POST HARVEST PROFILE OF BLACK GRAM

GOVERNMENT OF INDIA
MINISTRY OF AGRICULTURE
(DEPARTMENT OF AGRICULTURE AND COOPERATION)
DIRECTORATE OF MARKETING AND INSPECTION
BRANCH HEAD OFFICE
NAGPUR – 440001

MRPC-71

P R E F A C E

Black gram (*Vigna Mungo* L.), is one of the important pulses crop, grown throughout the country. The crop is resistant to adverse climatic conditions and improve the soil fertility by fixing atmospheric nitrogen in the soil. It has been reported that the crop produces equivalent to 22.10 kg of N/ha., which has been estimated to be supplement of 59 thousand tonnes of urea annually. The pulse 'Black gram' plays an important role in Indian diet, as it contains vegetable protein and supplement to cereal based diet. It contains about 26% protein, which is almost three times that of cereals and other minerals and vitamins. Besides, it is also used as nutritive fodder, specially for milch animals.

The profile on Black gram has been prepared on the recommendation of the Inter-Ministerial Task Force on Agricultural Marketing Reform (May-2002). The main object of the profile is aimed at to facilitate producers to know when, where and how to market the produce to get better prices on one hand and also to help the traders as well as the research scholars on other hand. The profile covers all aspects of Post-harvest management, market practices, marketing channels, marketing problems, institutional facilities, marketing services, marketing information and extension, various govt. marketing schemes etc.

The profile has been prepared by Shri M.P. Parashar, Marketing Officer, under the supervision and guidance of Shri B.D. Sherkar, Dy. AMA, Directorate of Marketing & Inspection, Branch Head Office, Nagpur.

The Directorate of Marketing & Inspection acknowledges the assistance and cooperation extended by various institutions / organisations in supplying the relevant data/information required for compilation of this profile.

The Govt. of India should not be regarded as assuming responsibility for any of the statements/contents, in this profile.

-sd-
(R.S.Kanade)
Agricultural Marketing Adviser
to the Govt. of India

Faridabad
Date:**Sept. 8th , 2006**

POST-HARVEST PROFILE OF BLACK GRAM

CONTENTS

1.0 INTRODUCTION

Black gram or urid is one of the important pulse crop in India. Black gram (*Vigna mungo* L) reported to be originated in India**.** Its references have also been found in Vedic texts such as Kautilya's 'Arthasasthra' and in 'Charak Samhita' lends support to the presumption of its origin in India. India is the largest producer and consumer of Black gram in the world.

Black gram is a rich protein food. It contains about 26 percent protein, which is almost three times that of cereals. Black gram supplies a major share of protein requirement of vegetarian population of the country. It is consumed in the form of split pulse as well as whole pulse, which is an essential supplement of cereal based diet. The combination of dal-chawal (pulse-rice) or dal-roti (pulse-wheat bread) is an important ingredient in the average Indian diet. The biological value improves greatly, when wheat or rice is combined with Black gram because of the complementary relationship of the essential amino acids such as arginine, leucine, lysine, isoleucine , valine and phenylalanine etc.

In addition, being an important source of human food and animal feed**,** it also plays an important role in sustaining soil fertility by improving soil physical properties and fixing atmospheric nitrogen. Being a drought resistant crop, it is suitable for dryland farming and predominantly used as an intercrop with other crops. The chemical composition of Black gram is given as under:

Table No. 1:

Chemical composition of Black gram

Calorific value (cal./ 100g)	Crude protein (%)	Fat (%)	Carb-ohyd-rate (%)	Ca (mg/ 100g)	Fe (mg/ 100g)	P (mg/ 100g)	Vitamine(mg/100g)		
							B_1	B_2	Niacine
350	26.2	1.2	56.6	185	8.7	345	0.42	0.37	2.0

Source: Pulse Crops, IARI, New Delhi

1.1 Botanical description

Black gram [*Vigna mungo* L] belongs to family Leguminoseae. The plant attains a height of 30 to 100 centimeters, with stem lightly ridged, covered with brown hairs and much branches from the base. The leaves are large, trifoliate and are also hairy, generally with a purplish tinge. The pods are long and cylindrical and about 4 to 6 centimeters in length. There are four to ten seeds in a pod. The seeds are generally black or very dark brown.

This crop is itself a mini-fertilizer factory, as it has unique characteristics of maintaining and restoring soil fertility through fixing atmospheric nitrogen in symbiotic association with Rhizobium bacteria, present in the root nodules. Crop is suitable for inter cropping with different crops such as cotton, sorghum, pearl millet, green gram, maize, soybean, groundnut, for increasing production and maintaining soil fertility.

2.0 PRODUCTION

2.1 Major producing states in India

Black gram is one of the most widely cultivated pulse crops in the country. It is grown over on an area of 30,11,300 hectares with a production of 12,95,400 tonnes in 2000-2001. Area, Production and Yield of Black gram in the country, during the years 1998-99 to 2000-2001, are furnished as under.

Table No. 2:

All-India Area, Production and Yield of Black gram from 1998-99 to 2000-01

Area: '000 hectares

Production: '000 tonnes

Yield: Kg/ha.

Year	Area	Production	Yield
1998-1999	2916.00	1350.00	483
1999-2000	2939.40	1330.80	453
2000-2001	3011.30	1295.40	431

Source: Directorate of Pulses Development, Bhopal

2.2 State-wise area, production and yield

State-wise area, production and yield of Black gram in major producing states in the country, during 1998-1999 to 2000-2001 are as under:

Table No. 3:

Area, production and yield of Black gram in major producing states In India

Area: '000 hectares

Production: '000 tonnes

Yield: Kg/ha.

State	Area			Production			Yield		
	1998-1999	1999-2000	2000-2001	1998-1999	1999-2000	2000-2001	1998-1999	1999-2000	2000-2001
Andhra Pradesh	430.00	460.70	554.80	262.00	295.10	390.30	609	641	703
Gujarat	125.20	109.30	84.00	75.20	38.40	24.70	601	351	294
Karnataka	142.70	130.00	145.50	50.60	43.20	55.90	365	332	384
Madhya Pradesh	554.30	562.70	420.20	175.50	177.40	105.80	317	315	252
Maharashtra	546.10	568.10	574.00	344.40	227.60	205.10	631	400	357

Orissa	131.30	131.90	109.10	23.20	25.40	27.30	177	193	250
Punjab	4.20	4.10	3.30	2.00	1.90	1.60	476	463	485
Rajasthan	172.00	119.50	112.80	54.70	33.90	32.50	318	283	288
Sikkim	4.40	4.40	3.80	3.10	3.40	2.80	705	773	737
Tamil Nadu	208.40	263.8/0	275.60	109.40	118.80	127.20	524	450	462
Uttar Pradesh	348.40	331.00	385.20	105.80	147.30	162.90	304	445	423
West Bengal	74.00	84.1	70.10	34.80	53.90	36.60	470	641	522
Others	175.00	169.8	272.90	109.30	164.60	122.70	625	969	450
All India	**2916.00**	**2939.40**	**3011.30**	**1350.00**	**1330.90**	**1295.40**	**462**	**453**	**431**

Source: Directorate of Pulses Development, Bhopal.

It reveals that Andhra Pradesh occupied 555 thousand hectares (18 percent) of area and the largest producer of Black gram accounting for 30 percent (390 thousand tonnes) of the total production, during 2000-2001 in country, followed by Maharashtra, 574 thousand hectares (19 percent) with production 205 thousand tonnes (16 percent). The area under Black gram in Uttar Pradesh was 385 thousand hectares (13 percent) with production 163 thousand tonnes (13 percent), whereas in Tamil Nadu, the area and production was 276 thousand hectares (9 percent) and 127 thousand tonnes (10 percent) respectively. Similarly, in Madhya Pradesh, the area under the crop was 420 thousand hectares (14 percent) with the production of 106 thousand tonnes (8 percent). These five major states together contribute about 73 percent of total area and 76 percent of total production, under the Black gram, during the said period.

However, in case of productivity, Sikkim stood first (737 Kg/ha.), followed by Andhra Pradesh (703 kg/ha), West Bengal (522 Kg/ha.), Punjab (485 Kg/ha.), Tamil Nadu (462 Kg/ha), Uttar Pradesh (423 kg/ha), Maharashtra (357 kg/ha) and Madhya Pradesh (252 kg/ha) during the period 2000-2001.

2.3 State-wise major commercial varieties

Table No. 4:

Improved varieties of Black gram grown in different states in India

S. No.	State	Season	Name of variety
		Kharif and Rabi	T-9, LBG-20, LBG-26, LBG-623

1	Andhra Pradesh	Rabi	LBG-611, LBG-17, LBG-645, LBG-685, LBG-648, LBG-639
2	Gujarat	Kharif	T-9, TAU-1
3	Karnataka	Kharif and Rabi	KARGAUN, TAU-1, T-9
4	Madhya Pradesh	Kharif	Pant-U-19, TPU-4, P.D.U.-4, R.U.-2, Pant-30
5	Maharashtra	Kharif	T-9, Lal Urd, Hara Urad, Kale Urad
6	Orissa	Summer	Pant U-26
		Rabi	KV-301,TU-942
		Kharif and Rabi	WBU-108
		Kharif and Summer	Pant U-19, Sarala, Pant U-30
		Kharif, summer and Rabi	T-9
7	Punjab	Kharif	Mash-338, Mash-1
8	Rajasthan	Kharif	T-9, PU-19, R.B.U.-38, T-9
		Summer	T-9

9	Tamil Nadu	Kharif and Rabi	ADT3, ADT4, ADT5, RM2, TMV1, VBN2, VAMBAN1, VBN3
		Kharif, Rabi and Summer	VBN(BG)4
10	Uttar Pradesh	Kharif and summer	I.P.U. 94-1, Narendra Urd-1, T-9, T-27, P.D.U. –1,Pant U-19, Pant U-35, Pant U-30, Shekhar-2
		Kharif	T-65, Azad-1
11	West Bengal	Kharif and Rabi	T-122, T-27, T-9

Source: Regional offices / Sub offices, DMI

3.0 Post-harvest Management

3.1 Harvesting care

Following care should be taken during harvesting:

- Harvesting should be done timely. Timely harvesting ensures optimum grain quality and consumer acceptance.
- Harvesting before the crops mature, usually result lower yields, higher proportion of immature seeds, poor grain quality and more chances of disease attack during storage.
- Delay in harvesting, results in shattering of pods and other losses caused by birds, rats, insects etc.
- Harvest the crop, when a large percentage of the pods are fully matured.
- Separate out the admixtures of other crop prior to harvesting,
- Avoid harvesting during adverse weather condition i.e. rains and overcast weather.
- Avoid pest infestation prior to harvesting.
- Use proper harvest equipment i.e., sickle etc.
- All the harvested stems should be kept in one direction in order to ascertain efficient threshing.
- The harvested bundles should be stacked in a dry place. The stacking should be cubical to facilitate circulation of the air around.
- Keep the harvested stems for drying in the sun.
- Keep the harvested crop separately from one variety to another to get true type of variety

3.2 Post-harvest losses

There is a sizeable quantitative and qualitative loss of Black gram during different post-harvest operations like threshing, winnowing, transportation, and storage. The post-harvest losses reported to be 2.46 percent. The estimated post-harvest losses at various stages are given below:

Table No. 5:
Estimated post-harvest losses of Black gram

Sl.No.	Stages	Production loss (Percent)
1.	Threshing	0.65
2.	Winnowing	0.62
3.	Field to threshing floor	0.70
4.	Threshing floor to storage	0.19
5.	During storage	0.30
	Total	**2.46**

Source: Report on "Marketable surplus and Post Harvest Losses of Black gram in India-2002", Directorate of Marketing and Inspection.

3.3 Grading

Grading means the sorting of the homogenous lots of the produce according to the fixed grade standard.

3.3.1 Benefits of grading:

i) The grading is beneficial to the farmers, traders as well as to the consumers.

ii) Grading of the produce before sale enables farmers to get better price for their produce.

iii) Grading helps the consumers to get standard quality produce at fair price.

iv) It facilitate the consumer to compare the prices of different qualities of a produce in the market.

v) It assures the quality of the graded produce and also reduces the cost of the marketing.

vi) Buyers offer price on the visual examination of whole lot considering the quality factors like size, colour of the grains, moisture content, refraction and admixture with other varieties.

