ANNUAL REPORT

वार्षिक प्रतिवेदन

2017-18

Indira Gandhi Krishi Vishwavidyalaya

Raipur - 492012 (Chhattisgarh), India

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No. PA/VC/IGKV/188/2018/169
Date : 04/09/2018

FOREWORD

I am extremely pleased to note that, Indira Gandhi Krishi Vishwavidyalaya, Raipur is publishing its Annual Report, 2017-18. This university is a known name in the realm of education and has taken giant strides in its progress.

Indira Gandhi Krishi Vishwavidyalaya, Raipur was established on January 20, 1987 which is the only agricultural university of the state. The university is known nationally and internationally for its large number of collections of rice germplasm and rice research.It is providing comprehensive, multifaceted, interdisciplinary good education with its dedicated, involved and committed staff. Indira Gandhi Krishi Vishwavidyalaya plays a vital role in the socio-economic growth of the state.

It has been eventful year with lot of activities all around. Students have been excelling in their field of study and have participated in curricular and extra-curricular activities including sports and culture, winning prizes, medals & awards.

Faculty members have participated in teaching, learning and other academic activities including research, demonstration and consultancy. Research work done by scientists have been published in reputed national and international journals.

Colleges and their departments have augmented the laboratory facilities by processing additional equipments, machinery, instruments, software and computer hardware.

I consider that, this document will serve as a showcase of the university activities. I would like to thank all the statutory officers, faculty members, Dr. K.L. Nandeha, Officer-In-Charge, University Technical Cell and his team for compiling and editing this manuscript in a comprehensive and presentable manner.

I appreciate the efforts of University Technical Cell and all the contributors, who concerted for bringing out this official report 2017-18.

(S.K. Patil)

About Chhattisgarh

Chhattisgarh located in the centre part and is the 10th largest state in India. It has an area of 135,190 km^2 with population of 25.5 million. Chhattisgarh is the 16th most populated state of the nation. The state was formed on 1st November 2000 by separation of 16 districts, known to be South-Eastern districts of Madhya Pradesh and became 26th State of the country. Raipur is its capital city. The Chhattisgarh borders are the states of Madhya Pradesh in the North-West, Maharashtra in the South-West, Andhra Pradesh in the South, Odisha in the East, Jharkhand in the North-East and Uttar Pradesh in the North. Currently the state comprises of 27 districts and 12% of India's forests area in Chhattisgarh, and 44% of the State's land is under forest. It is recognized as one of the richest bio-diversity habitats hotspot.The Green State of Chhattisgarh has the densest forests in India, rich wildlife and above all over 200 non-timber forest products with tremendous potential for value addition. One third of Chhattisgarh's population is of tribes, mostly residing in dense forests of North and South hilly areas.

The 36 forts of the state for which state named Chhattisgarh are Ratanpur, Moro, Kharod, Pandarbhata, Okher, Uproda, Pendra, Navagarh, Kotgarh, Kendra, Simariya, Chanpa, Ehuri, Vihaypur, Kunkuri, Laphagarh, Ondhi, Matin, Raipur, Amera, Lowan, Simga, Patan, Rajim, Fingeswar, Singarpur, Durg, Khallari, Akalwara, Mohandi, Sirpur, Saada, Singhangarh, Swarmal, Dekanal and Sirsa. Chhattisgarh is popularly recognized as rice bowl of the country, Rice is the principal crop of this state and about 69-70% of the net sown area is covered with *kharif* rice with 36-38 lakh ha area, while, 16.55 lakh hectares are cultivated under *rabi* season. With the increasing area under minor and major irrigation projects in Chhattisgarh, a number of crops are being grown during *Rabi* and summer season followed by rice under irrigated conditions. The other crops grown during the *rabi* season are wheat, mustard, maize and sunflower which are being grown under partially or fully irrigated conditions. On the other hand, pulses like lathyrus, chickpea, lentil and oilseed crop like linseed is grown under rainfed rice fallows during *rabi* season. Similarly, small millets are also grown in Bastar plateau during *Kharif*. However, districts of Chhattisgarh plains *viz*. Dhamtari, Janjgir-Champa have more than 75 per cent irrigated area and districts like Bastar, Jashpur, Narayanpur, Bilaspur etc. have nearly 5 per cent irrigated areas.

The state is divided into three agro-climatic zones *viz*, Chhattisgarh plains, Bastar plateau and Northern hills covering 51.0%, 28.0% and 21.0% of geographical area, respectively. The location of the state is such that it is closed to the bay of Bengal, which is instrumental in bringing monsoon in the northern part of the country. The state is endowed with abundant rainfall (1400-1600 mm), optimum solar radiation, favorable temperature, relatively well-conserved soils and surplus power and manpower. Inspite of this, the state lag behind from rest of the states in crop productivity and has high poverty, population and small fragmented holdings. The state is spreaded over 13.79 m ha of which 4.67 m ha is only cultivable. Because of limited availability of irrigation during rabi season, only 35 per cent area is under cultivation of which, major portion is under *utera* (relay) cropping of lathyrus, linseed and chickpea having very low productivity.

Agriculture Scenario

The State of Chhattisgarh has a rich tradition of food culture. Chhattisgarh's gross state domestic product current price has increased considerably. Chhattisgarh's success factors in achieving high growth rate are due to growth in agriculture and industrial production. Due to enhancement in rice production, state has won the Krishi Karman Award thrice in recent-past. Agriculture is counted as the chief economic occupation of the state. According to a government estimate, net sown area of the state is 4.828 million hectares and the gross sown area is 6.43 million hectares. Horticulture and animal husbandry also engage a major share of the total population of the state. About 76.86% of the population of the state is rural and the main livelihood of the villagers are agriculture and agriculture-based small industries. Majority of the farmers are still practicing the traditional methods of cultivation. They have to be made aware of modern technologies suitable to their holdings.

Fig. District map of Chhattisgarh

The main crops grown in the state are rice, maize, kodo-kutki, pulses (chickpea, grasspea, pigeonpea and kulthi), oilseeds, such as linseed, soybean and

sunflower. Further, substantial portion of the population is dependent on agriculture, a situation where nearly 80% of a state's area is covered under rice, immediate attention is thus needed to turn them into double crop areas. Also, very few cash crops are grown in Chhattisgarh, so there is a need to diversify the agriculture produce towards oilseeds, pulses and other cash crops.

Crop diversification

Diversification and intensification of rice-based systems to increase productivity per unit resource is very pertinent. The diversification of cropping system is necessary to get higher yield and return, to maintain soil health, sustain environment and meet daily requirements. The importance of highly intensive crop sequence is also well recognized to meet the growing demands of ever-increasing population. An intensive cropping which must not only be highly productive and profitable but also be stable over the time and maintains soil fertility in present conditions. Oilseeds and pulses including vegetables like brinjal, potato, onion, chilli and leafy vegetables are receiving more attention owing to higher prices and increased demand. Inclusion of such crops in a sequence will change the socio economic status of the state.

Cropping intensity

The cropping intensity of the state was only 114 per cent in nineties. It was 100 % in Bastar plateau and 109 per cent in Northern hills zones in the same year. The cropping intensity is increasing gradually and presently it is about 136%. The rate of increase in cropping intensity is higher in Chhattisgarh plains followed by Bastar plateau and Northern hills. It was noticed that *Kharif* crops including vegetables in Chhattisgarh plains and increasing area under maize in Bastar plateau and Northern hills contributed significantly in increasing cropping intensity. The area under rice-chickpea in rainfed as well as partially irrigated and rice-vegetable cropping system in irrigated conditions are also increasing. In fact, the major irrigation source is canal and the canal water is available when the reservoirs are filled with rainwater. The canal water is rain-dependent, thus, drought plays an important role in reducing the cropping intensity of Chhattisgarh.

Cropping systems in Chhattisgarh

The major cropping systems observed in Chhattisgarh can be categorized based on situation of cultivation .i.e. rainfed and irrigated conditions which are given below:

1. Mono cropped rainfed systems in medium to light soil

   Rice – fallow, Kodo/kutki – fallow Pigeonpea – fallow, Blackgram – fallow

2. Double cropped rainfed in heavy soils

   Rice – Utera (mostly Lathyrus and partly linseed) Rice – chickpea, Maize – rapeseed, rice – linseed

   Rice – Wheat (partly under rainfed)

3. Double cropped irrigated systems

   Rice – Wheat, Rice – Rice, Rice – Chickpea (partially under irrigated)

   Rice – Mustard

4. Emerging cropping systems

   Soybean – Wheat, Rice –Cabbage, Potato, Maize, Vegetable–Vegetable, Rice-Rice, Rice-Hybrid Sunflower

   Rice - Wheat

Predominant farming system

Based on socio-economic conditions, farmers' need, profound understanding and long experience regarding edaphic and climatic conditions over decades, following predominant traditional farming systems have been evolved by the farmers.

Table : Predominant farming system model adopted in three agro climatic zones of Chhattisgarh

S. No.	Farming system model	Farming situation	Adoption of farming system			Farmers perception
			CG Plains	Bastar plateau	Northern hills	
1.	Crops + milch animals (2 to 3) + poultry in backyard	Small to marginal farmers	√	√	√	Common in all the villages Milk is used for home consumption by farmers in remote villages and for sale in villages adjoining to town under areas. Poultry and eggs are used for home consumption and marketing in weekly bazar to some extent
2	Crops + draught-animal	Small to Marginal farmers	√	√	√	Generally farmers used to keep draught animal for field cultivation and transportation by bullock cart.
3	Crops in backyard + poultry + fish catching in ponds or nala	Small to marginal farmers	√	√	√	Tribal farmers adopt poultry and fish catching mainly for home consumption.
4	Crops (*kharif*) + collection and sale of forest produce like mahua, tendu leaves, harra, chironji, honey and lac collection, fuel and timber wood *etc*.	Tribal dominated region	√	√	√	Crops for food consumption and collection and sale of forest produce for income generation.
5	Crops + local poultry (meat)+local pig (meat)	Tribal dominated region	√	√	√	Tribal farmers of Bastar are adopting this system with local breed of crop and animal husbandry.

* Crops included rice, soybean, wheat, onion, sunflower, chickpea, mustard, maize *etc*.

Nutrient consumption : The average nutrient consumption of the state is 82 and 121 kg ha^{-1} of N, P_2O_5 and K_2O during Kharif and Rabi seasons respectively. The ratio of N:P_2O_5:K_2O consumption is highly imbalanced particularly in Korba, Raigarh, Janjgir and Sarguja districts where ratio is highly favored to N fertilizers.

Land Use : The total geographic area of Chhattisgarh is 13.79 million hectares, out of which the forests occupies 4.54 million ha (32.44%). Forest area in Bastar Plateau is highest (42.7%), followed by Northern Hills (36.4%) and Chhattisgarh Plains (26.6%). However, the net sown area is inversely proportional to the forest area. Barren land is also high (3.5 lakh ha) and it is highest in Chhattisgarh Plains (1.4 lakh ha) followed by Northern Hills (1.24 lakh ha) and Bastar Plateau (0.85 lakh ha).

