MANUAL ON STANDARDS OF PADDY

1. INTRODUCTION

Promotion of standardization and grading of agricultural commodities is an important aspect of agricultural marketing. The agricultural commodities are heterogeneous and hence it is very essential to grade these commodities as per standards to command better price either at domestic or international market. Sale of Paddy is offered on the basis of variety, wholesomeness, appearance, colour, presence of foreign matter, damaged grains, broken grains, admixture of inferior variety, moisture, harmful contaminants, etc. A quality grain is that which meets the end user specifications with respect to range of pre-determined Quality and Safety standards.

2. OBJECTIVE

The Manual has been designed with the objectives to

i. Create awareness about standards prescribed by various organizations for domestic and international markets so as to raise quality consciousness among the farmers, entrepreneurs and other market functionaries with the objective to equip them to face the global competition in the post WTO era.
ii. provide details of various parameters responsible for quality; and
iii. describe the advantages of grading & standardization so that farmers may get prices commensurate with quality produced by them.

3. IMPORTANT PARAMETERS RESPONSIBLE FOR QUALITY

3.1 Following Parameters are important in determination of QUALITY of Paddy

- Wholesomeness, appearance, colour
- Foreign matter(organic and inorganic)
- Damaged grains
- Broken grains
- Immature/Shriveled grains
- Weevilled grains
- Admixture
- Moisture content

3.2 Following SAFETY parameters are important:

- Pesticides residue
- Poisonous/Heavy metals
- Aflatoxin
- Uric acid
- Microbial load

3.3 Parameters by which grades of Paddy are differentiated

Important parameters by which grades can be differentiated in case of paddy are

- foreign matter
- Admixture
- Damaged/Immature/Weevilled grains

4. STANDARDS APPLICABLE FOR PURCHASES BY FOOD CORPORATION OF INDIA (FCI)

4.1 The main objectives of the FCI are

a) Effective price support operations for safeguarding the interests of the farmers.
b) Distribution of foodgrains throughout the country for Public Distribution System and other Govt. of India schemes, and
c) Maintaining satisfactory level of operational/buffer stocks of foodgrains to ensure national food security.

4.2 To meet these obligations, the FCI makes purchases of paddy and for this purpose, following standards for all varieties of paddy are applicable.

UNIFORM SPECIFICATION FOR ALL VARIETIES OF PADDY (MARKETING SEASON 2004-2005)

Paddy shall be in sound merchantable condition, dry, clean, wholesome, of good food value, uniform in colour and size of grains and free from moulds, weevils, obnoxious smell,*Argemone maxicana, Lathyrus sativus* (kesari), admixture of deleterious substances.

Paddy will be classified into Grade óAôand common groups.

Schedule of Specification

Sl.No.	Refractions	Maximum Limits(%)
1.	Foreign matter	
	a) Inorganic	1.0
	b) Organic	1.0
2	Damaged, discoloured, sprouted and weevilled grains	3.0
3	Immature, Shrunken and shriveled grains	3.0
4	Admixture of lower class	8.0
5	Moisture	17.0

NOTE: Within the overall limit of 1.0% for organic foreign matter, poisonous seeds shall not exceed 0.5% of which Dhatura and Akra seeds (*Vicia* species) not to exceed 0.025% and 0.2% respectively.

DEFINITIONS

Foreign Matter : Includes inorganic and organic matter. The inorganic matter shall include sand, gravel, dirt, pebbles, stones, glass and metallic pieces, lumps of earth, clay and mud. Organic matter shall include husk, chaff, straw, weed seeds and other inedible grains. Paddy shall be considered as foreign matter in commodities other than paddy.

Damaged : Kernels or pieces of kernels that are sprouted or internally damaged as a result of heat, moisture, weather or microbes.

Discoloured:Kernels or pieces of kernels that have changed the colour as a result of deteriorative changes.

Weeviled Grains : Weeviled grains are grain kernels that are partially or wholly bored by insects injurious to grain but do not include germ-eaten grains and egg-spotted grains.

Immature : Kernels or pieces of grain kernels that are not fully developed.

Varietal Admixture: The presence of a variety of the same grain other than the variety in consideration.

Moisture: The loss in mass caused as a result of heating for two hours at 130 to 133^{0}C under specified conditions and expressed as percentage.

5. STANDARDS APPLICABLE FOR STORAGE OF PADDY

5.1 CENTRAL WAREHOUSING CORPORATION (CWC) : The CWC works as an agent of the government for purchase, sale, storage and distribution of agricultural and industrial commodities, seeds, fertilizers and notified commodities for individual, cooperatives and other institutions in the country. CWC provides modern efficient warehousing to ensure maximum returns to the growers with better opportunities. It provides scientific facilities to the farmers for the stock of agricultural produce at a reasonable cost. CWC issues Warehouse Receipts to a person depositing goods in the warehouse. The banking institutions accept the Warehouse Receipts as co-lateral security for grant of loans to the holder of the Warehouse Receipt on its being endorsed and delivered to them. Thus, warehousing plays an active role in marketing and also provides socio-economic gains to the farmers, who otherwise get exploited by the middlemen and are forced to have distress sales.

