be seen in the following table.

Table No. 18

Arrivals of Wheat in Markets of Major Producing States During 1999 to 2002

(Qty. in qtls.)

Sl.No.	Name of the State	Y E A R		
		1999 – 2000	2000 – 2001	2001 – 2002
1.	Haryana	3947470	4593091	7574231
2.	Uttar Pradesh	1556179	1789734	1810198
3.	Bihar	1237230	1451383	1081550
4.	Madhya Pradesh	1164824	1377355	9061322
5.	Punjab	793000	9698000	10579000
6	Rajasthan	789329	1037531	923467
7.	Uttaranchal	308629	282312	320866
8.	Maharashtra	283393	194678	N.A
9.	Karnataka	16488	33743	54569
10.	Jharkhand	21919	20596	10969
11.	Delhi	160390	315260	86330

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SOURCE : Director General of Commercial Intelligence and Statistics (DGCIS), Kolkata

The markets arrivals in some of major markets have been depicted in the following table.

Table No. 19

Market Arrivals in Selected Major Markets of some of the States

Sl. No.	State	Markets		Year (Arrivals)		
				1999 – 2000	2000 – 2001	2001 – 2002
1.	2.	3.		4.	5.	6.
1.	Haryana	1.	Ambala	105624	141942	1566458
		2.	Sirsa	627692	742938	829830
		3.	Karnal	427371	536989	688674
		4.	Kaithal	420668	571533	667998

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1.	2.	3.		4.	5.	6.
2.	Uttar Pradesh	1.	Varanasi	420079	354600	353094
		2.	Sahajahanpur	152612	198239	197548
		3.	Gorakhpur	197839	158968	176001
		4.	Powayan	152139	186181	173986
3.	Bihar	1.	Sasaram	10091	15250	14110
		2.	Hilsa	18100	19000	9426
		3.	Muzaffarpur	56455	48457	27701
		4.	Gulabbagh	8757	35526	36130
4.	Madhya Pradesh	1.	Itarsi	39412	98871	100773
		2.	Harda	20998	75576	64694
		3.	Indore	84827	101207	59244
		4.	Tikamgarh	36679	63485	58685
5.	Punjab	1.	Sangrur	1037000	1208000	137000
		2.	Ferozpur	1198000	1240000	1291000
		3.	Amritsar	830000	1030000	1184000
		4.	Ludhiana	598000	741000	886000
6.	Rajasthan	1.	Hanumangarh	133310	164353	151477
		2.	Kota	174766	252742	233305
		3.	Bundi	63042	87073	99323
		4.	Sriganganagar	92879	112738	80399
7.	Delhi	1.	APMC Najafgarh	8979	15485	8141
		2.	APMC Narela	7861	15930	152
		3.	Panadara	NA	111	340
8.	Uttaranchal	1.	Kashipur	83516	79665	75210
		2.	Kichha	47347	27015	46270
		3.	Khatima	38256	32877	41256
		4.	Sitarganj	36039	35993	36432
9.	Maharashtra	1.	Pune	81508	77296	-
		2.	Sholapur	37094	25531	-
		3.	Jalna	11807	18525	-
10.	Karnataka	1.	Bangalore	-	10967	34699
		2.	Naragund	864	5281	6740
11.	Orissa	1.	Dunguripali	9866	10159	15315
		2.	Panposh	7652	7132	8256
12.	West Bengal	1.	Samsi	700	800	900
		2.	Lalbagh	600	400	700

SOURCE : (DGCIS), Kolkata

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In Uttar Pradesh, there were 232 daily regular sale centres and 27 weekly centres. 6 each secondary and primary markets. Karnataka state had 7 markets for wheat, except Bangalore (Urban), which is a terminal market. Others were primary regulated markets. In Kerala and Goa, there were no regulated markets for wheat. In Assam, wheat was transacted in 48 markets.

4.1.2 Despatches :

Most of the markets were not maintaining the record of despatches of wheat destination-wise. In most of the states, the despatches were mostly to other markets of district or neighbouring. Detailed interstate despatches are given in Table No. 21.

Wheat from surplus states like Haryana, Punjab and Uttar Pradesh was despatched to other states. Few markets like Powayan, Shahjahanpur, Bareilly, Pilibhit and Kanpur of Uttar Pradesh despatched the wheat to Assam, West Bengal, Bihar, Delhi and Gujarat States. West Bengal though received wheat from Uttar Pradesh and Gujarat, it caters to the need of North Eastern Region **(NER)**. In Assam, out of total 48 markets, which received wheat, 35 markets despatched the wheat to intra-state and inter-state markets of North Eastern Region.

Inter-state despatches from major wheat producing states is given below.

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Table No.20

Despatches of Wheat from One State to other States

Sl.No.	Feeder State	Receiving States
1.	Punjab	Andhra Pradesh, Bihar, Delhi, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Rajasthan, Tamil Nadu, West Bengal.
2.	Haryana	
3.	Uttar Pradesh	Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, West Bengal, North Eastern Region.
4.	West Bengal	Bihar, Gujarat, Orissa, Uttar Pradesh, Punjab, Delhi, North Eastern Region.
5.	Delhi	Andhra Pradesh, Karnataka, Gujarat, Kerala, Maharashtra, Orissa, Tamil Nadu, North Eastern Region.
6.	Madhya Pradesh	Andhra Pradesh, Bihar, Kerala, Tamil Nadu, Delhi.

SOURCE : **(DGCIS), Kolkata**

4.2 Distribution :

Producers bring the produce to assembling markets. Further distribution of wheat is handled by others until it reaches to the end users. The marketed surplus of wheat, which has been estimated to about 40 to 50 per cent of production, was sold by the producers through different channels as indicated under–

1.	Village Traders	4.	Commission Agents	7.	Procurement Agencies
2.	Itinerant Traders	5.	Flour Millers	8.	Retailer
3.	Wholesalers	6.	Cooperative Agencies	9.	Exporter

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4.2.1 Inter-state Movement :

Punjab (3,44,71,640 M.T.), Haryana (1,89,56,510 M.T) and Uttar Pradesh (70,34,200 M.T) were first three major inter-state trading states of wheat. These states catered to the need of nearly all states. Though Bihar, Madhya Pradesh and Rajasthan were also major producers. However, inter-state movements from these states were not substantial. Wheat from Bihar was despatched to Andhra Pradesh and West Bengal and other neighbouring states. Rajasthan (83,20,139 M.T) ranked the list of purchasers followed by Gujarat (83,20,139 M.T) and West Bengal. However, wheat was despatched from Rajasthan to Andhra Pradesh, Tamil Nadu and West Bengal. Uttar Pradesh despatched wheat to Assam, West Bengal and Bihar from Powayan, Bareilly and Pilibhit markets, whereas Kanpur market dispatched wheat to Delhi and Gujarat state.

Jalna and Dhule markets of Maharashtra despatched wheat to Gujarat, Madhya Pradesh and West Bengal to the tune of 50 – 60 per cent of the arrivals. Karnataka also dispatched wheat to Tamil Nadu, Andhra Pradesh and Kerala from Bangalore (Urban), Gadag and Nargund markets. State-wise despatches are given in Table No.22.

MOVEMENT OF WHEAT FROM UTTAR PRADESH TO OTHER STATES DURING 2000 – 2001

Qty in 000' tonnes

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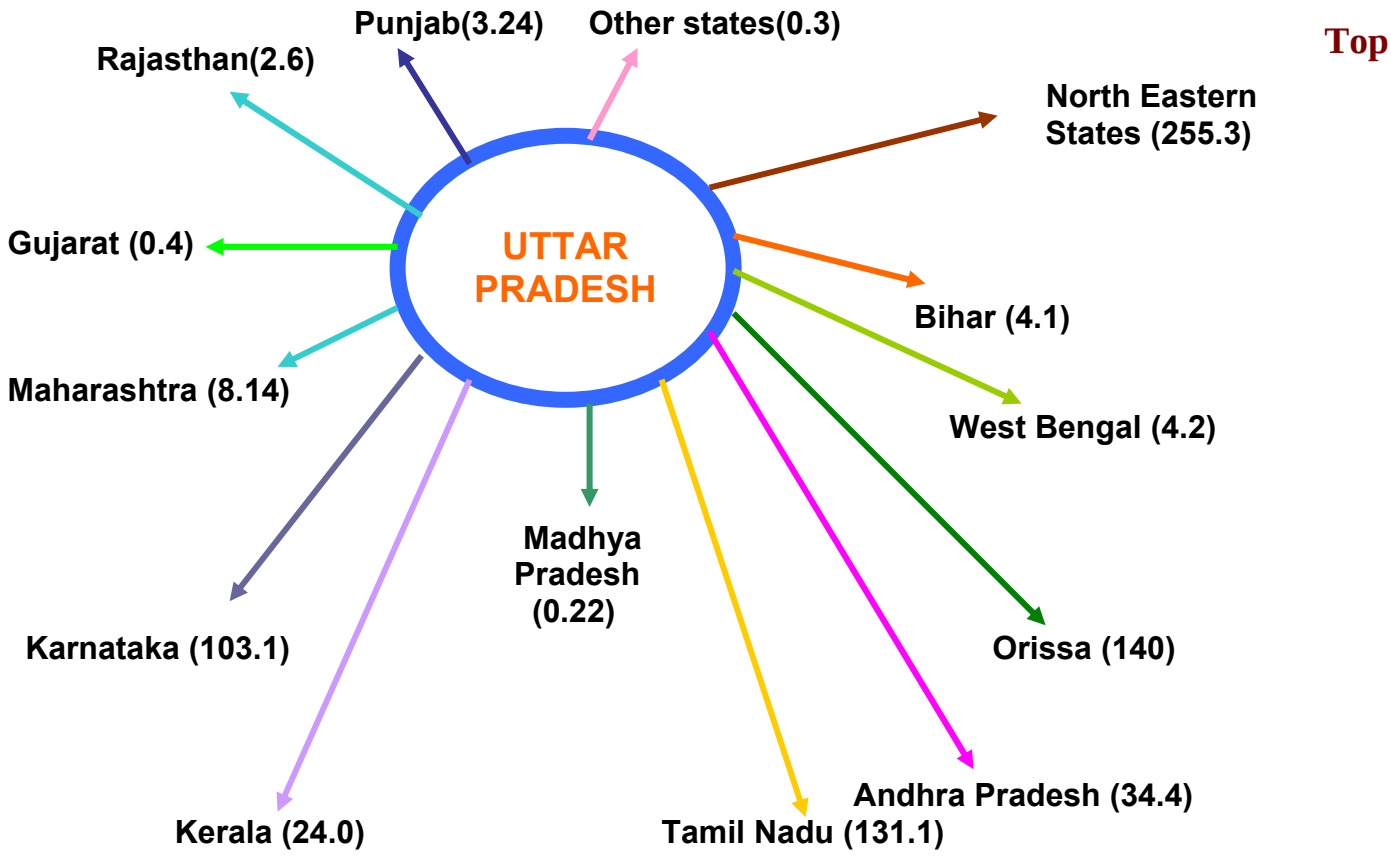

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Table No. 21

Interstate Movement of Wheat During 2000 – 2001

(Quantity in 000' tonnes)

Sl. No.	Exported from ⇨ ⇩ To	A.P.	Bihar	Chan-digarh	Delhi	Har-yana	Karna-taka	M.P	Punjab	Rajas-than	Tamil Nadu	U.P.	West Bengal
1.	A.P.	78.1	10.0	-	1.20	16.1	19.0	0.23	67.1	3.2	-	34.4	-
2.	Bihar	-	-	-	-	235.0	-	0.1	422.2	-	-	4.1	4.1
3.	Delhi	-	-	-	-	73.4	-	-	45.1	2.7	-	-	-
4.	Gujarat	-	-	-	0.33	231.0	-	-	596.0	0.5	-	0.4	4.32
5.	Haryana	-	-	-	-	-	-	-	7.0	-	-	-	-
6.	Karnataka	7.1	-	2.41	40.1	80.0	-	-	200.4	2.20	5.0	103.1	-
7.	Kerala	-	-	-	140.2	22.14	0.3	0.03	37.0	2.0	7.0	24.0	-
8.	M.P.	0.3	-	0.21	-	99.3	-	-	220.0	2.0	-	0.22	-
9.	M.S.	-	-	5.1	5.1	231.1	-	-	656.0	1.40	-	8.14	-
10.	Orissa	11.3	-	-	4.25	35.15	-	-	40.0	-	-	140.0	4.0
11.	Punjab	-	-	-	0.10	9.04	-	-	-	-	-	3.24	-
12.	Rajasthan	5.22	-	-	0.41	381.0	-	-	446.4	-	-	2.60	-
13.	Tamil Nadu	7.42	-	-	209.1	46.0	-	0.05	139.1	53.14	76.1	131.1	-
14.	U. P.	-	-	-	2.34	52.0	2.22	-	140.4	1.9	-	-	2.0
15.	W.B.	-	24.2	-	-	341.1	-	-	299.1	2.4	-	4.2	122.0
16.	N.E.R.	-	-	-	18.14	32.20	-	-	72.4	-	-	255.3	28.02
17.	Others	-	-	-	-	14.1	-	-	61.1	0.60	2.10	10.03	-
	TOTAL	109.4	34.2	7.72	428.2	1898.6	20.5	0.41	3449.3	71.14	90.2	711.1	164.4