Table : Land use pattern in agro climatic zones of Chhattisgarh (ha)

	Particulars	Chhattisgarh plains	Bastar plateau	Northern hills	Total
1.	Geographical area	7680404 (55.7%)	3262481 (23.7%)	2846951 (20.6%)	13789836 (100%)
2.	Forest	2045526	1392806	1036399	4474731
3.	Land under non agricultural uses	490829	79744	127145	697718
4.	Barren & uncultivable	137924	84692	124403	347019
5.	Fallow land	158232	171673	7165	337070
6.	Cultivable wasteland	100.76	155.89	6.6	263.3
7.	Net Sown area	3272730	607900	829800	4710430
8.	Double cropped area	859220	13850	100230	973300
9.	Cropping intensity (%)	126.25	102.27	112.07	120.66
10.	Irrigated area	1183624	12085	52581	1248290

Table : Characteristics of Soils of Chhattisgarh

S.No.	Characteristics	Entisol	Inceptisol	Alfisol	Vertisol
1	Available N kg ha-1	150 - 200	180 - 250	200 - 270	230 - 280
2	Available P kg ha-1	5 - 1 0	10 - 15	12 - 18	12 – 20
3	Available K kg ha-1	150 – 250	200 – 350	350 – 450	450 – 600
4	DTPA extractable Fe (mg kg-1)	260 - 320	150 -250	100 -150	50 -100
5	DTPA extractable Mn (mg kg-1)	40 – 55	20 – 30	15-25	10 - 20
6	DTPA extractable Zn (mg kg-1)	1 – 2	1.5 - 2.5	1 – 2	0.5 – 1.5
7	DTPA extractable Cu (mg kg-1)	2 – 4	2 – 5	2 – 4	1.5 - 3

Soils of different agrolimatic zones of Chhattisgarh

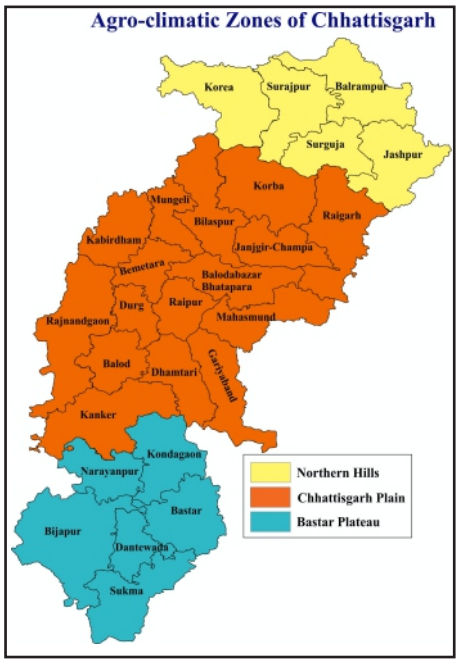
Chhattisgarh Plains		Bastar Plateau		Northern Hills	
(I)	Bhata (Lateritic)	(i)	Marhan (Gravely)	(i)	Hill soils (Gravelly)
(ii)	Matasi (Sandy loam)	(ii)	Tikra (Gravely with coarse sand)	(ii)	Tikra and (sadny loam)
(iii)	Dorsa (Clay loam)	(iii)	Mal (Sandy loam)	(iii)	Goda Chawar (Lateritic)
(iv)	Kanhar (Clay)	(iv)	Gabhar (Clay loam)	(iv)	Bahara (Silty loam)
(v)	Tikra (Sandy)				
(vi)	Kachhar (Alluvial)				

Irrigation : In Chhattisgarh, rice, the main crop, is grown on about 77% of the net sown area. Only about 30% of the area is under irrigation; the rest depends on mansoon of the three agro-climatic zones. About 73% of the Chhattisgarh plains, 97% of the Bastar plateau and 95% of the northern hills are rainfed. The irrigated area available for double cropping is only 87,000 ha in Chhattisgarh plains and 2300 ha in Bastar plateau and northern hills. Due to this, the productivity of rice and other crops is low, hence the farmers are unable to obtain economic benefits from agriculture.

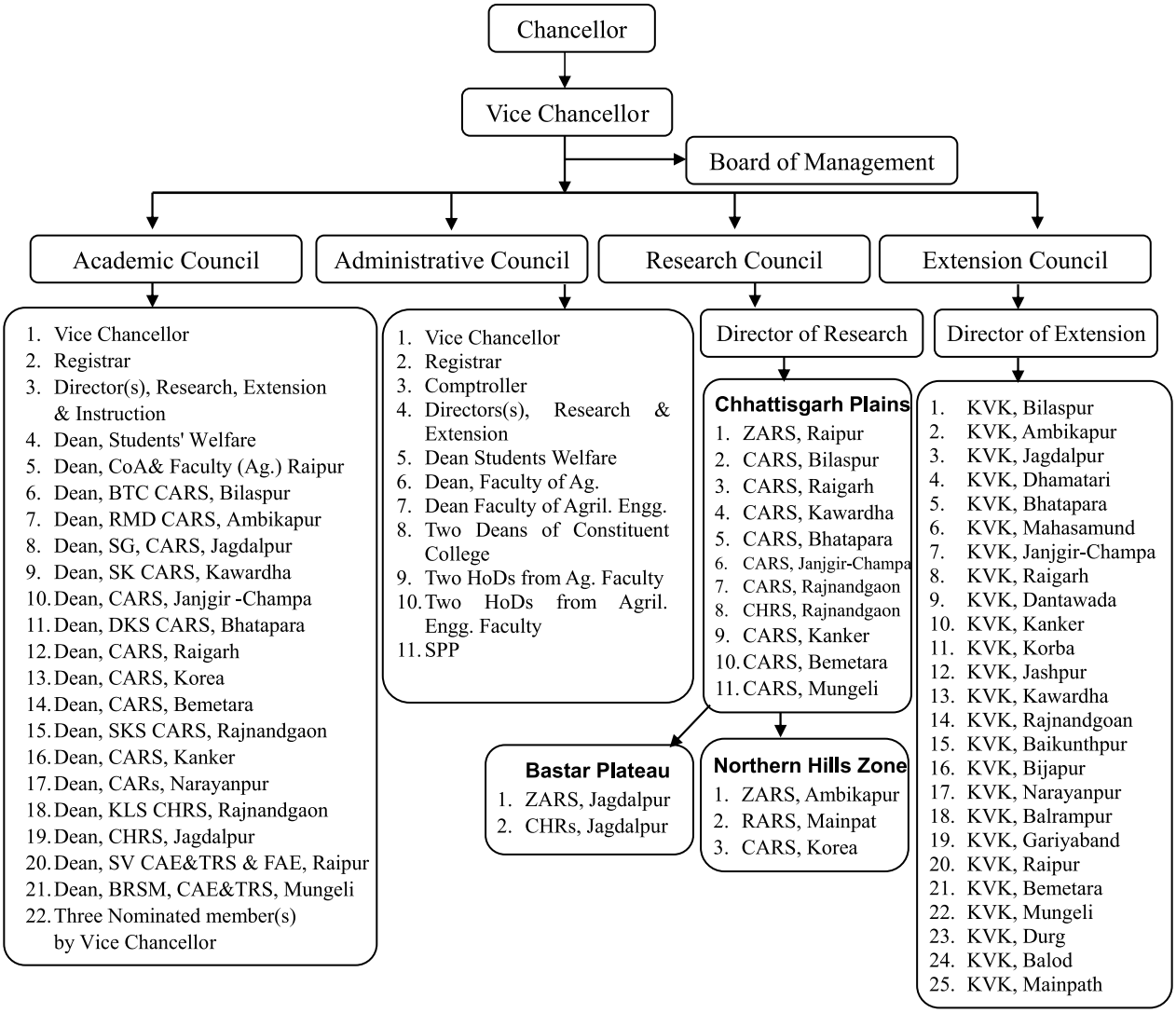
Climate : The climate of Chhattisgarh is tropical. It is hot and humid because of its proximity to the Tropic of Cancer and its dependence on the monsoons for rains. Summer in Chhattisgarh is from April to June and temperatures can reach 48°C (118°F). The monsoon season is from late June to October and is a welcome respite from the heat. Chhattisgarh receives an average of 1,292 millimetres (50.9 in) of rain. Winter is from November to January and it is a good time to visit Chhattisgarh. Winters are pleasant with low temperatures and less humidity. The temperature varies between 30 and 47 °C (86 and 117 °F) in summer and between 5 and 25 °C (41 and 77 °F) during winter. However, extremes in temperature can be observed with scales falling to less than 0°C to 49°C.

Agri-Diversity in the State

- Districts like Dantewada and Bijapur have more than 70% tribal population
- Forest based Economy is predominant in forest areas
- Forest area is 35% of geographical area in CG plain to 65 % in Bastar (Average 46%) 79% Dantewada
- Net Sown area is 36% in CG plain to 14 % in Bastar (Av. 35%)
- Cropping Intensity 136% ranging from 101% in Dantewada to 153% in Janjgir
- NPK use 5 kg/ha in Dantewada and Bijapur to 343 kg/ha in Dhamtari
- Irrigation 1% in Dantewada and Narayanpur to more than 75 % Janjgir and Dhamtari (Av. 28%)



Organizational Structure of IGKV



Abbreviation used

CoA	:	College of Agriculture	ZARS	:	Zonal Agricultural Research Station
RMD	:	Raj Mohini Devi	CARS	:	College of Agriculture & Research Station
TCB	:	Thakur Chhedilal Barister	SV	:	Swami Vivekanand
SK	:	Sant Kabir	DKS	:	Dau Kalyan Singh
SG	:	Saheed Gundadhur	KVK	:	Krishi Vigyan Kendra
KLS	:	Pt. Kishori Lal Sharma	CAE&TRS	:	College of Agricultural Engineering & TechnologyResearch Station
SKS	:	Pt. Shiv Kumar Shastri	CHRS	:	College of Horticulture & Research Station
BRSM	:	Bhawani Ram Sao Memorial	SPP	:	Superintendent Physical Plant

Teaching and Students' Activities

1. Academic Activities

Faculty of Agriculture

1.1 UG Programme

Students' status of Under Graduate Programme:

S.No.	Name of College	Degree	UG Programme 2017-18					Passed out
			I Yr	II Yr	III Yr	IV Yr.	Total	
	Constituent Colleges							
1	College of Agriculture, Raipur	B.Sc. (Ag.)	93	75	91	93	**352**	66
2	SG College of Agriculture and Research Station, Jagdalpur	B.Sc. (Ag.)	139	74	87	55	**355**	37
3	BTC College of Agriculture and Research Station, Bilaspur	B.Sc. (Ag.)	93	79	79	84	**335**	63
4	RMD College of Agriculture and Research Station, Ambikapur	B.Sc. (Ag.)	167	90	78	67	**402**	28
5	SK College of Agriculture and Research Station, Kawardha	B.Sc. (Ag.)	69	64	63	59	**255**	36
6	DKS College of Agriculture and Research Station, Bhatapara	B.Sc. (Ag.)	117	69	56	37	**279**	22
7	College of Agriculture and Research Station, Janjgir-Champa	B.Sc. (Ag.)	137	80	56	38	**311**	14
8	SKS College of Agriculture and Research Station, Rajnandgaon	B.Sc. (Ag.)	68	63	44	32	**207**	28
9	College of Agriculture and Research Station, Korea	B.Sc. (Ag.)	71	77	20	32	**200**	20
10	College of Agriculture and Research Station, Raigarh	B.Sc. (Ag.)	66	35	46	29	**176**	17
11	College of Agriculture and Research Station, Bemetara	B.Sc. (Ag.)	64	39	33	29	**165**	15
12	College of Agriculture and Research Station, Kanker	B.Sc. (Ag.)	76	64	38	26	**204**	10
13	KLS College of Horticulture and Research Station, Rajnandgaon	B.Sc.(Hort.)	69	44	41	47	**201**	14
14	College of Horticulture and Research Station, Jagdalpur	B.Sc.(Hort.)	72	54	61	35	**222**	12
	Total - A		**1301**	**907**	**793**	**663**	**3664**	**382**
	Affiliated Colleges							
15	College of Agriculture, Raigarh	B.Sc. (Ag.)	62	47	40	51	**200**	28
16	College of Agriculture, Dantewada	B.Sc. (Ag.)	66	50	36	40	**192**	06
17	Bhartiya College of Agriculture, Durg	B.Sc. (Ag.)	65	50	48	35	**198**	17
18	Chhattisgarh College of Agriculture, Bhilai (Durg)	B.Sc. (Ag.)	64	53	43	38	**198**	29
19	Mahamaya College of Agriculture, Dhamtari	B.Sc. (Ag.)	60	66	54	43	**223**	29
20	Shriram College of Agriculture, Rajnandgaon	B.Sc. (Ag.)	70	66	37	49	**222**	19
21	Bhoramdev College of Agriculture, Kawardha	B.Sc. (Ag.)	60	60	86	38	**244**	19
22	Margdarshan Sansthan Agriculture College, Ambikapur	B.Sc. (Ag.)	67	70	43	30	**210**	15
23	College of Agriculture, Ambagarh Chouki, Rajnandgaon	B.Sc. (Ag.)	66	86	51	25	**228**	13
24	Danteshwari College of Horticulture, Raipur	B.Sc.(Hort.)	63	55	38	24	**180**	13
25	Rani Durgawati College of Horticulture, Pendra Road, Bilaspur	B.Sc.(Hort.)	70	71	45	27	**213**	09
26	Gayatri College of Horticulture, Dhamtari	B.Sc.(Hort.)	70	51	31	39	**191**	13
27	K.L. College of Horticulture, Dhamtari	B.Sc.(Hort.)	69	56	24	48	**197**	26
	Total - B		**852**	**781**	**576**	**487**	**2696**	**236**
	Grand Total (A+B)		**2153**	**1688**	**1369**	**1150**	**6360**	**618**

1.2 PG Programme

Students status of Post Graduate Programme :

S.No.	Name of the Department & College	Admission status			Pass out status (No.)
		Previous	Final	Total	
1	Agronomy	53	47	**100**	09
2	Genetics and Plant Breeding	42	41	**83**	04
3	Soil Science and Agricultural Chemistry	30	30	**60**	07
4	Entomology	36	32	**68**	04
5	Agricultural Extension	20	14	**34**	06
6	Plant Pathology	22	19	**41**	02
7	Agricultural Statistics	12	10	**22**	-
8	Agricultural Economics	24	25	**49**	03
9	Plant Physiology and Biochemistry	12	12	**24**	01
10	Agro-meteorology	14	09	**23**	-
11	Plant Molecular Biology and Biotechnology	17	16	**33**	02
12	Agricultural Microbiology	13	12	**25**	01
13	Forestry	15	11	**26**	-
14	Agri-business and Rural Management	15	12	**27**	-
15	Horticulture	-	-	-	-
16	Fruit Science	19	18	**37**	11
17	Vegetable Science	26	26	**52**	04
18	Floriculture and Landscape	17	11	**28**	06
	Total	**387**	**345**	**732**	**60**

1.3 Ph.D. Programme

Students status of Ph.D. Programme :

S.No.	Name of the Department	Admission status			Pass out status (No.)
		Previous	Final	Total	
1	Agronomy	15	13	**28**	04
2	Genetics and Plant Breeding	12	13	**25**	01
3	Soil Science and Agricultural Chemistry	08	07	**15**	01
4	Entomology	09	10	**19**	02
5	Agricultural Extension	06	04	**10**	01
6	Plant Pathology	06	08	**14**	01
7	Agricultural Statistics	-	-	-	-
8	Agricultural Economics	08	08	**16**	-
9	Plant Physiology and Biochemistry	05	05	**10**	01
10	Agro-meteorology	03	-	**03**	-
11	Plant Molecular Biology and Biotechnology	08	06	**14**	-
12	Agricultural Microbiology	04	05	**09**	-
13	Forestry	03	04	**07**	-
14	Fruit Science	05	05	**10**	-
15	Vegetable Science	09	11	**20**	-
16	Floriculture and Landscape	06	03	**09**	-
	Total	**107**	**102**	**209**	**11**

Faculty of Agricultural Engineering

1.1 UG Programme

Students' status of Under Graduate Programme:

S.No.	Name of College	Degree	UG Programme 2017-18					Passed out
			I Yr	II Yr	III Yr	IV Yr.	Total	
1	BRSM College of Agricultural Engineering Technology and Research Station, Mungeli	B.Tech. (Agril. Engg.)	123	62	41	21	**247**	09
2	SV College of Agricultural Engineering Technology and Research Station, Raipur	B.Tech. (Agril. Engg.)	77	50	46	31	**204**	26
3	Bhartiya College of Agricultural Engineering, Durg	B.Tech. (Agril. Engg.)	54	51	34	38	**177**	20
4	Chhattisgarh College of Agricultural Engineering, Bhilai (Durg)	B.Tech. (Agril. Engg.)	63	58	29	31	**181**	12
	Total		**317**	**221**	**150**	**121**	**809**	**67**

1.2 PG Programme

Students status of Post Graduate Programme :

S.No.	Name of the Department	Admission status			Pass out status (No.)
		Previous	Final	Total	
1	Soil and Water Engineering	15	13	**28**	02
2	Farm Machinery and Power Engineering	15	15	**30**	01
3	Agricultural Processing and Food Engineering	11	10	**21**	-
	Total	**41**	**38**	**79**	**03**

1.3 Ph.D. Programme

Students status of Ph.D. Programme :

S.No.	Name of the Department	Admission status			Pass out status (No.)
		Previous	Final	Total	
1	Soil and Water Engineering	04	03	**07**	02
2	Farm Machinery and Power Engineering	06	06	**12**	-
3	Agricultural Processing and Food Engineering	03	04	**07**	-
	Total	**13**	**13**	**26**	**02**

Total Students of the University 2017-18

S.No.	Faculty	UG	PG	Ph.D.	Total
1	Faculty of Agriculture	6360	732	209	7301
2	Faculty of Agricultural Engineering	809	79	26	914
	Total	**7169**	**811**	**235**	**8215**

Students' Welfare Activities

(A) Cultural Activities :

(1) Cultural Programme organized by DSW in University Level

SN	Year	Name of Programme	Venue	Total College	Total Participants
1	2017-18	Inter College Youth Festival "Madai"	CoA, Raipur	22	780

(2) Cultural Achievements of IGKV, Raipur in Agriunifest & AIU Youth Festival

Year	Total	Youth Festival Name	Host	Events	Participants	Position
2017-18	33	Central Zone Inter University Youth Festival of AIU	AISECT University Bhopal	Folk Orchestra	11	Second
				Cartooning	01	Third





(B) Sports Activities

(1) Sports & Games Meet organized

Inter college (zonal) and Inter zonal sports and games meet 2017-18

S.N.	Competition	Venue (Host College)	Date
1.	Inter Class Competition	Respective College	Before zonal sports meet
2.	Inter College (Zonal) Competition	East Zone : CoA, Raipur West Zone : Rajnandgaon North Zone : RMD, CARS, Ambikapur South Zone : SG CARS, Jagdalpur	18-21,November 2017
3.	Inter-Zonal Competition (University Level)	College of Agriculture, Raipur(C.G.)	22-25, January 2018

Events: The following sports and games in the men & women sections were organized in the meet

S.N.	Men Section	Women Section
1.	Volley Ball	Volley Ball
2.	Table Tennis	Table Tennis
3.	Badminton	Badminton
4.	Kabaddi	Kabaddi
5.	Kho-Kho	Kho-Kho
6.	Football	--
7.	Cricket	--
8.	Athletics -100,200.400,800,1500,5000 M Running -4 x 100 M, -110 M Hurdles -High Jump, Long Jump, Triple Jump -Shot Put, Discus Throw, Javelin Throw	Athletics -100,200.400,800,1500 M Running -4 x 100 M -100 M Hurdles -High Jump, Long Jump, Triple Jump -Shot Put, Discus Throw, Javelin Throw

(2) Sports Achievements of IGKV, Raipur in Agriunisports & AIU Youth Festival

Year	Total	Name of AIU Sports Meet	Host	Participants	Position
2017-18	16	AIU East Zone Cricket (Men) Tournament	KIIT University, Bhubaneswar, Odisha	16	Participation
	12	AIU East Zone Volleyball (Women) Tournament	Sarguja University, Ambikapur	12	Participation
	42	AGRIUNISPORTS 2017-18	UAS, Banglore	42	1. ***Silver Medal*** in 4x400 Relay Race 2. ***Bronze Medal*** in Javelin Throw-

IGKV Sports achievements at a Glance

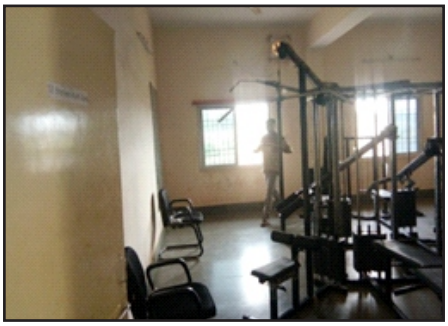
Facilities in Sports Complex:

1	Badminton Court	1 Set
2	Billiards	1 Set
3	Table Tennis	1 Set
4	Multi-station Gym Set	2 Set
5	Commercial Treadmill	4 Set
6	Carom	4 Set
7	Chess	12 Set
8	Girls Gym Common Room	01

Flood Light Ground

Physical Fitness & Health Club IGKV Raipur for the students, staff and their family members and other person residing nearby area of IGKV, Raipur has been started from Session 2016-17 in Sports Complex.