3.3.2 Grade Specifications

1) Grading under AGMARK:

A) Grade specification of quality of Black gram (Urd Whole)

I) General characteristics:

Black gram (Urd whole) shall be: –

a) The dried mature seeds of Pulse (Phaseolus mungo Linn);

b) Sweet, clean, wholesome, uniform in size, shape, colour and in sound merchantable conditions;

c) Free from living and dead insect, fungus infestation, added colouring matter, moulds, obnoxious smell, discolouration;

d) Free from rodent hair and excreta; and

e) Free from toxic and noxious seeds viz, Crotolaria(Crotolaria spp.), Corn cockle (Agrostemma githgo L.), Castor bean(Ricinus communis L.), Jimson weed (Dhatura spp.), Argemone mexicana, Khesari and other seeds that are commonly recognized as harmful to health;

f) Uric acid and Aflotoxin shall not exceed 100 milligrams and 30 micrograms per kilogram respectively; and

g) Comply with the restrictions in regard to poisons metals (rule-57), crop contaminates (rule 57-A), naturally occurring toxic substances (rule 57-B), use of insecticides (rule 65), and other provisions prescribed under the Prevention of Food Adulteration Rules, 1955, as amended from time to time;

II) Special characteristics:

Maximum limits of tolerance (per cent by weight)						
Grade Designation	Moisture	Foreign matter		Other edible grains	Damaged grains	Weevilled grains percent by count
		Organic	Inorganic			
1	2	3	4	5	6	7
Special	10.0	0.10	Nil	0.1	0.5	2.0
Standard	12.0	0.50	0.10	0.5	2.0	4.0
General	14.0	0.75	0.25	3.0	5.0	6.0

Note- In foreign matter, the impurities of animal origin shall not be more than 0.10 percent by weight.

B) Grade specification of quality of Black gram (Urd Split-husked)

I) General characteristics:

Black gram(Urd spilt-husked) shall be :–

a) Consist of husked and spilt seeds of Pulse (Phaseolus mungo Linn);

b) Sweet, clean, wholesome, uniform in size, shape, colour and in sound merchantable conditions;

c) Free from living and dead insect, fungus infestation, added colouring matter, moulds, obnoxious smell, discolouration;

d) Free from rodent hair and excreta;

e) Free from toxic and noxious seeds viz, Crotolaria(Crotolaria spp.), Corn cockle (Agrostemma githgo L.), Castor bean(Ricinus communis L.), Jimson weed (Dhatura

spp.), Argemone mexicana, Khesari and other seeds that are commonly recognized as harmful to health;

f) Uric acid and Aflotoxin shall not exceed 100 milligrams and 30 micrograms per kilogram respectively; and

g) Comply with the restrictions in regard to poisons metals (rule-57), crop contaminates (rule 57-A), naturally occurring toxic substances (rule 57-B), use of insecticides (rule 65), and other provisions prescribed under the Prevention of Food Adulteration Rules, 1955, as amended from time to time;

II) Special characteristics:

Maximum limits of tolerance (per cent by weight)							
Grade Designation	Moisture	Foreign matter		Other edible grains	Damaged grains	Broken and Fragm-ents grains	Weevilled grains percent by count
		Organic	Inorganic				
1	2	3	4	5	6	7	8
Special	10.0	0.10	Nil	0.1	0.5	0.5	1.0
Standard	12.0	0.50	0.10	0.5	2.0	2.0	2.0
General	14.0	0.75	0.25	3.0	5.0	5.0	3.0

Note- In foreign matter, the impurities of animal origin shall not be more than 0.10 percent by weight.

C) Grade specification of quality of Black gram (Urd Split-Unhusked)

I) General characteristics:

Black gram (Urd split-unhusked) shall be: –

a) Consist of unhusked and split seeds of Pulse (Phaseolus mungo Linn);

b) Sweet, clean, wholesome, uniform in size, shape, colour and in sound merchantable conditions;

c) Free from living and dead insect, fungus infestation, added colouring matter, moulds, obnoxious smell, discolouration;

d) Free from rodent hair and excreta;

e) Free from toxic and noxious seeds viz, Crotolaria(Crotolaria spp.), Corn cockle (Agrostemma githgo L.), Castor bean(Ricinus communis L.), Jimson weed (Dhatura

spp.), Argemone mexicana, Khesari and other seeds that are commonly recognized as harmful to health;

f) Uric acid and Aflotoxin shall not exceed 100 milligrams and 30 micrograms per kilogram respectively; and

g) Comply with the restrictions in regard to poisons metals (rule-57), crop contaminates (rule 57-A), naturally occurring toxic substances (rule 57-B), use of insecticides (rule 65), and other provisions prescribed under the Prevention of Food Adulteration Rules, 1955, as amended from time to time;

II) Special characteristics:

Maximum limits of tolerance (per cent by weight)							
Grade Designation	Moisture	Foreign matter		Other edible grains	Damaged grains	Broken and Fragm-ents grains	Weevilled grains percent by count
		Organic	Inorganic				
1	2	3	4	5	6	7	8
Special	10.0	0.10	Nil	0.1	0.5	20.	1.0
Standard	12.0	0.50	0.10	0.5	2.0	4.0	2.0
General	14.0	0.75	0.25	3.0	5.0	6.0	3.0

Note- In foreign matter, the impurities of animal origin shall not be more than 0.10 percent by weight.

Source: Agricultural Produce (Grading and Marking), Act, 1937(1 of 1937) with Rules, made upto 31st December 1979, (Fifth Edition), (Marketing Series No.192), Directorate of Marketing and Inspection.

2) Grading Under National Agricultural Cooperative Federation (NAFED):

National Agricultural Cooperative Federation (NAFED) is the central nodal agency of Government of India for procurement of Black gram in different states under the Price Support Scheme (PSS). The concerned State Co-operative Marketing Federations are the procuring agents for NAFED.

The organisation has prescribed only one grade i.e. Fair Average Quality (FAQ) for procurement of pulses including Black gram under the Price Support Scheme.

Grade Specifications of Black gram during 2003-2004 marketing season

A) General Requirements

i) Pulses shall have reasonably uniform size, shape and colour.

ii) Pulses shall be sweet, clean, wholesome and free from moulds, weevils, obnoxious smell, discolouration, admixture of deleterious substances (including added colouring matter) and all other impurity except to the extent indicated in the schedule.

B) Special characteristics

S.No.	Special characteristics	Maximum limits of tolerance (% by weight per qtl.) for FAQ
1.	Foreign matter	2
2.	Admixture	3
3.	Damaged pulses	3
4.	Slightly damaged pulses	4
5.	Immature and shrivelled pulses	3
6.	Weevilled pulses	4
7.	Moisture	12

C) Note: -

1. Foreign matter includes dust, stones, lumps of earth, chaff, husks-stem, straw or any other impurity including edible and non-edible seeds.
2. Admixture means any pulses other than the principal pulses.
3. Damaged pulses are those pulses that are internally / damaged or discoloured to such an extent that the damage or discolouration materially affects the quality of the pulses.
4. Slightly damaged pulses are those pulses that are superficially damaged or discoloured, such damage or discolouration not materially affecting the quality of the pulses.
5. Immature and shriveled pulses are those pulses that are not properly developed.
6. Weevilled pulses are those pulses that are partially or wholly bored or eaten by weevil or other grain insects.

Source: Action Plan and Operational arrangements under the Price Support Scheme (Kharif Season 2003), NAFED, New Delhi.

3) Grading under Prevention of Food Adulteration Act (PFA):

A.18.06.06-URD WHOLE:

Urd whole shall consist of seeds of pulses (Phaseolous mungo Linn.). It shall be sound, dry, sweet, and wholesome. It shall also conform to the following standards, namely: -

i) **Moisture**- Not more than 14 percent by weight (obtained by heating the pulverised grains at 130°C - 133°C for two hours).

ii) **Foreign matter (Extraneous matter) –** Not more than 1 percent by weight of which not more than 0.25 percent by weight shall be mineral matter and not more than 0.10 percent by weight shall be impurities of animal origin.

iii) **Other edible grains** – Not more than 4 percent by weight.

iv) **Weevilled grains** - Not more than 6 percent by count.

v) **Damaged grains** - Not more than 5 percent by weight.

vi) **Uric acid** – Not more than 100 mg per kilogram.

vii) **Aflatoxin** - Not more than 30 micrograms per kilogram

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 9 per cent by weight.

A.18.06.11 – Split pulse (Dal) urd:

Dal Urd shall consist of split seeds of pulse (Phaseolous mungo Linn.)]. It shall be sound, dry, sweet, wholesome and free from admixture of unwholesome substances. It shall also conform to the following standards, namely :-

i) **Moisture**- Not more than 14 percent by weight (obtained by heating the pulverised grains at 130°C - 133°C for two hours).

ii) **Foreign matter (Extraneous matter) –** Not more than 1 percent by weight of which not more than 0.25 percent by weight shall be mineral matter and not more than 0.10 percent by weight shall be impurities of animal origin.

iii) **Other edible grains** - Not more than 4 percent by weight.

iv) **Weevilled grains** - Not more than 6 percent by count.

v) **Damaged grains** - Not more than 5 percent by weight.

vi) **Uric acid** – Not more than 100 mg per kilogram.

vii) **Aflatoxin** - Not more than 30 micrograms per kilogram

Provided that the total of foreign matter, other edible grains and damaged grains shall not exceed 8 per cent by weight.

Source: The prevention of Food Adulteration Act, 1954 (Fifth Amendment -2003)

4) Grading at producers' level under Agmark

There is an increasing recognition to the fact that producers need to be assisted in grading their produce before sale so that they may get better price. For securing adequate returns to the producer/seller, the scheme of "Grading at Producers' Level" was introduced in 1962-63 by Directorate of Marketing and Inspection. The main objective of this scheme is to subject the produce to simple test and assign a grade before it is offered for sale. Up to 31-03-2005, 1968 grading units have been set up in the country.

Benefits:

i) It helps the producers to get prices commensurate with the quality of the produce
ii) It enables farmers to get higher price for their produce

iii) It helps the consumers to get standard quality produce at fair price

iv) It assist the machinery of distribution at all stages

v) It facilitate the dissemination of prices and market information

Progress:

The progress of grading during 2003-2004 and 2004-2005 is furnished as under

Table No. 6
Progress of grading during the year 2003-2004 and 2004-2005

Year	At Producers' Level	
	Quantity (in Tonnes)	Value (in Rs.Lakh)
2003-2004	47377	7465.28
2004-2005	12761.10	1821.89

Source: Directorate of Marketing and Inspection, Agmark Grading Statistics, Faridabad.

During the year 2004-2005, about 12761.10 tonnes of Black gram valued at Rs.1821.89 lakh was graded at producers' level against 47377 tonnes valued at Rs.7465.28 lakh in the year 2003-2004.

3.4 Packaging

Packaging is an important function in the marketing of Black gram. It is a practice to protect the produce from any damage during storage, transportation and other marketing practices. It is required at every stage of marketing from the producer to the consumer. In recent years, packaging plays an important role in marketing of produce. The good packaging of Black gram not only facilitates convenience in transportation and storage but also attracts consumer to pay more. The packaging reduces the marketing cost and protects the quality.

3.4.1 Availability of packaging materials

The following packaging materials are used in packaging of Black gram:

1) Jute bags: Gunny bags made up of jute are widely used by farmers and traders. As per NAFED, packing of Black gram should be made in New B Twill (Jute) gunny bags in 100 kg net.

2) HDPE/pp bags: These bags are also used for packaging Black gram.

3) Polythene impregnated Jute bags: These are the jute bags blended with synthetics

4) Poly pouches: In recent years, Black gram is packed in poly pouches with attractive label and brand name. Generally, these are available in 1 kg., 2 kg. and 5 kg. pack size.

(5) Clothe bags: Cloth bags are also used in packing of Black gram.

The packaging material must posses the following qualities:

- It must protect quality and quantity.
- It must prevent spoilage during transit and storage.
- It must tell information about quality, variety, date of packing, weight and price etc.
- It must be convenient in handling operations.
- It must be convenient to stack.
- It must be cheap, clean and attractive.
- It must free from adverse chemicals.
- It should be useful after the first use.

3.4.2 Method of packing :

Pulses shall be packed in gunny bags/jute bags, poly woven bags, poly pouches, cloth bags or other suitable packages which shall be clean, sound, free from insect, fungal infestation. The packing material shall be as permitted under the Prevention of food adulteration rules, 1955.

(i) Pulses shall be packed in containers, which safeguard the hygienic, nutritional and organoleptic qualities of the products.

(ii) 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 flavor to the product.

(iii) The net weight of the Pulses in a package shall be as per the provision prescribed under the packaged commodities rules, 1977.

(iv) Each package shall contain Pulses of the same type and of the same grade designation.

(v) Each package shall be securely closed and sealed.

3.4.3 Labelling and Marking :

Package should be clearly and indelibly marked with following particulars.

