



## DUS CHARACTERIZATION OF RICE FARMERS' VARIETIES UNDER PPV AND FRA IN CHHATTISGARH

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### ABSTRACT

In order to validate the distinctiveness of rice (*Oryza sativa* L.) varieties. For the establishment of the distinctness among One hundred thirty six farmers' varieties of rice, Characterization of 136 landraces/farmers' varieties of rice was done using fifty five agro-morphological traits following Distinctiveness, Uniformity and Stability test (DUS) during *kharif* season of 2014 at the IGKV instructional cum research farm. Out of one thirty six varieties studied, sixty six FVs were found to be distinctive on the basis of fifty five essential characters. Out of 66 Jengene and Tichun Dhan were found very early FVs under testing. "Gangtai" and "Matari Pochi" were found light green for colour of stigma. This study will be useful for breeders, researchers and farmers to identify and choose the restoration and conservation of beneficial genes for crop improvement and also to seek protection under Protection of Plant Varieties and Farmer's Rights Act.

**Key words :** DUS characterization, variety, rice, farmers, PPV&FRA.

Rice is the world's most important food crop and a primary food source for more than one third of world's population (1). The essence of plant breeding lies in the creation of genetic variation which is a prerequisite for any improvement in crop. The development of one or more varieties depends on the final selection of superior plants by the plant breeder who uses several techniques to create the genetic variation and to select from within that variation (1).

Rice (*Oryza sativa* L.) is a staple food for more than half of the world's population (Netha et al., 2005). A large number of new varieties are being released, but not all of these have been widely accepted, as many of them have been considered to be merely forms of acknowledged varieties. If these varieties are actually genetically distinct, conservation and purity of these varieties is needed for which a reliable and robust fingerprinting is absolutely required (2).

In order to introduce a new plant variety to the markets commercially, it is necessary to register a newly bred variety, which relies upon the results of DUS (distinctness, uniformity, and stability) tests; that is, for a new genotype to be registered as a commercial variety, it needs to be distinct (D) from all other released varieties, uniform (U), and stable (S) for morphological and other evaluated traits (1). Therefore, DUS test has been established to be the foundation of plant variety protection and also to identify a new variety from reference collection. The new variety should pass legal examinations to be commercialized and receive the certificate for the plant breeder's rights, a part of which consists of DUS tests according to morphological characteristics.

India has a rich and wide range of genetic wealth of rice. It has been estimated from various surveys that nearly 50,000 of rice is still being grown in the country (3). With the introduction of high yielding varieties and new technologies become a great threat to the security of the age-old practice of growing traditional varieties and landraces which may have immense potential for different important traits (4). Being signatory to the General Agreement on Trade and Tariffs (GAAT), Government of India has enacted its *Sui generis* system, Protection of Plant Varieties and Farmers' Right Act (PPV&FRA), 2001 for providing protection to plant varieties based on Distinctiveness, Uniformity and Stability (DUS) test, apart from novelty. Which is a unique and model act which gives equal importance to the farmers and breeders and treats them as partners in their efforts for sustainable food security (5). Thus the process of variety identification includes several steps were identification of a variety, Confirmation of the variety, Distinctness of the variety from all other in common knowledge, Purity of the variety and Characterization of the variety which enumerates its full descriptors. The concept of distinctness, uniformity and stability are thus fundamental to the characterization of a variety as a unique creation. Registration is allowed for three types of plant varieties new varieties bred by breeders, extant varieties and farmer's varieties subject to their fulfilling the conditions of Distinctness, Uniformity and Stability and Novelty in case of breeder's variety. The uniqueness of a particular variety is to be established by the test called DUS. The first step to implement our PPV&FR Act provisions is formulation of National Test Guidelines for conducting DUS tests. In this context, an attempt was made to characterize a set of thirty-five genotypes of rice germplasm for different morphological

**Table-1** : List of Farmers' varieties under DUS testing.

Sr	Denomination	Sr.	Denomination	Sr.	Denomination
1.	Shiv dharohar-1	47.	Dadbako	93.	Rajnigandha
2.	Shiv dharohar-2	48.	Gangtaidhan	94.	Sindursaal
3.	Shiv dharohar-3	49.	Mohlayan Bako	95.	Jeerabhog
4.	Lazni Super-1	50.	Ganga dhan	96.	Kolhin Khosa
5.	Lazni Super-2	51.	Khirasar	97.	Lal Sita Saal
6.	Shiv dharohar-4	52.	Kerakanghi	98.	NetaKalani
7.	Safri	53.	Tendhumoridhan	99.	DadhmainiDhan
8.	Gaanga kali	54.	Safri-1 Nakna	100.	Tichun Dhan
9.	LaliChavada	55.	DokraMecha	101.	Sitasaal Dhan
10.	Dhaniyadhan	56.	KundaiDati	102.	Hardasaal
11.	Luchai	57.	MachariPoti	103.	BarhbaliDhan
12.	Rani Kajal	58.	Kadam Phool	104.	ChhotaDhan
13.	DhoraMudriya	59.	Rani Kajar	105.	Balemsaar
14.	Borojeri	60.	GadurSela	106.	Tulsimanjar
15.	Sonachur	61.	BhurshiDhan	107.	Bagkalmi
16.	Bhurkund	62.	Bodi	108.	DigamberDhan
17.	Kera Khadi	63.	KakdoDhan	109.	HarikhuntaDhan
18.	Gangtai	64.	SendurSinga	110.	Changro Jeera Phool
19.	Jengene	65.	MeharDhan	111.	ChangroLaxmiBhog
20.	Kalajeera-1	66.	Kata Mehar	112.	Shyam Jeera
21.	Jeeraful	67.	AjamDhan	113.	Boga
22.	Tulshi Mala	68.	BhataMokdo	114.	Sugandha
23.	Rajga	69.	Alsaker	115.	Dudhkandar
24.	Kalamluchai	70.	Bhujni Dhan	116.	TulsiMukur
25.	Bhagalpuri	71.	Bhains Path	117.	Sona Chur
26.	Bathras	72.	Leem Dhan	118.	Tilasaar
27.	Agiasal	73.	Lokti Machi	119.	Nardha
28.	Ratanchuri	74.	Ramigali	120.	Basmati Baba
29.	Goindi	75.	Cheptigurmatia	121.	Koya Baba
30.	90 Number	76.	Lal Banko	122.	DeshiDhan
31.	Patania julli	77.	Titir Pankhi	123.	Bhojna Baba-6
32.	Gopal Bhog	78.	Keshar Jawaphool	124.	Gutika Baba
33.	Kendumudi-1	79.	Gowardhan Kali Kamod	125.	Bhojna Baba -H4
34.	Bhajna	80.	Gowardhan Badsabhog	126.	Damru Baba-3
35.	KajaliBoonde	81.	Gowardhan Vishnubhog	127.	Koya-10
36.	Surendro	82.	Ara Khunta	128.	Basmati Dhan-1
37.	Savansar	83.	Bacha Kolam	129.	Jeera Baba
38.	Dubraj	84.	Bagri Sona	130.	Koya-4
39.	Barhasal	85.	Safed Lalak	131.	Chaulalai Baba
40.	Luchai	86.	Karni Dhan	132.	Jaarli Baba
41.	Koliyara	87.	Lanhonchi	133.	Kodha Phool
42.	Karhani	88.	Tewan Dhan	134.	Goda

and agronomic traits and identify the variability available in the collection.

Agro-Morphological characterization should eventually lead to a system of recording and storing useful data that can be readily retrieved and made available to others and help in planning breeding programmes. Keeping in view the importance of aforesaid aspects, the

present investigation was undertaken to characterize the seventy landraces of rice.

## MATERIALS AND METHODS

Five landraces<sup>1</sup> and 136 rice farmers' varieties were tested by Indira Gandhi Krish Vishwavidyalaya, Raipur,