Sports Complex



Multi-station Gym

Multi-station Gym

Billiards

Multi-station Gym

Multi-station Gym


Girls Gym Common Room


Badminton Court


Table Tennis


Chess & Carom


Multi-station Gym


Sports Ground

(C) NCC Activities :

1. **NCC Activities at Indira Gandhi Krishi Vishwavidyalaya, Raipur**

S.N.	Name of College	Name of Unit	Year of Start	Allotted Strength
1	SK CARS, Kawardha	38 CG Bt. NCC, Rajnandgaon	2017	54(Boys) 54 (Girls)
2	Pt. KLS CoH, Rajnandgaon	38 CG Bt. NCC, Rajnandgaon	2017	54(Boys) 54 (Girls)
3	Pt. SKS CoA, Rajnandgaon	38 CG Bt. NCC, Rajnandgaon	2017	54(Boys) 54 Girls)

2. NCC Camps organized at Indira Gandhi Krishi Vishwavidyalaya, Raipur

S.N.	Name of Camp	Name of Unit	Period	Allotted Strength
1	CATC-VIII	1 CG Navel unit NCC, Raipur	05 to 14 June 2017	184 girls & boys cadets
3	CATC-IX	5 CG CTI COY. NCC, Raipur	29 June to 8 July 2017	560 girls & boys cadets

(C) BTC CARS, Bilaspur

S.N.	Year	'B' Certificate	'C' Certificate	CATC/NIC/Army attachment & other camp
3	2017-18	28	-	46

(3) Incentives to NCC Cadets

(A) By IGKV, Raipur (For AP/Scientist/SMS/TA/Programme/Assistant/Farm Manager)

Performance in Extra Curricular activities – NCC/NSS, Games and Sports, Cultural Activities (Inter University Level – with Certificate) ---------- Max. Marks-03

NCC- B Certificate- 01 Mark, C Certificate- 02 Marks

NSS- B Certificate- 01 Mark, C Certificate- 02 Marks

Sports/Cultural- Inter University level 01 Mark per Participation- Max. 02 Marks

(B) Govt. of India

(1) Army- 32 Vacancies in IMA and 50 Vacancies in OTA for NCC 'C' Certificate

(2) Navy- 06 Vacancies Air force

(3) BSF, CRP, CISF, Coast Guard, ITBP

NCC Activities :

(D) National Service Scheme (NSS) Activities:

National Service Scheme: NSS unit in different Colleges are working. Under the NSS activities, regular camp, adventure camp, training programme for staff/students, national level camp & International Yoga Day organize under NSS.

Registration of NSS Volunteers in IGKV, Raipur

Year	No. of Unit	No. of Volunteers
2017-18	50	4200

State & National Level Achievement/Award

Training Programme and training camp organized during 2013-14 to 2017-18

S.N.	Year	Topic	Organized by	No. of Participants	Participants
1	2013-14 to 2017-18	7 days Special Camp	All unit of IGKV	50% volunteers (each units)	All volunteers
2.	(29-31 March 2018)	Workshop on Agriculture based natural product in Arts	IGKV, Raipur	33	NSS Volunteers

National Level Camp attended by volunteers of National Service scheme

Year	Name of Camp	No. of Camp	No. of Participants
2017-18	National Youth Festival	1	2
2017-18	International Yoga Day (21st June)	1	500

Officials and NSS volunteers of different University during Yogafest 2017

NSS Advisory committee & one day workshop Yogafest-Technical session 2017-18 Foundation day 1st price rely race

Gajar Ghas Unmulan Blood donation camp 2018 Cultural Programme Yogafest 2017-18

(E) Hostel Information Detail in IGKV Raipur main campus 2017-18

S. N.	Name of Hostels	Total Rooms	Intake Capacity	Present Intake (2017-18)	Monthly Labour	Daily Paid labour	Sweeper	**Total**	VV Security	Hostel maintenance labour
Boys Hostels										
1	Satyam	100	200	198	1	3	2	06		
2	Shivam	40	100	135	1	3	1	05		1 (MIS)
3	Sundaram	60	120	146	1	3	1	08	3	1 (Other work)
4	Farmers	10	40	49	-	3	1	04		1 (Finance)
5	Swami Vivekananda		25	28	-	3	-	03		1(Electrician)
6	Shree Maharshi Arvind	16	32	50	-	3	1	06	2	
	Sub Total	**226**	**517**	**606**	**3**	**18**	**6**	**32**	**5**	**4**
Girls Hostels										
7	Saraswati	28	56	87	1	2	1	04	1	
8	Mandakini	26	52	86	1	2	1	04	2	
9	Kadambari	25	50	88	1	2	1	04	2	01 (Plumber)
10	Godawari	42	55	111	-	5 (2 Labour + 2 Security + 01 Labour- Kamdhenu VV)	1	06		
	Sub Total	**121**	**213**	**372**	**3**	**11**	**3**	**18**	**6**	**1**
									1 (Gape Filler)	
	Grand Total	**347**	**730**	**978**	**06**	**29**	**10**	**50**	**11**	**05**

IGKV Main Campus Raipur

Boys Hostels

Maharshi Arvind Hostel

Farmer Hostel

Swami Vivekananda Hostel

Sundaram Hostel

Shivam Hostel

Satyam Hostel

(F) University Placement Cell :

Student Counseling and Placement Cell: Give detailed report on placement cell and provide the report for recruitment of students by firms in last five years. What is the mode and mechanism of counseling being followed at the University level?

The University Placement Cell of IGKV was created on December, 1st, 1998 and named as Industrial Coordination Unit that was concentrated to the students of College of Agriculture, Raipur only. As our University has spread in length and breadth having 31 constituent and affiliated Colleges, thus a good number of students pass out every year from these Colleges. As training and counseling is crucial for effective placement, every student of the university needs proper guidance and assistance. Keeping these facts in view, placement and industrial coordination unit was reorganized on 12/08/2010 by Dean, Faculty of Agriculture and recognized as Placement Office, headed by Placement Officer. Now, to coordinate the training and placement activities of all the constituent and affiliated colleges at university levels, new placement cell has started under Dean Student's Welfare headed by Placement Coordinator.

The major objectives of the University Placement Cell are:

- To disseminate the educational and occupational information.
- To identify the student's potential and mapping their competencies.
- To provide the platform for molding the students according to the requirements of the corporate world and R&D departments.
- To carrying out career counseling for students to pursuing higher education.
- To plan and conduct faculty improvement/skill development training/seminars.

The Placement Cell is an integral part of our University. The office is sensitized to function all through the year towards generating placement and training opportunities for the students. Training activities are organized throughout the year in an effort towards preparing the prospective students for the campus selection programs. Reputed industrial houses across the country visit our institute regularly for the campus recruitment programs. Our pioneering efforts have borne fruits in achieving academic-industrial rapport and we are proud that our students are absorbed by leading giants in the industrial firmament. The Placement cell coordinates quite well with the corporate sector and provides available infrastructure to facilitate the campus selection programme. The Cell provides almost instantaneous data to the corporate sector with regard to the candidates available for consideration towards placement in accordance with their requirements. The Placement office has adopted an effective communication system to keep the students informed about potential job opportunities and guide from time to time. Private agencies involved in selecting suitable candidates for higher studies in India and abroad are also making presentations for the benefit of students with the assistance of Placement Cell. Several students have benefited from this facility. The Placement Cell ensures and takes care to provide the best arrangements and hospitality for the visiting company and other officials. The campus placement derive is conducted as and when required/approached by different companies/organizations. Eligible candidates interested to participate in campus selection need to register themselves in Placement Cell by submitting their resume in prescribed application format.

One Day Career Counseling Workshop

Placement by Semantics Tech. pvt technology

Kishan Man ke Aamdani La Kaise Badhaye Jaye

A. Students selected by different firm through Campus Placement.

Date	Name of firms	Position	Selected
24.01.2017	Local Company Raipur	Intern for Market Research	05
	CG State Rural Livelihood Mission	Young Professionals	40
03.04.2017	NIC Chhattisgarh	Lok Suraj Abhiyan Surveyor	
06.04.2017	IFFCO Fertilizers	Marketing Executive	
05/06/2017	DALBA Group of Saudi Arabia	Horticulture Agronomist/ Hydroponics Specialist.	
29/07/2017	Ankur Seeds Pvt Ltd, Nagpur		
10/08/2017	Nuziveedu Seeds Limited	Field Extension Officer	7
11/09/2017	BKC Wealthersys Pvt. Ltd.	(Trainee) Agriculture	01
31/10/2017	Semantics Technologies Pvt. Ltd	Crop Cutting Experiment Coordinator	15
13/11//2017	Semantics Technologies Pvt Ltd.	Crop Cutting Experiment Coordinator	

Campus Placement Tata Trust

Placement by Nuziveedu Seeds

Year	No of Students in Govt. Sector	Placement of Students in Pvt. Ltd.
2017-18	699	29

Disabled Friendly Facilities: *What kind of facilities is available for differently abled personsin the campus? Give a brief report.*

Sufficient play ground, indoor and outdoor games facilities are available for differently abled persons in the HQ. Sports and games competition are occasionally organized in the campus and players are selected for state and national level competitions. Very good lawns are available for their recreation. Hostel, library and canteen facilities available like other students.

Besides special provisions seats are available for UG, PG and Ph.D. Admission as well as in recruitment of ministerial and technical posts. Provision/creation of special attentive measures/facilities like ramps in buildings, washrooms etc are under consideration and gradually coming up in new construction and proposals are being prepared for old infrastructures.

B. Training/workshops on skill enhancement/ personality Development programme

Date	Topic	Participants
15.02.2017	APJ Abdul Kalam Scholarship for Eligibility for PhD	
	One Day career Counseling on Opportunities in Agriculture, Food And Ruler Development	750
05/09/2017	Orientation Program of Entrepreneurship	120
19.09.2017	Quiz Competition	40
29.11.2017	Chhattisgarhi Bhasan Commutation on Subject is " Kishan Man ke Aamdani La KaiseBadhaye Jaye"	15
03.12.2017	Bhasan Commutation at "Krishi Shiksha Diwas"	39

(G) Health Facilities : Provide the brief information about medical facilities available in the headquarter and off-campuses. A brief about Health Insurance scheme being implemented at the University may be provided.

There are good medical facilities available in the head quarter and out campuses of the University. At the head quarter, dispensary facilitates with residential doctor, nurse and other staffs are available for the basic treatments of staff and students. Ambulance facility is also available in head quarter. Whereas in out-campuses visiting doctors are available for routine checkup. In case of emergency in head quarter and out campuses, doctors refers patient to the Govt hospital or CG Govt recommended private hospital (all over the India) for advance treatments. Fix medical and reimbursement facilities both are provided to staff by university.