- Name of the commodity
- Variety
- Grade designation
- Lot/batch/code number
- Country of origin
- Net weight
- Name and address of packer
- Best before date
- Date of packing
- If fumigated, name of pesticide, date of fumigation and possible time fumigation

The ink used for marking on packages shall be of such quality, which may not contaminate on the produce

3.5 Transportation

The transportation of Black gram is mainly done by head loads, bullock or camel cart, tractor-trolleys, trucks, railways and ships depending upon the availability of transportation means, quantity of the produce and the stage of marketing. The most common means of transportation used are given below

Table No.7
Means of transportation used at different stages of marketing

Stage of Marketing from	Agencies	Means of Transport Used
✷ Threshing floor to the village market or primary market.	Farmers	By head load, pack animal, bullock or camel cart and tractor trolley.
✷ Primary market to secondary whole sale market and miller	Traders / Millers	By trucks, railways.
✷ Wholesale markets and miller to retailer	Millers / Retailers	By trucks, railways, mini trucks, tractor trolley.
✷ Retailer to consumer	Consumers	By hand, bicycle, rickshaw.

✷ Export and Import	Exporters and Importers	By railways and ship

3.5.1 Availability of cheaper and convenient modes of transport:

There are different modes of transport used in Black gram transportation. Road and Rail transport is normally used for internal markets; however, for export and import mainly Sea transport is used. The most common modes of transportation are

1) Road transportation: Road transport is the most pre-dominant mode of transport used in the movement of Black gram right from the producing areas to the ultimate consumer. The following means of road transport are used in different parts of the country.

a) Head load **b) Pack animals** **c) Bullock carts**

d) Tractors trolley **e) Trucks**

2) Railways: Railway is one of the most important means of transportation and is cheaper than road transport. It is more suitable for longer distance, as well as for large quantity.

3) Water transport: This is the oldest and cheapest mode of transport. It includes river, canal and sea transport. Only meager quantities are transported through internal waterways. The export and import is mainly done by sea transport. This transport system is slow but cheap and suitable for carrying large quantity of Black gram.

3.5.2 Selection of mode of transportation:

Following points should be considered while selection of transport:

- The mode of transportation should be cheaper among available alternatives.
- It should be convenient during loading and unloading.
- It must protect from adverse weather conditions.
- It should be safe from pilferage.
- It must deliver to consignee in stipulated period.
- It should be easily available particularly during post harvest period.
- Distances should be considered.

3.6 Storage

The storage is an important aspect of post harvest management because Black gram is seasonally produced but consumed throughout the year. Therefore, the supply has to be maintained by proper storage throughout the year. Storage protects the quality of grains from deterioration and helps in stabilization of prices by regularising demand and supply. It has been reported that, the storage losses caused by insects, rodents and microorganisms are maximum. Lack of storage facilities, forced the farmers to sell their produce, at low price. It is essential that during storage, Black gram should remain in good condition and not undergo any deterioration due to fungal and insect infection or, attack by rodents.

3.6.1 Requirements for safe storage:

The following requirements should be fulfilled for safe storage.

☛ **Selection of site (location):**

The storage structure should be located on a raised well-drained place. It should be easily accessible. The storage structure should be protected from humidity, excessive heat, direct sunrays, insects and rodents. Storage godown should be constructed on a well-built platform at a height of not less than 1 foot from ground level to prevent dampness.

☛ **Selection of storage structure:**

The storage structure should be selected according to the quantity of to be stored.

☛ **Cleaning of storage structures:**

The storage structures should be properly cleaned before storing produce. There should be no left over grains, cracks, holes and crevices in structure, which may be harbour of insects. Before storage, the storage structure should be fumigated.

☛ **Cleaning and drying:**

Before storage, it should be properly cleaned and dried. Grains should be free from foreign matters and excessive moisture to avoid quality deterioration and pest attack.

☛ **Cleaning of bags:**

As far as possible, new gunny bags should be used. The old gunny bags should be properly cleaned, dried and fumigated before use.

☛ **Separate storage of new and old stock:**

To check infestation and to maintain hygienic condition of godown, the new and old stock should be stored separately.

☛ **Cleaning of vehicles:**

The vehicles used for transporting should be properly cleaned with phenyl.

☛ **Use of dunnage:**

Dunnage should be used before stacking bags to avoid absorption of moisture from floor. Bags should be kept on wooden crates or bamboo mats along with a cover of polythene sheet, preferably.

☛ **Proper aeration:**

There should be proper aeration during clear weather condition but care should be taken to avoid aeration during rainy season.

☛ **Regular inspection:**

Regular inspection of stored Black gram should be carried out to check infestation. It is necessary to maintain proper health and hygiene of the stock.

3.6.2 Code of practices for safe storage of pulses adopted by Indian Grain Storage Institute, Hapur

To check loss in quantity as also preserve its quality, the code of practices developed by IGSI Hapur, for safe storage of pulses are as under:

1. Pre-harvest stage:

(i) Harvest fully matured crop.
(ii) Construct pucca threshing yard or plaster the kachcha threshing yard with mud or Cow dung.
(iii) Disinfest the threshing yards with recommended pesticides like malathion (50% E.C.).
(iv) Use moisture and rodent free threshing yards.

2. Post-harvest stage:

(a) Keep the polyethylene/tarpaulene sheet ready for covering the crop in threshing yards for the protection from untimely rains.

(b) Prepare the grain for storage :

(i) Dry the pulses around 11% to 12% moisture, clean and cool, them before storage.
(ii) Fill the insect free pulses into the structure to check their multiplication and fumigate the pulses within a week with EDB/ALP as recommended to control the insect pests.

(c) Preparation of storage structures/premises:

(i) Clean the storage structures well and plaster the cracks and crevices with cement/mud/cow dung as the case may be.

(ii) Remove the domestic articles from storage structures.
(iii) Whitewash the storage structures.

(iv) Make the structure airtight using polyethylene sheet etc.

(v) Seal all the rodent burrows with broken glass pieces, concrete and cement.

(vi) Ensure that there is no entry of rainwater from any source inside the structure.

(vii) Use dunnage (crates, bamboo matting, sandwiched with polyethylene sheet in case of bag storage).

(viii) Stack the bags keeping sufficient space from the walls for time to time inspection.

(ix) If the grain is stored in old gunny bags, dry them properly, fumigate with EDB at the recommended doses under polyethylene covers.

(x) Use scientific storage structures like metal bin, pucca kothi, R.C.C. ring bin and R.B. bin or improve your existing storage structures as per the improvements suggested by IGSI.

(xi) Structure should not be kept open for longer period or opened frequently particularly in rainy season to avoid cross infestation and entry of moisture.

3. Control measure:

(A) Insect control:

Inspect stored pulses for infestation time to time. In case of insect infestation, adopt the following practices.

(i) To check the cross infestation of insect pests of stored pulses, spray the outer surfaces of the structure with malathion as recommended.

(ii) Fumigate the stored pulses with EDB/ALP as recommended.

(iii) Repeat the fumigation as and when the presence of insect infestation observed.

(iv) Treat (coat) the pulses with coconut or groundnut or mustard oil depending upon the availability and cost, @ 250 to 500 ml per quintal to protect pulses from the infestation of pulse beetles.

(B) Rodent control:

Control the rats by using 2% zinc phosphide poison bait (96 parts bait material, 2 parts zinc phosphide, 2 parts edible oil) or use single dose

anticoagulant like Bromadiolone 0.005% (93 parts crushed wheat/maize/jowar/bajra or flour, 3 parts sugar/jaggery, 2 parts edible oil and 2 parts Bromadiolone 0.25%)

(C) Bird control:

(i) Fix the wiremesh on the ventilators/windows to check the entry of birds in godowns.

(ii) Destroy the nests of the harmful birds such as house sparrow, pigeon etc.

(iii) Use the bird scarer in threshing yards and godowns.

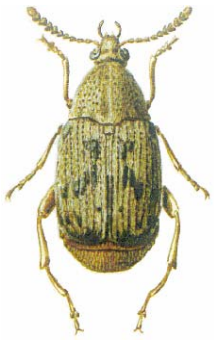
3.6.3 Major stored grain pests and it's control measures

Post-harvest protection of pulses assumes a greater importance in overall crop protection system. All the efforts put in while raising the crop would go in vain, if adequate measures are not adopted during storage. The produce is to be essentially stored for longer or shorter duration, either for consumption or as seed for sowing during next cropping season.

The various factors responsible for deteriorate of grains and seeds stored can be broadly classify under two categories.

1. Biotic factors	**2. Abiotic factors**
1) Insect	1) Moisture content/Relative humidity and
2) Rodents	2) Temperature
3) Birds	
4) Fungi	
5) Mites	
6) Bacteria	

Under varying combinations of biotic and abiotic factors, the grains and seeds get deteriorated, resulting in insect infestation, loss in weight, quality, germinability, discolouration of the commodity, odour, unacceptability in the trade and finally leading to huge monetary losses.

Name of pests	Figure of Pest	Nature of Damage
1. Pulse beetle **Callosobruchus** *sps.*	 **Beetle**	i) The larvae bore into pulses and feed the entire content of the seed leaving only the shell (seed coat) behind. ii)Adults cut out circular holes in seeds. iii)Sometimes these insects begin their infestation, when the pods are in the ripening stage in the field, and are subsequently carried with the seeds into the store after harvest. iv)These pests do not attack split pulses.
2.Khapra beetle *Trogoderma granarium (Everts)*	 **Beetle**	i) Larvae are one of the most serious stored seed pest but the beetle itself does not damages. ii) The larvae starts feeding from embryo point and later consume the entire kernel/seed which makes the grain hollow and only the husk remains. iii) Infested seeds are full with frass, cast skins of larvae and excreta, which results in deterioration of quality of pulses. iv) The larvae are often found on edges of jute stacks and make the infested store unhygienic.
3. Dried bean weevil **Acanthoscelides** *obtectus (Say)*		i) Infestation is induced in the field on ripening of crop when pods are split. ii) Larvae feed on the seed by boring.

4. Rice moth *Corcyra cephalonica (Stainton)*	 **Moth**	i) Larvae contaminate the seeds with dense webbing, excreta and hairs. ii) Whole seed are bound into lumps.
5.Confu-sed flour beetle *Tribolium confusum J.du V.*		i) Beetle and larvae both feed on broken and damaged seeds produced by milling and handling or attacked damaged seeds of other insects.
6. Rodents		i) Rodents feed whole seeds and split pulses. ii) They also cause mechanical damage to gunny bags and other storage structures of pulses by cutting, which results spilling of grains. iii) They spill more seeds than they consume. iv) Rodents also contaminate pulses by hair, urine and feces, which deteriorate the quality and cause many diseases, like cholera, food poisoning, ringworm, rabbies etc.
7.Tempera ture		Temperature is an important abiotic factor governing the condition of pulses in store. All the insects do breed within a limit of minimum and maximum temperature. The optimum temperature for breeding of most of insects in storage, range between 27^0C -37^0C.

3.6.4 Insect pest management

A) Use of chemicals:

This is one of the important components of Insect Pest Management in grain and seed storage but warrants judicious use. In view of the problem of residue and health hazards involvement, the use of chemicals for direct mixing with the grain meant for consumption, is not advised. The use is restricted to prophylactic treatment or mixing in case of seeds. The use of BHC 5% or pyrethrum 0.06%, dust @ 25 gm/sq.meter area has been in practice for treatment of the surface area of the stacks with repeated application after interval of 3 weeks as prophylactic treatment. Spray of BHC wettable powder, pyrethrum E.C. and malathion E.C. with interval of 3 weeks for repeat performance may be carried, the details of which are as follows.

BHC WP (50%)	3 L/100 sq.meter area	Dilution 1:25
Pyrethrum (2.5 E.C.)	3 L/100 sq.meter area	Dilution 1:300
Malathion (50 E.C.)	3 L/100 sq.meter area	Dilution 1:300

Preservation of seeds, malathion which has low mammalian toxicity can effectively check insect infestation when aplied @ 10 ppm. However, organophosphates viz. fenitrothion, pirimiphos methyl, bromophos, idofenfos, etrimphos may be used as seed protectants. The most recent in use is treatment of bags with deltamethrin W.P. (2.5%) @ 30 mg/per sq.meter surface area. It has been found to be very promising prophylactic treatment.

B) Fumigation:

The process of fumigation for the control of insect pests continues to play an important role in protection of stored grains and seeds and is considered to be one of the most efficient methods.