**Table-2** : Essential characters along with descriptor.

Sr.	Characters	States				
		Green	Light purple	Purple lines	Uniform purple	
1.	Basal leaf: Sheath colour	Green	Light purple	Purple lines	Uniform purple	
2.	Leaf : Intensity of green colour	Light	Medium	Dark		
3.	Leaf : Anthocyanin colouration	Absent	Present			
4.	Leaf sheath : Anthocyanin colouration	Absent	Present			
5.	Leaf sheath : intensity of anthocyanin colouration	Very weak	Weak	Medium	Strong	Very strong
6.	Leaf : Pubescence of blade surface	Absent	Weak	Medium	Strong	Very strong
7.	Leaf : Auricles	Absent	Present			
8.	Leaf : Anthocyanin colouration of auricles	Colourless	Light purple	Purple		
9.	Leaf : Collar	Absent	Present			
10.	Leaf : Anthocyanin colouration of collar	Absent	Present			
11.	Leaf : Ligule	Absent	Present			
12.	Leaf : Shape of ligule	Truncate	Acute	Split		
13.	Leaf : Colour of ligule	White	Light purple	Purple		
14.	Leaf : Length of blade	Short (<30 cm)	Med. (30-45 cm)	Long (>45 cm)		
15.	Leaf : Width of blade	Narrow (<1 cm)	Medium (1-2 cm)	Broad (>2 cm)		
16.	Culm : Attitude	Erect	Semi-erect	Open	Spreading	
17.	Time of heading (50% of plants with panicles)	Very early (<71)	Early (71-90)	Medium (91-110)	Late (111-130)	Very late (> 131)
18.	Flag leaf : Attitude of blade (early observation)	Erect	Semi-erect	Horizontal	Drooping	
19.	Spikelet : Density of pubescence of lemma	Absent	Weak	Medium	Strong	Very strong
20.	Male sterility	Absent	Present			
21.	Lemma : Anthocyanin colouration of keel	Absent / very weak	Weak	Medium	Strong	Very strong
22.	Lemma : Anthocyanin colouration of area below apex	Absent	Weak	Medium	Strong	Very strong
23.	Lemma : Anthocyanin colouration of apex	Absent	Weak	Medium	Strong	Very strong
24.	Spikelet : Colour of stigma	White	Light green	Yellow	Light purple	Purple
25.	Stem : Thickness	Thin (<0.40 cm)	Medium (0.40-0.55 cm)	Thick (>0.55 cm)		
26.	Stem : Length (excluding panicle; excluding floating rice)	Very short (<91 cm)	Short (91-110 cm)	Medium(111-130 cm)	Long (131-150 cm)	Very long (>150 cm)
27.	Stem : Anthocyanin colouration of nodes	Absent	Present			
28.	Stem : Intensity of anthocyanin coloration of nodes	Weak	Medium	Strong		
29.	Stem : Anthocyanin colouration of internodes	Absent	Present			
30.	Panicle : Length of main axis	Very short (<16cm)	Short (16-20 cm)	Medium (21-25cm)	Long (26-30 cm)	Very long (>30 cm)
31.	Flag leaf : Attitude of blade (late observation)	Erect	Semi-erect	Horizontal	Deflexed	
32.	Panicle : Curvature of main axis	Straight	Semi-straight	Deflexed	Drooping	
33.	Panicle : Number per plant	Few (<11)	Medium (11-20)	Many (>20)		
34.	Spikelet : Colour of tip of lemma	White	Yellowish	Brown	Red	Purple
35.	Lemma and Palea : Colour	Straw	Gold and gold furrows on straw background	Brown spots on straw	Brown furrows on straw	Brown (tawny)
		Reddish to light purple	Purple spots / furrows on straw	Purple	Black	
36.	Panicle: Awns	Absent	Present			

Table-2 : Contd....

Table-2 : Contd. ....

37.	Panicle : Presence of secondary branching	Absent	Present			
38.	Panicle : Secondary branching	Weak	Strong	Clustered		
39.	Panicle : Attitude of branches	Erect	Erect to semi-Erect	Semi-erect	Semi-erect to spreading	Spreading
40.	Panicle : Exertion	Partly exerted	Mostly exerted	Well exerted		
41.	Time maturity (days)	Very early (<100)	Early (101-120)	Medium (121-140)	Late (141-160)	Very late (>160)
42.	Leaf : Senescence	Early	Medium	Late		
43.	Sterile lemma : Colour	Straw	Gold	Red	Purple	
44.	Grain : Weight of 1000 fully developed grains	Very low (<15 g)	Low (15-20 g)	Medium (21-25 g)	High (26-30)	Very high (>30 g)
45.	Grain : Length	Very short (<6mm)	Short (6.1 - 8.5mm)	Medium (8.6-10.5 mm)	Long (10.6-12.5m m)	Very Long >12.5mm
46.	Grain : Width	Very Narrow (<2 mm)	Narrow (2.1-2.5 mm)	Medium (2.6-3.0 mm)	Broad (3.1-3.5 mm)	Very broad >3.5 mm
47.	Grain : Phenol reaction of lemma	Absent	Present			
48.	Decorticated grain : Length	Short	Medium	Long	Long (Basmati Type)	Extra Long
49.	Decorticated grain : Width	Narrow (<2.0mm)	Medium (2.0-2.5)	Broad (>2.5 mm)		
50.	Decorticated grain : Shape (in lateral view)	Short Slender	Short Bold	Medium Slender	Long bold	Long slender
		Long slender (Basmati Type)	Extra Long Slender			
51.	Decorticated grain : Colour	White	Light Brown	Variegated Brown	Dark Brown	Light Red
		Red	Variegated purple	Purple	Dark Purple	
52.	Endosperm : Presence of amylase	Absent	Present			
53.	Varieties with endosperm of amylose absent only Polished grain : Expression of white core	Absent or Very small	Small	Medium	Large	Fully Chalky
54.	Gelatinization temperature through alkali spreading value	Low	Medium	High Medium	High	
55.	Decorticated grain: Aroma	Absent	Present			

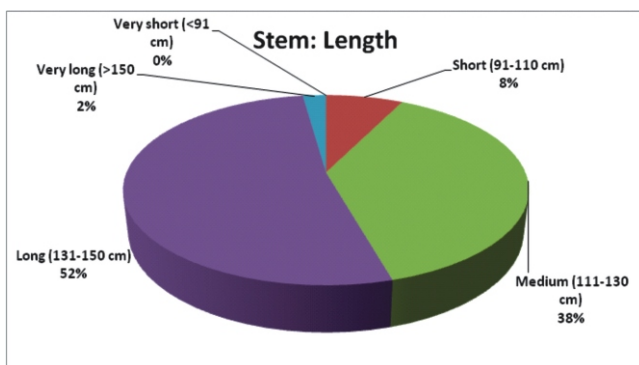
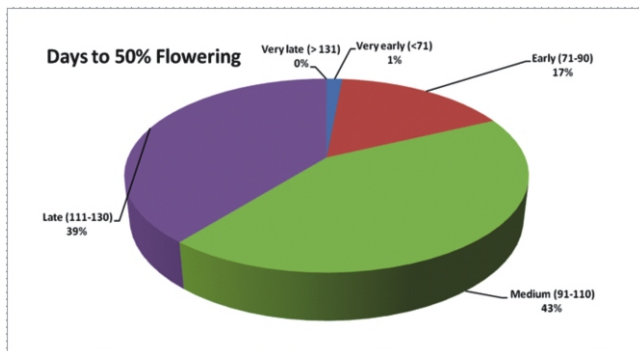
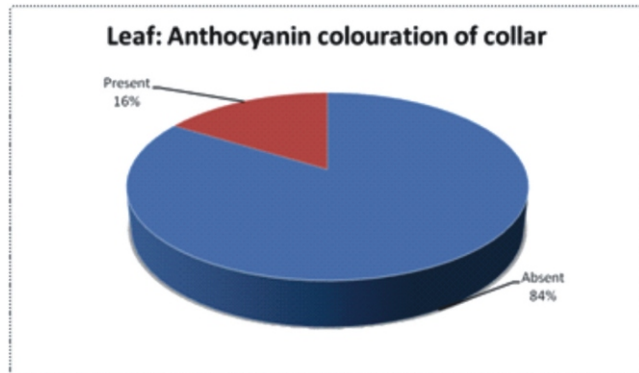
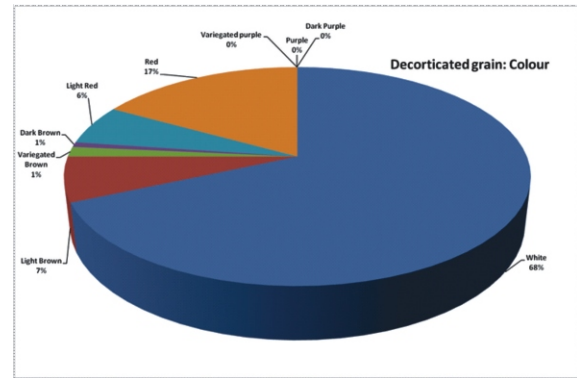
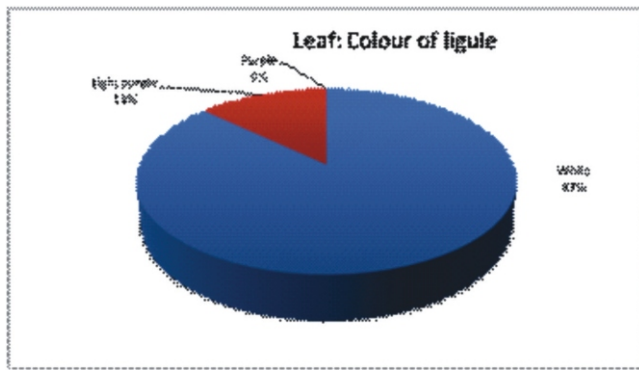
Chhattisgarh. It is a Co-nodal DUS centre of rice farmers' varieties of PPV&FRA.