SOURCE : DGCIS, Kolkata

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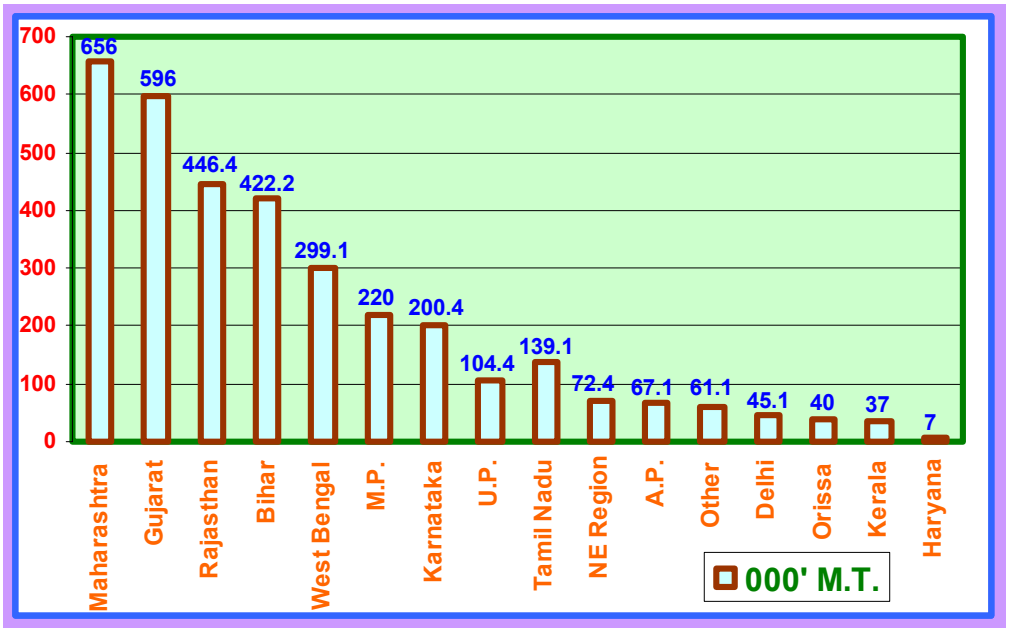
MOVEMENT OF WHEAT FROM PUNJAB TO OTHER STATES DURING 2000 – 2001



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MOVEMENT OF WHEAT FROM HARYANA TO OTHER STATES DURING 2000-2001

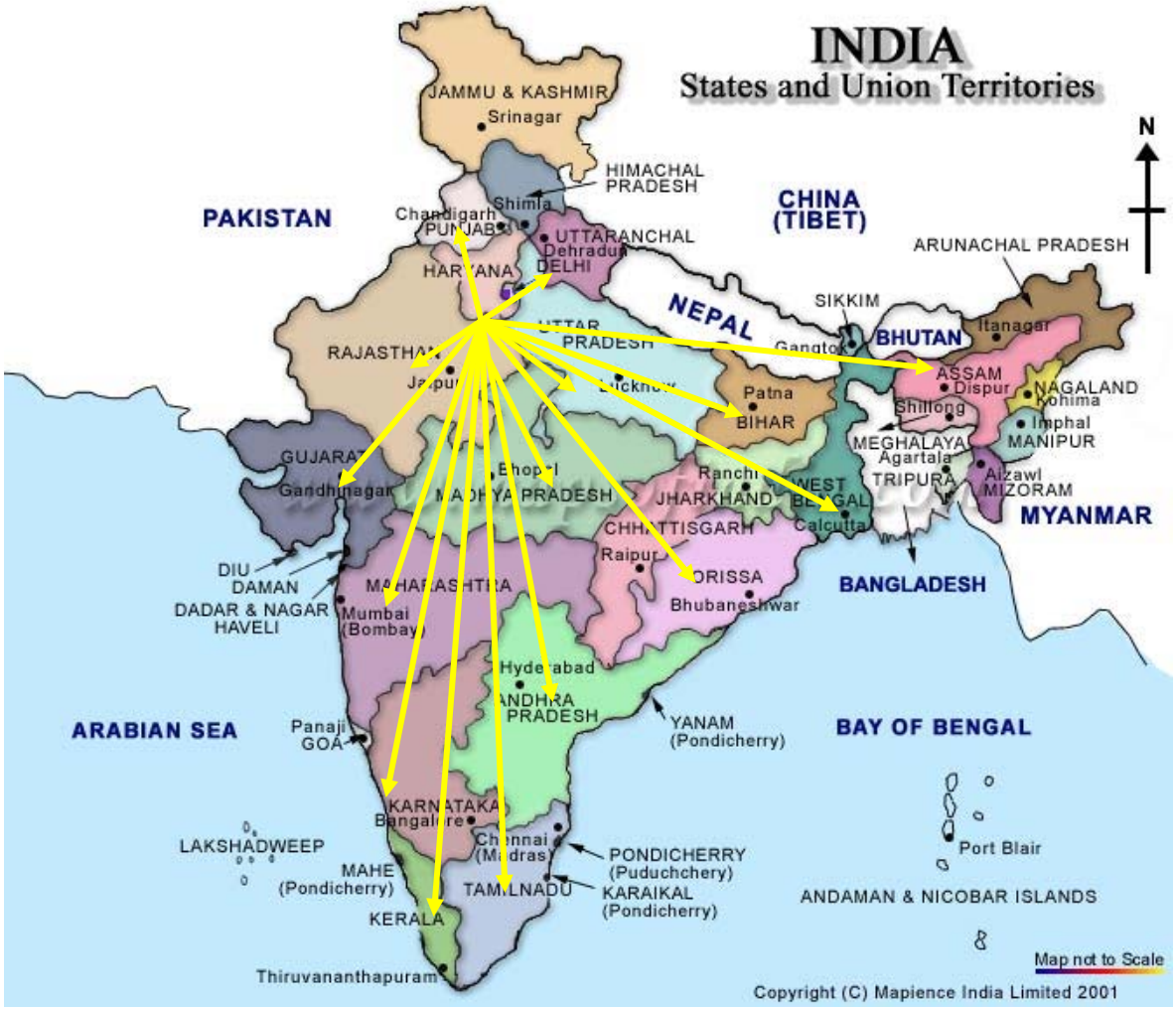

Table No.22

Interstate Movement of Wheat from Haryana

Qty.in 000 tonnes

Rajasthan	381.0	Uttar Pradesh	52.0
West Bengal	341.1	Tamil Nadu	46.0
Bihar	235.0	Orissa	35.15
Maharashtra	231.1	North Eastern Region	32.2
Gujarat	231.0	Kerala	22.14
Madhya Pradesh	99.3	Andhra Pradesh	16.1
Karnataka	80.0	Others	14.1
Delhi	73.4	Punjab	9.04

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4.3 Export and Import :

Import : India imported food grains to the tune of 19.70 and 14.15 lakhs tonnes during 1997-1998 and 1998-1999 respectively. Food Corporation of India (FCI), was the handling agency for import, storage and distribution. **In the year 1998-1999, 50 per cent custom duty was imposed on wheat import, resulting into decline of import. Only 1.35 M.T. wheat valued at Rs.0.84 lakhs was imported during 2001-2002.**

Export : The global wheat trade was more than 100 million tonnes. Till 1990, there was paucity of wheat and domestic prices (Rs.2860 per tonne) were higher as compared to international prices (Rs.2391 per tonne 1990-1991). However, India emerged as formidable exporter due to huge generation of marketable surplus and ranked 6th position in world exports. The major competitors are Canada, USA, Australia and Argentina.

India exported wheat to 23 countries. The major export markets for India were Bangladesh, United Arab Emirates, Yemen Rep., Phillippines, and Netherlands. It is evident from the following table that India made quantum jump in export of wheat during 2001 to 2002 in terms of quantity (29.24 per cent) compared to previous year.

Table No. 23

Quantity and Value of Exports of Wheat by India during 2000-2001 to 2001-2002

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Sl. No.	Descrip-tion	Country	April, 00 to March, 01		April, 01 to March, 02	
			Qty. (MT)	Value '000' Rs.	Qty. (MT)	Value '000' Rs.
1.	SEED	Bangladesh	730.00	4699.88	1964.98	9656.57
		Indonesia	1.00	50.63	385.00	1823.55
		Malaysia	100.00	508.20	6550.00	32110.07
		Oman	N.A.	N.A.	27030.00	153666.00
		Others	28520.00	148273.52	34734.30	512731.37
		Total	29351.00	153532.23	858379.71	709987.56
2.	CON-SUMPTION PURPOSE	Bangladesh	205110.07	1076558.73	822449.73	4016359.30
		Indonesia	N.A.	N.A.	73531.85	369616.94
		Malaysia	N.A.	N.A.	92153.00	487720.71
		Philippines	36858.65	213622.20	394245.13	2146693.63
		Singapore	18212.00	88007.95	57713.10	273395.94
		Sri Lanka	N.A.	N.A.	31273.00	148384.55
		U.Arab Emirates	103156.00	492045.15	347169.30	1633093.41
		Vietnam S.R.	15750.10	75481.41	149004.98	686376.43
		Yemen Rep.	56000.00	265951.21	162501.00	775956.34
		Others	326567.78	1681470.24	278914.56	1523798.40
		Total	761654.60	3893136.89	2408955.55	12061395.65

SOURCE: Director General of Commercial Intelligence & Statistics, (DGCIS), Kolkata

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The export of wheat also showed increase of more than three hundred per cent both in terms of quantity and value during the same period.

The new Agricultural Policy encompasses commercialization, value addition and market orientation for both internal and export trade. In post **World Trade Agreement (WTA)** regime, export led growth is an important strategy. Devaluations of rupee, permission to PSUs and private parties to lift from FCI stocks, conditional removal of quantitative restrictions are some of the measures to boost the exports. The quantity and value of export of wheat during the last four years may be seen in the following table.

Table No.24

The quantity of Wheat Exported during the 1999-2000 to 2002-2003

Year	Quantity (Metric tonnes)	Quantity (Rs.in Lakh)
1999 – 2000	3.15	Negligible
2000 – 2001	813492.28	415.09
2001 – 2002	2649380.73	1330.20
2002 – 2003	3671253.97	1759.87

SOURCE : APEDA (Annual Export Information)

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The country failed to fully avail the golden opportunity of wheat export due to lack of adequate and proper infrastructure. Indian wheat is, competitive in terms of price and at advantageous position in freight charges for export to South Asia. Paucity of rail rakes came in the way of export though stocks and export orders were available. Exporters are renewing the early orders on revised prices, which have been enhanced, as they could not fulfill the supply in stipulated period of six months. The export price of wheat was hiked from Rs.4560 to 4810 per tonne for old crop and from Rs.4600 to 4950 per tonne for wheat crop procured in 2002-2003 rabi marketing season w.e.f.01.01.2003.

T.durum wheat is having immense potential for export. The bright amber colour, hard texture and high gluten content are preferred by Pasta Industry. Durum wheat cultivation is being encouraged by concerned stake holders. Following points are also under active consideration for promotion of export of wheat and its value added products.

- **Long term policy for export, coupled with export promotion activity.**
- **To compete in international markets, maintenance of quality parameters and consistency in quality and supply is essential. The Government of India in consultation with the concerned states is working in the direction of legalized contract farming, direct marketing etc.**
- **Biscuits, pasta, noodles etc., are being considered to be included under wheat products so as to permit subsidy.**

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4.3.1 Sanitary and Phyto-Sanitary Measures (SPS) :

For international market, certain norms are prescribed under SPS agreements, which are very important. SPS agreement covers aspects related to health i.e. food additives, pesticides residue, codes and guidelines of hygienic practices, etc.

Sanitary and Phyto-Sanitary Measures (SPS) are applied in four situations.

- **Risk arising from the entry, establishment or spread of pests, disease, and disease carrying organisms or disease causing organisms.**
- **Risk coming from additives, contaminants, toxins or disease causing organisms in foods, beverages or feed stuffs.**
- **Risk arising from diseases carried by animals, plants or products there of or from the entry, establishment or spread of pests.**
- **Prevention or limitation of damage caused by the entry, establishment or spread of pests.**
- **Non-compliance of SPS criteria attracts penalties prescribed by WTO.**

The exporter / importer is required to maintain bio-security and sanitary, phyto-sanitary, import risk analysis issued by the Plant Protection and Quarantine authorities **(PPQ)** under the **Plant, Fruits And Seeds Order, 1989**.

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Technical Barriers to Trade (TBT): *(Including Codex Standards)* Technical Barriers to Trade (TBT) Agreement was revised and converted into multi-lateral agreement through Uruguay round. It covers all technical requirements and standards, such as product description, labelling and package specifications, etc., which are not covered under the SPS agreement.