Doctor	Dr. Girish Ramole, (MD Medicine)
Lab Technician	Shri. Kailash Yadu , Peon
Nurse	Smt Leena Paul, DW
Ambulance Driver	Shri. A.Swami Rao

(H) Yog-Vatika : Yoga training activities to students, staff and their family members and other person residing nearby area of IGKV, Raipur has been started from 24.11.2017 every day from 6 to 7 am. Special "Yog-Vatika" place near to Agricultural Museum has been developed for this training in IGKV HQ. It was inaugurated by Shri Sanjay Agrawal, Chairman Chhattisgarh Yog Ayog, Dr. (Col) S.K. Patil, Hon'ble Vice-Chancellor, IGKV, Raipur and Dr. M.B. Chetti, ADG (Edu.). ICAR, New Delhi on 24.11.2017. Naveen Kumar Patel, MA Applied Philosophy and Yog & International Gold medalist in Yoga is the Master Trainer for the Yog training.

Details of Regular Yoga training in "Yog-Vatika"

S.N.	Month & Year	Strength
1	November 2017	241
2	December 2017	703
3	January 2018	889
4	February 2018	556
5	March 2018	314
6	April 2018	357
7	May 2018	350
	Grand Total Strength	**3410**








Research Activities and Highlights

Crop Improvement

Basic Information

Research Network

Particular	No.
Research Stations	17
AICRPs	35+7
Ad-hoc Projects	120
International Projects	3
KVKs	23

Climate

District wise rainfall status during south-western monsoon season in 2017

S. No.	Districts	Actual	Normal	Dep. (%)	Situation
1	Sukma	1596.2	1145.5	39	Excess
2	Kabirdham	1338.0	892.6	50	Excess
3	Balod	1366.5	1019.2	34	Excess
4	Surguja	1396.3	1284.9	9	Normal
5	Bastar	1352.8	1193.1	13	Normal
6	Jashpur	1197.3	1348.6	-11	Normal
7	Dantewada	1193.3	1244.3	-4	Normal
8	Korba	1153.7	1365.2	-15	Normal
9	Bijapur	1115.1	1369.1	-19	Normal
10	Bemetara	1112.9	1008.9	10	Normal
11	Surajpur	1098.3	1145.2	-4	Normal
12	Kondagaon	1071.0	1193.1	-10	Normal
13	Dhamtari	1070.4	1050.6	2	Normal
14	Kanker	1035.8	1169.3	-11	Normal
15	Raigarh	968.6	1143.5	-15	Normal
16	Balrampur	927.4	1141.3	-19	Normal
17	Gariaband	911.2	1087.1	-16	Normal
18	Mahasamund	905.5	1044.0	-13	Normal
19	Bilaspur	881.0	1080.9	-18	Normal
20	Narayanpur	956.0	1227.4	-22	Deficit
21	Janjgir	941.1	1201.9	-22	Deficit
22	Raipur	789.2	1048.2	-25	Deficit
23	Mungeli	781.1	1080.9	-28	Deficit
24	Durg	747.2	1019.2	-27	Deficit
25	Koriya	726.0	1138.9	-36	Deficit
26	Rajnandgaon	724.5	1035.7	-30	Deficit
27	Baloda Bazar	660.0	1020.1	-35	Deficit
	Subdivision Rainfall/CG state	1041.0	1152.5	-10	Normal

- Monsoon started on 16 Jun and withdrawn on 17 Oct.
- Long term average value of SWM rainfall of state was 1152.5 mm against which we received 1041 mm rains that considered normal rains for the state.
- Inspite of normal rains in state, district wise analysis of rainfall indicates that we received excess rainfall only in 3 districts, normal rainfall in 16 districts and deficit rainfall in 8 districts as compare to long term value.
- Out of 8 deficit districts, 5 districts *viz* Narayanpur, Janjgir, Raipur,
- Mungeli, and Durg although rainfall is less than normal value but the amount of rains is sufficient to grow the *kharif* crops with the intervention of new technologies going on in the field of agriculture. This new technology need to be disseminated and popularized in farmers fields.

Technologies recommended and Commercialized

Outcome-Varieties developed and proposed for identification

Horsegram variety identified in workshop

IGKV entry BSP 15-1 identified for North Zone during Annual Group meet of Arid Legume and MULLaRP held at S K Nagar, Dantiwada Gujrat

Variety Name & Parentage	Production Condition	Grain Yield (qt/ha)		Special Feature
		Average	Potential	
BSP 15-1	Rainfed mid kharif	10.18	24.08	High protein content

Chhattisgarh Ratalu-1

Chhattisgarh Devbhog and Jinco Rice

Soybean Variety RSC 10-46 identified for CZ

Varieties Identified & proposed

1. **Recommended-** 01 Varieties of Vegetable Crops -Sem (Submitted to State Sub Seed Committee- CG Purple Sem)

Identified for release – One variety of Bottle gourd (Round) and one variety of Brinjal (Green Long)

Status of Vegetable Seed Production 2017-18

Under Vegetable Seed Rev. Fund (AICRP-VC)

S.No	Crop	Variety	Area (acre)	Prod. (qt)
1.	Pea	Arkel	1.50	6.80
2.	Methi	RMT305	2.00	8.00
3.	Cowpea	Indira Barbatti Lal	0.25	0.20
4.	Cowpea	Kashi Kanchan	0.20	5.00
5.	Coriander	Pant Haritma	0.80	2.00
6.	Palak	All Green	0.25	1.50
7.	Brinjal	C.G. White Baigan	1.00	0.05
8.	Sem	Indira Sem-1	1.00	2.00
9.	Sem	Indira Sem-2	1.00	2.00
10.	Okra	Arka Anamika	0.3	2.50
11	Tomato	Kashi Amrit	0.60	12 kg
	Total		**8.00**	

Palak Seed Plot

Genetics and Plant Breeding

Recommended Varieties Notification of Crops for Chhattisgarh from 2011 to 2018

S.No.	Crop	No. of Varieties Notified	Released from IGKV	Released from Others
1	Rice	25	11	14
2	Rice Hybrids	23	0	23
3	Maize	23	0	23
4	Maize Hybrids	11	0	11
5	Wheat	10	2	8
6	Barley	2	0	2
7	Oats	2	0	2
8	Sorghum	3	0	3
9	Bajra	1	0	1
10	Guinea Grass	2	0	2

11	Kodo Millet	3	2	1
12	Little Millet	2	2	0
13	Finger Millet	3	2	1
14	Proso Millet	1	0	1
15	Arhar	1	1	0
16	Blackgram	2	1	1
17	Frenchbean	1	0	1
18	Lentil	4	0	4
19	Fieldpea	5	1	4
20	Hrosegram	3	2	1
21	Gram	1	1	0
22	Fababean	1	0	1
23	Cowpea	1	0	1
24	Castor	2	0	2
25	Safflower	3	0	3
26	Linseed	3	3	0
27	Soybean	2	1	1
28	Niger	1	0	1
29	Sunnhemp	1	0	1
30	Roselle	1	0	1
31	Jossa Jute	2	0	2
32	Okra	1	0	1
33	Mango	1	1	0
34	Onion	4	0	4
35	Fenugreek	1	0	1
36	Turmeric	1	0	1
37	Funnel	1	0	1
	Total	154	30	124

Recommended Varieties Notification of Crops for Chhattisgarh from 2017 to 2018

S. No.	Crop	No. of Varieties Notified	Released from IGKV	Released from Others
1	Rice	05	01	04
2	Rice Hybrids	06	--	06
3	Maize	04	--	04
4	Maize Hybrids	05	--	05
5	Wheat	03	02	01
6	Barley	01	--	01
7	Oats	--	--	--
8	Sorghum	01	--	01
9	Bajra	--	--	--
10	Guinea Grass	--	--	--
11	Kodo Millet	01	--	01
12	Little Millet	01	01	--
13	Finger Millet	01	01	--

14	Proso Millet	01	--	01
15	Arhar	--	--	--
16	Blackgram	--	--	--
17	Frenchbean	--	--	--
18	Lentil	03	--	03
19	Fieldpea	02	--	02
20	Horsegram	02	02	--
21	Gram	01	01	--
22	Fababean	01	--	01
23	Cowpea	01	--	01
24	Castor	01	--	01
25	Safflower	02	--	02
26	Linseed	02	02	--
27	Soybean	02	01	01
28	Niger	01	--	01
29	Sunnhemp	--	--	--
30	Roselle	--	--	--
31	Jossa Jute	--	--	--
32	Okra	--	--	--
33	Mango	--	--	--
34	Onion	01	--	01
35	Fenugreek	--	--	--
36	Turmeric	01	--	01
37	Funnel	01	--	01
	Total	154	30	124

Notified varieties of Rice for Chhattisgarh 2011-18

S. No.	Crop	Variety	Recommended Area	Remarks
Rice				
	2017			
1	Rice	28P09	Odisha, West Bengal and UP, Assam, Chhattisgarh, Maharashtra, Gujarat, Tamil Nadu and AP	S.O.1007(E)
2	Rice	Chhattisgarh Sugandhit bhog	Chhattisgarh	S.O.1007(E)
	2018			
3	Rice	KPH-473	Chhatisgarh, MP and Maharashtra	S.O.399(E)
4	Rice	DDR Dhan 50 IET 25671)	AP, Telangana, Tamil Naidu, Karnataka, Bihar, Odisha, Chhattisgarh, UP and MP.	S.O. 1379(E)
5	Rice	DDR Dhan 51 (IET 25484)	UP, Gujarat, Telangana, and Chhattisgarh.	S.O. 1379(E)

Notified Rice Hybrids for Chhattisgarh 2011-18

S. No.	Crop	Variety	Recommended Area	Remarks
Rice Hybrid				
	2017			
1	Rice Hybrid	JKRH-3333	MP in addition to the states of West Bengal, Bihar, **Chhattisgarh**, Gujarat and AP notified vide S.O.No.3540(E), dated 24.11.2016	S.O.1007(E)
2	Rice Hybrid	GK 5022	Bihar and **Chhattisgarh**	S.O.1007(E)
3	Rice Hybrid	27P36	Bihar, MP, Jharkhand, **Chhattisgarh** and Odisha	S.O.1007(E)
	2018			
4	Rice Hybrid	27P37PR 14101 (IET24844)	Chhattisgarh, MadhyaPradesh and Maharashtra.	S.O.1379(E)
5	Rice Hybrid	28S41PR 14109 (IET24891)	UP, Odisha, West Bengal, Jharkhand, Maharashtra, MP, Chhattisgarh, Telangana, AP, Karnataka and Tamil Naidu.	S.O. 1379(E)
6	Rice Hybrid	28P67 PR 14105 (IET24879)	U.P, Bihar, Jharkahand, Odisha, W.B., Chhattisgarh and Mah.	S.O. 1379(E)