One thirty six farmer's varieties of rice (Table-1) were grown in a randomized complete block design with three replications at the instructional cum research farm, Indira Gandhi Krishi Vishwavidyalya, Raipur, Situated at N 21°14'4" latitude, E 81°42'57" longitude and altitude of 248m above mean sea level. The material was grown in a complete randomized block design with twenty two reference varieties in two replications during *Kharif* 2014. Each entry was sown in two paired rows of 4m length at spacing of 20 cm between rows and 15 cm between plants. Crop was raised under recommended package of practices. Observations were recorded on five randomly chosen plants of each genotype per replication for fifty five morphological, agronomical and qualitative traits which

are visually assessed characteristics were observed according to the National Test Guidelines for DUS test in rice which was developed by Indian Institute of Rice Research, Rajendranagar, Hyderabad (6). The observation of various characteristics was recorded at different stages of growth with appropriate procedures as per the DUS test guidelines of PPV & FR Act, 2001. Like UPOV, in PPV and FR Act, a variety must fulfil the criteria of Distinctiveness, Uniformity, Stability and novelty (if new) so as to get protection under this act (7).

## RESULTS AND DISCUSSION

To establish distinctiveness among rice cultivars, 55 characters have been used. Qualitative characters are considered as morphological markers in the identification of landraces of rice, because they are less influenced by



environmental changes. Regarding leaf characteristics (Table 3), intensity of green colour was dark in 13 cultivars. Out of one thirty six cultivars only 2 cultivars had leaf anthocyanin colouration. Anthocyanin coloration in leaf sheath was present in 12 cultivars, out of which 12

cultivars were found to be distinct for having very strong pubescence while 1 cultivars were marked for absence of pubescence in leaf blade. 39 cultivars exhibited presence of leaf auricle. 13 out of 39 cultivars shown purple auricle. With respect to leaf collar 118 cultivars showed for its presence. Except 18 cultivars remaining showed absence of anthocyanin colouration for the leaf collar. All the cultivars were having acute shape of ligule. 18 cultivars possess light purple colour of ligule and 118 are of white. Out of 136 cultivars 83 showed long leaf blade, were as 27 are of medium type and 23 were of narrow width of leaf blade. For the character Culm attitude, 90 cultivars were of erect type. Cultivar "Jengene" and Tichun Dhan showed very early time of heading and 57 were of medium type. Erect type of flag leaf was observed for 64 cultivars, variety 19 cultivar having horizontal type but remaining were of semi erect type. For density of pubescence of lemma Kata mehar and Ramigali were of strong pubescence, 44 were of medium type. It is important to note that no cultivar exhibited male sterility. 21 cultivars showed strong coloration but not found any cultivar very strong and 63 were shown absence anthocyanin coloration of keel. 29 cultivars were of strong, 8 cultivars were of very strong, 22 is medium and 62 cultivars shown absence of anthocyanin coloration of area below the apex. For colour of stigma 91 cultivars shown white, 36 were of light purple and 7 were of yellow colour and "Gangtai" and "Matari Pochi" were light green. With respect to thickness of stem 24 cultivars were of thin, 64 were of medium and 48 were of thick. For the stem length (excluding panicle) Kalajeera, Dadbako and Keshar Jawaphool cultivars were of very tall 10 were of short 52 and 71 were of medium and long respectively. 115 cultivars were shown absence for anthocyanin coloration of node and remaining 21 found presence for the character. Similarly for anthocyanin coloration of inter node 133 were absence and Rani Kajar, Titir Pakhi and Bacha Kolam shown presence for the character. Panicle length for Bagri Sona, Karni Dhan and Tichun Dhan were very short and 6 cultivars was of short, 65 were of medium, 45 were of long and 17 were of very long panicle. Flag leaf (attitude of blade) 36 were of semi erect 49 were of horizontal, 41 were deflexed and only 10 cultivars were of



Table-3 : DUS Characteristics of farmers' varieties under the PPV&amp;FRA

Sr.	Denomination	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1.	Shiv dharohar-1	2	5	9	9	9	5	9	3	9	9	9	1	1	7	7	3	5	3	5	1	1	1	7	5	7	5	9	7
2.	Shiv dharohar-2	1	5	9	9	5	9	9	3	9	1	9	3	1	7	5	1	7	3	5	1	1	1	7	5	5	5	9	7
3.	Shiv dharohar-3	2	5	1	1	5	7	9	1	9	1	9	3	2	7	7	3	5	1	5	1	1	1	7	1	7	7	1	3
4.	Lazni Super-1	1	5	1	9	5	7	9	1	9	1	9	3	1	5	5	1	5	1	5	1	1	1	1	1	5	5	1	3
5.	Lazni Super-2	1	5	1	1	5	7	9	1	9	1	9	3	1	3	3	1	5	1	5	1	1	1	1	1	5	5	1	3
6.	Shiv dharohar-4	2	5	1	1	5	5	9	2	9	9	9	3	2	7	7	3	7	1	7	1	1	1	7	5	5	7	1	3
7.	Safri	1	5	1	1	5	7	9	1	1	1	9	3	1	7	7	3	7	1	7	1	1	1	1	1	7	7	1	3
8.	Gaanga kali	2	5	1	1	5	7	9	1	9	9	9	3	1	5	7	3	5	1	7	1	1	1	9	5	5	7	9	5
9.	Lali Chavada	1	5	1	1	5	5	9	1	1	1	9	3	1	7	3	1	3	1	3	1	1	9	1	1	5	7	1	3
10.	Dhaniya dhan	1	5	1	9	5	7	9	1	1	1	9	3	1	7	5	1	5	1	7	1	1	1	1	1	5	7	9	5
11.	Luchai	1	5	1	1	5	5	9	1	1	1	9	3	1	7	7	1	7	3	5	1	3	5	1	1	7	7	1	3
12.	Rani Kajal	2	5	1	1	5	5	9	1	1	1	9	3	2	7	5	3	7	3	7	1	1	1	7	5	5	7	9	5
13.	Dhora Mudriya	1	5	1	1	5	5	9	3	9	9	9	3	1	7	7	1	5	3	7	1	1	1	7	5	7	7	9	7
14.	Borojeri	1	5	1	1	5	5	9	1	1	1	9	3	1	7	3	3	3	1	5	1	5	1	1	1	5	3	1	3
15.	Sonachur	1	5	1	1	5	5	9	1	1	1	9	3	1	7	5	1	5	1	5	1	1	1	1	1	5	7	1	3
16.	Bhurkund	1	5	1	1	5	5	9	1	1	1	9	3	1	7	3	3	5	3	7	1	5	7	7	5	7	7	1	3
17.	Kera Khadi	1	5	1	1	5	5	9	1	1	1	9	3	1	7	7	1	7	3	5	1	1	1	1	1	7	7	1	3
18.	Gangtai	1	7	1	1	5	7	9	1	1	1	9	3	1	3	7	1	5	1	5	1	1	1	1	3	5	3	1	3
19.	Jengene	1	5	1	1	5	3	9	1	1	1	9	3	1	3	3	1	1	3	5	1	5	1	1	1	3	5	1	3
20.	Kalajeera-1	1	5	1	1	5	7	9	1	1	1	9	3	1	7	5	3	7	1	7	1	5	9	9	1	7	7	1	3
21.	Jeeraful	1	5	1	1	5	5	9	1	1	1	9	3	1	7	5	1	5	5	7	1	3	3	1	1	7	7	1	3
22.	Tulshi Mala	1	5	1	1	5	7	9	1	1	1	9	3	1	7	5	3	7	3	3	1	1	1	7	1	7	7	1	3
23.	Reiga	1	3	1	1	5	5	9	1	1	1	9	3	1	7	7	1	3	1	7	1	3	5	5	1	5	5	1	3
24.	Kalam luchai	1	5	1	1	5	7	9	1	1	1	9	3	1	7	7	3		3	5	1	5	7	1	1	7	5	1	3
25.	Bhagalpuri	1	3	1	1	5	5	9	1	1	1	9	3	1	7	5	1		3	7	1	5	5	5	1	7	5	1	3
26.	Bathras	1	3	1	1	5	5	9	1	1	1	9	3	1	7	7	3		3	7	1	3	5	1	1	7	7	1	3
27.	Aghasal	1	5	1	1	5	5	1	1	9	1	9	3	1	7	7	1	7	5	7	1	5	7	1	1	7	7	1	3
28.	Ratanchuri	2	5	1	1	5	7	1	1	9		9	3	2	7	7	3	7	3	7	1	5	7	9	5	7	5	1	3
29.	Goindi	2	5	1	1	5	5	1	3	9	9	9	3	1	7	5	3	7	3	7	1	3	3	1	1	7	7	1	3
30.	90 Number	1	5	1	1	5	1	1	1	9	1	9	3	1	7	7	1	7	3	7	1	1	1	1	1	5	7	1	3
31.	Patania julli	1	3	1	1	5	5	1	1	9	1	9	3	1	7	5	1	7	3	7	1	1	1	1	1	7	7	1	3
32.	Gopal Bhog	1	5	1	1	5	5	1	1	9	1	9	3	1	7	3	1	7	5	7	1	1	1	1	1	5	5	1	3
33.	Kendumudi-1	2	5	1	1	5	5	9	3	9	9	9	3	2	5	5	3	5	1	7	1	5	7	9	5	5	7	1	7
34.	Bhajna	1	5	1	1	5	3	1	1	9	1	9	3	1	7	5	1	5	1	5	1	1	7	1	1	3	7	1	3
35.	Kajali Boonde	2	5	1	1	1	3	1	1	9	1	9	3	2	7	7	1	5	1	7	1	1	1	7	1	3	7	1	3
36.	Surendro	1	5	1	1	5	7	1	1	9	1	9	3	1	5	7	1	5	1	5	1	1	1	7	5	5	3	1	3

Table-3 : Contd....