4.3.2 Export Procedures :

In present WTO regime, the trade is bound, with certain conditions under Agreement on Agriculture (AoA) such as :

- **Member countries to provide market access opportunities upto 5 per cent of their domestic consumption.**
- **Removal of quantity restrictions on 715 items including 208 items of agricultural sector.**
- **Stringent compliance of HACCP, SPS and environment protection guidelines/ norms.**

Similarly, there are conditions for exporters also like:

- **Registration with RBI, RBI code number.**

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- **Importer Exporter code number – to be obtained from D.G., Foreign Trade.**
- **Registration-cum-membership certificate from concerned Export Promotion Councils.**

Further, for export consignment the exporter should have following.

- **Quality certificate.**
- **Insurance cover (Marine/Air)**
- **Certificate of origin – from Chamber of Commerce.**

For availing various benefits under Duty Draw-back Scheme certain documents are needed these are:

- **Shipping Bill**
- **Carting order for export.**
- **Mail receipt – certificate from Captain of Ship.**
- **Bills of loading or Air way bill.**

4.4 Marketing Constraints :

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Lack of proper marketing infrastructure like –

- **Storage –** Lack of proper and adequate storage facilities at producer's level creates problems. Now Government are addressing the problem through Gramin Bhandaran Yojna and construction of storage by co-operatives.
- **Grading –** Grading enables the farmer to fetch competitive price but its lack in the markets is a constraint.
- **Transportation –** Due to high cost of truck transportation charges coupled with market glut, majority of the producers dispose of wheat at village level to the village traders, itinerant merchants, etc. The transport problem is mainly faced by small/ marginal farmers.
- **Market Glut –** In peak post harvest period, the markets are flooded with wheat arrivals causing all sorts of problems of storage, selling space, jam on roads etc. Due to heavy supply and resultant glut in the markets, the distress sales are a common feature.
- **Long Chain of Marketing –** Due to, multi-segmented marketing channel, the producers do not get fair share in consumer's rupee.

Financial Problems of Producers : The farmers borrow credit from the village traders at a high rate of interest in anticipation of selling their produce at farm harvest price.

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Lack of Market Information : Farmers are generally not aware of market information like supply, demand, prices prevailing in the market, market charges, etc., which are crucial for decision making at right time. Now with the development of information technology, wheat producers can get the market information quickly relating to various markets with in the state or outside the state.

Paucity of Marketing Extension : At present, there is no organised market extension system to improve the awareness of farmers in order to orient them towards market driven production, and educate them about the benefits of adoption of modern post-harvest technology.

5.0 MARKETING CHANNELS, COSTS AND MARGINS :

5.1 Marketing Channels :

Marketing channel is a group of interrelated intermediaries, who market the produce from the farmers to consumer. Private and Institutional channels are the important marketing channels in the movement or distribution of major agricultural commodities. Most common channels for wheat are given below;

I Private – The Marketing channels in private sector are –

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1. **Farmer ⇨ Consumer**
2. **Farmer ⇨ Retailer or village trader ⇨ Consumer**
3. **Farmer ⇨ Wholesaler ⇨ Retailer ⇨ Consumer**
4. **Farmer ⇨ Village Trader ⇨ Wholesaler ⇨ Retailer ⇨ Consumer**
5. **Farmer ⇨ Wholesaler ⇨ Miller ⇨ Retailer ⇨ Consumer**

II Institutional – It covers the public and co-operative sector agencies. It plays a very important role in the procurement and distribution of wheat. The Food Corporation of India is the main agency for procurement, maintenance of buffer stocks and distribution of wheat. The main institutional marketing channels for wheat are as under;

6. **Farmer ⇨ (FCI, State Govt., Co-operatives) Govt. Agency ⇨ Fair Price Shop ⇨ Consumer**
7. **Farmer ⇨ Co-operative Marketing Society ⇨ Retailer ⇨ Consumer**
8. **Farmer ⇨ (FCI, State Govt., Co-operatives) ⇨ Private Trader ⇨ Export.**

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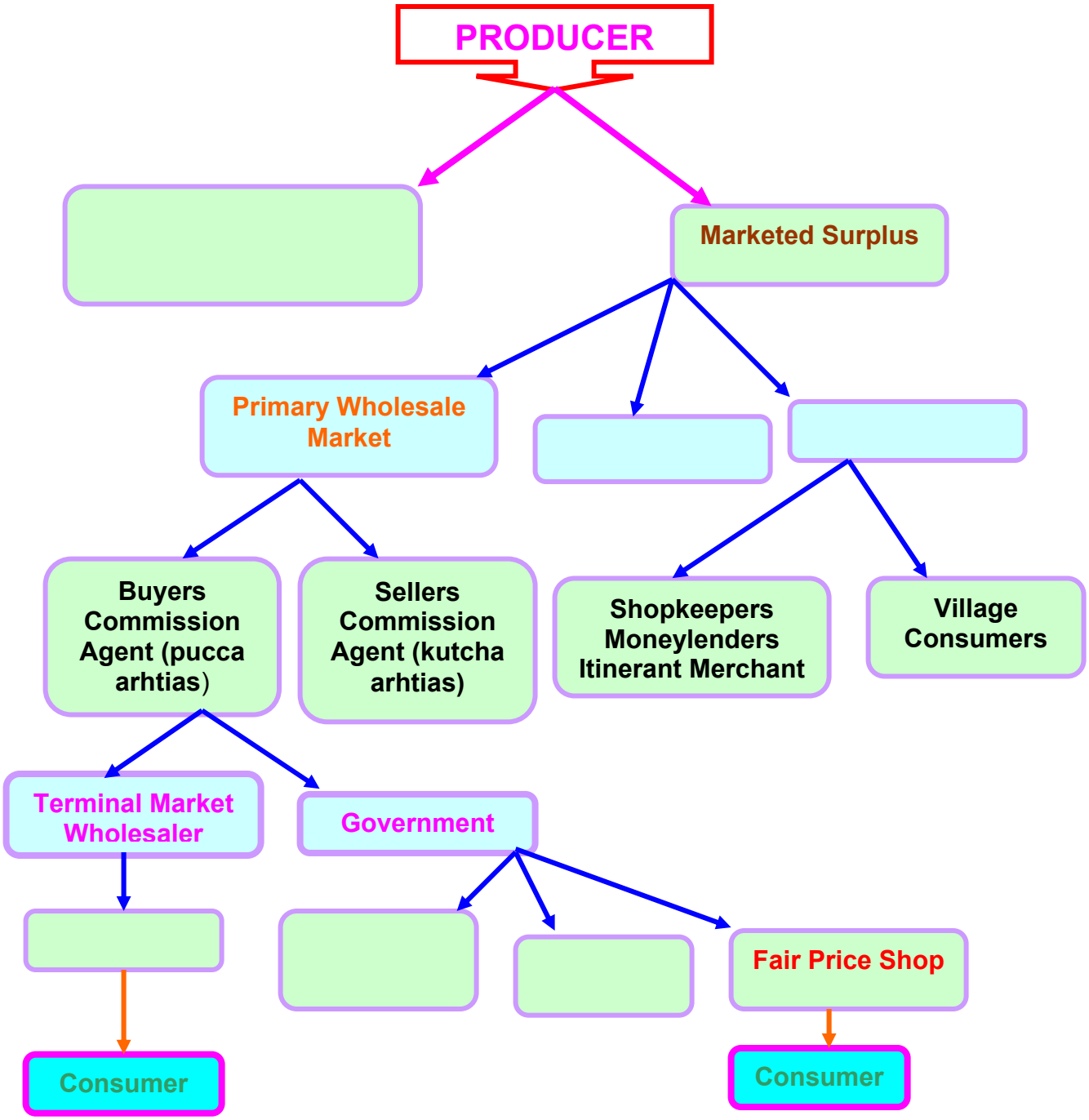
MARKETING CHANNELS OF WHEAT



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Criteria for Selection of Channels :

Short channel, with minimum marketing cost and ensuring reasonable returns to farmer is considered as cost effective channel. The following are the criteria for section of efficient marketing channel.

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

5.2 Marketing Costs and Margins :

Marketing Costs :

The total costs incurred by the producer – seller and by the various intermediaries involved in the sale and purchase of the produce till the commodity reaches the ultimate consumer are known as marketing costs. These include –

- ➢ **handling charges for produce at primary place.**
- ➢ **assembling charges.**
- ➢ **storage and transport cost.**
- ➢ **handling charges by wholesaler and retailer.**
- ➢ **other expenses on secondary services like, finance, risk, market intelligence.**

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Marketing Margins :

Marketing margins are the profits of the various market functionaries involved in marketing the produce from initial point of production till it reaches to the end user.

Measures for Reducing the Costs and Margins

The marketing cost can be reduced by increasing the efficiency in marketing system.

- ★ **Handling of bulk quantity at a time reduce marketing costs and improve the efficiency.**
- ★ **Improved methods of handling, packing and efficient use of labour reduce the marketing costs.**
- ★ **Adopting proven management techniques reduce the marketing costs.**
- ★ **Selling value added products reduce the marketing costs.**

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Marketing margins of agricultural commodities are often higher because of the inherent risk at various stages of marketing. Following measures may reduce the risk ;

- **The adoption of hedging operations, efficient market news services, grading and**
- **Increasing the competition in the marketing of farm products.**

The absolute value of the total marketing margin varies from market to market, channel to channel and time to time.

- **Market Fee –** It is charged either on the basis of weight or on the basis of value of the produce. It is usually collected from the buyers. The market fee differs from state to state. It varies from 0.5 per cent to 2.00 per cent advaloram.
- **Commission –** The commission charges are usually made in cash. It varies from market to market. These charges were observed nil in the state of Assam, Kerala, Madhya Pradesh, Goa, Arunachal Pradesh, Whereas 2-4 per cent in Andhra Pradesh, Delhi, Gujarat, Haryana, Karnataka and Maharashtra.
- **Taxes –** Different taxes are charged in different markets such as toll tax, terminal tax, sales tax, octroi, etc. These taxes on wheat differ from market to market in the same state and also from state to state. These taxes are payable usually by the seller.

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- **Miscellaneous Charges –** In addition, some other charges are also levied. These include handling, weighing, loading, unloading, cleaning, charity contribution in cash and kind etc. These charges are payable either by seller or by buyers.

Table No.25

Market charges and taxes levied in different states are given below

Sl. No.	State	Mar-ket fee %	License fee Rs. per annum	Market charges Rs. per unit	Commi-ssion charges %	Octroi %	Sales Tax %	Remark
1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	Andhra Pradesh	1	A- 125 B- 75 C- 50 D- 25	1. Weighing –0.50 to 0.75 2.Unloading -0.50 to 0.75 3. Hamal – 0.50 to 0.75 4. Cleaning – 0.75 to 1.00 5. Loading – 0.50 to 0.75.	1 to 2	Nil	4	
2.	Arunachal Pradesh	2	Traders –1500 Com.Ag.– 1000 Weighmen- 200 Hamal -100	--	Nil	Nil	Nil	

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1.	2.	3.	4.	5.	6.	7.	8.	9.
3.	Assam	1	Traders – 10	-- *	Nil	Nil	---	* Markets are not in operation
4.	Delhi	1	Traders – A- 100 B- 100 C- 100 D- 100 E- 50	1. Weighing– 0.70/ bag 2. Unloading– 0.70 / bag 3.Cleaning– 0.40/ bag	2	Nil	---	
5.	Gujarat	0.5	Com. Ag. 100 Traders A – 75 B – 50 C – 5 to 30	1.Weighing -1 to 2.5/bag 2. Unloading- 2.5 3. Brokerage - 6 4. Hamal - 1 / bag	2	0.2 to 4	---	
6.	Goa	1	Traders A – 150 B – 100 C – 50	Cleaning – 100/ Truck	Nil	Nil	---	Entry fee Rs. 10/ Truck.
7.	Haryana	2	Traders A – 100 B - 60 C - 20	1. Weighing - 0.55 2. Unloading - 0.40 3. Brokerage - 0.16 4. Hamal - 1.00 5. Cleaning - 0.65	2.50	Nil	4	
8.	Karnataka	1	Traders/ Com. Ag. – 200 Others – 100 Retail Traders – 25	1. Weighing - 0.50 to 3 2. Unloading-1 to 3 3. Brokerage – 0.50 to 10 4. Hamal - 1 to 3 5. Cleaning– 1 to 3	2	Nil	Nil	
9.	Madhya Pradesh	2	Traders – 1000 Processor- 1000	---	Nil	Nil	N.A.	Develop-ment cess from Traders only 1 to 5%
10.	Maharashtra	0.75 to 1.0	Traders 3 to 200	---	4	Nil	Exm-pted	Entry fee Rs.10/ Truck.
11.	Meghalaya	1	As per provision of the Act.	---	Nil	Nil	Nil	
12.	Nagaland	2	Traders – 100	1. Weighing – 0.50/Qtl. 2. Unloading – 5.0/Truck 3. Cleaning – 1.0/ Truck load 4. Service charges – 0.50/ Qtl.	2	Nil	Nil	
13.	Punjab	2	Traders Rs.300/3 yrs.					**
14.	Rajasthan	1.60	Traders – 200 Com.Ag.- 200 C.A.Cum.Tr. – 300	1. Weighing - 1 to 2 2. Unloading – 0.50 to 1 3. Brokerage – 2 4. Hamal – 1 to 4 5. Cleaning – 1 to 2	2	Nil	4	Surcharge on sales tax – 15%
15.	Tripura	2	Traders–20 to 50	1. Weighing – 2.50 2. Unloading – 2.50 3. Cleaning - 5.00	Nil	Nil	Nil	Entry fee Rs.1 per head.