Notified varieties of Maize for Chhattisgarh 2011-18

S. No.	Crop	Variety	Recommended Area	Remarks
Maize				
	2017			
1	Maize (Pop Corn)	Shalimar Pop Corn-1(KDPC-2)	Jammu and Kashmir, HP, Uttarakhand, Punjab, Haryana, Delhi, UP, Hihar, Odisha, Jharkhand, West Bengal, Rajasthan, Gujarat, MP, Chhattisgarh, Assam, Manipur, Meghalaya, Mizoram , Arunachal Pradesh, Tripura and Nagaland.	S.O.1007(E)
	2018			
2	Maize	Shaktiman-5 (MHQPM 09-08)	UP, Bihar, Jharkhand, West Bengal, Odisha and Chhattisgarh in both Kharif and Rabi seasons.	S.O. 1379(E)
3	Maize	GK 3150	Rajsthan, Gujarat, Chhattisgarh and MP.	S.O. 1379(E)
4	Maize	LG 34.05 (BL 900)	UP, Bihar, Jharkhand, West Bengal, Odisha, Maharashtra, Telangana, AP, Karnataka, Tamil Nadu, MP, Chhattisgarh, Gujarat and Rajasthan.	S.O. 1379(E)

Notified Maize Hybrids for Chhattisgarh 2011-18

S. No.	Crop	Variety	Recommended Area	Remarks
Maize Hybrids				
	2017			
1	Maize Hybrid	Vivek Hybrid 27(Central Maize VL Baby Corn 2)	Jammu and Kashmir, Uttarakhand, HP, Delhi, Punjab, Haryana, UP, Karnataka, Tamil Nadu, AP, Telangana, Maharashtra, Rajasthan, Gujarat, MP and Chhattisgarh.	S.O.1007(E)
	2018			
2	Maize Hybrid	DMRH-1301(Rabi-Irrigated condition)	NEPZ- Eastern UP, Bihar, Jharkhand, Odisha and West Bengal and CWZ -Rajasthan, Gujarat, MP and Chhattisgarh (Zone III and V)	S.O.399(E)
3	Maize Hybrid	DMRHP-1402 (Kharif Popcorn)	NWPZ- Punjab, Haryana, Delhi NCR and Western UP and CWZ -Rajasthan, MP, Chhattisgarh and Gujarat. (Zone II and V)	S.O.399(E)
4	Maize Hybrid	DMRH-1308 (Rabi-Irrigated condition)	CWZ- Rajasthan, Gujarat, Chhattisgarh and MP	S.O.399(E)
5	Maize Hybrid	ADV-756 (ADV 990296)	Karnataka, Maharashtra, AP, Tamil Nadu, Telangana, Rajsthan, Gujarat, MP and Chhattisgarh.	S.O. 1379(E)

Significant Achievements

- **Luchai (L:1099)** was found resistant for Sheath Blight
- **Mokdo (M:550)** was found aromatic
- Protein content of **Bantha Luchai (B:2733)** was found ~12%

On the basis of **3 year** mean data the 2 accessions will be nominated to AICRP Trial **Luchai (L:1099) and Luchai (L:246)**

Luchai (L:1099) High yielder Aromatic grain

Shrikamal (S: 660I) Good grain quality (MS)

Mokdo (M: 550)

Khuddi (K: 1128 IV) High Zn and Iron

Promising Pipeline Rice Hybrids

	Hybrid	Yield (Kg/ha)	Percent increase over Indira Sona (%)	Percent increase over KRH 4 (%)	Percent increase over IGKV-R1 (%)
1	IRH 111	6879.59	11.90	10.93	40.72
2	IRH 117	6648.11	8.13	7.20	35.98
3	IRH 107	6324.04	2.86	1.97	29.36
Ch1	KRH 4	6201.82			
Ch2	INDIRA SONA	6148.11			
Ch3	IGKV- R1	4888.86			

Promising Stable Mutants of Rice

Total 23 varieties of rice were treated with Gamma Rays and electron Beam

S. No.	Name of stable rice mutants	Number of stable mutants
1	Dubraj mutants	3
2	Jawaphool mutants	2
3	Safri-17 mutants	3
4	Luchai mutants	1
5	Til Kormel Mutants	1
6	Sonagathi mutants	1
7	MTU 1010 mutants	1

Dubraj mutants

Jawaphool mutants

GPB 83: Rice Germplasm Maintenance, Regeneration, Conservation, Evaluation & Seed multiplication, documentation and cataloguing

Status of Rice Germplasm 2017-18

S. No.	Indigenous lines	No. of accessions
a	Indigenous Collections	18541
	1. Early (up to 125 days)	5557
	2. Medium (126 to 140 days)	5069
	3. Late (above 140 days)	7915
b	Collections through OFC & NATP	1757
c	BD Series (from Indigenous)	938
d	Breeding lines (Labh.& DT rice)	849
e	Wild Rice (no of species - 3) (*O. nivara, O. officinalis, O. latifolia*)	210
f	Upland rice, special rice and others	955
	Total	23250
	Regeneration in Kharif 2017	5008

Groups	No. of Accessions
A. Early	3610
B. Medium	2948
c. Super Core in R I & R II	400
Total	6958

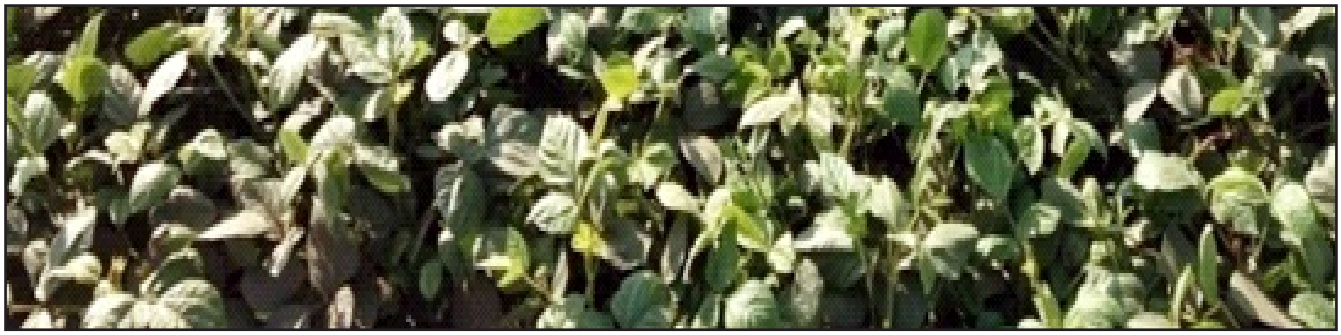
Rice Germplasm evaluated under DNA Fingerprinting project

Germplasm Conservation *Rabi* 2017-18 at Raipur

S. No.	Crops	No. of Accessions sown
1.	Linseed	1485
2.	Lathyrus	1557
3.	Rajgira (Grain Amaranthus)	25
4.	Quinoa	20 lines
5.	Wheat	25
6.	Lentil	104
7.	Fieldpea	63
	Total	**3279**

Biodiversity maintained in Chhattisgarh

S.N	Crops	No. of acc.	Place of Maintenance
1	Drumstick (Moringa oleifera)	240	Rajnandgaon
2	Amaranthus	40	Rajnandgaon
3	Coriander	28	Rajnandgaon
4.	Turmeric	67	Raigarh
5	Ginger	15	
6	Coriander	22	
7	Fenugreek	15	
8	Nigella	6	
9	Ajwain	3	
10	Kasuri Methi	2	
11	Suva/ Dil	2	
12	Groundnut	13	
13	Lotus (Nelumbo nucifera Garten)	49	7 districts viz. Dhamtari, Gariyabandh, Raipur, Kawardha, Bemetara and Mahasamund
	MAPs: Butch – 4, Betel Vine -15, Kalmegh – 295, Lemon grass -5, Ashwagandha – 80, Khus -1		Raipur



Quality Genetic Stock of Pigeonpea 2017-18

Objective: To evolve varieties for higher seed yield, R/ MR/ Tolerant to PSB & SMD and Pod Borer Complex.

Population	Populations/ GP accessions
Station Fresh Crosses	40
National Fresh Crosses	02
F_1	20
F_2	73
F_3	25
F_4	70
F_5	35
Germplasm	
RP 1 to RP 191	138
ICP 6993 to ICP 7429	37
New Collected Germplasm	25
Total Germplasm	200

Extra Early *Kharif* Pigeonpea – GPB 10

Performance of top ranking Extra Early *Kharif* Pigeonpea entries at Raipur.

S. N.	Genotypes	Yield (Kg/ha)	Yield/ Plant (g)	Maturity (Days)	50% D/F	Plant Ht. (cm)	Branches/ plant	Pods/ plant	100 seed wt. [g]
1	ICPL 11242	1648	159.000	137.0	51.0	172.8	15.2	143.5	7.750
2	GT 100	1585	267.000	135.3	60.0	266.7	15.6	227.7	9.500
3	ICPL 11279	1453	63.333	133.0	52.0	181.3	13.6	176.8	8.000
4	ICPL 11301	1356	142.000	138.3	60.0	223.0	13.3	144.9	7.750
5	ICPL 20325	1270	83.667	135.0	53.0	165.0	15.2	136.4	7.500
6	Pragati (ICPL 87)	1064	42.333	136.0	56.0	144.1	12.9	247.2	8.500
	Mean	960							
	CD at 5%	369							
	CV%	22.69							

BRNS/ BARC Funded Ad-hoc project

Development of Early maturing varieties of Safflower for rice based late sown condition through mutation breeding.

Duration- 03 years Started from 2016-17

Standardization of LD 50 for gama radiation

Doses 100GY to 1200 GY, four lines were treated

Frequencies of different kinds of mutants identified in M2 generations

Total population in each entry were approx. 25000 plants in M2

	A-1	RVS 12-13	RSS 2011-3	RSS 2011-7
For early rosette	56	30	45	21
For early Flowering	56	30	45	21
Change in bud shape and bracts	15	35	18	15
Increased branches	36	45	42	38
Dwarf type	12	18	02	05
Non spiny	10	-	22	-
Tall	8	25	20	-
Appressed type	05	12	20	-
Non beneficial	12	19	20	26

View of Developed Maize Hybrids

No. of collections in potential Crops

Spine gourd -34 germplasm

Winged bean- 10 germplasm

Faba bean- 5 germplasm

Spine Gourd



IGKV Funded projects output:

1. Completed three yrs of IGKV funded MLT of Turmeric and Coriander at Raigarh, Ambikapur and Jagdalpur. Rajnandgaon location added (2017).
2. Turmeric: IT 10 identified as a promising entry in IGKV Univ. Identification Committee and release proposal submitted to CG State Seed sub committee.
3. IT 36 identified as early maturity entries suitable for double cropping sys.
4. Maintained promising genetics stocks of Turmeric i.e. IT 10, IT 36, CGH 1, Roma, Suranjana, BSR 2, Narendra Haldi and 30 best germplasm.
5. In Turmeric early maturing clones selected (165 to 180 days).
6. In Coriander ICS 4 identified as best entry in MLT trials.
7. 30 Germplasm of Coriander maintained and characterized.
8. MLT of Fenugreek started - 4 locations, RIG, AMB., RND, JDPR (2017).
9. In Fenugreek entry IFGS-11 performed well over all four locations CG.
10. 15 single crosses as per Half diallel design effected during Rabi-2017-18 and will be tested in Rabi 2018-19 for yield and yield parameters.
11. Characterization of germplasm of fenugreek completed.
12. Notification of Chhattisgarh Haldi -1 and Chhattisgarh Dhaniya -1 submitted.