Table-3 : Contd....

37.	Savansar	1	5	1	1	1	5	7	1	1	9	1	9	3	1	5	5	1	5	3	7	1	5	7	9	1	7	7	1	3
38.	Dubraj	1	3	1	1	1	5	3	1	1	9	1	9	3	1	5	5	1	7	3	7	1	1	1	1	1	5	7	1	3
39.	Barhasal	1	3	1	1	1	5	5	9	3	9	9	9	3	2	7	7	1	7	3	7	1	7	9	9	1	7	7	1	5
40.	Luchai	1	3	1	1	1	5	5	1	1	9	1	9	3	1	3	3	1	7	3	5	1	1	1	1	1	7	5	1	3
41.	Koliyara	2	5	1	1	1	5	5	1	3	9	1	9	3	2	5	7	1	5	5	7	1	3	3	7	5	5	1	3	3
42.	Karhani	1	5	1	1	1	5	5	1	1	9	1	9	3	1	3	3	1	3	1	5	1	3	3	3	4	3	5	1	3
43.	Chinmouri	1	5	1	1	1	5	7	1	1	9	1	9	3	1	7	7	1	5	3	7	1	7	9	7	1	7	7	1	3
44.	Jouful	1	3	1	1	1	5	5	9	1	9	1	9	3	1	7	3	1	7	5	7	1	3	3	1	1	3	7	1	3
45.	Kalajeera	1	5	1	1	1	5	3	1	1	9	1	9	3	1	5	5	1	7	5	7	1	7	9	9	1	3	9	1	3
46.	Kadamfool	1	5	1	1	1	5	7	1	1	9	1	9	3	1	5	5	1	7	5	7	1	5	7	1	1	5	7	1	3
47.	Dadbako	1	3	1	1	1	5	7	1	1	9	1	9	3	1	7	5	1	7	3	7	1	3	5	1	1	5	9	1	3
48.	Gangtai dhan	1	7	1	1	1	5	3	1	1	9	1	9	3	1	3	5	1	5	3	7	1	3	3	1	1	3	3	1	3
49.	Mohlayan Bako	2	5	1	1	1	5	3	9	2	9	9	9	3	2	3	5	1	5	1	7	1	1	7	7	5	7	3	9	5
50.	Ganga dhan	1	5	1	1	1	5	5	1	1	9	1	9	3	1	3	5	1	5	3	7	1	1	1	1	1	3	3	1	3
51.	Khirasar	1	3	1	1	1	5	3	1	1	9	1	9	3	1	3	5	1	5	5	7	1	5	7	7	5	3	5	1	3
52.	Kerakanghi	1	5	1	1	1	5	3	1	1	9	1	9	3	1	7	5	1	7	3	7	1	1	1	1	1	5	7	1	3
53.	Tendhumoridhan	2	7	1	9	7	7	3	9	2	9	9	9	3	2	3	5	1	5	1	7	1	1	1	1	7	5	3	7	9
54.	Safri-1 Nakna	1	5	1	1	1	5	3	1	1	9	1	9	3	1	7	7	1	7	3	7	1	5	7	7	5	3	5	1	3
55.	Dokra Mecha	1	5	1	1	1	5	7	1	1	9	1	9	3	1	7	7	1	3	1	3	1	1	1	1	4	7	5	1	3
56.	Kundai Dati	1	5	1	1	1	5	5	1	1	9	1	9	3	1	3	3	1	3	1	3	1	3	1	1	1	3	5	1	3
57.	Machari Poti	1	5	1	1	1	5	3	1	1	9	1	9	3	1	3	7	1	3	1	5	1	5	5	1	3	5	5	1	3
58.	Kadam Phool	1	3	1	1	1	5	3	1	1	9	1	9	3	1	3	5	1	3	1	5	1	3	3	1	1	3	5	1	3
59.	Rani Kajar	4	7	1	9	5	5	9	1	2	9	9	9	3	2	7	7	1	5	3	7	1	7	1	9	1	5	7	9	7
60.	Gadur Sela	1	5	1	1	1	5	7	1	1	9	1	9	3	1	7	3	1	3	1	7	1	3	3	7	1	5	7	1	3
61.	Bhurshi Dhan	1	5	1	1	1	5	5	1	1	9	1	9	3	1	7	7	1	3	1	3	1	1	1	1	1	5	5	1	3
62.	Bodi	1	5	1	1	1	5	5	1	1	9	1	9	3	1	5	7	1	3	1	3	1	3	3	7	1	3	7	1	3
63.	Kakdo Dhan	1	7	1	1	1	5	7	1	1	9	1	9	3	1	7	5	1	3	3	5	1	3	3	7	5	5	7	1	3
64.	Sendur Singa	1	3	1	1	1	5	7	1	1	9	1	9	3	1	7	7	1	3	1	7	1	1	1	7	5	5	7	1	3
65.	Mehar Dhan	1	5	1	1	1	5	7	1	1	9	1	9	3	1	3	5	3	5	1	5	1	3	5	1	4	3	7	1	3
66.	Kata Mehar	1	5	1	1	1	5	7	1	1	9	1	9	3	1	3	5	3	5	1	9	1	5	7	1	1	3	7	1	3
67.	Ajam Dhan	1	5	1	1	1	5	7	9	3	9	9	9	3	1	3	7	3	5	3	7	1	3	5	7	5	5	1	3	3
68.	Bhata Mokdo	4	5	1	1	1	5	3	1	2	9	9	9	3	2	7	7	3	5	1	7	1	1	1	7	5	7	5	1	3
69.	Alsaker	1	3	1	1	1	5	3	1	3	9	9	9	3	1	7	7	3	7	5	5	1	3	3	9	5	7	7	9	7
70.	Bhujni Dhan	2	5	1	9	5	5	7	9	3	9	9	9	3	2	7	5	3	5	3	7	1	1	1	7	5	7	7	9	5
71.	Bhains Path	1	5	1	1	1	5	7	1	1	9	1	9	3	1	7	5	3	5	5	7	1	5	7	9	1	7	5	1	3
72.	Leem Dhan	2	5	1	1	1	5	7	1	3	9	9	9	3	2	7	7	3	5	3	7	1	3	5	9	5	7	7	1	3
73.	Lokti Machi	1	5	1	1	1	5	3	1	1	9	1	9	3	1	7	5	3	5	5	7	1	3	5	7	1	7	5	1	3
74.	Ramigali	1	5	1	1	1	5	7	1	1	9	1	9	3	1	7	7	3	5	5	9	1	5	7	7	5	7	7	1	3

Table-3 : Contd....

Table-3 : Contd....