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1.	2.	3.	4.	5.	6.	7.	8.	9.
16.	U.P.	2 + Deve-lopment cess 0.50	Traders – 250 Retailers –100	1. Weighing – 0.50/Qtl. 2. Unloading – 0.50/Qtl. 3. Hamal - 1.0/Qtl. 4. Cleaning – 1.00/Qtl. 5. Brokerage –0.50	1.50	Nil	4	
17.	West Bengal	0.50	Traders – 150 Com.Ag.-200	No fixed rates, varies as per local charges for other activities.	No fixed rate	Nil	N.A	

**The charges on Procurement of Paddy and Groundnut under contract farming are 11.50 per cent in Punjab, the break up is Purchase tax – 4 per cent; Cess – 1 per cent ; Market fee – 2 per cent; R.D.Fund – 2 per cent; Aarhtia charges – 1 per cent; Infrastructure cost – 1.5 per cent. When entire country is becoming one market it is imperative that there should be uniformity in the state level tax structure for agricultural commodities.

6.0 MARKETING INFORMATION AND EXTENSION :

Marketing information plays a pivotal role in planning production and marketing of the produce by the farmers. It is also necessary for the market participants in arriving at optimal trading decisions. Availability and dissemination of accurate and complete marketing information is the basic necessity for achieving both operational and pricing efficiency in the marketing system.

Information Technology in Agril. Research and Development

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The computer technology pervaded all walks of human life and has become an essential tool for information. Information technology includes computer programming, data base management systems, internet, electronic banking, smart card, geographic information system, computer modeling and expert systems to accelerate agricultural research and development. Information technology generates useful data bases, information packages on demand, availability, price, quality and time frame of supply. Inter Ministerial Task Force in its report in May, 2002 recommended extensive promotion of Information Technology in Agricultural Marketing.

DMI under Ministry of Agriculture has initiated provision of information in its web-site during 9th plan. Selected A.P.M.Cs are provided with computer, accessories and software to disseminate the market information in respect of arrivals and prices on daily basis. So for, 735 markets are connected out of which 650 markets are regularly posting arrivals and rates on portal, 406 more markets shall have connectivity in2005-06. Post Harvest Profiles of Paddy, Bengal Gram, Red Gram and Mustard-Rapeseed are already available on website to be followed by 6 more commodity profiles on wheat, soybean etc, for the benefit of farmers and other market functionaries.

Some private corporates are also using this technology for mutual benefit of farmers and organization. ITC's e-chaupals had made visible impact in production, price realization and availability of raw material for processing in respect of soybean in Madhya Pradesh. It is also operating in Uttar Pradesh, Andhra Pradesh, Karnataka and Maharashtra States. So far, more

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than 200 E-chaupals are operating. Establishment of ***"Agriclinic or Agribusiness Centre and Kisan Cell"*** are for immediate redressal of problems of farmers on phone. Kisan call centres have already become operative and are providing guidance to needy farmers.

Marketing Extension :

Liberalization and globalization of markets paved the way for major changes in agricultural marketing. As such, agriculture has to be market driven, cost effective, innovative and responsive to high technology information.

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Marketing intelligence has to be imparted at the grass root level to farmers, market functionaries and others engaged in the agricultural marketing activities, such as – market demand, post harvest management, availability of market finance facilities, etc.

7.0 ALTERNATIVE SYSTEMS OF MARKETING :

7.1 Direct Marketing :

Direct marketing involves sale of wheat by producer to the consumer / miller directly without any middleman. It enables producers and millers and other bulk buyers to economize transportation cost and improve price realization. Direct marketing by farmers to the end users has been experimented in the country through ***Apni Mandi*** in Punjab and Haryana. However, these markets at present are being run at the expenses of the State exchequer as a promotional measure to encourage marketing by small and marginal farmers.

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MNCs are entering into contracts with producers for buying their produce, this is direct marketing. Flour millers are also directly negotiating with producers and buying their wheat at their farm gates by paying immediately. In Madhya Pradesh earlier purchase at the doorsteps of farmer was not possible because of restrictions as per Agricultural Produce Marketing Regulation Act. Recently, the Andhra Pradesh Government has proposed to privatize loss making Rythu Bazars to make them economically viable.

Benefits of Direct Marketing

- **It increases price realization of the producer.**
- **It minimizes marketing cost, transportation cost.**
- **It encourages distributional efficiency.**
- **It satisfies the consumer through better quality of produce at reasonable price.**
- **It encourages direct interaction between producers and consumers.**
- **It encourages the farmers for retail sale of their produce, thus their involvement in marketing process and help in discovering the demand of markets for future market oriented planning.**

7.2 Contract Farming :

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Contract farming is an agreement between buyer and producer for the purchase of produce at mutually agreed price under forward agreement. In such arrangement, the purchaser, may be exporter or processing unit, generally provides inputs, technical know-how and financial support. Thus sharing the risk by both the, buyers and sellers. ***"It is an approach that can contribute to increased income to farmers, avoidance of risk of adverse price fluctuation, and higher profitability to sponsors"***.

Many companies like Pepsi Food Ltd., Rallis India Ltd., Mahindra Sublabh, Escorts Ltd., have entered into contracts with farmers for production and marketing of wheat. These are success stories of contract farming. ACC, further developed the concept with backward (farmer) and forward (technology unit) integration successfully.

Rallis India Ltd. started contract farming for wheat in Madhya Pradesh and Uttar Pradesh. The company is providing seeds, fertilizers and financial support through SBI. Rallis India Ltd. has buy-back arrangements with Hindustan Lever Ltd. for wheat in Madhya Pradesh. This is a first State Bank of India tie up with corporate sector in contract farming, with forward linkage with HLL.

However, there are instances where one party backs out leaving the other. Generally the small / marginal farmers are left high and dry. It caters to the need of large farmers ignoring the small and marginal farmers in the absence of any legal binding.

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During National Seminar on Role of Private Sector in Agricultural Marketing -3rd September, 2001, a number of recommendations were made. Some of the pre-requisite for success are;

- **Review of *"Land Ceiling Act" and "Leasing of Land"* – Land reforms should facilitate aggregation of land for economic cultivation and agri-practices.**
- **State Govts. should come out with a detailed policy on contract farming so as to attract M.N.Cs or big Corporates. The policy may provide- Financial benefits in form of exemption of taxes, import of inputs, exemption from market fee.**
- **Legal framework with tripartite arrangement between farmer, buyer and Govt. or Quasi judicial system of contract enforcement.**
- **Fast track sanitary and phyto-sanitary clearance.**
- **Inclusion of small and marginal producers.**
- **Risk consideration.**

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Directorate of Marketing and Inspection (DMI), Ministry of Agriculture, Govt.of India has already drafted Model Agreement for contract farming. Since the contract farming can not be implemented without modifying the Agricultural Produce Marketing (Regulation) Act, the DMI has prepared a draft of model act of Agricultural Produce Marketing (Development and Regulation) Act, 2003, wherein a model agreement for contract farming has also been incorporated. This is reproduced at Annexure No.III. States like Punjab, Maharashtra and Madhya Pradesh have amended their respective Agricultural Produce Market Acts and initiated contract farming. In Madhya Pradesh, the taxes have been rationalized and buyers have been permitted to go to producer's door steps.

Benefits :

- **Sharing and minimizing the price risk due to future fluctuations.**
- **It promotes use of quality seeds, inputs and new technology resulting in to assured quality produce.**
- **It ensures regular and timely payments through bank tie up, assured quality supply to buyers / processors.**
- **It minimizes malpractices by elimination of middlemen.**
- **It strengthens mutual relationship between producers, sellers and buyers.**

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7.3 Co-operative Marketing :

"Co-operative Marketing" is a system of marketing in which a group of producers join together to market their produce competitively. Co-operatives are the best instrument to ensure remunerative prices to the farmers and also to function as a effective interface for stabilizing marketing prices. Recognizing the positive role of co-operatives, Government have designated them as Nodal Agency for price support operations of various agricultural commodities. The co-operative structure in the different states consists of three levels;

- **PCMS (Primary Co-operative Marketing Societies) at the mandi level.**
- **SCMF (State Co-operative Marketing Federation) at state level.**
- **NAFED (National Agricultural Co-operative Marketing Federation of India Limited) at the National level. Besides the National Co-operative Development Corporation (NCDC) was created in 1962. In the year 2000-2001, the NCDC released an assistance of Rs.14267 lakhs for marketing and input activities.**

Co-operatives continued to play an important role for procurement of wheat as agents of Food Corporation of India (FCI) under the Price Support Scheme of the Government of India during 1999-2000. Co-operatives procured 45.19 lakh tonnes of wheat through 4680 procurement centres located in five major wheat growing states.

Table No.26

Procurement of Wheat in Major Producing States 1999-2000

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(Qty. in Million tonnes)

Sl. No.	State	Co-operatives		Central Pool (Qty)
		No. of Centres	Quantity	
1.	Haryana	296	16.84	380.7
2.	Punjab	940	5.41	783.1
3.	Rajasthan	103	2.60	63.7
4.	Uttar Pradesh	3196	6.22	126.1
	Total	4525	31.07	135.99

SOURCE : Deptt. of Agril. and Cooperation, Ministry of Agril., Govt.of India.

7.4 Forward and Future Markets :

Forward and future markets are important tools of price stabilization and risk management. Extension of future markets to all major agro-commodities was reflected in the National Agricultural Policy of Government of India announced in the year 2002 and the budget speech of the Finance Minister (2002-2003)

Commodity future markets in the country are regulated under Forward Contracts (Regulation) Act, 1952. The Forward Markets Commission under provisions of Section-3 of the Act performs advisory, monitoring, supervisory and regulatory functions in futures and forward trading. The exchanges are owned by the associations registered under the Act. At present, about 25 commodity exchanges are operating.

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Broadly, three types of derivative transactions are being transacted **(i) Forward Contracts (a) Non-Transferable Specific Delivery Contract (NTSD) and (b) Transferable Specific Delivery Contract (TSD)**. The exchanges are specifically allowed for NTSD, forward contracts are not permitted. If the exchange is allowed for hedge contracts can not undertake NTSD / TSD, unless it is specifically permitted. Thus, there is compartmentalization between commodity exchanges and financial derivative exchanges. **(ii) Ready Delivery Contract -** In such cases, quality, quantity, place of delivery and time are standardized. Only, rate is negotiable. Delivery of goods and payment thereof is completed within eleven days of contract. Such contracts are outside the Act. **(iii) Option in Goods –** An agreement for the purchase of sale or a right to buy or sale. Options in goods are totally prohibited under the Act.

Till February, 2003, the future trade in food grains was banned. The National Multi-Commodity Exchange **(NMCE)**, Ahmedabad offers future trading from March, 2003 in food grains as the proposal has already been approved by the Forward Markets Commission **(FMC)**. As per report, 493,800 tonnes of foodgrains valued at Rs.470 crores has been traded till March, 2004. The future trading in wheat from 13th December, 2003 to 26th February, 2004 was 89000 tonnes worth Rs.73.4 crores. Future trading in wheat is expected to relieve the Government from MSP expenditure and FCI its storage costs.