C) Use of plant products:

The practice of adding a small quality of vegetable oil or mineral oil to grains of legumes to protect them from insects is common. Vegetable oils obtained from ground nut, mustard, rape, soybean, cottonseed, neem, palm, sesame, safflower, rice bran, etc have also been used. The treatment of oil results in prevention of egg laying, reduced fecundity, adult mortality, reduction in egg hatching, interference with larval development and finally reduces adult progeny. Mixing of local plants viz. neem kernel powder, custard apple seed powder, crushed dried fruits of black pepper have also adopted.

D) Good storage practices:

Good storage practices are divided into two i.e.,

1) Preventive measures 2) Curative measures

1) Preventive measures:

(A) Drying of grains

Moisture contents less than 9 percent has been found to be safe and does not permit insects to breed. The grains may be dried to the desired moisture content by exposing them to solar radiation, in thin layers on a cemented floor or solar absorbency bed developed at Indian Agriculture Research Institute, New Delhi. Mechanical drier provided with hot air blowing process could also dry the grains on larger scale.

(B) Maintenance of hygiene

Dirt, rubbish, webbing or refuse material of the previous leftover grain should be swept from the store. Cracks and crevices, holes in the wall, floor or ceiling should be scrapped off and replaced by new one. Rat holes should be closed and store be white washed. Turn inside out and expose to sun or fumigate, if old bags are being reused to avoid any insect presence.

(C) Use of Improved storage structures

Properly dried grains should be stored in improved storage structures where ecological conditions viz. temperature, moisture, oxygen and carbon dioxide can be manipulated to suit the safe storage conditions.

(D) Prophylactic treatment

Disinfestation of the godown be carried with chemical spray, dust or fumigation. Surface treatment of the bags with suitable persistent insecticide. Mixing of insecticide and fungicides with the seeds.

2) Curative measures

Treat the seeds with insecticide, if the insect infestation has taken place for lapses and in case of grains meant for consumption, be exposed to sun or fumigated with appropriate fumigant.

3.6.5 storage structures

: Some common structures are:

- **Mud bins or, Kothi:** Cylindrical in shape and are made up of clay mixture with straw and cow dung or mud and bricks.
- **Metal drums:** Cylindrical in shape and are made up of iron sheets.
- **Thekka:** Rectangular in shape and are made up of gunny or, cotton wound around wooden support.
- **Gunny bags:** Gunny bags are made up of jute.
- **Improved bins:**

a) Pusa Kothi b) Nanda bins c) Hapur Kothi
d) PAU bins e) PKV bins f) Chittore stone bins

- **Warehouse:** Warehouse is scientific storage structure constructed and usedby different organisations like CWC, SWC, NAFED etc

- **CAP storage (cover and plinth):** It is an economical way of storage on a large scale

- **Silos:** Silos are used for storage of food grains. Silos are made from bricks, concrete and metallic materials with automatic loading and unloading equipments.

3.6.6 Storage facilities

Storage of the Black gram is performed at different level i.e. at Producers' level, at Rural level, at Mandi level, at CWC and SWC level and at Co-operative level.

i) At Producer's level:

Producers store Black gram in various types of traditional and improved structures. Generally, these storage structures are used for short period. Different organizations /institutions have developed improved structures for food grains storage with varying capacities and shape like Hapur Kothi, Pusa Kothi, Nanda bins, PKV bins. These are usually constructed on a raised platform or plinth constructed of plastered mud brickwork, stone slabs or wooden planks. Some producers also store Black gram in jute gunny bags or in gunny bags lined with polythene stacked in the room.

ii) At rural level:

Considering the importance of rural storage in marketing of agricultural produce, the Directorate of Marketing and Inspection initiated a Rural Godown Scheme, in collaboration with NABARD and NCDC, to construct scientific storage godown with allied facilities in rural areas and to establish a network of rural godowns in the States and Union Territories. Upto 31-03-2005, 9483 new construction godown projects were sanctioned through NABARD and NCDC with the total storage capacity of 141.83 lakh tonnes. The main advantages of Rural Godown Scheme are as under:

i) To prevent distress sale of food grains and other agricultural commodities immediately after harvest.
ii) To reduce quantitative-cum-qualitative losses due to storage in sub-standard godowns.
iii) To reduce pressure on transport system during the post-harvest period.
iv) To help the farmers in getting pledge loans against the stored produce.

iii) At mandi level:

Most of the States and Union Territories have enacted Agricultural Produce Market (Regulation) Act. The regulated markets developed modern market yard with necessary infrastructural facilities. The APMCs have constructed godowns so that the agricultural produce brought into the market should be stored safely by market committees. The produce is weighed in the presence of producer/seller at the time of keeping the produce in the godown after grading and receipt is issued indicating the quality and weight of produce to be stored. The receipt is issued by the licensed general commission agents or brokers depending upon the case. The CWC, SWC and Co-operative societies have also constructed godown in the market yards.

In most of the secondary and terminal regulated markets, central and state warehousing corporations also provide scientific storage facilities at prescribed storage charges and issue warehousing receipt against pledge of produce, which is a negotiable document for obtaining finance from the Scheduled Banks.

iv) At CWC & SWC level:

a) Central Warehousing Corporation (CWC):

CWC was established during 1957. It is one of the biggest public warehouse operators in the country. In March 2005, CWC was operating 484 warehouses all over the country under 16 regions, covering total 229 districts, with a total storage capacity of 101.90 lakh tonnes. State-wise storage capacity with CWC as on 31-03-2005 is given below.

Table No.8:
State-wise storage capacity with CWC as on 31-03-2005

Name of State	No of CWC	Total Capacity (lakh Tonnes)
1.Andhra Pradesh	50	14.40
2.Assam	6	0.64
3.Bihar	13	0.97
4.Chhattisgarh	10	2.37
5.Delhi	11	0.18
6.Gujarat	29	6.23
7.Haryana	25	4.40
8.Karnataka	32	4.54
9.Kerala	9	1.30
10.Madhya Pradesh	31	6.75
11.Maharashtra	57	15.64
12.Orissa	11	1.88
13.Punjab	30	7.74
14.Rajasthan	27	3.75
15.Tamil Nadu	26	8.02
16.Uttaranchal	7	0.75
17.Uttar Pradesh	50	11.56
18.West Bengal	40	6.86
19. Others	20	3.92
Total	**484**	**101.90**

Source: Annual Report 2004-2005, Central Warehousing Corporation, New Delhi.

Apart from storage, CWC also offers services in the area of clearing and forwarding, handling and transportation, procurement and distribution, disinfestation services, fumigation services and other ancillary activities i.e. safety and security, insurance, standardization and documentation. The CWC has also introduced a scheme, called the Farmers Extension Service at selected centres to educate farmers about the benefits of a scientific storage and use of public warehouses.

b) State Warehousing Corporation (SWCs):

Different states have set up their own warehouses in the country. The areas of operation of the SWC are district place of the state. The total share capital of the state warehousing corporations is contributed equally by the Central Warehousing Corporation and the concerned State Government. At the end of June 2005, SWCs were operating in 17 states of the country with the total capacity of 195.20 lakh tonnes. The state-wise storage capacity with SWCs as on 1-7-2005 is given below.

Table No.9:

State-wise storage capacity with SWCs as on June 2005.

Name of SWC	Total capacity (in lakh tonnes)
1. Andhra Pradesh	22.82
2. Assam	2.48
3. Bihar	2.03
4.Chhattisgarh	6.07
5. Gujarat	2.27
6. Haryana	16.07
7. Karnataka	8.98
8. Kerala	1.92
9. Madhya Pradesh	11.38
10. Maharashtra	12.20
11. Meghalaya	0.11
12.Orissa	4.05
13.Punjab	60.12
14.Rajasthan	7.19
15.Tamil Nadu	6.36
16.Uttar Pradesh	28.88
17.West Bengal	2.27
Grand Total	**195.20**

Source: Central Warehousing Corporation, New Delhi

iV) Cooperatives :

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

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

Table No. 10:
State-wise cooperative storage facilities as on 31-3-2004.

Name of State	Rural level	Market level	Total capacity (in tones)
1. Andhra Pradesh	4003	571	690470
2. Assam	770	264	298900
3. Bihar	2455	496	557600
4. Gujarat	1815	401	372100
5. Haryana	1454	376	693960
6. Himachal Pradesh	1640	209	204800
7. Karnataka	4958	960	693590
8. Kerala	1959	133	323335
9. Madhya Pradesh	5166	1024	1305900
10.Maharashtra	3852	1492	2010920
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	2834	469	483060
17.Other States	1046	233	644830
Grand Total	**56096**	**9602**	**14119083**

Source: Annual Report 2003-2004, National Cooperative Development Corporation, New Delhi.

3.6.7 Pledge finance system:

The farmers are often compelled to sell their produce immediately after harvest, when the prices are low. To avoid such distress sale, Government of India, promoted Pledge Finance Scheme through a network of rural godowns and negotiable warehouse receipt system. Through this scheme, small and marginal farmers can get immediate financial support to meet their requirements and retain the produce till they get remunerative price.

According to the RBI guidelines, loan/advances upto 75 percent of the value of the produce stored in the godown can be advanced to farmers against pledge/hypothecation of agricultural produce (including warehouse receipts) subject to a ceiling of Rs. 5 lakh per borrower. Such loan shall be for a period of 6 months, which can be extended upto 12 months based on financing banks commercial judgment. The commercial/co-operative banks/RRBs provide credit to the farmers for the produce stored in the godown under this scheme. The banking institutions accept the godown receipt on its being duly

endorsed and delivered to bank for pledge loan against hypothecation of produce as per RBI guidelines. Farmers are given freedom to take back their produce once the pledge loan is repaid. Facility of pledge finance is extended to all farmers, whether they are the borrowing members of Primary Agricultural Credit Societies (PACS) or not and the District Central Cooperative Banks (DCCBs) directly finance

Benefits of Pledge finance scheme

(I) This increases the retention capacity of the small farmers, which consequently also enable the farmers to avoid distress sale.

(ii) This minimises the farmer's dependency on the commission agents as the pledge finance provides financial support to them immediately after harvest period.

(iii) Participation of the farmers, irrespective of their land holding size, increases the arrivals in market yard throughout the year.

(iv) This gives a sense of security to the farmers even if their produce not sold out in the market yard immediately.

4.0 MARKETING PRACTICES AND CONSTRAINTS

4.1 Assembling:

Assembling is an important marketing function. Assembling includes the operation of collecting Black gram produce from different villages to at a central place i.e. primary market and secondary market for its further movement to the dal millers or, the consumers.

Major Assembling Markets in the country:

Some major assembling markets of different states are as under:

Sl. No.	Name of State	Name of Dist.	Location / Place of Regulated Markets
1.	Andhra Pradesh	East Godawar	Kothapeta, Ambuje Peta, Rajanmundri, Tuni
		Prakasam	Ongole, Addaniki, Markapur, Kambam, Kondepi, Santanutllapady
		Guntur	Bapatla, Repalle, Tenali, Ponnur, Vinukonda, Sattenapally
		Krishna	Jaggaialipeta, Bapulapadu
2	Gujarat	Vadodara	Vadodara, Chota Udaipur, Jetpur pavi, Kargan, Padra, Sarli, Bodeli Sinor, Vaghodia, Dhbhoi, Naswadi, Kavarit
		Panchmahal	Godhra, Holal, Delal Lunawada, Shahira
		Sabarkanthqa	Himatnagar,Dhausura Bayad,Malpur,Idar, Khedbrambha,Badali, Modasa,Prantig, Bhiloda, Meghraj, Talodi
		Mehsana	Mesana,Visnagar ,Kadi,Vadnagar,Vijapur,
3	Karnataka	Gulbarga	Gulbarga, Sedam
		Bidar	Bidar, Bhulki, Aurad, Bhasavakalyan
4.	Maharashtra	Nander	Nander
		Latur	Latur

5.	Orissa	Anugul	Anugul
		Jagatsingpur	Jagatsingpur
		Jajpur	Jajpur
		Kandhanial	Tikabali
		Khurda	Balugoan
		Mayurbhanj	Baripada
		Nowrangpur	Dabugaon
		Rayagada	Gunpur, Rayagada
		Sundargarh	Sargapalli
6.	Rajasthan	Kota	Kota, Ramganj Mandi
		Tonk	Malpura,Deoli
		Ajmer	Kekri,Bijaynagar
		Bhilwara	Bhilwara
		Bhawani Mandi	Jhalawar
		Swai Madhopur	Swai Madhopur
		Chittogarh	Pratapgarh
		Udaipur	Udaipur
7.	Tamil Nadu	Cuddalore	Cuddalore,Panruti, Virudhchalam
		Vilupuram	Vilupuram
		Salem	Salem, Athur
		Tuti corin	Tuticorin, Kovilapatti
		Tiruvaram	Tiruvaram, Nagapattanam
		Thanjavur	Tanjavur
		Erode	Erode
8	Uttar Pradesh	Moradabad	Chandausi
		Kanpur Nagar	Kanpur
		Allahabad	Allahabad
		Jhansi	Jhansi,Chirgaon, Gursarai Mauranipur,
		Hamirpur	Rath
		Mahoba	Mahoba
		Varanasi	Varanasi
		Saharanpur	Saharanpur
9	West Bengal	North 24 Pargana	Borgaon, Barsat
		Burdwan	Katwa
		Purulia	Golbazar, Court Maidan, Chawk
		Nadia	Bellanadhari, Karimpur, Nabadweep, Majdia
		Maldah	Harischandrapur, Samsi
		Birbhun	Saithia
		Dinajpur North	Islamabad
		Murshidabad	Jiagang,Lalgola, Dhuliari

4.1.1 Arrivals

The disposal of Black gram commences shortly after threshing since the producers require funds for the purpose of discharging their various financial obligations. During 2002-2003, the total arrivals of Black gram in the 43 markets of Andhra Pradesh were reported to be 136166 tonnes, followed by 27 markets in Madhya Pradesh (103044 tonnes), 6 markets in Maharashtra (90500 tonnes), 12 markets in Uttar Pradesh (67351 tonnes), 7 markets in Tamil Nadu (32043 tonnes), 6 markets in Karnataka (19458 tonnes), 24 markets Gujarat(9946.10 tonnes), 19 markets West Bengal(3018 tonnes).