PGR Status

SN.	Crop	Total no of G.P.	Remarks
1	Turmeric	64	55 GP submitted to NBPGR New Delhi for IC No. Kozhicode (Nov 2017)
2	Coriander	30	IC no. allotted to seven G.P. lines
3	Ginger	5	All are moderately resistant to Rhizome rot
4	Mango Ginger	06	-
5	Fenugreek	12	Will send for IC no. to NBPGR during 2018
6	Ajwain*	02 + 1 (V)	One local collection
7	Karayat*	(04 + 01) 05	4 New collections + 01 released varieties
8	Kasuri methi*	02 + 02	2 released varieties + 02 selections
9	Kala, Sona, Pila haldi	03	Each of one GP available

Registration of farmers variety in PPV&FR

Crop betelvine (*Piper betle* L.)

Denomination –Chuikhadan desi kapuri pan.

Alternate denomination-Kasita kapoori pan.

Traditional knowledge:

Keeping quality :up to one month.

Leaf: easily dissolve in mouth.

Medicinal use: keep cool during summer.

Other use: Pooja and Marriage.

MAPS & Betel vine

PGR activities

Kalmegh 295 accession has been characterised on morphological and biochemical basis.

Ashwagandha 80 accessions has been characterized .

Thirteen accession of Aloe vera have been characterized.

Four accessions of Lemongrass were characterised and maintained.

Multiplication and maintained satawar (7), three accessions of safed musli (3), sarpgandha (3), khus (1)acessions.

Fifteen cultivar of betelvine are conserved.

Received IC No from NBPGR, New Delhi of batch, kalmegh and lemongrass of promising entries.

Entries contribution in AICRP trial 2018 *Kharif*

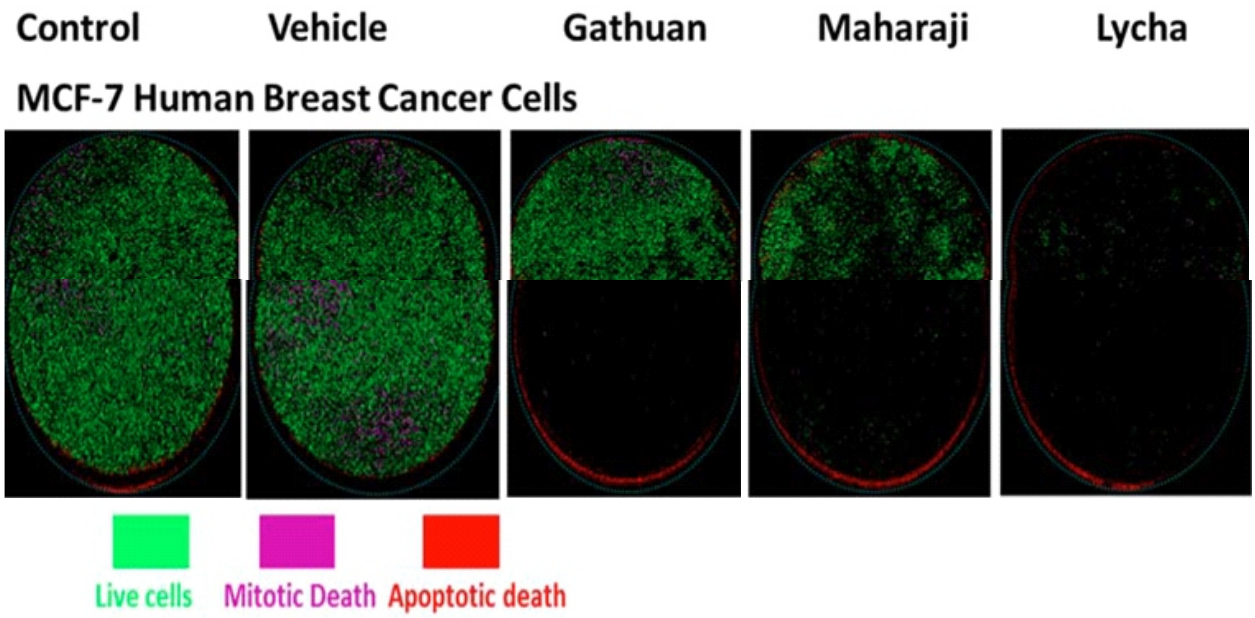
Initial Varietal Trial in Forage Cowpea (New)

Entry	Pedigree	Green Forage Yield (t/ha)		Tested in trials
		Test entry	Check	
Raipur Forage Cowpea-1 (RFC-1)	Selection from local material	33-38	BL-1	SVT
Raipur Forage Cowpea-2 (RFC-2)	Selection from local material	30-35	UPC-5286	SVT

Medicinal Rice Programme with BARC

Methanolic extracts from medicinal rice varieties from IGKV Raipur showed anti tumor activity in vitro

Each coloured dot represents one cancer cell. Decrease in number of cells per well (green dots) following treatment with rice extracts was on account of inhibition of cell proliferationin cancer cells.



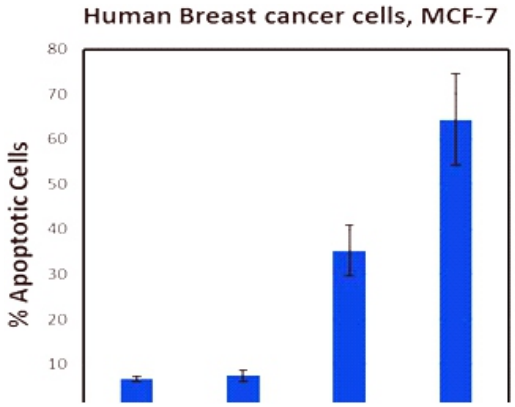
Medicinal Rice Programme with BARC

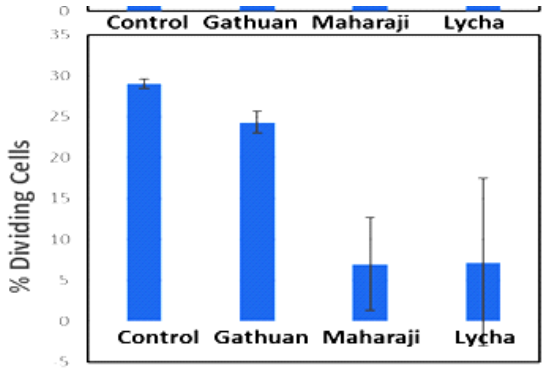
Anticancer activity of the extracts from medicinal rice varieties from IGKV Raipur against human breast cancer cells (MCF-7) was found to be through increase in cell death (apoptosis) and decrease in cell proliferation

The methanolic extracts from three varieties (Gathuan, Lycha and Maharaji) were tested for their anticancer efficacy in human breast cancer cells (MCF-7) and human lung cancer cells (A549) using High Content Screening. It was found that methanolic extracts from these varieties inhibited the growth of human breast cancer and human lung cancer cells in vitro.

The anti-tumor effect of methanolic extracts from medicinal rice varieties was found to be mediated through induction of apoptosis as well as inhibition of cell cycle in cancer cells.

Among the three varieties tested so far, Lycha extract was most effective in killing human breast cancer cells. The methanolic extracts from all three varieties showed almost same efficacy in killing human lung cancer cells in vitro.





New initiatives

New introduction of crop **Quinoa (*Chenopodium quinoa*)** from MP

Pipeline entries

On-going research for technology development

GPB-8/105

Development of value added products -cloth, handicraft, handmade paper from Linseed plant & related machinery

- To develop double purpose linseed genotype suitable for Chhattisgarh.
- To develop agronomical techniques for harnessing fibre from linseed.
- To standardize fibre extraction technique from linseed plant.
- To standardize of techniques for making good quality clothes and other materials from linseed plant. Mixing of linseed fibre with other crop fibre to lower the manufacturing cost etc.
- To develop a technique for making handicraft products from cores fibre of linseed plant to enhance additional income generation avenues through linseed in tribeal dominating area of Chhattisgarh.
- To develop a protocol for preparation of handmade paper and other products from linseed waste fibre.
- To design and develop machines for Linseed stem cutting, linseed fibre extraction, and thread making from linseed plant fibre.
- Development of protocol for spinning designing and colouring of cloths garments items etc.
- GPB-8/105
- Development of value added products -cloth, handicraft, handmade paper from Linseed plant & related machinery

RLP-13

- Hight -75-80 cm. Extream top branching.
- sutable for late sowing – up-to 15 December
- R- budfly, PM, and MR to wilt & AB

Design and development of machines for Linseed stem, branch cutting, linseed fibre extraction, and thread making from linseed plant fibre

Two Machines designed and developed by- SV, FAE, Raipur

Branch Cutitng Fibre extraction Machine

Manual Operated single touch

Fibre extraction Machine

Power Operated Dobule touch

Cutting of Branch plastic containers

Retting of Stem for 4 days in

Stem without branch



Standardization of techniques for making good quality Thread, clothes and mixing of linseed fibre with other crop fibre to lower the manufacturing cost etc.

Thread Making



Ready Thread

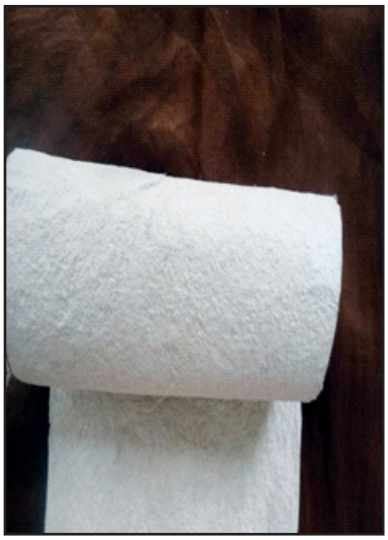
Wraping of thread in gauriya

Jacket made from linseed by IGKV, Raipur (C.G.)