Commodity futures trading in the country suffer certain limitations viz.,

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- **Limited and closed nature of members. In most of the agricultural commodity exchanges, less than 10 per cent of the registered members are actually actively trading.**
- **Absence of many hedgers, other national exchange i.e. Multi-Commodity Exchange (MCX) Mumbai and National Commodity and Derivatives Exchange (NCDEX) became operative from October and December, 2003, respectively.**
- **Absence of legal framework for warehouse receipt system with full negotiability and transferability.**

Benefits of Forward Marketing

- **Price discovery mechanism – Producer can get an idea of future pricing and thus select suitable beneficial commodities.**
- **Price Risk Management – It helps the exporter in quoting a realistic price and facility of hedging or insurance to producer or dealers**
- **Price Stabilization – In times of violent price fluctuation, future markets help in price stabilization.**

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8.0 INSTITUTIONAL FACILITIES :

8.1 Marketing Related Schemes of Government and Public Sector Organizations

Name of the Scheme / Implementing Organization	Facilities provided / Salient features / Objectives
1.	2.
1. Gramin Bhandaran Yojana (Rural Godown Scheme) Directorate of Marketing and Inspection, Head Office, NH-IV, Faridabad.	➢ It is a capital investment subsidy scheme for construction/renovation/expansion of rural godown. The scheme is implemented by DMI in collaboration with NABARD and NCDC. The objectives of the scheme are to create scientific storage capacity with allied facilities in rural areas. ➢ To prevent distress sale immediately after harvest. ➢ To promote grading and quality control and improve marketability. ➢ To promote pledge financing and marketing credit to strengthen agricultural marketing in the country by introduction of a national system of warehouse receipt in respect of agricultural commodities stored in such godowns. ➢ The entrepreneur will be free to construct godown at any place and of any size except for restrictions that it would be outside the limits of Municipal Corporation area and be of a minimum capacity of 50 M.T. ➢ The scheme provides credit linked back-ended capital investment subsidy @ 25 percent of the project cost with a ceiling of Rs.37.50 lakh per project. For the projects in North-Eastern states and hilly areas with altitude of more than 1000 m. above mean sea level and SC/ST entrepreneurs, maximum subsidy admissible is Rs.50.00 lakh @ 33 percent of the project cost.
2. Agmark Grading and Standardization Directorate of Marketing and Inspection, Head Office, NH-IV, Faridabad.	➢ Promotion of grading of agricultural and allied commodities under Agricultural Produce (Grading & Marking) Act, 1937 and rules made there under. ➢ Agmark specifications for agricultural commodities have been framed, based on their intrinsic quality. Food safety factors are being incorporated in the standards to compete in world trade. Standards are being harmonized with international standards keeping in view the WTO requirements. Certification of agricultural commodities is carried out for the benefit of producer and consumer.

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1.	2.
3. Agricultural Marketing Information Network Directorate of Marketing and Inspection, Head Office, NH-IV, Faridabad.	➢ To establish a nationwide information network for speedy collection and dissemination of market data for its efficient and timely utilization. ➢ To ensure flow of regular and reliable data to the producers, traders and consumers to derive maximum advantage out of their sales and purchases. ➢ To increase efficiency in marketing by effective improvement in the existing market information system, also to help better future planning. ➢ The scheme includes providing connectivity to the markets State Agricultural Marketing Department (SAMD) / Boards. These concerned nodes are being provided with on computer and its peripherals. The SAMD/Boards/Markets collect desired market information and pass on to respective state authorities and Head Office of the DMI for forward dissemination. National Agriculture Policy has proposed for coverage of another 2000 nodes during the Tenth Plan.
4. Price Support Scheme (PSS) Food Corporation of India, Barakhamba Lane, Cannaught Place, New Delhi-110 001	➢ Nodal agency of Government of India to undertake procurement of wheat under price support scheme. ➢ Provides regular marketing support to the farmers to sustain and improve the production of wheat. ➢ Scheme was operative in Punjab and Haryana at nodal point of clusters of wheat producing villages.
5. Co-operative Marketing, Processing Storage etc. Programmes in Comparatively under / least developed states. National Co-operative Development Corporation, Hauz Khas, New Delhi – 110016	➢ To correct regional imbalances and to provide needed momentum to the pace of development of various programmes of Co-operative Agricultural Marketing Processing, Storage etc. in under/least developed states/UTs by providing financial assistance on liberal terms to augment the income of farmers and weaker sections of the community. ➢ The scheme provides for distribution of agricultural inputs, development of agro-processing including storage, marketing of food grains and plantation/horticulture produce, development of weaker and tribal sections, cooperatives, in dairy, poultry and fisheries.

8.2 Institutional Credit Facilities :

Adequate and timely availability of finance to producer, specially the small and marginal farmers, is an important impediment. Generally, farmers depend on money lenders, whose interest rates are very high. Therefore, institutional credit at reasonable / subsidized rates is vital

for their well being. Accordingly, National Agricultural Policy had taken note of it. The Task Force on Agricultural Credit has estimated Rs.736570 crores for five years during Xth Five Year Plan. The target fixed for year 2002-2003 for agriculture credit was Rs.82,073 crores. Another important feature of policy is timely and adequate credit flow to small and marginal farmers.

The credit is offered for short, medium and long term periods. During the year 2002-2003, the target shares for rural credit were through cooperatives to the tune of 43 per cent, Commercial Banks 50 per cent and Regional Rural Banks 7 per cent. The Commercial Banks are also expanding their branches and facilities in rural areas due to RBI directions. The total rural branches as on 30.06.2001 were 32,574, 49.4 per cent of total branches of all Commercial Banks.

Table No.27

Short Term and Medium Term Loans

Sl. No.	Name of Scheme	Eligibility	Objective / Facilities
1.	2.	3.	4.
1.	Crop Loan	All categories of farmers	➢ To meet cultivation expenses for various crops as short term loan. ➢ This loan is extended in the form of direct finance to farmers with a repayment period not exceeding 18 months.
2.	Produce Marketing Loan	All categories of farmers	➢ This loan is given to help farmers to store produce on their own to avoid distress sale. ➢ This loan also facilitates immediate renewal of crop loans for next crop. ➢ The repayment period of the loan does not exceed 6 months.
3.	Kisan Credit Card Scheme (KCCS)	All Agriculture clients having good track record for the last two years.	➢ This card provides running account facilities to farmers to meet their production and contingency needs. ➢ Procedures are simplified for obtaining crop loans, as and when need arises. Money can be drawn by using conventional withdrawl slips. ➢ Credit limit depends on operational land holdings, cropping pattern, etc. subject to minimum Rs.3000/- ➢ The Kisan Credit Card is valid for 3 years subject to annual review. ➢ It also covers personal insurance against death or permanent disability for which a maximum amount Rs.50,000 and Rs.25,000 respectively is given.

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1.	2.	3.	4.
4.	National Agricultural Insurance Scheme (NAIS)	Scheme is available to all farmers loanee and non-loanee both, irrespective of the size of their holding.	➢ To provide insurance coverage and financial support to the farmers in the event of failure of any of the notified crop as a result of natural calamities , pests and diseases attack. ➢ To encourage the farmers to adopt progressive farming practices like, high value in-puts and high technology. ➢ To help stabilization of farm incomes, particularly in disaster years. ➢ General Insurance Corporation of India (GIC) is the implementing Agency. ➢ Sum insured may extend to the value of threshold yield of the area insured. ➢ Covers all food crops (cereals, millets and pluses), oilseeds and annual commercial/horticultural crops. ➢ Provides subsidy of 50 percent in premium of small and marginal farmers. The subsidy will be phased out over a period of 5 years on sunset basis.

LONG TERM LOAN

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Sl. No.	Name of Scheme	Eligibility	Objective / Facilities
1.	2.	3.	4.
1.	Agricultural Term Loan	All categories of farmers are eligible, provided they have necessary experience in the activity and required area.	➢ The banks extend this loan to farmers to create assets facilitating crop production/income generation. ➢ Activities covered under this scheme are land development, minor irrigation, farm mechanization, plantation and horticulture, dairying, poultry, sericulture, dry land, waste land development schemes, etc. ➢ This loan is offered in the form of direct finance to farmers with a repayment span of minimum 3 years and maximum 15 years. ➢ Government of India had directed hike of 30 per cent quantum of farm credit over previous year for 2004-2005.

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8.3 Organizations / Agencies Providing Marketing Services :

Sl. No.	Name of the Organization / Agencies	Services Provided
1.	2.	3.
1.	Directorate of Marketing and Inspection (DMI) NH-4, CGO Complex, Faridabad – 121 001 **Website :** www.agmarknet.nic.in	☞ To integrate development of marketing of agricultural and allied produce in the country. ☞ Promotion of standardization and grading of agricultural and allied produce. ☞ Market development through Regulation, Planning and Designing of physical market. ☞ Liaison between the Central and State Governments through its regional offices (11) and sub-offices (37) spread all over the country. ☞ Human resource development through various training programmes for better marketing. ☞ Assisting State authorities in dissemination of market informations (MRIN)
2.	Food Corporation of India (FCI), Barakhamaba Lane, Cannaught Place, New Delhi-110001 **Website :** www.fciweb.nic.in	☞ Procurement of foodgrains for effective price support operations for safeguarding the interest of the farmers. ☞ Distribution of foodgrains throughout the country for Public Distribution System, especially to Below Poverty Line (BPL) population. ☞ Maintains satisfactory level of operational/buffer stocks of foodgrains to ensure National Food Security.
3.	Central Warehousing Corporation (CWC) 4/1 Siri Institutional Area, Opp.Siri Fort New Delhi-110016 **Website :** www.fieo.com/cwc/	☞ Provides scientific storage and handling facilities. ☞ Offers consultancy services/training for the construction of warehousing infrastructure to different agencies. ☞ Import and export warehousing facilities. ☞ Provides disinfestations services.
4.	Agricultural and Processed Food Products Export Development Authority (APEDA) NCUI Building 3, Siri Institutional Area August Kranti Marg, New Delhi-110016 **Website :** www.apeda.com	☞ Development of scheduled agriculture products related industries for export. ☞ Provides financial assistance to these industries for conducting surveys, sensibility studies, relief and subsidy schemes. ☞ Registration of exporters for schedule products on payment of nominal. ☞ Adapting standards and specification for the purpose of export of scheduled products. ☞ Carrying out inspection of meat and meat products for ensuring the quality of products.

1.	2.	3.
4.	Agricultural and Processed Food Products Export Development Authority (APEDA) NCUI Building 3, Siri Institutional Area August Kranti Marg, New Delhi-110016 **Website :** www.apeda.com	☞ Improving the packaging of the scheduled products. ☞ Promotion of export oriented production and development of scheduled products. ☞ Collection and publication of statistics for improving marketing of scheduled products. ☞ Training in the various aspects of industries, functionaries related to the scheduled products.
5.	National Co-operative Development Corporation (NCDC) 4, Siri Institutional Area, New Delhi-110016 **Website :** www.ncdc.nic.in	☞ Planning, Promoting and Financing Programmes for production, processing, marketing, storage, export and import of agricultural produce. ☞ Financial support to Primary, Regional, State and National level co-operative marketing societies is provided towards; i) Margin Money and Working Capital Finance to augment business operations of agricultural produce. ii) Strengthening the share capital base and iii) Purchase of transport vehicles.
6.	Director General of Foreign Trade (DGFT) Udyog Bhavan, New Delhi **Website :** www.nic.in/eximpol	☞ Provides guidelines / procedure for export and import of various commodities. ☞ Allot import-export code number (IEC No.) to the exporters of Agricultural commodities.
7.	State Agricultural Marketing Boards (SAMBs), At State Capitals and Marketing Directorates	☞ Implementation of the regulation of markets in the state. ☞ Provide infrastructural facilities for the marketing of notified agricultural produce. ☞ Provide grading service in the markets. ☞ Co-ordinate all the market committees for providing information services. ☞ Provide aid to financially weak or needy market committees in the form of loans and grants. ☞ Eliminate malpractices in the marketing system. ☞ Arrange seminars, workshops or exhibitions on subject relating to agricultural marketing and farmers training programme on various aspects of agricultural marketing. ☞ Some of the SAMBs are also promoting agro-business.

9.0 UTILISATION:

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According to report prepared by the Working Group on Demand and Supply Projections, the per capita per annum consumption of wheat was at 60.75 kgs. (2001-02). On **October, 2004** the wheat stock was 14.2 million tonnes against the minimum requirement of 11.6 million tonnes. Thus stock position of wheat was appreciably comfortable.

9.1 Processing :

Initial processing like dehusking, shelling, drying and cleaning add value to wheat and reduce handling and storage costs. The value addition in bread industry is only 12 per cent against 92 per cent in USA. Before consumption, wheat is parboiled, wheat flour (atta), refined flour (maida) and grits (suji, dalia) are utilized for various end uses. Wheat flour is obtained by 5-10 hp burr mills, whereas maida and suji are produced in roller mills with 13 per cent bran and 3 per cent germ as by products.

Milling of Wheat – In our country, there are about 2,60,000 small flour mills engaged in primary milling and 820 (1999) large flour mills using about 10.5 million tonnes of wheat.

- **Traditional Stone Grinder –** Whole wheat is ground with bran and germ.
- **Modern Flour Mill –** The object is to obtain maximum amount of flour from endosperm without any bran or germ content. Generally, yield of white flour is about 70 per cent and mill feed (Bran – 12, Germ – 3 and shorts 15 per cent) 30 per cent by weight.

The following steps are involved in wheat milling -

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Wheat
⇩
Drying
⇩
Cleaning
⇩
Conditioning
⇩
Milling
⇩
Packaging
⇩
Blending

- Receiving, drying and storage.
- **Cleaning –** To remove impurities like sticks, stones, sand, dirt, other food grains, defective food grains etc. Lastly, the wheat is washed.
- **Conditioning –** The temperature of wheat should not be raised above 47^0 C so that gluten quality is not affected. Hydrothermal treatment is used for conditioning because both moistening and heating are carried out simultaneously.
- **Grinding –** Is carried out by roller mills – break roll, reduction roll systems and scratch system generally. In break rolls the bran is cracked and kernel is broken. The endosperm adhering to bran is milled.
- **Packaging and Storage –** End products are packed in waterproof bags and stored in cold dry conditions.
- **Blending –** Increasing health consciousness amongst the consumers, some blending of flours is being carried out e.g. soybean flour, fortification of flour by adding Calcium carbonate, vitamins A and D, Thiamine, Riboflavin.