75.	Cheptigurmata	4	7	1	9	5	7	9	3	2	7	7	3	3	1	5	1	1	1	7	5	7	5	1	3
76.	Lal Banko	1	3	1	1	5	3	1	1	3	1	7	7	1	5	3	7	1	3	5	1	1	7	7	3
77.	Titir Pankhi	2	5	1	9	3	7	1	1	9	7	7	3	5	3	7	1	3	7	7	5	7	5	1	3
78.	Keshar Jawaphool	1	3	1	1	5	7	1	1	3	1	7	7	3	5	5	7	1	3	5	1	1	5	9	3
79.	Gowardhan Kali Kamod	1	5	1	1	5	7	1	1	3	1	7	5	1	7	5	7	1	7	9	9	1	5	5	3
80.	Gowardhan Badsabhog	1	3	1	1	5	7	1	2	3	1	5	5	1	5	3	7	1	3	5	1	1	5	7	3
81.	Gowardhan Vishnubhog	1	7	1	1	5	7	1	1	3	1	5	5	1	7	3	7	1	1	1	1	1	5	5	3
82.	Ara Khunta	1	3	1	1	5	3	1	1	3	1	7	5	1	7	5	7	1	5	7	1	1	7	7	3
83.	Bacha Kolam	2	5	1	9	5	9	9	3	2	7	5	3	7	1	5	1	3	5	9	5	3	7	9	5
84.	Bagri Sona	1	3	1	1	5	7	1	1	3	1	7	7	1	3	3	5	1	1	5	1	7	5	1	3
85.	Safed Lalak	1	5	1	1	5	7	1	1	3	1	3	5	1	5	1	5	1	1	1	1	1	5	3	3
86.	Kami Dhan	1	5	1	1	5	7	1	1	3	1	7	3	1	3	1	7	1	5	5	1	4	3	3	1
87.	Lanhonchi	1	5	1	1	5	5	1	1	3	1	3	5	3	5	1	7	1	3	3	7	4	3	7	9
88.	Tewan Dhan	1	5	1	1	5	9	1	1	3	1	7	5	3	5	1	5	1	1	1	1	1	5	5	1
89.	Barun Goda	1	3	1	1	5	7	1	1	3	1	5	5	1	3	1	7	1	3	3	5	1	5	5	1
90.	Badka Dhan	1	5	1	1	5	9	1	1	3	1	3	3	1	3	1	7	1	3	3	5	4	3	3	1
91.	Barabali	1	5	1	1	5	7	1	1	3	1	5	3	1	5	1	5	1	5	7	9	5	5	5	9
92.	Hajar Khunta	1	5	1	1	5	7	1	1	3	1	7	5	3	7	1	5	1	1	1	1	1	5	5	1
93.	Rajigandha	1	5	1	1	5	7	1	1	3	1	7	3	1	5	3	5	1	7	9	9	1	5	7	1
94.	Sindursaal	1	7	1	1	5	7	1	1	3	1	7	7	3	7	3	7	1	5	7	1	1	7	7	1
95.	Jeerabhog	1	5	1	1	5	5	1	1	3	1	7	3	1	7	5	7	1	1	1	1	1	3	7	1
96.	Kolhin Khosa	1	5	1	1	5	5	1	1	3	1	7	7	3	7	3	7	1	5	7	7	5	5	7	1
97.	Lal Sita Saal	1	5	1	1	5	7	1	1	3	1	7	5	3	7	3	5	1	3	5	1	1	5	7	1
98.	Neta Kalani	1	5	1	1	5	7	1	1	3	1	3	3	1	5	1	7	1	5	7	9	5	3	5	1
99.	Dadhmaini Dhan	1	7	1	1	5	7	1	1	3	1	5	5	1	5	1	7	1	1	1	1	1	5	5	1
100.	Tichun Dhan	1	7	1	1	5	7	1	1	3	1	3	5	1	1	1	7	1	1	1	1	1	3	5	1
101.	Sitasaal Dhan	1	5	1	1	5	7	1	1	3	1	3	5	1	3	1	5	1	1	1	1	1	3	5	1
102.	Hardasaal	1	3	1	1	5	7	1	1	3	1	7	7	1	7	3	7	1	5	7	1	1	7	7	1
103.	Barbali Dhan	2	5	1	9	5	7	9	3	2	7	7	3	7	1	7	1	3	5	9	1	5	7	1	3
104.	Chhota Dhan	1	5	1	1	5	5	1	1	3	1	5	5	1	5	5	7	1	5	7	5	1	5	7	1
105.	Balemsaar	1	5	1	1	5	7	1	1	3	1	5	5	1	5	5	7	1	1	3	1	1	5	7	1
106.	Tulsimanjar	1	5	1	1	5	9	1	1	3	1	7	5	1	7	5	7	1	7	9	9	1	5	7	1
107.	Bagkalmi	1	7	1	1	5	9	1	1	3	1	3	5	3	5	3	7	1	5	7	7	5	5	7	9
108.	Digamber Dhan	1	5	1	1	5	5	1	1	3	1	3	5	1	5	3	7	1	1	1	1	1	5	5	1

Table-3 : Contd....



Table-3 : Contd....

109.	Harikhunta Dhan	1	5	1	1	5	9	1	1	9	1	9	1	9	3	1	5	5	1	7	3	5	1	1	1	1	7	1	3
110.	Changro Jeera Phool	1	5	1	1	5	7	1	1	9	1	9	1	9	3	1	7	3	5	1	7	3	5	1	1	1	5	5	3
111.	Changro Laxmi Bhog	1	5	1	1	5	5	1	1	9	1	9	1	9	3	1	7	3	5	1	7	1	5	1	1	1	5	5	3
112.	Shyam Jeera	1	5	1	1	5	7	1	1	9	1	9	1	9	3	1	7	3	5	1	7	1	5	1	7	9	5	1	3
113.	Boga	2	5	1	1	5	7	9	3	9	9	9	9	9	3	1	3	3	5	1	3	1	5	1	5	9	5	9	5
114.	Sugandha	1	5	1	1	5	5	1	1	9	1	9	1	9	3	1	5	7	1	7	3	7	1	5	7	1	7	1	3
115.	Dudhkandar	1	5	1	1	5	7	1	1	9	1	9	1	9	3	1	5	5	1	5	3	7	1	1	1	1	5	5	3
116.	Tulsi Mukur	1	5	1	1	5	7	1	1	9	1	9	1	9	3	1	5	5	1	7	1	5	1	5	7	9	1	7	3
117.	Sona Chur	1	5	1	1	5	7	1	1	9	1	9	1	9	3	1	7	3	7	3	7	1	1	9	1	9	1	7	3
118.	Tilasaar	1	5	1	1	5	7	1	1	9	1	9	1	9	3	1	5	3	3	5	1	7	1	1	1	1	5	7	3
119.	Nardha	1	5	1	1	5	5	1	1	9	1	9	1	9	3	1	5	5	1	7	3	7	1	1	1	1	7	5	3
120.	Basmati Baba	1	5	1	1	5	5	1	1	9	1	9	1	9	3	1	5	5	3	7	1	7	1	1	1	1	5	5	3
121.	Koya Baba	1	7	1	1	5	9	1	1	9	1	9	1	9	3	1	5	5	1	5	1	5	1	3	5	7	5	9	5
122.	Deshi Dhan	1	3	1	1	5	3	1	1	9	1	9	1	9	3	1	7	7	3	7	3	7	1	3	5	1	7	1	3
123.	Bhojina Baba-6	2	5	1	9	5	5	9	3	9	9	9	9	9	3	2	7	7	1	5	3	5	1	5	7	9	5	9	7
124.	Gutika Baba	1	5	1	1	5	5	1	1	9	1	9	1	9	3	1	7	7	3	7	1	5	1	1	1	1	5	7	3
125.	Bhojina Baba -H4	1	3	1	1	5	7	1	1	9	1	9	1	9	3	1	7	7	3	5	1	5	1	1	1	1	7	7	3
126.	Damru Baba-3	1	3	1	1	5	3	1	1	9	1	9	1	9	3	1	7	7	3	5	3	7	1	5	7	9	5	7	3
127.	Koya-10	1	7	1	1	5	9	1	1	9	1	9	1	9	3	1	5	5	3	5	1	7	1	3	5	7	5	7	9
128.	Basmati Dhan-1	2	5	1	1	5	5	1	1	9	1	9	1	9	3	1	7	5	1	7	3	7	1	1	7	1	5	7	3
129.	Jeera Baba	2	5	1	1	5	9	1	1	9	1	9	1	9	3	1	7	5	1	7	1	7	1	1	1	1	5	3	3
130.	Koya-4	2	5	1	1	5	3	1	1	9	1	9	1	9	3	1	7	5	1	5	1	7	1	5	7	5	5	9	7
131.	Chaulai Baba	2	5	1	1	5	5	1	1	9	1	9	1	9	3	1	7	5	1	5	1	5	1	1	1	1	7	7	3
132.	Jaarli Baba	2	3	1	1	5	9	1	1	9	1	9	1	9	3	1	5	5	1	3	1	7	1	1	1	1	4	5	3
133.	Kodha Phool	2	3	1	1	5	5	1	1	9	1	9	1	9	3	1	7	5	1	7	1	5	1	1	1	1	7	5	3
134.	Goda	2	3	1	1	5	7	1	1	9	1	9	1	9	3	1	3	5	1	7	1	5	1	3	1	1	5	5	3
135.	Dev Dhan	2	3	1	1	5	7	9	3	9	9	9	9	9	3	1	7	5	1	3	1	7	1	1	5	9	5	7	9
136.	Gundari Bhog	2	5	1	1	5	7	1	1	9	1	9	1	9	3	1	7	5	1	7	1	7	1	1	1	1	7	5	3

Table-3 : Contd....

Table-3 : Contd....