5.1.1 Standards of Central Warehousing Corporation

Central Warehousing Corporation follows Standards given in Item 4.3.2 for accepting paddy for storage in the warehouses.

In addition, CWC has following categorization for deciding the period of storability of paddy in the warehouses.

Percentage of Weevilled grains :

Upto 1%	A
Above 1% upto 4%	B
Above 4% upto 7%	C
Above 7% upto 15%	D

In order to have better storability of paddy farmers are advised to ensure that paddy for storage has Weevilled grains less than 1% (by count).

6. STANDARDS APPLICABLE FOR DOMESTIC MARKET

6.1 The Prevention of Food Adulteration Act, 1954 (PFA Standards)

Prevention of Food Adulteration Rules, 1955 (PFA Rules) have been notified to carry out the provisions of the Prevention of Food Adulteration Act, 1954. These rules define the standards of quality and fix the limit of variability permissible in respect of article of food. These rules also provide guidelines for packing and labeling of an article of food. Standards framed under the provisions of the rules are popularly called PFA standards. PFA standards prescribe minimum limit for Quality as well as Safety parameters. PFA standards are minimum standards and are**mandatory.** They do not differentiate between Quality. **Food articles being sold in the market should comply with PFA standards.**

6.1.1 QUALITY PARAMETERS

Quality standards of Paddy are not prescribed in PFA Rules, 1955.

6.1.2 SAFETY PARAMETERS

Paddy is not as such consumed as food. However, it is suggested that after removal of husk, the resultant product (rice) must comply with limits for following food safety parameters.

Limits for insecticides and pesticides.

Following maximum limits are prescribed for residues of insecticides and pesticides.

Sl.No.	Name of insecticides	Tolerance Limit mg/kg. (ppm)
1	Aldrin dieldrin,(The limits apply to aldrin and dialdrin singly or in any combination and are expressed as dieldrin)	0.01
2	Benomyl	0.50
3	Carbaryl	2.5
4	Chlordane (residue to be measured as cis plus trans chlordane)	0.02
5	Chlorfenvinphos (residues to be measured as alpha and beta isomers of chlorfenvinphos)	0.025
6	Chlorpyrifos	0.05
7	Carbendazim	0.50
8	Carbofuran(Sum of carbofuran and 3-hydroxy carbofuran expressed as carbofuran)	0.10
9	Cataphydrochloride	0.50
10	Diazinon	0.05
11	Dichlorvos (Content of dichloracetaldehyde (D.C.A) be reported where possible	1.0
12	Decamethrin/Delta methrin	0.50
13	2,4-D	0.01
14	Dithiocarbamates (the residue tolerance limit are determined and expressed as mg/CS_2/Kg and refer separately to the residues arising from any or each groups of dithiocarbamates (a)Dimethyldithiocarbamates residue resulting from the use of ferbam or Ziramand (b)Ethylene bis-carbamates resulting from the use ofmancozebmane ,or Zineb(including zineb derived from nabam plus zinc sulphide)	0.20
15	Edifenphos	0.02
16	Ethion (Residues to be determined as ethion and its oxygen analogue and expressed as ethion).	0.025
17	Fenitrothion	0.02
18	Fenthion (sum of fenthion, its oxygen analogue and their sulphoxidesand sulphones, expressed as fenthion)	0.10
19	Heptachlor (combined residues of heptachlor and epoxide to be determined and expressed as heptachlor)	0.01
20	Hexachlorocyclohexane and its isomers (a)Alfa isomer Rice grain unpolished Rice grain Polished	 0.10 0.05

	(b)Beta isomer Rice grain unpolished Rice grain Polished (c)Gamma isomer known as Lindane Rice grain unpolished Rice grain Polished (d)Delta isomer Rice grain unpolished Rice grain Polished	 0.10 0.05 0.10 0.05 0.10 0.05
21	Hydrogen cyanide	37.5
22	Inorganic bromide (determined and expressed as total bromide from all sources)	25.0
23	Malathion (Malathion to be determined and expressed as combined residue of malathion and malaoxon)	4.0
24	Methyl Choloro phenoxyacetic Acid (MCPA)	0.05
25	Monocrotophos	0.025
26	Oxydemeton methyl	0.02
27	Oxydiazon	0.03
28	Paraquat-Dichloride(Determined as paraquat cations)	0.1
29	Phosphamidon residues (expressed as the sum of phosphamidon and its desethyl derivative).	0.05
30	Phenthoate	0.05
31	Phorate (sum of phorate, its oxygen analogue and their sulphoxide andsulphones, expressed as phorate)	0.05
32	Pirimiphos-methyl	0.50
33	Quinolphos	0.01
34	Trichlorfon	0.05
35	Thiometon (residues determined as thiometon its sulfoxide andsulphone expressed as thiometon)	0.025
36	Triazophos	0.05
37	Iprodione	10.0
38	Ethoxysulfuron	0.01
39	Oxyfluorfen	0.05
40	Carbosulfan	0.2
41	Tricyclazole	0.02
42	Imidacloprid	0.05
43	Butachlor	0.05
44	Pendimethalin	0.05
45	Pretilachlor	0.05
46	Cyhalofop-butyl	0.5
47	Thiamethoxam	0.02
48	Fenobucarb	0.01
49	Anilophos	0.1
50	Kitazin	0.2
51	Isoprothiolane	0.1

Poisonous Metals

Following limits are prescribed for poisonous metals

Name of the Poisonous metal	**parts per million by weight**

1	Lead	2.5
2	Copper	30.0
3	Arsenic	1.1
4	Tin	250.0
5	Zinc	50.0
6	Cadmiun	1.5
7	Mercury	1.0
8	Methyl Mercury (Calculated as the element)	0.25

Uric Acid : Not more than 100 mg. per kg.