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Table No.28

Position of Roller Flour Mills in India

	Year (1st Jan.)						
	1960	1970	1980	1990	1996	2001	2003
No. of units	127	211	205	516	812	820	516
Estimated Capacity (Million tonnes)	2.9	5.4	7.4	11.25	19.20	19.50	19.50
Utilization	1.6	2.7	3.6	8.00	12.00	12.50	12.50

SOURCE : Annual Report of Ministry of Food Processing, Govt. of India.

9.2 Uses :

As per the survey on marketable surplus conducted by DMI, 65.1 per cent was estimated as marketable surplus at the farmer's level. The total utilization by the farmer worked out to 31.7 per cent of the production, whereas about 3.2 per cent was physically lost. The details are given hereunder:

Table No.29

Percentage of Utilization and Losses of Wheat at the Farm Level

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Sl No.	Items	Percentage
I.	Production	100
II.	Utilization and Losses	
1.	Retention by farmers for family consumption.	4.6
2.	Purchased for family consumption	6.3
3.	Receipts as wages in kind	1.1
4.	Total quantity utilized for family consumption (1+2+3)	12.0
5.	Other uses	19.7
6.	Total utilization	31.7
7.	Physical losses	3.2
8.	Total utilization and physical losses	34.9
III.	Marketable Surplus (productin – total utilization + physical losses)	65.1

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In the same survey, the utilization of wheat for different purposes was also estimated, which is given in the following table.

Table No.30

Utilization of Wheat for different purposes in India

Sl. No.	Purpose	Percent to production
I.	Consumption by farmers (Retention + Purchases and Wages in kind) 4.6 + 7.4	12.0
II	i) Seed purpose	7.9
	ii) Animal feed	0.9
	iii) Barter transaction	0.1
	iv) Payments in kind	4.2
	v) Payments in cash	4.0
	vi) Consumption by temporary labour	0.1
	vii) Consumption by permanent labour	2.5
	Total	19.7
	Grand Total	31.7

However, as per the recent study conducted by the Directorate of Marketing and Inspection, the marketable surplus was estimated to be 53.81 per cent, whereas, the retention by farmer was found to be 36.83 per cent of average production.

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The other traditional uses of wheat can be summarized as follows :

1.	2.	3.
1.	Bread or bakery flour	having high level of good quality protein (gluten) and good gassing power.
2.	Biscuit flour	having less protein and more extensibility in flour.
3.	Confectionary flour for cakes, buns, puff, etc.	flour similar to biscuit flour but with still less protein and controlled particle size.
4.	Self-raising flour	having special chemicals added to flour to produce (leavened products on spot) without addition of yeast.
5.	House-hold flours	medium protein flours with or without added chemicals.
6.	Whole meal flour or atta	prepared from wheat after extracting 2-8 per cent bran, used in Indian household for chapatti, Roti tc.
7.	High ration flour	achieved by dividing flour in different particle sizes by air classification and thus getting 'high' and 'low' protein flours from the same parent flour.
8.	Enzyme inactivated flours	produced by heat treatment of wheat and used for soups, gravies, thickening agents, etc.

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Wheat contains about 2 to 3 per cent germ, which is generally mixed with bran and sold as cattle feed. Wheat germ is a rich source of protein (25-30 per cent and vitamin E) and can be used in Biscuits, breakfast food and high protein drinks. Besides, the wheat gluten dried powder can be mixed with flour to produce slimming diets, crisp breads, breakfast foods, breads, etc. to increase their texture and nutritional value.

In so far as utilization of different varieties of wheat is concerned, T.aestivum / vulgare, the common bread wheat is preferentially used for making Chapaties, bread, biscuits, whereas T.Durum, known as Macaroni wheat is preferred for making suji, macaroni, spaghetti, vermicelli, etc. Triticum dicoccum, known as emmer wheat (commercially known as ***Khapli***) is commonly used in South India for the preparation of breakfast food called ***Upuma***.

Wheat is used for different purposes and hence quality requirements vary on its end use. Hard wheat (T.aestivum) with strong gluten and > 12.0 per cent protein has been found suitable for bread making, for biscuits soft wheat with less gluten and < 11.0 protein is best suited. Whereas for pasta products (T.durum), hard wheat with gluten < 12.5; protein < 10.0 and 7.0 FPM carotene content is required.

Table No.31

Influence of Area on Quality Parameters of Variety PBW 343

Sl. No.	Quality Parameter	Uttaranchal	Punjab	Haryana		India
				Hissar LP (16.7)	Karnal LP (21.0)	
1.	Flour Data (ER)	67.0	71.6	70	70	69.6
2.	Bread Loaf Volume (CC)	510	560	520	550	528
3.	Biscuits spread factor	7.4	7.19	5.57	7.08	6.56

ER – Extraction Rate Percentage.

SOURCE: **Quality of Indian Wheat. Directorate of Wheat Research (ICAR), Karnal.**

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10.0 DO'S AND DON'T'S :

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Sl. No.		Do's	Don't's
1.	2.	3.	4.
A.	FARMERS	✓Select land after soil testing.	X Avoid fields near animal waste or municipal waste dumps.
		✓Supply compost well before sowing. Use certified quality seeds of specific variety.	X Avoid top dressing and human excreta.
		✓Harvest at proper time when plants become yellow, grain is hardened and straw become dry and brittle.	X Avoid early or late harvesting to soy on infestation and shattering, spilling losses
		✓Ensure cleanliness and sanitation of packing areas, packing floors.	X Protect from contaminated water and livestock waste near pack houses.
		✓Remove foreign matter, damaged, discoloured, shrivelled immature or grains with greenish tinge on seed coat.	X Do not make admixture of varieties, sizes, stones, mud, excess bran etc.
		✓Make uniform lots on size, shape, maturity, colour and variety and grade according to specified standards, in proper pack sizes and labelling.	X Ungraded and improper package may result into less price realization.
		✓Follow proper storage practices like drying grains (12 per cent) and hygienic conditions in store house	X Grains with more moisture attract fungal attack.
		✓Use low cost storage prepared from locally available raw material or bins.	X Do not store in open or rooms in loose form.
		✓Old and new grains may be stored separately.	X Do not mix the old and new crops.
		✓Avoid fungal attack to prevent aflatoxin, mycotoxin level below 30 mg/kg.	X Unscientific storage may result into fungal and pest attack.
		✓Use dunnage between floor and grain bags	X Do not stack bags directly on floor.

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1.	2.	3.	4.
A.	FARMERS	✓Use permitted, genuine and quality insecticides/ pesticides like Aluminum phosphate (tablets) Malathion (50 per cent) 2-4-D-(0.5 mg.kg), Carboryl (5 mg/kg) Ethephon (1.0 mg/kg), EDV ampule etc. in judicious manner.	X Do not use banned chemicals and residues of pesticides heavy metals beyond permissible limits should be restricted.
		✓Control rodent to keep uric acid level below 100 mg/kg by use of baits (anti co-augulent poison) or cakes	X Unprotected wheat
		✓Gain first hand knowledge regarding markets, market charges, prevailing prices in different markets through media / internet website- www agmarknet. nic.in	X Do not depend on hearsay or village merchants.
		✓ Maintain cleanliness of workers, agricultural implements, use low cost, more efficient and less time consuming appliances.	X Use of traditional methods and implements is time consuming, less effective and results into inferior end products.
		✓ Avail benefits of Central / State Govt. schemes like *Crop Insurance, Storage Insurance, Grammeen Bhandaran Yojna, Financial Assistance* on ware house receipts, supply of gunny bags, MRIN etc.	X Do not depend on local money lenders who charges high interest rates
		✓ Be aware of rules and regulations pertaining to marketing and sale of produce.	X Do not be guided by ignorant, self proclaimed people.
		✓ Form cooperatives for collective bargaining power and effective redressal of genuine problems.	X One man's voice is neither heard nor heeded.

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Annexure – I

COMPARATIVE STUDY OF IMPORTANT PROVISIONS IN VARIOUS STATE AGRICULTURAL PRODUCE MARKET ACTS

Sl. No.	Features	BIHAR	GUJARAT	MADHYA PRADESH	MAHARASHTRA	PUNJAB	RAJASTHAN	UTTAR PRADESH
1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	Title of the Act/ Rules	The Bihar Agricultural Produce Markets Act, 1960/ Rules, 1975	The Gujarat Agricultural Produce Markets Act, 1963/ Rules, 1965	The Madya Pradesh Krishi Upaj Mandi Adhiniyam, 1972/1980	The Maharashtra Agricultural Produce Marketing (Regulation) Act, 1963/1967	The Punjab Agricultural Produce Market Act, 1961/Rules, 1962	The Rajasthan Agricultural Produce Markets Act, 1961/ Rules, 1963	The Uttar Pradesh Krishi Utpadan Mnadi Adhiniyam, 1964/ Rules/1965
2.	Administering Authority of the Act	Director of Marketing	Director of Agricultural Marketing Finance	Director of Marketing	Director of Agricultural Marketing	Agricultural Marketing Board	Director of Agricultural Marketing	Director of Mandies
3.	Term of Office Members of Market Committee	Three Years [Sect.9(5)]	Four Years [Sect.11(4)]	Five Years [Sect.11(5)] Chairman and Vice-Chairman the office for 2½ years	Five Years [Sect.14(3)]	Three Years (Sect.14)	Three Years [Sect.7(3)]	Five Years [Sect.13(8)]
4.	Superintendence and Control over Market Committee	State Agril. Marketing Board	Director of Agril. Marketing & Rural Finance	Director of Marketing	Director of Agril.Marketing	State Agril. Marketing Board	Director of Agril. Marketing	Agricultural Produce Market Board
5.	Status of the Marketing Board	Statutory (Sec.33 A)	Statutory (Sec.34)	Statutory (Sec.40)	Statutory (Sec.39 A)	Statutory (Sec.3)	Statutory (Sec.22 A)	Statutory (Sect.26 A)
6.	Secretaries of Market Committee	Secretary shall be appointed by the Govt. or Board	Secretary shall be appointed by the M.Cs with the approval of Director [Sec.22(1)]	Secretary shall be a member of State Marketing Service and shall be appointed by the Govt. [Sec.27(2)]	Secretary shall be appointed by the M.C with prior approval of the Director [Sec.35(1)]	Secretary shall be appointed by the State Marketing Board [Sec.20(1)]	Secretary shall be a Govt.servant appointed by the Govt. [Sec.11 B(2)]	Secretary shall be appointed by the Board [Sec.23(2)]
7.	Rate of Market Fee	1% advalorem (Sec.27)	Mzx. – Min. % of advalorem as may be prescribed by the M.C.	Subject to a minimum of 0.5% or max. of 2% advalorem [Sec.19(1)] (Present rate 1%)	Such rate may be decided by M.C. (but subject to min. & max. rates which may be fixed by the State Govt. [Sec.31(1)]	Note exceeding 2% advalorem [Sec.23(1)]	Max. of 2% advalorem (Sec.17)	Not less than 1% and not more than 1½ advalorem [Sec.17(iii)(6)]

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1.	2.	3.	4.	5.	6.	7.	8.	9.
8.	Authority to grant/renewal licences to market functionaries	All licences are issued/by the Market Committee	Market Committee grants/renews licences to al functionaries [Sec.27(1)]	Market Committee grants/renews licences to all functionaries (Sec.32)	Market Committee grants/renews licences to all functionaries [Sec.7(1)]	Traders licences are issued by the Secretary of the Marketing Board (Sec.9) and licences to other functionaries are issued by the Market Committee [Sec.13(3)]	Market Committee grants/renews licences to all functionaries (Sec.14)	Market Committee grnats/renews licences to all functionaries [Sec.17(i)]
9.	Appellate Authority	Marketing Board/State Govt.	Director/State Govt. [Sec.27(5)]	Director of Marketing Divisional Commissioner (Sec.34)	Director of Agril.Marketing State Govt. (Sec.9)	Marketing Board (Sec.40) State Govt.(Sec.42)	Director of Agril. Marketing, State Govt. (Sec.16)	Marketing Board (Sec.25)
10.	Market Year	1st April – 31st March	1st Oct.- 30th September	1st Oct.- 30th September	1st Oct.- 30th September	1st April – 31st March	1st April – 31st March	1st April – 31st March
11.	Authority to order production of account of traders and power of entry, inspection and seizure	Any officer or servant of Market Committee authorized by the Chairman of M.C. has power to order production of accounts, power of entry and seizure (Sec.31B)	Chairman, Vice-Chairman or Secretary of M.C. or any member, officer or servant authorized by M.C. has power to entey, search and seizure (Sec.29)	Any officer or servant of the Board or Market Committee empowered by State Govt.has power to order production of accounts and has power to entry, inspection and seizure (Sec.20)	Any officer or servant of market committee as authorized by M.C. has power to order production on accounts and has power to entry inspection and seizure (Sec.32A)	Any officer empowered by the Board, has power to order production of accounts and power of entry, inspection and seizure (Sec.33A)	Secretary of the Market Committee or any offer authorized by State Govt. has power to order production of accounts and power of entry search and seizure (Sec.27B)	Secretary of the Market Committee or nay officer authorized by the State.Govt. or the board, has power to inspect, entry, search and seizure. (Sec.36)
12.	Agricultural Produce as defined in the Act.	Any produce whether processed or unprocessed of agriculture, horticulture, animal husbandry, forest produce, sericulture, pisciculture, as specified in the schedule.	All produce whether processed or not of agriculture, horticulture, animal husbandry as specified in the schedule.	All produce whether processed or not of agriculture, horticulture, pisciculture or forest as specified in the schedule.	All produce whether processed or not of agriculture, horticulture, animal husbandry, pisciculture, forest as schedule.	All produce whether processed or not of agriculture, horticulture, animal husbandry or forest as specified in the schedule (except wool, goat hair and camel hair, no livestock or livestock products are included in the schedule	All produce whether of agriculture, horticulture, animal husbandry or otherwise as specified in the schedule (except wool and ghee, no livestock or are included in the schedule at preset)	Such items of produce whether processed or unprocessed of agriculture, horticulture, viticulture, apiculture, sericulture, pisciculture, animal husbandry or forest as specified in the schedule and includes admixture of two or