Sr.	Denomination	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55
1.	Shiv dharohar-1	1	5	5	7	5	4	2	1	9	3	9	5	7	5	2	3	3	1	1	3	3	5	6	9	5	3	1
2.	Shiv dharohar-2	1	5	5	5	5	4	2	1	9	2	7	5	7	5	2	1	3	1	1	3	3	5	1	9	1	7	1
3.	Shiv dharohar-3	1	5	7	7	3	4	2	1	9	3	7	7	7	5	2	1	3	3	1	3	5	3	6	9	7	3	1
4.	Lazni Super-1	1	5	3	7	3	1	2	1	9	1	5	5	3	3	2	1	3	1	-	3	3	5	6	9	5	5	9
5.	Lazni Super-2	1	5	3	7	5	1	2	1	9	2	9	7	3	3	2	3	3	5	1	3	3	5	1	9	1	7	1
6.	Shiv dharohar-4	1	7	1	7	5	4	2	1	9	2	9	5	7	7	2	1	3	5	9	3	5	4	1	9	1	7	1
7.	Safri	1	7	7	7	5	1	2	1	9	2	3	5	7	7	2	5	5	5	9	5	5	5	1	9	3	3	1
8.	Gaanga kali	1	5	3	7	3	5	2	1	9	1	7	7	3	5	2	3	1	5	-	1	5	2	1	9	5	7	1
9.	Lali Chavada	1	5	3	5	5	2	5	1	9	1	7	7	3	3	3	5	3	5	9	3	5	4	1	9	1	3	1
10.	Dhaniya dhan	1	5	5	7	3	1	4	1	9	1	9	5	3	5	2	1	1	5	1	1	5	2	1	9	1	7	9
11.	Luchai	1	5	5	5	3	1	3	1	9	2	9	5	7	7	3	3	3	5	9	3	5	4	1	9	1	5	9
12.	Rani Kajal	1	9	5	5	3	4	2	1	9	2	3	5	7	7	1	3	3	5	9	1	5	2	1	9	1	7	1
13.	Dhora Mudriya	1	7	5	7	3	4	2	1	9	1	3	5	7	7	2	7	3	7	9	3	5	4	1	9	5	5	1
14.	Borojeri	1	5	5	7	3	1	1	1	9	2	7	5	7	3	3	3	3	1	1	3	3	5	1	9	1	5	9
15.	Sonachur	1	9	7	7	5	1	2	1	9	2	9	7	7	7	1	3	3	5	9	1	5	2	1	9	1	5	9
16.	Bhurkund	1	9	5	5	3	3	3	1	9	1	1	7	7	7	1	3	3	5	9	1	5	2	1	9	5	7	9
17.	Kera Khadi	1	5	5	7	3	1	2	1	9	1	3	7	7	7	1	3	3	5	9	1	5	2	2	9	1	5	1
18.	Gangtai	1	5	3	5	3	1	2	1	9	1	3	5	3	5	2	7	5	7	1	5	7	4	1	9	5	5	9
19.	Jengene	1	5	5	5	5	2	3	1	9	1	3	5	1	3	3	5	5	5	9	3	5	4	6	9	1	3	9
20.	Kalajeera-1	1	9	7	7	3	6	9	1	9	2	9	7	7	7	4	1	1	5	9	1	5	2	1	9	1	3	9
21.	Jeeraful	1	9	5	7	3	1	2	1	9	2	9	7	7	7	1	1	1	5	1	1	5	2	1	9	1	5	9
22.	Tulshi Mala	1	9	7	5	5	6	9	1	9	2	9	7	7	7	1	3	1	5	9	1	5	2	1	9	3	7	1
23.	Raiga	1	7	5	3	5	6	9	1	9	1	3	5	3	3	4	7	3	5	9	3	5	4	6	9	5	7	1
24.	Kalam luchai	1	7	5	7	3	3	3	1	9	3	3	5	7	7	2	5	3	5	9	3	5	4	1	9	3	7	-
25.	Bhagalpuri	1	7	7	7	3	2	3	1	9	2	3	5	7	7	3	1	1	5	1	1	5	2	1	9	1	7	9
26.	Bathras	1	7	7	7	3	1	2	1	9	1	3	7	7	7	2	9	5	5	9	5	7	4	1	9	7	5	-
27.	Aglasal	1	5	3	5	3	1	1	1	9	2	9	7	7	7	2	7	5	5	9	5	5	4	1	9	1	7	1
28.	Ratanchuri	1	5	3	7	3	4	5	1	9	2	3	5	7	7	3	7	3	7	9	3	7	2	1	9	5	7	1
29.	Goindi	1	7	5	7	5	1	2	1	9	1	9	5	7	7	1	7	3	7	-	3	5	4	5	9	7	7	1
30.	90 Number	1	9	5	5	3	1	2	1	9	2	3	5	7	7	1	5	3	5	9	9	5	6	1	9	1	7	1
31.	Patania julli	1	7	7	7	3	1	2	1	9	2	9	7	7	7	2	3	5	5	1	3	5	5	2	9	1	5	1
32.	Gopal Bhog	1	9	5	7	5	1	2	1	9	2	9	7	7	7	2	1	1	5	1	1	3	3	1	9	7	7	9
33.	Kendumudi-1	1	7	7	7	3	6	4	1	9	1	5	5	7	7	3	5	3	7	9	3	7	2	1	9	7	5	1
34.	Bhajna	1	7	3	7	5	1	2	1	9	2	9	5	7	7	2	3	3	5	1	3	3	5	6	9	7	7	9
35.	Kajali Boonde	1	7	7	7	5	6	2	1	9	1	9	7	7	5	2	7	3	5	9	3	5	4	1	9	1	3	9
36.	Surendro	1	5	7	5	3	4	2	1	9	1	3	5	5	5	2	5	3	5	1	3	5	5	1	9	3	7	1
37.	Savansar	1	9	3	5	5	4	9	1	9	2	9	7	5	5	4	1	3	5	9	1	5	3	1	9	5	5	9

Table-3 : Contd....

Table-3 : Contd....

38.	Dubraj	1	5	5	7	3	1	2	9	9	2	3	3	5	7	7	2	3	3	5	9	3	3	5	4	1	9	7	7	1
39.	Bathasal	1	7	5	7	5	6	9	9	9	1	3	3	7	7	7	4	9	3	7	9	3	3	7	4	2	9	5	-	9
40.	Luchai	1	5	3	7	3	1	2	1	9	2	9	3	5	7	7	2	5	3	5	9	3	3	5	5	5	9	3	5	9
41.	Koliyara	1	5	5	5	3	4	5	1	9	1	9	7	7	5	5	3	7	3	5	9	3	3	5	4	1	9	5	5	1
42.	Karhani	1	5	5	7	5	4	9	9	9	1	3	3	3	3	3	4	5	3	5	9	3	3	5	2	6	9	1	7	9
43.	Chinmouri	1	5	5	7	3	2	4	1	9	3	9	7	7	5	5	3	3	3	5	9	1	5	3	1	9	1	5	9	
44.	Jouful	1	7	7	7	5	1	2	1	9	2	9	5	5	7	7	2	1	3	5	9	1	3	3	1	9	1	7	-	
45.	Kalajeera	1	9	7	7	5	6	9	1	9	2	9	7	7	5	7	4	1	3	5	1	1	5	2	1	9	1	3	-	
46.	Kadamfool	1	5	7	5	3	2	4	1	9	3	9	7	7	5	5	2	3	3	7	1	1	5	2	1	9	1	5	9	
47.	Dadbako	1	7	7	7	3	1	1	1	9	1	3	5	7	7	7	2	5	3	5	9	3	3	5	1	9	7	7	9	
48.	Gangtai dhan	1	5	3	7	3	1	2	1	9	1	3	5	5	5	5	2	7	5	5	-	5	5	5	1	9	1	7	1	
49.	Mohlayan Bako	1	5	3	7	5	4	2	1	9	2	9	5	5	5	5	1	9	3	5	9	5	5	5	1	9	7	3	1	
50.	Ganga dhan	1	5	3	7	5	1	2	1	9	1	3	3	3	7	7	2	5	3	5	9	3	5	4	1	9	1	3	1	
51.	Khirasar	1	7	5	7	3	6	3	1	9	2	9	7	7	5	5	3	3	3	7	1	1	5	2	1	9	5	7	1	
52.	Kerakanghi	1	5	7	5	3	1	2	1	9	2	3	5	7	7	7	1	3	3	5	9	3	5	4	1	9	1	3	9	
53.	Tendhumori dhan	1	5	3	7	3	6	4	1	9	2	9	5	5	5	5	3	7	3	7	9	3	7	4	1	9	9	5	1	
54.	Safri-1 Nakna	1	5	7	7	3	4	3	1	9	2	3	5	7	7	7	1	5	5	5	-	3	5	4	3	9	5	5	9	
55.	Dokra Mecha	1	5	5	5	3	1	2	9	9	3	9	7	7	3	5	2	5	3	7	1	1	7	2	1	9	9	7	9	
56.	Kundai Dati	1	5	5	7	5	1	2	1	9	1	3	5	3	3	3	3	3	3	1	1	3	3	5	1	9	1	5	9	
57.	Machari Poti	1	5	3	7	5	1	2	1	9	1	3	5	3	3	3	3	3	3	5	1	1	5	3	1	9	1	7	1	
58.	Kadam Phool	1	5	5	7	5	1	4	1	9	1	3	5	3	5	3	5	3	1	5	-	1	3	2	1	9	1	7	9	
59.	Rani Kajar	9	5	3	5	3	5	2	1	9	3	9	7	7	3	7	2	1	1	5	1	1	3	2	1	9	3	7	1	
60.	Gadur Sela	1	5	5	7	5	4	3	1	9	1	9	5	3	3	3	1	9	3	7	9	3	7	4	1	9	7	3	1	
61.	Bhurshi Dhan	1	7	5	7	3	1	2	9	9	1	9	5	3	3	3	2	3	3	5	1	1	5	2	6	9	1	3	9	
62.	Bodi	1	5	5	7	3	4	3	1	9	1	3	5	3	3	3	3	5	3	5	9	3	7	2	1	9	5	5	9	
63.	Kakdo Dhan	1	5	5	7	3	4	2	1	9	2	9	7	7	3	3	2	5	3	5	9	3	5	4	1	9	5	3	1	
64.	Sendur Singa	1	5	7	7	3	5	5	1	9	1	9	5	3	3	3	3	5	3	5	9	3	5	4	1	9	5	-	-	
65.	Mehar Dhan	1	5	1	3	5	6	9	1	9	1	3	5	3	3	3	4	7	3	5	1	3	5	4	3	9	3	5	1	
66.	Kata Mehar	1	5	3	3	3	6	9	9	9	1	3	5	3	3	3	4	3	3	7	9	3	5	4	2	9	7	3	-	
67.	Ajam Dhan	1	5	5	5	5	4	5	1	9	1	9	7	7	5	5	3	5	3	5	9	3	5	4	1	9	7	7	9	
68.	Bhata Mokdo	1	7	5	7	5	6	2	1	9	1	9	5	5	5	7	2	9	3	7	1	3	7	2	1	9	1	3	1	
69.	Alsaker	1	7	7	7	3	6	2	1	9	2	9	5	7	7	7	2	7	3	5	1	3	5	2	1	9	7	7	9	
70.	Bhujni Dhan	1	5	7	7	5	6	2	1	9	1	9	7	7	5	5	2	5	3	5	1	5	5	5	1	9	7	7	1	
71.	Bhains Path	1	9	7	7	3	6	9	1	9	2	9	7	7	7	7	4	1	3	5	9	1	3	3	1	9	5	3	1	
72.	Leem Dhan	1	7	7	7	5	4	2	1	9	2	9	5	5	5	5	1	3	3	5	9	3	3	5	1	9	7	7	1	
73.	Lokti Machi	1	7	7	7	5	6	2	1	9	2	9	7	7	5	5	2	1	3	5	9	1	3	3	1	9	1	3	9	
74.	Ramigali	1	7	5	5	3	6	9	1	9	1	9	7	7	5	7	3	7	5	7	1	3	5	4	1	9	5	5	9	