The arrivals of Black gram during the years 2000-2001 to 2002-2003 in important markets of major producing states are given as under.

Table No. 11:
Arrivals in important markets of major Black gram producing states

Sl. No.	Name of the States	Arrivals (in Tonnes)		
		2000-2001	2001-2002	2002-2003
1.	Andhra Pradesh (43 markets)	162416	157457	136166
2.	Gujarat(24 markets)	3078.86	9078.80	9946.10
3.	Karnataka (6 markets)	16123	11196	19458
4.	Madhya Pradesh (27 markets)	61171	67151	103044
5.	Maharashtra (6 markets)	43251	36849	90500
6.	Orissa(10 markets)	6203	9352	2363
7.	Rajasthan(7 markets)	8478	10447	N.A.
8.	Tamil Nadu(7 markets)	55642	50757	32043
9.	Uttar Pradesh (12 markets)	68289	56759	67351
10.	West Bengal(19 markets)	2355	2645	3018

Source: Sub-offices of Directorate of Marketing and Inspection

4.1.2 Despatches

Black gram is mostly despatched to the markets of within the state or, to the markets of the adjoining states. It has been observed that 4465 tonnes of Black gram**,** from Uttar Pradesh markets were mainly despatched to Bihar, Chattisgarh, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, and West Bengal during 2002-2003. Similarly 136166 tonnes of Black gram**,** from Andhra Pradesh markets despatched to, Karnataka, Kerla and Tamil Nadu, and of 1445 tonnes of Black gram**,** from Orissa markets were despatched to Andhra Pradesh, Bihar, Chattisgarh, Jharkhand, Madhya Pradesh, Tamil Nadu, and West Bengal. In case of Karnataka**,** 19458 tonnes of Black gram were despatched mainly to Andhra Pradesh and Tamil Nadu during the same period. The despatches of Black gram from different states are as under:

Table No. 12:

Despatches of major Black gram producing states

States from where despatched	Quantity Despatched (Tonnes)			States to which despatched
	2000-2001	2001-2002	2002-2003	
1.Andhra Pradesh	16216	157457	136166	Karnataka,Kerla, Tamil Nadu
2. Gujarat	1313	3074	3512	N.A.
3.Karnataka	16123	11196	19458	Andhra Pradesh, Tamil Nadu
4.Madhya Pradesh	N.A.	N.A.	N.A.	N.A.
5. Maharashtra	26670	19530	N.A.	Assam,Chatisgarh,Kerla
6. Orissa	5057	8048	1445	Andhra Pradesh, Bihar, Chattisgarh Jharkhand, Madhya Pradesh, Tamil Nadu, W.B.
7.Rajasthan	N.A.	N.A.	N.A.	N.A.
8.Tamil Nadu	36562	43270	26330	N.A.
9.Uttar Pradesh	5474	4668	4465	Bihar,Chatisgarh, Gujarat, Jharkhand,Madhya Pradesh, Maharashtra ,W.B.
10.West Bengal	2222	2507	2859	Bihar,Madhya Pradesh, Rajasthan

Source: Sub-offices of Directorate of Marketing and Inspection

4.2 Distribution

Assembling and distribution of the agricultural produce are interlinked. The assembling deals with the movement of the Black gram from the farm to the assembling centre while the distribution deals with its further movement to the consumer.

Agencies involved:

Following agencies are involved in distribution of Black gram in whole and split husked form at various stages:

- Producers
- Village Traders
- Itinerant Traders
- Wholesale merchants
- Retailers
- Commission Agents or, Arhatias
- Representative of Dal Miller
- Co-operative organisations
- Government organisations

4.3 Role of NAFED in handling of pulses

NAFED is the nodal agency for procurement of pulses, viz., Urid, Moong, Arhar, Gram, and Masoor under the price support scheme of the Govt. of India. As and when the prices tend to rule below the declared support level, NAFED intervenes in the markets and undertake purchases on behalf of the Govt. of India. In the notified areas of Bihar and Maharashtra, NAFED procured the grains, under the PSS, through cooperatives.

During 2005-2006 (Upto Dec.02005), Nafed procured 466 tonnes of Black gram valued Rs. 110.5 lakhs on commercial basis and purchased 107797 tonnes valued Rs. 17430.78 lakhs under PSS.

4.4 Export and import

Export

India is deficit in pulses. Only small quantities of pulses are exported. The countrywise export of Black gram during the year 2002-2003 is given below.

Table No. 13:
India's export of Black gram (country-wise) during 2002-2003

Quantity in Kgs.
Value in Rs.

Country	Quantity	Value
Australia	91195	3076533
Baharain Is	173246	4557875
Brunei	1800	50715
Canada	465562	10766159
China P RP	1100	35833
Denmark	3000	78059
Franch	99181	2573896
German F. Rep	75323	1956375
Ghana	1270	52088
Hong Kong	8800	258731
Israel	10395	297131
Japan	700	10590
Kenya	57210	1378435
Korea RP	100	5553
Kuwait	519836	11997194
Malaysia	635442	16141385

Maldives	10035	217253
Mauritious	75449	1931939
Nepal	405627	8348227
Netherland	2200	80136
New Zealand	29790	851466
Norway	4816	167320
Oman	30600	795579
Qatar	149640	4409574
Saudi Arab	480126	10906271
Singapore	457460	11028606
South Africa	31056	773325
Sri Lanka	1442790	27029543
Switzerland	8000	218346
Tanzania Rep	1750	56309
U Arab EMTS	1248831	30067519
UK	812939	19906287
USA	1840047	50660659
Vietnam Soc Rep	200	8618
Unspecified	20119	998195
Total	9195635	221691724

Source: Directorate General of Commercial Intelligence and Statistics (DGCIS), Kolkata.

The above table reveals that a small quantity of Black gram were exported mainly to Australia, Bhutan, Brunei, Malaysia, Maldives, Portugal, Saudi Arab, Singapore, South Africa, Sri Lanka, U.A.E., UK, and USA.

Import

During the year 2002-2003, country imported 35360642 tonnes of Black gram worth Rs. 537038730. Import of Black gram in India from different countries from the year 2002-2003 is furnished as under.

Table No.14

India's import of Black gram (country-wise) 2002-2003

Quantity in Kgs.
Value in Rs

Name of Country	Quantity	Value
Australia	20000	233590
Mayanmar	34171642	519408655
Singapur	444000	6198396
Thailand	725000	11198089
Total	35360642	537038730

Source: Directorate General of Commercial Intelligence and Statistics (DGCIS), Kolkata.

4.4.1 Sanitary and Phyto-sanitary requirements

The agreement on Sanitary and Phyto-Sanitary (SPS) measures is a part of the GATT Agreement, 1994, for export and import trade. The aim of the agreement is to prevent the risk of introduction of new pests and diseases in new region i.e. importing countries. The main purpose of the agreement is to protect human health, animal health, and Phyto-Sanitary situation of all member countries and protect the members from arbitrary or unjustifiable discrimination due to different Sanitary and Phyto-Sanitary standards.

When SPS required:

The SPS agreement applies to all Sanitary and Phyto-Sanitary measures, which may directly or indirectly, affect international trade. Sanitary measures deals with human or animal health, and Phyto-Sanitary measures are related to plant health. SPS measures are applied in four situations for the protection of human, animal or plant health:

- Risks arising from the entry, establishment or spread of pests, diseases, disease- carrying organisms or disease causing organisms.
- Risks coming from additives, contaminants, toning or disease-causing organisms in foods, beverages or foodstuffs.
- Risks arising from diseases carried by animals, plants or products thereof, or from the entry, establishment, or spread of pests.
- Prevention or limitation of damage caused by the entry, establishment or spread of pests.

The SPS standards commonly applied by Governments, affecting imports are:

(i) Import ban (Total/partial) is generally applied, when there is a significant risk about a hazard.

(ii) Technical specification (Process standards/Technical standards) are most widely applied measures and permit import subject to compliance with pre-determined specification.

(iii) Information requirements (Labelling requirements/Control on voluntary claims) permit imports, provided they are appropriately labeled.

Procedure for issue of SPS certificate for export:

In order to make plant materials free from quarantine and other injurious pests to conform with the prevailing Phyto-Sanitary regulations of the importing country, the exporter needs to give a suitable disinfestation / disinfection treatment, without affecting the viability for sowing / edibility of the plants/seeds.

For plant materials (seed, meal, extraction, etc.) meant for export, Government of India, has authorised some Private Pest Control Operators (PCO) who have the expertise, men and materials for treating the export agricultural cargo / produce. The exporter has to apply to the officer in charge (Plant Protection and Quarantine Authority, Department of Agriculture and Cooperation) for Phyto-Sanitary certificate (PSC) in prescribed application for at least 7 to 10 days in advance of the export. Before submitting the application for issue of PSC, it should be ensured that the cargo is treated properly by the licensed PCO.

4.4.2 Export procedures

The exporter should keep in mind about the following laid down procedure during the export of Black gram from India: -

1. Registration with RBI. (Apply in prescribed form (CNX) to obtain code number. This code number is to be quoted on all export papers).
2. Importer-Exporter code (IE code) number is to be obtained from the Director General of Foreign Trade (DGFT).
3. Register with Agricultural and Processed Food Products Export Development Authority (APEDA) to obtain registration cum membership certificate. This is required to obtain permissible benefits from the Government.
4. Exporter can now procure their export orders.
5. Quality of the produce is to be assessed by the inspecting agency and a certificate is issued to this effect.
6. Produce is now shifted to port.
7. Obtain marine insurance cover from any Insurance Company.
8. Contact the Clearing and Forwarding (C&F) agent for sorting the produce in godowns and to get the shipping bill for allowing shipment by the Custom Authority.
9. Shipping Bill is submitted by C & F agent to custom house for verification and verified shipping bill is given to the shed superintendent to obtain carting order for export.
10. The C&F agent presents shipping bill to preventive officer for loading into ship.
11. After loading into ship, a mate's receipt is issued by captain of ship to the superintendent of the port, who calculates port charges and collect the same from the C&F agent.
12. After the payments, C&F agent takes mate's receipt and requests port authority to prepare bill of loading to the respective exporter.
13. Then C&F agent sends the bill of loading to the respective exporter.
14. After receiving the documents, exporter obtains a certificate of origin from chamber of commerce, stating that the produce is of Indian origin.
15. Importer is informed by exporter regarding date of shipment, name of vessel, bill of loading, customer's invoice, packing list etc.
16. Exporter submits all documents to his bank for verification and bank verifies the papers against original letter of credit.
17. After verification, bank sends documents to foreign importer to enable him to take delivery of produce.
18. After receiving papers, importers makes payment through bank and send the GR form to RBI, an evidence of realisation of export proceeds.
19. Exporter now applies for various benefits from duty drawback schemes.