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Annexure – II

MODEL AGREEMENT FOR CONTRACT FARMING

(All clauses of the agreement are subject to the respective explanatory notes given under "contents of a model contract farming agreement")

THIS AGRFEEMENT is made and entered in to at_____on the _____day of _____, 2003 between_____ age _____ residing at _____ , herein after called the party of the First part (which expression shall unless repugnant to the context of meaning thereof mean and include his heirs, executors, administrators and assigns) of the one part, and M/s _____ a Pvt./ Public Limited Co. incorporated under the provisions of Companies Act-1956 and having its registered office at _____ herein after called the party of the Second part (which expression shall unless repugnant to the context or meaning thereof mean and include its successors and assigns) of the other part.

WHEREAS the party of the First part is the owner/cultivator of the agricultural land bearing the following particulars.

Village	Gut.No.	Area in Hectare	Tehsil & Distt.	State

AND WHEREAS, the party of the Second part is trading in agricultural produce and also providing technical know-how in respect of land preparation, nursery, fertilization, pest management, irrigation, harvesting and alike things.

AND WHEREAS the party of the Second part is interested in the items of the agricultural produce more particularly mentioned in Schedule – I hereto annexed and at the request of the party of the Second part, party of the First part has agreed to cultivate and produce the items of agricultural produce mentioned in the Schedule – I hereto annexed.

AND WHEREAS the parties hereto have agreed to reduce in writing the terms and conditions in the manner hereinafter appearing.

NOW, THESE PRESENCE WITNESSTH AND IT IS HREBY AGREED BY AND BETWEEN THE PARTIES AS FOLLOWS**:**

Clause – 1

The party of the First part agrees to cultivate and produce and deliver to the party of the Second part and the party of the Second part agrees to buy from the party of the first part the items of the agricultural produces particulars of the items, quality, quantity and price of the items are more particularly mentioned in the Schedule – I hereto annexed.

Clause – 2

The agricultural produce particulars of which are mentioned in the Schedule – I hereto will be supplied by the party of the First part to the party of the Second part within the period of _____ months/years from the date hereof.

OR

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It is expressly agreed between the parties hereto that this agreement is for agricultural produce particulars of which are described in Schedule – I hereto and for a period of _____ months/years and after the expiration of said period, this agreement will automatically come to an end.

Clause – 3

The party of the First part agrees to cultivate, produce and supply quantity mentioned in the Schedule – I hereto annexed to the party of the Second part.

Clause – 4

The party of the First part agrees to supply the quantity contracted according to the quality specifications stipulated in Schedule – I. If the agricultural produce is not as per the agreed quality standards, the party of the Second part will be entitled to refuse to take the delivery of the agricultural produce only on this count. Then

a) The party of the First part shall be free to sell the produce to the party of the Second part at a mutually renegotiated price

OR

b) In open market (to bulk Buyer viz. exporter / processor / manufacturer etc.) and if he gets a price less than the price contracted, he will pay to the party of the Second part, for his investment proportionately less

OR

c) In the market yard and if the price obtained by him is less than contracted price, then he will return proportionately less for the party of the Second investment.

In the event the party of the Second part refuses/fails to take the delivery of the contracted produce for his own reasons then the party of the First part will be free to sell the produce in the open market and if the price received is lower than the contracted price the difference will be on account of the party of the Second part and the party of the second part shall pay the said difference to the party of the First part within a period of _____ days from asserting the said difference.

Clause – 5

The party of the First part agrees to adopt instructions / practices in respect of Land preparation, nursery, fertilization, pest management, irrigation, harvesting and any other, as suggested by the party of the Second part from time to time and cultivate and produce the items as per specifications mentioned in the Schedule – I hereto.

Clause – 6

It is expressly agreed by and between the parties hereto that buying will be as per the following terms and buying slips will be issued immediately after the purchase.

Date	Delivery Point	Cost of Delivery

It is further agreed that it will be the responsibility of the party of the Second part to take into possession of the contracted produce at the delivery point agreed after it is offered for delivery and if he fails to take delivery

Contd..3/-

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within _____ period then the party of the First part will be free to sell the agriculture produce contracted as under **:**

a) In open market (to bulk Buyer viz. exporter / processor / manufacturer etc.), and if he gets a price less than the price contracted, he will pay to the party of the Second part for his investment proportionately less.

b) In the market yard, and if the price obtained is less than contracted price then he will return proportionately less to the party of the Second part for his investment.

It is further agreed that the quality maintenance in transit will be the responsibility of the party of the Second part and the party of the First part shall not be responsible or liable for the same.

Clause - 7

The party of the Second part shall pay to the party of the First part the price / rate mentioned in Scheduled – I when his crop has been harvested and delivered to the party of the Second part after deducting all outstanding advances given to t party of the First part by the party of the Second part. The following schedule shall be followed for the payment.

Date	Mode of Payment	Place of Payment

Clause - 8

The parties hereto shall insure the contracted produce mentioned in Schedule – I hereto, for the period of _____against the risk of losses due to acts of Gods destruction of specified assets, loan default and production and income loss anal other acts or events beyond the control of the parties, such as very low production caused by the serious outbreak of a disease, epidemic or by abnormal weather condition, floods, drought, hailstorm, cyclones, earthquakes, fire or other catastrophes, war, acts of Government, action exiting on or after the effective date of this agreement which prevent totally or partially the fulfillment of the obligation of the farmer. Upon request, the party of the First part invoking such acts shall provide to the other party confirmation of the existence of facts. Such evidence shall consist of a statement of certificate of the appropriate Government Department. If such a statement or certificate cannot reasonably be obtained, the party of the First part claiming such acts may as substitute, thereof, make a notarial statement describing in details the facts claimed and the reasons why such a certificate or statement confirming the existence of such facts. Alternatively, subject to the mutual agreement between the two parties, the party of the First part may fill his quota of the produce through other sources and the loss suffered by him thereby due to price difference, shall be shared equally between the parties, after taking into account the amount recovered from the insurance company, the insurance premium shall be shared equally by both the parties.

Clause – 9

The party of the Second part hereby agrees to provide following services to the party of the First part during the period of cultivation and post harvest management, particulars of which services are as follows:

1.
2
3
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Clause – 10

The party of the Second part or it's representatives agrees to have regular interactions with the farmers forum set up / named by the party of the First part during the period of contract.

Clause – 11

The party of the Second part or it's representatives at their cost shall have the right to enter the premises / fields of the party of the First part to monitor farming practices adopted and the quality of the produce from time to time.

Clause – 12

The party of the Second part confirms that he has registered himself with the Registering Authority _____ on _____ and shall pay the fees in accordance with the law prevailing in this regard to the Registered Authority which has jurisdiction to regulate the marketing of agriculture produce which is cultivated on the land described _____ **OR** The party of the Second part has registered himself on _____ with a single point registration Authority namely _____ prescribed by the State in this regard. The fees levied by the respective Registering Authority shall be borne by the party of the Second part exclusively and will not be deducted in any manner, whatsoever, from the amounts paid to the party of the First part.

Clause – 13

The party of the Second part will have no rights whatsoever as to the Title, Ownership, Possession of the land / property of the party of the First part nor will it in any way alienate the party of the First part from the land property particularly nor mortgage, lease, sublease or transfer the land property of the First party in any way to any other person / institution during the continues of this agreement.

Clause – 14

The party of the Second part shall submit true copy of this agreement signed by both the parties within a period of 15 days from the date of execution thereof with the _____ market committee / registering authority as required by the APMR Act / any other registering authority prescribed for the purpose.

Clause – 15

Dissolution, Termination / Cancellation of the Contract will be with consent of both the parties. Such dissolution or termination / cancellation deed will be communicated to the registering authority within 15 days of such dissolution, termination / cancellation.

Clause – 16

In the event of any dispute or difference arising between the parties hereto or as to the rights and obligations under this agreement or as to any claim, monetary or otherwise of one party against the other or as to the interpretation and effect of any terms and conditions of this agreement, such dispute or difference shall be referred to arbitration authority constituted for the purpose of Authority declared by State Government in this regard.

Clause – 17

In case of change of address of any party to this agreement, it should be intimated to the other party and also to the Registering Authority.

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Clause – 18

Each party hereto will act in good faith diligently and honestly with the other in the performance of their responsibilities under this agreement and nothing will be done to jeopardize the interest of the other.

In witness whereof the parties have signed this agreement on the _____ day, _____month and _____ year first above mentioned.

SIGNED, SEALED AND DELIVERED by the withinnamed 'PARTY OF THE FIRST PART' in the presence of _____
1._____
2._____

SIGNED, SEALED AND DELIVERED by the withinnamed 'PARTY OF THE SECOND PART' in the presence of _____
1._____
2._____

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Schedule – I

GRADE, SPECIFICATION, QUANTITY AND PRICE CHART

Grade	Specification	Quantity	Price / Rate
Grade 1 or A	Size, Colour, Aroma etc		
Grade 2 or B : : : : : : : :			

Supporting Legislation on Contract Farming (to be inserted in State APMC Act)

Definition : **"Contract Farming"** means farming by a person called "Contract Farming Producer Under a written agreement with another person called "Contract Farming Sponsor" to the effect that his farm produce shall be purchased as specified in the agreement.

Explanation : 'Contract Farming Producer' means individual agriculturist or association of agriculturist by whatever name called registered under any law for the time being inforce. In North Eastern States where the ownership or control over the agricultural lands lies with village panchayats or similar bodies legally recognized, such body will treated as 'Contract Farming Producer'.

"Contract Farming Agreement" means the agreement made for contract farming between Contract Farming Sponsor and Contract Farming Producer.

Procedure and Form of contract farming agreement : Contract Farming agreements shall be governed in the manner laid down hereinafter.

1) Contract farming Sponsor shall register himself with the Market Committee or with a prescribed officer in such a manner as may be prescribed.

2) The Contract Farming Sponsor shall get the contract farming agreement recorded with the officer prescribed in this behalf. The contract farming agreement shall be in form containing such particulars and terms and conditions as may be prescribed.

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Notwithstanding anything contained in contract farming agreement, no title, rights, ownership or possession shall be transferred or alienated or vest in the contract farming sponsor or his successor or his agent as a consequence arising out of the contract farming agreement.

3) Disputes arising out of contract farming agreement may be referred to an authority prescribed in this behalf for settlement. The prescribed authority shall resolve the dispute in a summary manner within thirty days after giving the parties a reasonable opportunity of being heard, in the manner prescribed.

4) The party aggrieved by the decision of the prescribed authority under sub-section (3) may prefer an appeal to an Appellant Authority within thirty days from the date of decision. The Appellant Authority shall dispose off the appeal within thirty days after giving the parties a reasonable opportunity of being heard and the decision of the Appellant Authority shall be final.

5) The decision by the authority under sub section (3) and decision in appeal under sub section (4) shall have force of the decree of the civil court and shall be enforceable as such and decretal amount shall be recovered as arrears of land revenue.

6) Disputes relating to and arising out of contract farming agreement shall not be called in question in any court of law than otherwise provided herein above.

7) The agricultural produce covered under the Contract Farming agreement may be sold to the Contract Farming Sponsor out side the market yard and in such a case, no market fees will be levied.

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Annexure – III

MODEL AGREEMENT FOR CONTRACT FARMING

(All clauses of the agreement are subject to the respective explanatory notes given under "Contents of a model contract farming agreement)

1. Parties to the Agreement

This agreement is executed Between Contract Farming Sponsor, herein after called Party of the First part.

and

Contract Farming Producer/s herein after called Party of the Second part At_____ on this _____ day of 2003, on terms and conditions hereinafter mentioned.