Table-3 : Contd....

Table-3 : Contd....

75.	Cheptigurnatia	1	5	3	5	3	4	5	1	9	1	9	1	9	7	7	5	5	2	9	3	7	1	3	5	4	1	9	7	7	9
76.	Lal Banko	1	7	5	7	5	1	3	1	9	2	9	2	9	7	7	5	5	3	7	5	5	9	5	5	5	1	9	5	5	9
77.	Titir Pankhi	9	5	5	7	3	5	8	1	9	2	9	2	9	5	1	3	1	1	3	5	9	1	3	1	5	9	1	7	9	
78.	Keshar Jawaphool	1	9	7	7	3	1	2	1	9	1	9	1	9	7	7	7	2	1	3	7	9	1	5	2	1	9	3	7	1	
79.	Gowardhan Kali Kamod	1	7	7	5	5	6	9	1	9	2	3	7	7	7	7	4	1	3	5	1	1	3	1	1	9	1	7	1		
80.	Gowardhan Badsabhog	1	7	5	7	5	1	4	1	9	3	9	7	7	7	7	3	1	1	5	1	1	1	5	2	1	9	7	7	9	
81.	Gowardhan Vishnubhog	1	7	5	5	3	1	2	1	9	3	3	7	7	7	7	2	1	1	5	1	1	1	5	2	1	9	1	7	-	
82.	Ara Khunta	1	7	7	7	3	2	4	1	9	1	3	5	7	7	7	3	7	5	5	9	9	9	5	6	9	5	5	1		
83.	Bacha Kolam	9	5	3	3	3	6	2	1	9	1	3	7	9	7	9	7	2	7	5	7	9	3	5	4	1	9	9	7	9	
84.	Bagri Sona	1	1	5	5	3	4	2	1	9	3	3	3	5	3	3	2	3	3	5	1	1	1	5	2	6	9	5	5	1	
85.	Safed Lalak	1	3	1	5	5	1	2	1	9	1	3	5	3	5	3	3	2	7	3	5	9	1	5	2	1	9	1	3	1	
86.	Karni Dhan	1	1	1	3	3	1	9	9	9	1	3	3	1	3	3	4	5	3	5	9	3	5	5	2	6	9	5	3	1	
87.	Lanhonchi	1	3	3	3	3	4	9	9	9	1	3	3	3	3	3	2	7	3	5	-	3	5	4	6	9	7	5	9		
88.	Tewan Dhan	1	5	3	7	3	1	2	1	9	1	3	3	3	3	5	2	7	3	5	9	3	5	4	1	9	7	7	9		
89.	Barun Goda	1	3	1	3	3	4	3	1	9	1	3	5	1	3	3	7	3	7	3	5	-	3	5	4	6	9	7	7	1	
90.	Badka Dhan	1	3	1	3	3	4	9	9	9	1	3	3	1	3	3	2	7	3	5	1	3	5	4	6	9	1	7	1		
91.	Barabali	1	5	3	3	3	4	9	9	9	1	3	7	5	5	5	1	9	5	5	9	3	5	4	6	9	5	3	1		
92.	Hajar Khunta	1	5	5	7	3	1	9	1	9	1	3	7	5	5	5	2	7	3	7	1	3	7	4	2	9	7	7	9		
93.	Rajnigandha	1	7	5	7	3	6	9	1	9	2	9	7	5	7	5	4	1	3	5	9	1	5	2	1	9	1	5	9		
94.	Sindursaal	1	7	3	7	3	1	4	1	9	2	3	5	7	7	7	3	5	3	7	9	1	5	3	1	9	3	7	1		
95.	Jeerabhog	1	9	7	7	7	3	1	2	1	9	2	3	7	7	7	2	1	1	5	9	1	5	2	1	9	1	7	-		
96.	Kolhin Khosa	1	7	7	5	3	2	5	1	9	1	3	7	7	7	7	3	5	5	9	3	5	4	6	9	7	7	-			
97.	Lal Sita Saal	1	7	7	7	3	1	4	1	9	2	3	5	7	7	7	3	3	3	5	9	3	3	5	1	9	5	5	9		
98.	Neta Kalani	1	3	1	3	5	4	9	9	9	1	3	3	5	3	5	1	9	3	5	1	3	5	4	5	9	3	7	1		
99.	Dadhmaini Dhan	1	5	5	7	5	1	2	1	9	2	3	5	3	5	3	2	5	3	5	1	3	5	2	1	9	7	3	9		
100.	Tichun Dhan	1	1	3	3	3	1	2	1	9	1	3	3	1	3	2	7	3	7	3	7	1	3	5	2	1	9	7	7	1	
101.	Sitasaal Dhan	1	5	3	5	5	1	2	1	9	1	3	5	3	5	3	2	7	5	5	9	5	5	5	1	9	1	3	1		
102.	Hardasaal	1	7	7	7	3	4	9	1	9	1	3	5	7	7	7	3	7	3	7	9	3	7	2	5	9	3	5	9		
103.	Barbali Dhan	1	7	3	5	5	6	9	1	9	2	3	5	9	7	4	7	5	7	1	5	7	4	1	9	7	7	1			
104.	Chhota Dhan	1	5	7	5	3	6	9	1	9	1	3	5	3	5	3	2	7	5	5	9	3	5	5	5	9	3	5	1		
105.	Balemsaar	1	5	3	3	5	1	2	1	9	1	3	5	3	5	3	1	3	5	5	1	3	5	5	5	6	9	7	7	1	
106.	Tulsimanjar	1	9	7	7	5	6	9	1	9	2	3	7	7	7	4	1	3	5	9	1	5	2	1	9	1	9	1	7	1	
107.	Bagkalmi	1	5	3	3	3	4	9	9	9	1	3	5	3	5	3	2	7	3	5	1	3	5	5	6	9	1	5	9		
108.	Digamber Dhan	1	7	3	7	5	1	2	1	9	1	3	5	3	5	3	1	5	3	1	5	9	3	5	2	1	9	9	7	9	

Table-3 : Contd....

Table-3 : Contd....