4.5 Marketing constraints

The following are main marketing constraints in Black gram:

i) Distress sale: Due to financial crisis, farmers are forced to sale their produce just after harvesting. During this period, farmers get lower price due to glut in the market. The producers cannot withhold or store their produce for some period to get more price since the farmers have to meet urgent requirement of money.

ii) Unstable price: Generally, the price of Black gram goes down or prevails low in the early post harvest period due to more arrivals in the market and later on prices goes up. Due to this unstable price, the farmers get lesser price in the market.

iii) Lack of marketing information: Due to lack of information regarding arrivals and prices, prevailing in other markets, producers market the Black gram in the village market at lower price which can be avoided.

iv) Adoption of standards: Farmers usually do not grade their produce, as a result they do not get remunerative price in the market.

v) Inadequate storage facilities at rural stage: Due to inadequate storage facilities at rural stage, farmers loose a substantial quantity of their produce by way of driage, spoilage, rodents etc. Farmers are also forced to sale their produce just after harvest due to lack of storage facilities. So rural godowns are must to avoid the sale immediately after the harvest so as to enable to get more prices to producers.

vi)Transportation facilities at producers' level : Due to inadequate transportation facilities at villages level, producers sale their Black gram to traders directly from their farm or in the village, which offer them lesser price than prevailing in the markets.

vii)Training to producer: The training to producer regarding marketing of their produce is required. It improves their skill for better marketing of their produce.

viii)Infrastructure facilities: Due to inadequate infrastructure facilities at producers level, traders and market level, the marketing of Black gram is affected adversely.

ix) Malpractices in markets: There are many malpractices prevailing in markets like excess weighment, delay in payment, large quantity of sample from the produce, different kinds of arbitrary deductions for religious and charitable purpose from producers, high

commission charges, delay in weighing, loading, unloading and weighing charges from producers

x) Superfluous middlemen: The existence of a long chain of middlemen reduces the share of the consumer's price received by the actual cultivator.

5.0 MARKETING CHANNELS, COSTS AND MARGINS

5.1 Marketing channels

The following are the important marketing channels exist in the marketing of Black gram.

A) Private marketing channel:

This is a traditional channel and the most common marketing channel in India. The main private marketing channels for **Black gram** are as under:

i) Producer → Dal Miller → Consumer

ii) Producer →VillageTrader → Dal Miller → Wholesaler → Retailer → Consumer

iii) Producer → Dal Miller → Retailer → Consumer

iv) Producer → Commission Agent → Dal Miller → Wholesaler → Retailer → Consumer

B) Institutional marketing channel:

Some institutions have been entrusted with marketing activities of Black gram like NAFED. NAFED is the nodal agency for procuring Black gram through providing minimum support prices to the farmers for their produce. The main institutional marketing channels for Black gram are as under:

1) Producer → Procuring Agency → Dal Miller → Consumer

2) Producer → Procuring Agency → Dal Miller → Wholesaler → Retailer → Consumer

3) Producer → Procuring Agency → Dal Miller → Retailer → Consumer

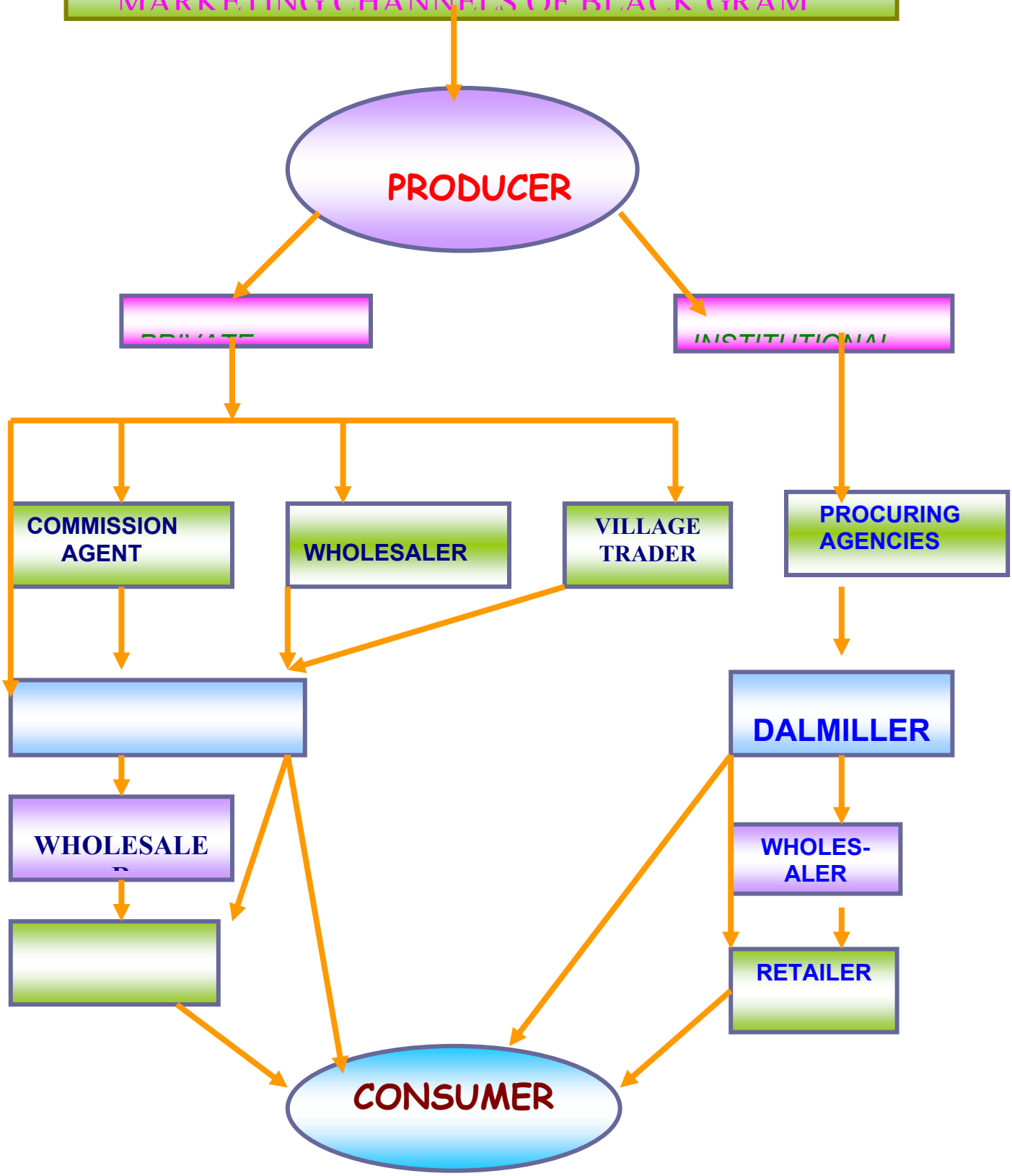
Criteria for selection of channels:

Following criteria should be considered during selecting a marketing channel:

1. The channel, which ensures the higher share to producer and also provides cheaper price to consumer, is considered as the most efficient channel.
2. Selection should be for shorter channel having lesser market cost.
3. Avoid the longer channel having more intermediaries causing higher market cost and less producer's share.
4. Select the channel which distributes the produce appropriately at least expense and secure the desired volume of disposal.

CHART NO.1

MARKETING CHANNELS OF BLACK GRAM



5.2 Marketing costs and margins

Marketing costs: Marketing Costs are the actual expenses required in bringing goods and services from the producer to the consumers. The marketing cost normally includes

(i) handling charges at local points

(ii) assembling charges

(iii) transport and storage costs

(iv) handling by wholesaler's and retailer's charges to consumers

(v) expenses on secondary services like financing, risk taking and market intelligence, and

(vi) profit margins taken out by different agencies.

Market margins: Margin refers to the difference between the price paid and received by a specific marketing agency such as a single retailer, or by any type of marketing agency, i.e. retailers or assemblers or by any combination of marketing agencies in the marketing system as a whole.

The total marketing margin includes cost involved in moving the Black gram from producer to consumer and profits of various market functionaries.

Total Marketing Margin = **Cost involved in moving the Black gram from producer to consumer** + **Profits of various market functionaries**

The absolute value of the marketing margin varies from market to market, channel to channel and time to time. The Market Cost incurred by farmers and traders at Regulated market includes

i) Market fee

ii) Commission

iv) Taxes, and

iv) Other miscellaneous charges.

i) Market fee: Market fee or entry fee is collected by the market committee of the markets. It is charged either on the basis of weight or on the basis of the 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 2.0 per cent ad valoram.

ii) Commission: It is paid to the commission agent, and may be payable either by seller or by the buyer or sometimes by both. The charge is usually made in cash and varies considerably.

iii) Taxes: Different taxes are charged in different markets such as toll tax, terminal tax, sales tax, octroi etc. These taxes livable on Black gram differ from market to market in the same state as also from state to state. These taxes are usually payable by the seller.

iv) Miscellaneous charges: In addition to the above-mentioned charges, some other charges are levied in markets of Black gram. These includes handling and weighment charges (weighing, loading, unloading, cleaning etc.), charity contribution in cash and kind, grading charges, postage, charges payable to water man, sweeper, Chowkidar etc. These charges may be payable either by the seller or by the buyers.

Market fee, commission charges, taxes and other charges in different states are given in table no. 15

Table no 15.

Market Fees, Commission Charges, Taxes and Other Charges in Important Markets of The State

(in Rs.)

Sl. No	State	Market fee	Commission charges	Sales tax	Licence fee per annum	Market charges	Other Charges	Charges paid by whom
1.	Andhra Pradesh	1%	2%	4%	For turnover i) >Rs. 1 Crore -600 ii) Rs. 50 lacs -400 to 1crore iii) <Rs.50 lacs - 200	i)Unloading 0.75/bag ii)Heaping 0.50/bag iii)Cleaning 1.00/bag iV)Weighing 0.75/bag v) Loading 0.75/bag	Nil	1)Market fee by buyer ii)Market charges and commission charges by seller
2.	Gujarat	0.25% - 0.80%	1.50 %	Nil	0.21-1.07 on income per lacs	5.00 per quintals	Nil.	Buyer
3.	Karnataka	1.50%	2.00%	Nil	i)Commission agent -200 ii)Importer -100 iii)Exporter -100 iv)Stockist -100 v)Warehouseman -100	As per concerned market committee buy-law	As per concerned market committee buy-law	i)Before sale by seller ii)After sale by buyer
4.	Madhya Pradesh	2%	Nil	Nil	Rs. 1000 for traders, processors	4% to 6%	0.2%	Buyer
5.	Maharashtra	1.05%	3%	Nil	Rs. 180/-	4% to7%	-	Buyer

6.	Orissa	1%	0.5%	Nil	i)Trader: 100 ii)Trader-cum Commission Agent: 100 iii)Commission Agent: 50 iv)Broker: 50 v)Retail Trader: 25	Weighing 0.40 per bag Handling 0.80 per bag	Rs.2 per qtl.	Buyer
8.	Rajasthan	1.60%	2%	Nil	i) Commission Agent 300 ii) Traders 200	N.A.	N.A.	Buyer
9.	Tamil Nadu	1.00 adval-orem	Nil	Nil	i)Wholesaler: 100 ii)Other Traders 75 iii)Small and Petty Traders 75 iv)Weighmen, Measurer , Warehousing man 25	i) For farmers 15 to180 days- 0.05 ii)For Traders Exeeding 24 hrs. upto 180 days - Double the amount fixed for the farmers and an amount fixed towards insurance and fumigation	Nil	Except storage charges all fees and charges are paid by the traders.
10.	Uttar Pradesh	2.5%	i)Agricultural producers-1.50% ii)Dalal 0.50% iii)Weighment- 0.25 per qt. iv)Pallidar 0.50 per qt.	2%	100-250	i)Unloading 0.20 per qtls. ii)Cleaning 0.60 per qtls	Nil	Buyer
11.	West Bengal	1.00%	10-15 per qt.	Nil	200.00	Nil	2.00	Buyer

6 MARKETING INFORMATION AND EXTENSION

Marketing information:

Marketing information is a key function to take efficient marketing decisions, regulate the competitive marketing processes and to restrict the monopoly or profiteering individuals in the market. It is needed by producers in planning production and marketing of their produce, and is equally required by other market participants. Farmers need to be fully familiarized in different areas of agricultural marketing in order to improve price realization. Marketing information is important at all the stages of marketing right from farm level to ultimate consumption level and simultaneously for all the participants in these stages i.e. producers, traders (millers), consumers, etc. It is the key to achieve both operational and pricing efficiency in the marketing system.

Marketing extension:

Marketing extension is a vital factor in enlightening and educating the farmers about proper marketing of their produce and removal of their marketing problems. It envisages educating the farmers, traders and consumers for bringing desired changes in their knowledge, skills, attitude and behavior. In the present global agricultural scenario, the farmers need to be educated to accept modern market-oriented farming by taking care of productivity, quality and market demand. Farmer needs to reorient their cropping pattern as per the market demand. The farmers should keep pace with fast changing technology, economic reforms, consumer awareness and new export-import policies for agricultural commodities.