Aflatoxin : Not more than 30 micrograms per kg.

7. STANDARDS FOR GRADING

7.1 GRADING – Grading provides description of the quality of the consignment and assists in the formation of a legally binding agreement. It facilitates proper marketing of agricultural commodities. It also ensures that agricultural commodities move through the market faster and without obstructions. This also facilitates transactions without physical verifications by the distant buyers.

Advantages of Grading

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

7.2 AGRICULTURAL PRODUCE (GRADING & MARKING) ACT, 1937 (AGMARK STANDARDS).

Standards of various agricultural commodities prescribed under the provisions of the Agricultural Produce (Grading & Marking) Act, 1937 are popularly known AGMARK Standards. AGMARK standards comply with minimum standards of quality & safety prescribed in Prevention of Food Adulteration Rules, 1955. In addition, AGMARK standards differentiate between qualityby having four grades. The grades are differentiated on the basis of foreign matter, Admixture, damaged/immature/weeviled grains, etc. Farmer can grade the paddy produced by him as per the AGMARK quality standards and get prices commensurate to the quality produced by him.

7.2.1 AGMARK Standards of Paddy

GRADE DESIGNATIONS AND DEFINITION OF QUALITY OF PADDY

Grade	Special Characteristics	General Characteristics

designation	Maximum limit of tolerance			
	Foreign Matter (% by wt.) (2)	Admixture (% by wt.) (3)	Damaged Immature, Weevilled (% by wt.) (4)	(5)
(1)				
I	1.0	5.0	1.0	a) be the dried mature grains with husk of*Oryza sativa,L;* b) have uniform size, shape and colour; c)be hard, clean, wholesome and free from moulds,weevils, obnoxious smell,discolouration, admixture of deleterious substances and all other impurities except to the extent indicated in the Schedule; d)be in sound merchantable condition; e) not have moisture exceeding 14%.
II	2.0	10.0	2.0	
III	4.0	15.0	5.0	
IV	7.0	30.0	10.0	

DEFINITIONS:

Foreign matter: It includes dust, stones, lumps of earth chaff, stem or straw and any other impurity. In case of admixture of other foodgrains in paddy, 0.5 per cent of the other food grains shall be treated as free tolerance and any thing above 0.5 percent shall be treated as foreign matter.

Admixture: Presence of inferior varieties shall be considered as admixture.

Damaged: Grains that are internally damaged or discoloured, damage and discolouration material ly affecting the quality. The proportion of damaged grains shall not exceed 5.0 percent for Grade-IV.

Immature :- Grains that are not properly developed.

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

8. STANDARDS FOR INTERNTIONAL TRADE.

8.1 CODEX ALIMENTARIUS COMMISSION (CAC) : Codex Alimentarius Commission (CAC) implements joint FAO/WHO Food Standards Programme. The purpose of the CAC programmeis to protect the health of consumers and ensure fair practices in the food trade. The CAC is a collection of internationally adopted food standards presented in a uniform manner. Sanitary andPhyto-Sanitary Agreement and Technical Barriers to Trade Agreement of World Trade Organisation recognizes standards framed by CAC with respect

to safety and quality aspects of food items. **Thus for international trade, standards framed by CAC are recognized.**

8.1.1 Codex Alimentarius Commission has not yet formulated quality standards for paddy.

8.1.2. Paddy is not consumed directly as food. It is consumed after removal of the husk. As such it is suggested that after removal of husk, the resultant product may comply with following Food Safety parameters prescribed by CAC for rice.

PESTICIDE RESIDUES

Sl.No.	PESTICIDE	MRL	(Mg/kg)
1.	2,4-D	MRL	0.05
2.	BENTAZONE	MRL	0.1
3.	CARBARYL	MRL	5.0
4.	CHLORPYRIFOS	MRL	0.1
5.	CHLORPYRIFOS-METHYL	MRL	0.1
6.	DIQUAT	MRL	10.0
7.	DISULFOTON	MRL	0.5
8.	ENDOSULFAN	MRL	0.1
9.	FENTIN	MRL	0.1
10.	GLYPHOSATE	MRL	0.1
11.	PARAQUAT	MRL	10.0

HEAVY METALS

Maximum levels for lead 0.2 mg/ kg.

HYGIENE

Paddy after cleaning and removal of husk

- Shall be free from microorganisms in amounts which may represent a hazard to health.
- Shall be free from parasites which may represent a hazard to health.
- Shall not contain any substance originating from microorganisms, including fungi, in amounts which may represent a hazard to health.