109.	Harikhunta Dhan	1	5	7	7	3	1	2	1	9	1	3	5	7	7	1	5	3	5	9	3	5	4	2	9	3	5	1
110.	Changro Jeera Phool	1	9	7	7	5	1	2	1	9	2	9	7	7	7	1	1	1	5	1	1	5	2	1	9	5	7	9
111.	Changro Laxmi Bhog	1	7	7	7	3	1	2	1	9	2	9	7	7	7	2	1	3	5	1	1	5	2	1	9	3	7	9
112.	Shyam Jeera	1	7	7	7	3	5	8	1	9	2	9	7	7	7	4	1	1	5	1	1	5	2	1	9	1	7	1
113.	Boga	1	5	1	5	3	6	3	1	9	1	9	5	3	3	2	7	3	5	1	3	5	4	1	9	5	5	9
114.	Sugandha	1	5	5	7	5	1	3	1	9	1	3	3	7	7	2	7	3	7	9	3	7	4	1	9	5	7	-
115.	Dudhkandar	1	5	5	5	5	1	2	1	9	1	9	5	3	3	4	9	3	5	1	3	5	1	9	3	7	9	
116.	Tulsi Mukur	1	9	5	7	5	6	8	1	9	2	9	7	5	5	4	3	3	5	9	3	5	4	1	9	9	5	1
117.	Sona Chur	1	7	7	7	3	6	3	1	9	2	3	7	9	7	1	1	1	5	1	1	3	2	1	9	5	7	9
118.	Tilasaar	1	5	3	7	3	1	2	1	9	1	3	7	5	5	2	5	3	5	1	3	5	5	2	9	1	7	1
119.	Nardha	1	5	7	5	3	1	3	1	9	2	3	5	5	5	2	3	3	5	9	3	5	4	2	9	7	7	1
120.	Basmati Baba	1	5	3	7	5	1	2	1	9	2	3	5	9	7	2	1	3	5	1	1	5	2	1	9	3	7	9
121.	Koya Baba	1	5	1	3	5	4	2	9	9	1	3	5	5	5	2	7	3	7	1	3	7	4	4	9	5	5	9
122.	Deshi Dhan	1	5	7	5	5	1	3	1	9	2	3	5	7	7	2	7	3	5	9	5	5	4	5	9	3	7	1
123.	Bhojna Baba-6	1	5	5	5	3	6	2	1	9	1	3	7	5	5	2	3	5	7	9	3	7	4	6	9	3	5	1
124.	Gutika Baba	1	5	3	5	3	1	2	1	9	2	9	5	7	7	1	5	3	7	9	1	5	2	1	9	7	7	1
125.	Bhojna Baba -H4	1	7	7	7	3	1	2	1	9	2	9	5	5	5	1	5	5	5	9	5	5	5	6	9	1	7	1
126.	Damru Baba-3	1	7	5	7	5	4	3	1	9	2	3	7	5	5	2	5	5	5	9	3	5	4	2	9	5	7	1
127.	Koya-10	1	3	3	5	3	4	2	9	9	1	3	5	5	5	1	9	3	7	1	3	5	4	6	9	5	3	1
128.	Basmati Dhan-1	1	7	3	5	5	2	2	1	9	2	3	5	7	7	2	1	1	5	1	1	5	2	1	9	1	7	9
129.	Jeera Baba	1	5	3	3	5	1	2	1	9	1	3	5	9	7	2	5	5	5	9	5	5	5	1	9	7	7	1
130.	Koya-4	1	5	3	3	5	4	9	9	9	1	3	5	5	5	2	7	3	7	9	3	5	4	5	9	7	7	9
131.	Chaulalai Baba	1	7	7	7	3	1	2	1	9	1	3	5	5	5	1	5	5	5	1	3	3	5	1	9	5	5	9
132.	Jaarli Baba	1	7	5	7	5	2	2	1	9	1	9	7	5	5	3	7	5	5	9	3	5	4	1	9	5	5	1
133.	Kodha Phool	1	7	5	5	3	1	3	1	9	1	3	5	7	7	1	5	3	5	9	3	7	4	6	9	5	7	9
134.	Goda	1	7	5	5	3	4	3	1	9	1	9	5	3	3	1	7	5	7	9	5	5	1	9	1	5	9	9
135.	Dev Dhan	1	7	1	5	3	4	3	1	9	1	3	7	3	3	1	7	5	5	9	3	5	5	6	9	7	5	1
136.	Gundari Bhog	1	9	5	7	3	2	3	1	9	2	3	7	5	5	3		3	5	-	1	3	2	1	9	1	7	9

erect type. For the character panicle (curvature of main axis) 81 were of deflexed but no on were of drooping type, 39 were of semi straight and 16 were of straight. With respect to panicle number per plant 82 cultivars exhibited medium number, 54 were many type. Colour of tip of lemma 59 were of white, 10 were of yellowish, Bhurkund and Kalam Luchai were brown, 27 were black, 33 and 5 were of red and purple colour respectively. For the character lemma and palea colour Borojeri, Agiasal and dadbako cultivars were of straw colour, 67 were of gold, 21 were of brown spots on straw, 10 were brown furrow on straw, 7 were brown (tawny). 3 were reddish to light purple and 25 were purple spots on straw. 121 cultivars were shown absence of awns but 15 were shown presence of awns. All the cultivars exhibited presence of secondary branching. 56 cultivars were of strong secondary branching, 10 cultivars were cluster secondary branching and remaining were weak in nature. Bhurkund observed as erect type panicle, Semi erect to spreading was observed for 5 cultivars, Lazni super-1 and Kendumudi were of semi erect type, 73 were of erect to semi erect but 55 were of spreading type. Mostly that is 53 cultivars were of well exerted panicle exertion, 74 were of mostly exerted type and 40 cultivars is of partly exerted type. For about 35 cultivars the time maturity was medium (121-140 days), 34 were of early (101-120 days) 55 were of late (141-160) but 5 cultivars viz. Bacha Kolam, Barhabali Dhan, Sona Chur, Basmati baba and Jeera baba were were very late maturity (> 160 days) and desirable 6 farmers' varieties very early (< 100 days) were found viz. Jengene, Titirpankhi, KarniDhan, Barun Goda, Badkadhan and Tichundhan. For the character leaf senescence 61 were of late, 41 were of medium and 34 were of early type. 28 cultivars were of straw sterile lemma colour, 28 were of red, 63 were of gold and 17 were of purple. For the grain weight 31 cultivars shown medium weight (21-25gm), 28 were of low (15-20gm), 36 were of high (26-30gm), 30 were of very low (<15gm) and 10 cultivars were shown very high grain weight (>30gm).

90 number and Ara kunta were found extra long decorticated grain length, 43 were of short, 77 were of medium and 14 of long decorticated grain length. Titirpankhi and Govardhan Kali kamod were found short slender grain shape. Safari 1 nakna and Mehar dhan were found variegated brown decorticated grain colour and Koya baba were found as dark brown, 23 were red colour but 8 of light red decorticated grain colour and remaining 93 were found white decorticated grain colour.

## CONCLUSION

Out of one thirty six varieties studied, sixty six FVs were found to be distinctive on the basis of fifty five essential

characters. Out of 66 Jengene and Tichun Dhan were found very early FVs under testing. "Gangtai" and "Matari Pochi" were found light green for colour of stigma. For density of pubescence of lemma Kata mehar and Ramigali were of strong pubescence. This study will be useful for breeders, researchers and farmers to identify and choose the restoration and conservation of beneficial genes for crop improvement and also to seek protection under Protection of Plant Varieties and Farmer's Rights Act.

The abundance of morphological and biochemical quality parameter descriptors (65 in UPOV and 62 in PPV&FRA) makes DUS testing in rice an interesting study, besides its routine regulatory function for the release of varieties. We have shown that qualitative morphological characters were quite efficient in varietal identification and in estimating DUS in rice. Such a study is relevant for member countries of UPOV when plant varietal registration is gaining acceptance around the world. It needs to be based on solid evidence of the best, most discriminatory characters. For countries which are centres of origin or centres of diversity for certain crops and thereby housing a wide range of variability, work may be needed to adapt the UPOV DUS testing guidelines with standardized modifications, as has been done in India. It will then be appropriate to test the adapted system; the results may be useful not only for varietal registration, but also in the wider context of varietal classification and clustering.

## REFERENCES

1. Anonymous (2001). Protection of Plant Varieties and Farmers Right Act (No. 53 of 2001). Dept. of Agriculture and Cooperation. *Ministry of Agriculture, Govt. of India*, krishi Bhawan, New Delhi.
2. PPV & FRA (2007). Guidelines for the Conduct of Test for Distinctiveness, Uniformity and Stability on Rice (*Oryza sativa* L.). Protection of Plant Varieties and Farmers' Right Authority (PPV & FRA). Govt. of India, New Delhi.
3. Patra, B.C. (2000). Collection and characterization of rice genetic resources from Keonjhar district of Orissa. *Oryza* 34: 324-326.
4. Prakash, S. (2007). 'DUS test in rice', in Proceedings of Training Program in Rice, DRR, Hyderabad, pp 84-93.
5. Shobha Rani N.; Subba Rao; L.V. and Viraktamath, B.C. 2006, 'National guidelines for the conduct of tests for distinctness, uniformity and stability: rice (*Oryza sativa* L.) - Zero Draft', *Directorate of Rice Research*, Rajendranagar, Hyderabad, Andhra Pradesh.
6. Singh, P. and Singh, V.P. (2007). 'Quality of direct seeded rice cultivars', *Agricultural Science Digest*, Vol 2, pp 79-82.
7. Suman, A.; Shankar, V.G.; Subba Rao, L.V. and Sreedhar, N. (2005). 'Variability, heritability and genetic advance in rice (*Oryza sativa* L.)', *Crop Research*, Vol. 30, No (2) : pp 211-214.