An effective marketing extension service is need of the hour. This has assumed even greater importance in the light of fast changing business environment as a result of liberalization of economy under WTO Agreement. The marketing extension functionaries should disseminate the complete, accurate and latest market information to the grass root level in areas such as market driven production programme, post harvest management, availability of marketing finance, facilities for grading, packaging, storage, transportation, online market information system, marketing channels, contract farming, direct marketing, alternative markets including forward and future markets etc.

Benefits of marketing information and extension:

Marketing information and Extension is important tool for all the concern participants of agricultural marketing.

1) **Benefits to producers:** In present situation, an effective market information and extension service facilitates decision making about when, where and how to market Black gram.

2) **Benefits to consumers:** With the help of market information and extension, producers will produce Black gram according to consumer preferences for fetching remunerative price.

3) **Benefits to traders:** Market information and extension foster true competition among the market players. It helps them to take decision regarding purchase, sale and storage of Black gram by knowing the trend of arrivals, demands, consuming centers, grading, packaging, stock position etc. in the markets.

4) **Benefits to government:** Market information play vital role in formulating appropriate agricultural policies about procurement, export and import, minimum support price.

Sources of marketing information:

In our country, there are a number of sources/institutions that are directly or indirectly disseminating marketing information and providing extension services as summarised below:

Sources / Institutions	Activities for Marketing Information and Extension
1. Agricultural Produce Market Committee (APMC)	➤ Provides market information on arrivals, prevailing prices, despatches etc. ➤ Provides market information of adjoining / other market committees. ➤ Arranges training, tours / exhibitions etc.

2. Central Warehousing Corporation (CWC) 4/1 Siri Institutional Area, Opp. Siri fort, New Delhi-110016 Website: www.fieo.com/cwc/	➢ Farmers Extension Service Scheme (FESS) was launched by CWC in the year 1978-79 with the following objectives : i) To educate farmers about the benefit of scientific storage and use of public warehouses. ii) To impart training to the farmers on the techniques of scientific storage and preservation of food grains. iii) To assist farmers in getting loans from the banks against pledge of warehouse receipt. iv) Demonstration of spraying and fumigation methods to control insects.
3.Federation of Indian Export OrganisationsPHQ House. Opp. Asian Games , New Delhi-16	➢ Provide information to its members about latest developments of export and import. ➢ Organise seminars, workshops, presentation, tours, buyer-seller meets, sponsoring participation in international trade fair, exhibitions and providing advisory services with specialized divisions. ➢ Provide information about market development assistance schemes. ➢ Provide useful information on India's export and import with diverse database.
5.Directorate General of Commercial Intelligence and Statistics (DGCIS), 1,Council House Street, Kolkata-1 www.agricoop.nic.in	➢ Collection, compilation and dissemination of marketing related data i.e. export-import data, inter state movement of food grains etc.
6.Directorate of Marketing and Inspection (DMI), NH-IV, CGO Complex, Faridabad. Website: www.agmarknet.nic.in	➢ Provides information through nationwide Marketing Information Network (Agmark net portal). ➢ Marketing extension through training to Consumers, Producers, Graders, etc. ➢ Marketing Research and Survey. ➢ Publication of reports, pamphlets, leaflets, Agricultural Marketing journals, Agmark Grade standards etc.
7.State Agricultural Marketing Boards, at different state capital	➢ Provide marketing related information to co-ordinate all the market committees in the state. ➢ Arrange seminars, workshops and exhibitions on subject related to agricultural marketing. ➢ Provide training facilities to producer, traders and employees of the Boards.

8.Different websites on Agricultural Marketing Information	www.agmarknet.nic.in www.agricoop.nic.in www.fieo.com/cwc/ www.ncdc.nic.in www.apeda.com www.fmc.gov.in www.icar.org.in www.fao.org www.dpd.mp.nic.in www.agriculturalinformation.com www.agriwatch.com www.kisan.net www.agnic.org www.nafed-india.com www.indiaagronet.com www.commodityindia.com

7.0 ALTERNATIVE SYSTEMS OF MARKETING

7.1 Direct marketing

Direct marketing is an innovative concept, which involves marketing of produce i.e. Black gram by the farmer directly to the consumer/miller without any middlemen. Direct marketing enable producers and millers and other bulk buyers to economize on transportation cost and improve price realization. It also provides incentive to large scale marketing companies i.e. millers and exporters to purchase directly from producing areas. Direct marketing by farmers to the consumers has been experimented in the country through *Apni Mandis* in Punjab and Haryana. The concept with certain improvements has been popularised in Andhra Pradesh through *Rythu Bazars.* At present, these markets are being run at the expense of the state exchequer, as a promotional measure, to encourage marketing by small and marginal producers without the help of the middlemen. In these markets, mainly fruits and vegetables are marketed alongwith other commodities at present.

Benefits of direct marketing :

- Direct marketing helps in better marketing of the produce.
- It increases profit of the producer.
- It minimizes marketing cost.
- It encourages distribution efficiency of the marketing system.
- It promotes employment to the producer.
- Direct marketing satisfy the consumer.
- It provides better marketing techniques to producers.
- It encourages direct contact between producers and consumers.
- It encourages the farmers for retail sale of their produce.

7.2 Contract marketing

Contract Marketing is a system of marketing, where selected crop is grown for marketing by farmers under a 'buy back' agreement with an agency (entrepreneur or trader or processor or manufacturer). In the wake of economic liberalization, it has gained momentum as the national and multinational companies enter into contracts for

marketing of agricultural produce. They also provide technical guidance, capital, input supply to contracted farmers. Contract Marketing ensures continuous supply of quality produce at mutually contracted price to contracting agencies, as well as ensures timely marketing of the produce. Contract Marketing is beneficial to both parties i.e. farmers and the contracting agency.

Advantages to farmers: -

- Price stability ensuring fair return of produce
- Assured marketing outlet and no involvement of middlemen.
- Prompt and assured payments
- Technical advice in the field of production till harvesting
    - Fair trade practices
    - Credit facility
    - Crop insurance
    - Exposure to new technology and best practices

Advantages to contracting agency: -

- Assured supply of produce (raw materials)
- Control on need based production/post harvest handling
- Control on quality of produce
- Stability in price as per mutually agreed contract terms and conditions
- Opportunities to acquire and introduce desired varieties of crop
- Help in meeting specific customer needs/choice
- Better control on logistics
- Strengthen producer/buyer relationship

The Pepsi has already taken up contract marketing of pulses in Punjab. Since there are many success stories of contract marketing in agricultural sector, there are possibilities of exploring the contract marketing in case of Black gram.

7.3 Co-operative marketing

The co-operative societies sale the member's produce directly in the market, which fetches the remunerative price. Co-operative societies market the member's produce collectively and secure advantages of economy of scale to its members.

Co-operative marketing provides the following services

- Procurement and disposal of farm produce
- Processing of produce
- Grading
- Packing
- Storage

- Transport
- Credit
- Fair trade practices
- Protect against marketing malpractices

National Co-operative Development Corporation was established in 1956 for strengthening and promoting agricultural marketing through co-operative societies.

The co-operative marketing societies consist 3-tier structure: -

i) Primary Marketing Society (PMS) at the village level.
ii) State Co-operative Marketing Federation (SCMF) at the state level.
iii) National Agricultural Co-operative Marketing Federation of India Limited (NAFED) at the national level.

Benefits:

- Remunerative price to producers
- Reduction in cost of marketing
- Reduction in commission charges
- Effective use of infrastructure
- Credit facilities
- Timely transportation service
- Reduces malpractices
- Marketing Information
- Supply of agricultural inputs
- Collective processing

7.4 Forward and future markets

Forward trading means an agreement or a contract between seller and purchaser, for a certain kind and quantity of a commodity for making delivery at a specified future time, at contracted price. It is a type of trading, which provide protection against the price fluctuations of agricultural produce. Producers, traders and millers utilize the future contracts to transfer the price risk. Presently, future markets in the country are regulated through Forward Contracts (Regulation) Act, 1952. The Forward Markets Commission (FMC) performs the functions of advisory, monitoring, supervision and regulation in future and forward trading. Forward trading transactions are performed through exchanges owned by the associations registered under the Act. These exchanges operate independently under the guidelines issued by the FMC.

Forward contracts are broadly of two types:

(a) Specific delivery contracts:

Specific delivery contracts are essentially merchandising contracts, which enables producers and consumers of commodities to market their produce and cover their requirements respectively. These contracts are generally negotiated directly between parties depending on availability and requirement of produce. During negotiation, terms of quality, quantity, price, period of delivery, place of delivery, payment terms, etc. are incorporated in the contracts. Specific delivery contracts are of two types:

i) Transferable specific delivery contracts (T.S.D.).
ii) Non-transferable specific delivery contracts (NTSD).

In the TSD contracts, transfer of the rights or obligations under the contract is permitted while in NTSD it is not permitted.

b) Other than specific delivery contracts:

Though this contract has not been specifically defined under the act, these are called as 'future contracts'. Futures contracts are forward contracts other than specific delivery contracts. These contracts are usually entered into under the auspices of an Exchange or Association. In the futures contracts, the quality and quantity of commodity, the time of maturity of contract, place of delivery etc. are all standardised and contracting parties have to negotiate only the rate at which contract is entered into.

Benefits of future trading :

Futures contracts perform two important functions i) Price discovery and ii) Price risk management. It is useful to all segment of economy.

For producers:	It is useful to the producer because they can get idea of price likely to prevail at a future point of time and, therefore, can decide time and planning of production that suits them.
For traders/ exporters:	The future trading is very useful to the traders/exporters as it provides an advance indication of the price likely to prevail. This helps the traders/exporters in quoting a realistic price and, thereby, secure trading/export contract in a competitive market.
For millers/	Future trading enables the

consumers:	millers/consumers to get an idea of the price at which the commodity would be available at a future point of time.

The other benefits of future trading are:

i) Price stabilization:	In times of violent fluctuations, future trading reduces the price variations.
ii) Competition:	Future trading encourages competitions and provides competitive price to farmers, millers or traders
iii)Supply and demand:	It ensures a balance in demand and supply position throughout the year.
iv) Integration of price:	Future trading promotes an integrated price structure throughout the country.

8.0 INSTITUTIONAL FACILITIES

8.1 Marketing related schemes of government and public sector organisations

Name of the scheme/imple-menting organisation	Facilities provided/salient features/ objectives
1.Agricultural Marketing Information Network Directorate of Marketing & Inspection, Head Office, N.H.-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. ▶ The scheme provided connectivity to 2458 nodes comprising the State Agricultural Marketing Department (SAMD) /Boards/ Markets. These concerned nodes have been provided with one computer and its peripherals. These SAMD/Boards/ Markets are to collect desired market information and pass on to respective state authorities and Head Office of the DMI for forward dissemination. The eligible markets will get 100 percent grant by Ministry of Agriculture.
2.Gramin Bhandaran Yojana (Rural Godowns Scheme) Directorate of Marketing & Inspection, Head Office, N.H.-IV, Faridabad.	▶ It is a capital investment subsidy scheme for construction/renovation/expansion of rural godowns. 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 meet the requirements of farmers for storing farm produce, processed farm produce, consumer articles and agricultural inputs. ▶ To prevent distress sale immediately after harvest. ▶ To promote grading, standardization and quality control of agricultural produce to improve their marketability. ▶ To promote pledge financing and marketing credit to strengthen agricultural marketing in the country for the 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 100 MT. ▶ 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 @33 percent of the project cost, with a ceiling of Rs. 50.00 lakhs.
3. Scheme for development/ strengthening of agricultural marketing Infra-structure, grading & standardization Directorate of Marketing and Inspection, Head Office, N.H.-IV, Faridabad.	▶ To provide additional agricultural marketing infrastructure to cope up with the expected marketable surpluses of agricultural and allied commodities including dairy, poultry, fishery, livestock and minor forest produce. ▶ To promote competitive alternative agricultural marketing infrastructure by inducement of private and co-operative sector investments that sustains incentives for quality and enhanced productivity thereby improving farmers' income. ▶ To strengthen existing agricultural marketing infrastructure to enhance efficiency. ▶ To promote direct marketing so as to increase market efficiency through reduction in intermediaries and handling channels thus enhancing farmers' income. ▶ To provide infrastructure facilities for grading, standardization and quality certification of agricultural produce so as to ensure price to the farmers commensurate with the quality of the produce. ▶ To promote grading, standardization and quality certification system for giving a major thrust for promotion of pledge financing and marketing credit, introduction of negotiable warehousing receipt system and promotion of forward and future markets so as to stabilize market system and increase farmers' income. ▶ To promote direct integration of processing units with producers. ▶ To create general awareness and provide education and training to farmers, entrepreneurs and market functionaries on agricultural marketing including grading, and quality certification.