2. Description of Farm land covered by the agreement

The party of the Second part agrees to produce and deliver to the party of the First part and the party of the First part agrees to buy from the party of the Second part, the items of the agricultural produce described in clause 4, on the lands mentioned (owned/cultivated) below :-

3. Duration of the Agreement

The agricultural produce mentioned in clause 4 will be supplied to the party of the First part within a period of _____ Months/Years from the date hereof. OR This agreement is between the party of the First part and party of the Second part for agricultural produce described in clause 4 for a period of _____ Months/years.

4. Description of Farm Produce

The party of the Second part agrees to produce for the party of the First part, the items of agricultural produce mentioned below as per Schedule 1 annexed herewith.

5. Quantity Specification

The Second party agrees to supply quantity mentioned in the schedule 1, to the First party.

6. Quality Specifications of Commodity Contracted

The Second party agrees to supply the quantity contracted according to the quality specifications stipulated in Schedule 1. It the agricultural produce is not as per the agreed quality standards, the party of the First part will be entitled to refuse to take the delivery of the agricultural produce only on this count. Then

a) The party of the Second part shall be free to sell the produce to the party of the First part at a mutually re-negotiated price

OR

b) n open market (to bulk Buyer viz. exporter/ processor/manufacturer etc.) and if he gets a price less than the price contracted, he will pay to the party of the First part, for his investment proportionately less

OR

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c) In the market yard and if the price obtained by him is less than contracted price, then he will return proportionately less for the party of the First parts investment.

In the event the party of the First part refuses/fails to take the delivery of the contracted produce for his own reasons then the party of the Second part will be free to sell the produce in the open market and if the price received is lower than the contracted price the difference will be on account of the party of the First part and shall be recoverable as per the procedure of law.

b) Cultivation/Input Specifications.

The party of the Second part agrees to adopt instructions/practices in respect of Land preparation, nursery, fertilization, pest management, irrigation, harvesting and any other, as suggested by the party of the first part from time to time.

b) Crop Delivery Arrangements

Buying will be as per the following terms and buying slips will be issued immediately after the purchase.

Date **Delivery point** **Cost of delivery**

It will be the responsibility of the party of the First part to take into possession the contracted produce at the delivery point agreed after it is offered for delivery and if he falls to take delivery within _____ period then the party of the Second part will be free to sell the agriculture produce contracted.

b) In the bulk buyer viz. exporter/ processor/ manufacturer etc.), and if it gets a price less than the price contracted, it will pay to the party of the First part for his investment proportionately less.

OR

b) In the market yard, and if the price obtained is less than the contracted price then it will return proportionately less to party of the First part for his investment. Quality maintenance in transit will be the responsibility of the party of the First part.

9. Pricing Arrangements

The party of the Second part will be paid as per the price/rate mentioned in Scheduled 1 when his crop has been harvested and delivered to the party of the First part and all outstanding advances given to him have been deducted. The following schedule shall be followed for the payment.

Date **Mode of payment** **Place of payment**

10. Insurance Arrangement.

The party of the First part and the party of the Second part shall insure the contracted produce mentioned in clause 4, for the period of _____ against the risk of losses due to acts of Gods, destruction of specified assets, loan default and production and income loss and all other acts or events beyond the control of the parties, such as very low production caused by the serious outbreak of a disease, epidemic or by abnormal weather condition, floods, drought, hallstom, cyclones, earthquakes, fire or other catastrophes, war, acts of Government, action existing on or after the effective date of this agreement which prevent totally or partially the fulfillment of the obligation of the farmer. Upon request, the party of the Second part invoking such acts shall provide to the other party

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confirmation of the existence of facts. Such evidence shall consist of a statement of certificate of the appropriate Government Department. If such a statement or certificate cannot reasonably be obtained, the party of the Second part claiming such acts may as substitute, thereof, make a notarial statement describing in details the facts claimed and the reasons why such a certificate or statement confirming the existence of such facts. Alternatively, subject to the mutual agreement between the two parties, the party of the Second part may fill his quota of the produce through other sources and the loss suffered by him thereby due to price difference, shall be shared equally between the parties, after taking into account the amount recovered from the insurance company. The insurance premium shall be shared equally by both the parties.

11. Support Services to be Provided by the Party of the First Part.

The First party of the agreement hereby agrees to provide following services to the Second party during the period of cultivation and post harvest management.

12. Farmer-Management Forum.

The party of the First part or it's representatives agrees to have regular interactions with the farmers forum set up/named by the party of the Second part during the period of contract.

13. Monitoring Quality and Yields.

The party of the First part or it's representatives shall have the right to enter the premises/fields of the party of the Second part to monitor farming practices adopted and the quality of the produce from time to time.

14. Registration of Contract farming Agreements and Dispute Resolution Mechanism.

The party of the First part confirms that he has registered himself with the Registering Authority _____ on _____ and shall pay the fees in accordance with the law prevailing in this regard to the Registering Authority which has jurisdiction to regulate the marketing of agriculture produce which is cultivated on the land described in clause2. **OR** The party of the First part has registered himself on _____ with a single point registration Authority namely _____ prescribed by the State in this regard. The fees levied by the respective Registering Authority shall be borne by the party of First part exclusively and will not be deducted in any manner, what-so-ever, from the amounts paid to the party of the Second part.

In the event of any dispute or difference arising between the parties hereto or as to the rights and obligations under this agreement or as to any claim, monetary or otherwise of one party against the other or as to the interpretation and effect of any terms and conditions of this agreement, such dispute or difference shall be referred to arbitration authority constituted for the purpose or Authority declared by State Government in this regard.

15. Indemnity in favour of party of the Second part.

The party of the First part will have no rights whatsoever as to the Title, Ownership, Possession of the land/property of the party of the party of the Second part which is particularly described in clause 2, of this agreement nor will it in any way alienate the party of the Second part from the land property particularly described in clause 2, not mortgage, lease, sublease or transfer the land property of the Second party in any way to any other person/institution.

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16. Submission of Agreement for Registration.

Copy of this agreement signed by both the parties will be submitted within a period of 15 days by the party of the First part with the _____ market committee/ registering authority as required by the APMR Act/ any other registering authority prescribed for the purpose.

17. Dissolution of Contract.

Dissolution of Contract will be with consent of both the parties and such dissolution deed will be communicated to the registering authority within 15 days of such dissolution.

18. Change of address of either parties.

In case of change of address of a party, it should be intimated to the other party and also to the Registering Authority.

Each party hereto will act in good faith diligently and honestly with the other in the performance of their responsibilities under this agreement and nothing will be done to jeopardize the interest of the other.

In witness whereof the parties have signed this agreement on the _____ day, _____ month and the _____ year first above mentioned.

PARTY OF THE FIRST PARTPARTY OF THE SECOND PART
(Authorized signatory, stamp & name)

(Authorized signatory/Thumb Impression & Name)

Witnesses
(Name, full address)

Witnesses
(Name, full address)

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ANNEXURE - IV

CODEX STANDARD FOR WHEAT *(CODEX STAN 199 – 1995)*

The Annex to this standard contains provisions, which are not intended to be applied within the meaning of the acceptance provision of Schedule 4 A(1)(b) of the General Practice of the Codex Alimentarius.

1. SCOPE : This standard applies to wheat grains and durum wheat grains as declined in schedule 2 intended for processing for human consumption. It does not apply to club wheat ***(Triticum compactum Host.)***, red durum wheat, durum wheat semolina or products deriven from wheat.

2. DESCRIPTION :

2.1 Wheat is the grain obtained from varieties of the species ***Triticum aestivum L.***

2.2 Durum wheat is the grain obtained from varieties of the species ***Triticum Durum Desf.***

3. ESSENTIAL COMPOSITION AND QUALITY FACTORS :

3.1 Quality and Safety Factors General

3.1.1 Wheat and durum wheat shall be safe and suitable for processing for human consumption.

3.1.2 Wheat and durum wheat shall be free from abnormal flavours, odours, living insects and mites.

3.2 QUALITY FACTORS SPECIFIC :

3.2.1 Moisture Content

	Maximum Level
Wheat	**14.5 % m/m**
Durum Wheat	**14.5 % m/m**

Lower moisture limit should be required for certain destinations in relation to the climate, duration of transport and storage. Governments accepting the Standards are requested to indicate and justify the requirement to enforce in their country.

3.2.2 ERGOT :

Selerotium of the fungus *Claviceps purpurea*

	Maximum Level
Wheat	**0.05 m/m**
Durum Wheat	**0.05 m/m**

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Extraneous matter are all organic and inorganic materials other than wheat and durum wheat, broken kernels, other grains and filth.

3.2.3.1 Toxic or Noxious Seeds :

The products covered by the provisions of these standards shall be free from the following toxic or noxious seeds in amount which may represent a hazard to the human health.

Crotolaria **(*Crotalaria – Spp.)***, Corn Cockle **(*Agrostemma githago L.*)**, Castorbeans **(*Ricinus Communis L.*)**, Jimson weed **(*Datura Spp.*)**, and other seeds that are recognized as harmful to health..

3.2.3.2 Filth :

Impurities of animal origins, (including dead insects) - 0.1 % m/m maximum

3.2.3.3 Other organic extraneous matter which is defined as organic components other than edible grains of cereals (foreign seeds, stems etc.)

	Maximum Level
Wheat	1.5% m/m
Durum Wheat	1.5% m/m

3.2.3.4 Inorganic extraneous matter which is defined as inorganic components (stones, dust etc.)

	Maximum Level
Wheat	0.5% m/m
Durum Wheat	0.5% m/m

4. CONTAMINANTS :

4.1 Heavy Metals :

The products covered by the provisions of the standards shall be free from heavy metals in amount which may represent a hazard to human health.

4.2 Pesticides Residues :

Wheat and durum wheat shall comply with those maximum residue limits established by the Codex Alimentarius Commission for this commodity.

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5. HYGIENE :

5.1 It is recommended that the product covered by the provision of this standard be prepared and handled in accordance with the appropriate sections of the Recommended International Code of Practice General Principle of Food Hygiene (CAC / RCP 1-1969, Rev. 2-1985), and other Codes of Practice recommended by the Codex Alimentarius Commission which are relevant to this product.

5.2 To the extent possible in goods manufacturing practices the cleaned product shall be free from objectional matter.

5.3 When tested by appropriate methods of sampling and examination, the product, after cleaning and sorting, and before further processing.

- ★ **shall be free from micro-organism in amount which may represent a hazard to health;**
- ★ **shall be free from parasites which may represent a hazard to health; and**
- ★ **shall not contain any substance originating from micro-organisms, including fungi, in amount which may represent a hazard to health.**

6. PACKAGING :

6.1 Wheat and durum wheat shall be packaged in containers which will safeguard the hygienic, nutritional, technological and organoleptic of the product.

6.2 The containers, including packaging material, shall be made of substances which are safe and suitable for their intended use. They should not impart any toxic substance or undesirable odour or flavour to the product.

6.3 When the product is packed in sacks, must be clean, sturdy and strongly sewn or sealed.

7. LABELLING :

In addition to the requirement of the Codex General Standard for the labelling of Prepackaged Foods (CODEX STAN 1-1985, Rev 1-1991, Codex Alimentarius Volume 1 A), the following specific provisions applied.

7.1 Name of the Product :

The name of the product to be shown on the label shall be ***" wheat "*** or ***"durum wheat"*** as applicable.

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7.2 Labeling of Non-Retail Containers :

Information for non-retail containers shall be given either on the container or to accompanying documents, except that the name of the product, lot identification and the name and address of the manufacturer or packer shall appear on the container. However, lot identification and the name and address of the manufacturer or packer may be replaced by an identification mark, provided that such a mark is clearly identifiable with the accompanying documents.

8.0 Methods of Aanalysis :

Sl. No.	Factor / Description	Limit		Method of Analysis
		Wheat	Durum Wheat	
1.	2.	3.	4.	5.
1.	**Minimum test weight :** the weight of a hundred litre volume expressed in kilogram's per hectoliter.	68	70	The test weight shall be the weight per ISO 7971-1988 expressed in kilogram's per hectoliter as determined on a test portion of the original sample.
2.	**Shrunken and broken kernels:** broken or shrunken wheat or durum wheat which will pass through a 1.7 mm x 20 oblong-holed metal sieve for wheat and through a 1.9 mm x 20 oblong-holed metal sieve for durum wheat.	5.0% m/m max	6.0 % m/m max	ISO 5223-1988 Test sieves for cereals
3.	**Edible Grains other than wheat and durum wheat** (Whole or identifiably broken)	2.0 % m/m max	3.0% m/m max	ISO 7970-1987 : (Annex C)
4.	**Damaged kernels** (including pieces of kernels that show visible deterioration due to moisture, weather, disease, mould, heating, fermentation, sprouting, or other causes.)	6.0 % m/m max	4.0 % m/m max	ISO 7970-1987 : (Annex C)
5.	**Insect bored kernels :** kernels which have been visibly bored or tunneled by insects.	1.5 % m/m	2.5 % m/m	To be developed

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