4. Agmark grading and standardization Directorate of Marketing & Inspection, Head Office, N.H.-IV, Faridabad.	▶ Promotion of grading of agricultural and allied commodities under Agricultural Produce (Grading & Marking) Act.1937. ▶ 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 the world trade. Standards are being harmonised with international standards keeping in view the WTO requirements. Certification of agricultural commodities is carried out for the benefit of producer and consumer.
5. Price Support Scheme (PSS), National Agricultural Cooperative Marketing Federation of India Limited (NAFED), Nafed House, Sidhartha Enclave, New Delhi-1100014	▶ NAFED is the nodal agency of Government of India to undertake procurement of Sunflower under price support scheme. ▶ The objective of scheme is to provide regular marketing support to sustain and improve the production of Sunflower. ▶ Purchases under PSS are undertaken when the prices of Sunflower rate at or below the declared support prices for a particular year.
6.Co-operative Marketing, processing storage etc. programmes in comparatively under/least developed states, National Co-operative Development Corporation (NCDC), 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 crops, development of weaker and tribal sections, cooperatives, dairy, poultry and fisheries.

8.2 Institutional credit facilities

Institutional credit facilities are the vital factor in agricultural development. The main emphasis is laid down on adequate and timely credit support to the farmers, particularly small and marginal farmers for encouraging adoption of modern technology and improved agricultural practices.

The institutional agriculture credit disbursed through co-operatives was 31 percent, 60 percent through Commercial Banks and 9 percent through Regional Rural Banks during 2003-2004. The institutional credit to agriculture is offered in the form of short term, medium term and long term credit facilities:

Short term and medium term loans:

Name of scheme	Eligibility	Objective/Facilities
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 (PML)	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	All agriculture clients having good track record for the last two years.	➢ This card provides running account facilities to farmers to meet their production credit and contingency needs. ➢ The scheme follows simplified procedures to enable the farmers to avail the crop loans as and when they need. ➢ Minimum credit limit is Rs. 3000/-. Credit limit is based on operational land holding, cropping pattern and scale of finance. ➢ Withdrawals can be made by using easy and convenient withdrawal slips. The Kisan Credit Card is valid for 3 years subject to annual review. ➢ It also covers personal insurance against death or permanent disability; a maximum amount of Rs. 50,000 and Rs. 25,000 respectively.

4.National Agricultural Insurance Scheme	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 crops as a result of natural calamities, pests and diseases attack. ➢ To encourage the farmers to adopt progressive farming practices high value in-puts and higher technology in agriculture. ➢ To stabilize 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. ➢ Coverage of all food crops (cereals, millets and pulses), 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 loans:

Name of scheme	Eligibility	Objective/Facilities
Agricultural Term Loan	All categories of farmers (small/medium and agricultural labourers) 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 not less than 3 years and not exceeding 15 years.

8.3 Organisations/ Agencies providing marketing services

Name of the Organisations / Agencies & Address	Services Provided
1. Directorate of Marketing and Inspection (DMI) NH-IV, CGO Complex Faridabad 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. ➤ Administration of Meat Food Products Order (1973). ➤ Promotion of Cold Storage. ➤ Liaison between the Central and State Governments through its regional offices (11) and sub-offices (37) spread all over the country.
2.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 scheduled product exporters on payment of such fees as may be prescribed. ➤ 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 such products. ➤ 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 related to the scheduled products.
3.National Agricultural Cooperative Marketing Federation of India Ltd. (NAFED) Nafed House, Sidhartha Enclave, New Delhi – 110014	➤ Central nodal agency of Government of India for procurement of pulses, millets and oilseeds under price support scheme. ➤ It undertakes sale of pulses and oilseeds procured under PSS and import and provide storage facilities. ➤ Consumer Marketing Division of NAFED serves the consumers in Delhi through the network of its retail outlets (NAFED BAZAR) by providing consumer items of daily need.

Website: www.nafed-india.com	Processing of pulses, fruits, etc for internal trade.

4.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 disinfestation services.
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 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 ii) Purchase of transport vehicles.
6.Director General of Foreign Trade, (DGFT) Udyog Bhavan, New Delhi. Website: www.nic.in/eximpol	➤ Provides guidelines / procedure of export and import of different commodities. ➤ Allot import-export code number (IEC No) to the exporter of Agricultural commodities.
7.State Agricultural Marketing Board, at different state's capital	➤ Implementation of the regulation of marketing in the state. ➤ Provides infrastructural facilities for the marketing of notified agricultural produce. ➤ Grading of agricultural produce in the markets. ➤ To co-ordinate all the market committees for information services. ➤ Provides aid to financially weak or needy market committees in the form of loans and grants. ➤ To eliminate malpractices in the marketing system. ➤ To arrange or organise seminars, workshops or exhibitions on subject relating to agricultural marketing.

9.0 UTILIZATION

9.1 Processing

Processing is an important marketing function in the present day marketing of Black gram. Processing converts the raw materials and brings the produce nearer to human consumption. It is concerned with value addition to the produce by changing its form. Pulses are generally converted into dal by decutilating and splitting the whole seed. Over 75% of the total legumes produced in the country is split into dal.

Processing of Black gram is generally known as dal milling or, dehulling. Milling means removal of the outer husk and splitting the grain into two equal halves. Dal milling is one of the major food processing industries in the country, next only to rice milling. The efficiency of conversion of grain to dal by traditional methods of milling is low and the resultant product especially that from the wet method is inferior in cooking quality. The average dal yield varies from 68-75 percent (theoretical value 85 percent), i.e. a net loss of 10-17 percent during the conversion of Black gram into finished dal by traditional methods.

9.2 Uses

The Black gram is used in many ways as human food, fodder, fuel, fencing materials and maintaining soil fertility. The main uses of Black gram are as follows:

- **Dal:** Decorticated split cotyledon of whole seed is called dal. Black gram is consumed mainly as dal in India. Black gram dal is an important ingredient of diet of Indian people.
- **Seed purpose:** Generally, farmers retain a part of his produce for seed purpose for sowing in next season.
- **Animal feed:** The by-product of seed coats, broken bits and powder from dal mills forms a valuable protein source of dairy animals. The husk of pods and leaves obtained during threshing constitute a valuable cattle feed.
- **To Improve soil fertility:** Rhizobium bacteria are present on the root nodules of Black gram. The Black gram crop fixes atmospheric nitrogen in symbiotic association with Rhizobium bacteria and maintains the soil fertility.

10.0 Do's and Don'ts

DO'S	DON'TS
✓ Harvest the Black gram at proper time of maturity.	✗ Delay in harvesting which results shattering of pods.
✓ Harvest the Black gram crop when 80% of the pods are mature (turned yellow).	✗ Harvest Black gram before the pods are fully mature, which results lower yields, higher proportion of immature seeds, poor grain quality.
✓ Harvest during conducive weather condition.	✗ Harvest the crop during adverse weather condition (during rain and over cast weather).
✓ Threshing and winnowing on cemented (pucca) floor.	✗ Perform threshing and winnowing on kutcha floor.
✓ Market the Black gram after AGMARK grading to get remunerative prices in the market.	✗ Market Black gram without grading, which will fetch lower prices.
✓ Before marketing the produce, get the market information regularly from agmarknet.nic.in website, newspapers, T.V., radio, concerned APMC offices etc.	✗ Market produce without collecting / verifying marketing information.
✓ Store the Black gram during post harvest period and sale it later when the prices are higher in the market.	✗ Sale the Black gram during post harvest period when the prices are low during this period due to glut.
✓ Use proper and scientific method of storage.	✗ Use conventional and outdated method of storage, which causes storage losses.
✓ Avail the benefit of centrally sponsored GRAIN BHANDARAN YOJANA scheme for construction of rural godowns and store Black gram to minimise losses.	✗ Store Black gram at unscientific place in a haphazard manner, which will result qualitative and quantitative deterioration of Black gram grains.
✓ Select the shortest and efficient marketing channel to get highest share in marketing.	✗ Use the long marketing channel, which reduces the producer's share as well as more commission charges.
✓ Package properly to protect the quality and quantity of produce during transit and storage.	✗ Pack in Improper package which causes more losses during transit and storage.
✓ Select the cheapest and convenient mode of transportation from the available alternatives.	

✓ Transportation of Black gram in bags to minimize the grain losses.	✗ Use the mode of transport, which will cause losses and require higher cost.
✓ Use effective, efficient and improved post harvest technology and processing techniques to avoid post harvest losses.	✗ Transport Black gram in bulk, which causes more losses.
✓ Avail the facility of Price Support Scheme during glut situation.	✗ Use traditional and conventional techniques in post harvest operations and in processing which causes more quantitative and qualitative losses.
✓ Avail the procedure of Sanitary and Phyto-Sanitary measures during export.	✗ Sale Black gram to local traders or itinerant merchant during glut situation.
✓ Assure better marketing of the produce, avail benefit of contract farming.	✗ Export without any Sanitary and Phyto-Sanitary measures.
✓ Avail the benefits of future trading to avoid price risk arising due to wide fluctuations in commodity prices.	✗ Produce Black gram without assessing and assuring its market demand for that year.
	✗ Sell the produce at fluctuating prices or in glut situation.

11.0 REFERENCES

(A) Text books

1. Advances in Pulse Production Technology, Jeswani, L.M. and Baldev, B., Indian Council of Agricultural Research Publication (1988).
2. Principles and Practices of Post Harvest Technology, Pandey ,P.H.(1988).
3. Agricultural Marketing in India, Acharya, S.S.and Agarwal,N.L.(1999).
4. Handling and storage of food grains, Pingale, S.V.(1976).
5. Fundamentals of Food and Nutrition, Mudambi, S.R.and Rajagopal,M.V.
6. Post Harvest Technology of Cereals, Pulses and Oil seeds, Chakraverty, A.(1988).

(B) Annual reports

1. Annual Report, 2003-2004, National Cooperative Development Corporation, New Delhi.
2. Annual Report, 2004-2005,Central Warehousing Corporation, New Delhi.
3. Agmark Grading Statistics, 2003-2004 and 2004-2005, Directorate of Marketing and Inspection, Faridabad.

(C) Research paper

1. Establishing Regional and Global Marketing Network for Small holders' Agricultural Produce / Products with reference to Sanitary and Phyto-sanitary (SPS) Requirement, Agarwal, P.K., Agricultural Marketing, April-June, 2002, PP.15-23.
2. Inroads to Contract Farming, Devi, L., Agriculture Toady, September, 2003, PP.27-35.
3. Contract Farming: Associating for Mutual Benefit, Gururaja H., www.CommodityIndia.com, June, 2002, PP.29-35.
4. Marketing Costs Margins and Efficiency, Singh, H.P., Course material for Diploma course in Agricultural marketing. (AMTC Series-3), Directorate of Marketing and Inspection, Branch Head Office, Nagpur.
5. Role of Co-operative Marketing in India, Pandey, Y. K.,et.al., Agricultural Marketing, Oct.-Dec.2000, pp.20-21.

(D) Other related documents

1. Area, Production and Average Yield from Department of Agriculture and Cooperation, New Delhi.
2. Export, Import and Inter-state movement from Directorate General of Commercial Intelligence and Statistics (DGCIS), Kolkata.
3. Market arrivals, market fee and taxation from sub-offices of Directorate of Marketing and Inspection.
4. Operational guidelines of Gramin Bhandaran Yojna (Rural Godown Scheme), Ministry of Agriculture, Department of Agriculture and Cooperation, Directorate of Marketing and Inspection, New Delhi.
5. Action Plan and Operational arrangements for procurement of Oilseeds and Pulses under Price Support Scheme in Kharif season 2002,Nafed, New Delhi.
6. Agmark grading from Agricultural produce (Grading and Marking), Act, 1937 with Rules, made upto 31st December, 1979 (Fifth Edition), (Marketing Series No. 192), Directorate of Marketing and Inspection.
7. Packaging of foodgrains in India, Packaging India, February-March, 1999, pp.59-63.
8. Punjab's March Towards Industry Alliances, www.CommodityIndia.com, May,2003, PP.17-26.
9. Forward Trading and Forward Markets Commission, September, 2000, Mumbai.

(E) Websites

www.agrmaknet.nic.in
www.agricoop.nic.in
www.apeda.com
www.fao.org
www.nabard.org
www.unu.edu
www.ksamb.com