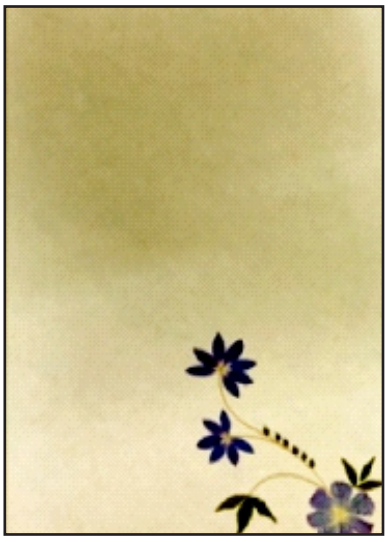
Development of protocol for spinning, designing and colouring of cloths garments items etc.- on going

Korien Silk- as Tana
Linseed- as Bana

Cotton - as Tana
Linseed- as Bana
Development of protocol for preparation of handmade paper and other products from linseed waste fibre



Hand made paper



Plant Molecular Biology and Biotechnology

Major Achievements

- High Zn rice line identified at National Level
- High Protein and high Zn line submitted for release
- A rice line adapted to Rainfed situation identified, performing better then checks including hybrids
- Large scale production of Double Haploid
- Transcriptome analysis of *Lathyrus* for identification of genes involved in ODAP bio-synthetic pathway
- Transcriptome analysis of Littlie millet – a native species of jaypore tract and genes involved in moisture stress tolerance and Fe biosynthesis genes.
- *EfNAS2* gene from Barnyard millet (*Echinochloa frumentacea) Isolated, sequenced, characterized and cloned for the plant transformation.*
- DNA fingerprinting of ~9500 lines based on 24 markers completed, Whole genome of 40 rice sequenced, GBS of 80 lines under progress
- Rice DNA based Bar coding tool developed to discriminate varietal differences
- Genotypes with P-deficiency tolerance identified
- Tissue culture of Male and Female lines of Kakoda standarized
- Tissue culture work on Bamboo initiated

R-RHZ-LI-23 (IET 25477)

Zincorice-MS (High Yielding Nutri -Rich Rice Variety) Identified for 3 states (CG, Orissa and WB) by VIC 2018

View of Plant of IET-25477



Grain Morphology IET-25477

Varietal Description:

- Parentage: Lalmati x IR68144B-18-2-1-1
- Plant height: 96.33 cm

- Maturity: Medium (100 days to 50% flowering)
- Grain type: Medium slender
- Medium grain Protein- 7.83%
- Zinc content: 25.5 ppm
- Amylose content: 24.2

R-RHZ-LI-23 (IET25477)

§ Tested in 3 years AICRIP Trails IVT-RB 2015, AVT 1-RB 2016, AVT2-RB 2017 conducted at 52 locations covering Zones II, III, V, VI & VII.

§ Found promising for 3 states i.e., West Bengal, Odisha, Chhattisgarh by VIC during ARGM meeting held on 14th April 2018.

National (AICRP) Trials wet season 2017

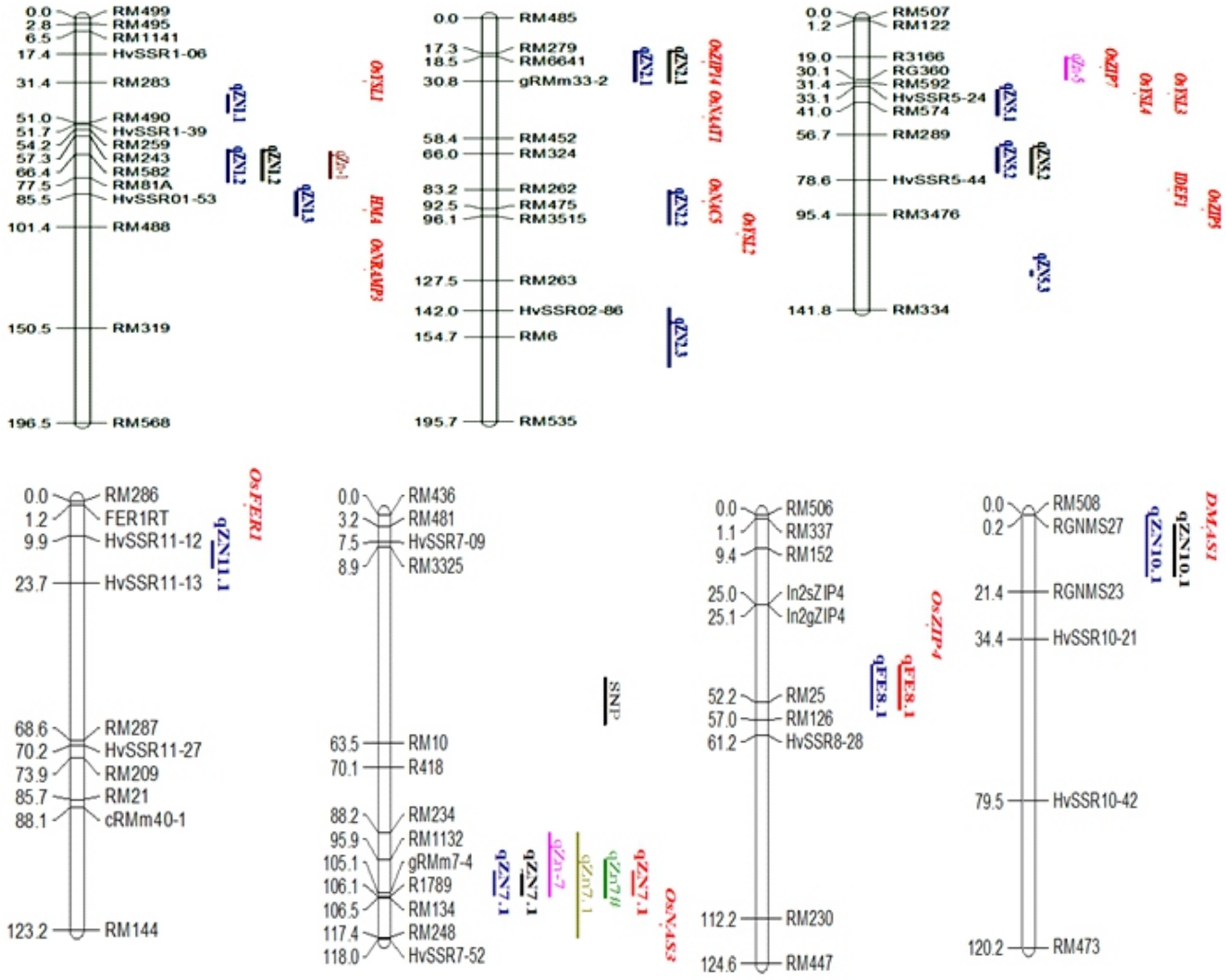
2 entries of IGKV promoted to AVT 2 Biofortification next year

S.N.	Designation	Parentage	50% Flowering (Days)	Grain Zinc (white) (ppm)	Yield (q/ha)	Grain Type
1	R-RHZ-LI-23 (IET 25477)	Lalmati /IR 68144B-18-2-1-1	100	25.5	47.91	MS
MC	Chittimuthyalu	Percent increase over the checks		6.69 % (23.9)	4.2% (45.97)	
MC	Kalanamak	Percent increase over the checks		23.18% (20.7)	3.9% (46.09)	
2	R-RHZ-SM-14 (IET 25475)	Swarna / Moroberekan	90	25.3	51.02	SB
MC	Chittimuthyalu	Percent increase over the checks		5.8% (23.9)	10.9% (45.97)	
MC	Kalanamak	Percent increase over the checks		22.2% (20.7)	10.7% (46.09)	

1 entry of IGKV promoted to AVT 1 Biofortification next year

SN	Designation	Parentage	50% Flowering (Days)	Grain zinc (white, ppm)	Yield (q/ha)	Grain Type
IGKV Raipur						
1	**R-RHZ-MI-81(IET 27170)**	**Moro/ IR94046-31**	**93**	**26.4**	**69.88**	**LB**

Identification of QTLs Zn content in milled rice grains



QTLs identified for AOC Zn content

QTLs identified for average grain Zn content

Candidate genes identified within/nearby QTLs

Lu *et al*.,2008

Swamy *et al*. 2011

Garcia-olievera *et al*., 2009

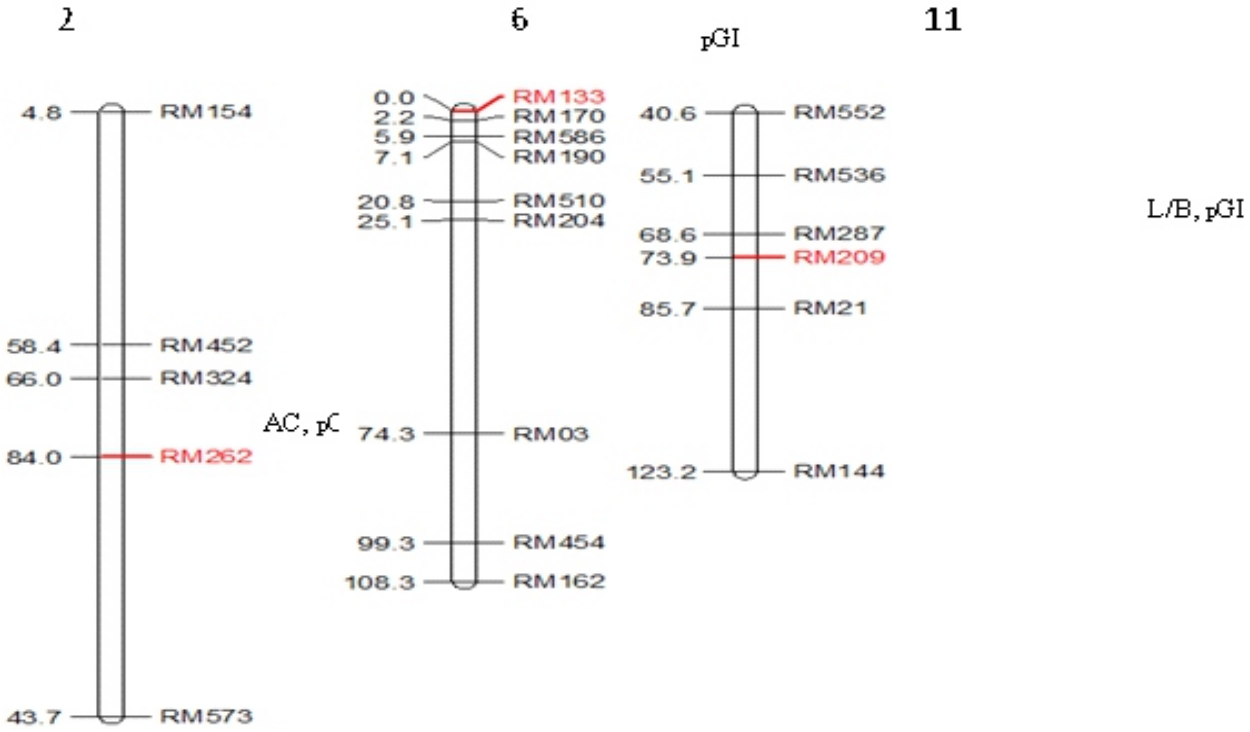
Anuradha *et al*.,2012

Xu *et al*., 2015

- ü 7 new QTLs were identified present in chromosome 1 (qZN1.1), 2 (qZN2.2, qZN2.3), 5 (qZN5.2, qZN5.3), 10 (qFE8.1) and 11 (qZN11.1).
- ü Among all QTLs observed for AOC Zn content, found to be co-localized with the average Zn content, indicating more consistency in the data.

Markers Associated with $_{P}$GI values

Genotyping by Rice Microsatellite markers - Total 125 RM



TASSEL based General Linear Model (GLM) and Mixed linear Model (MLM) methods were applied for association Mapping

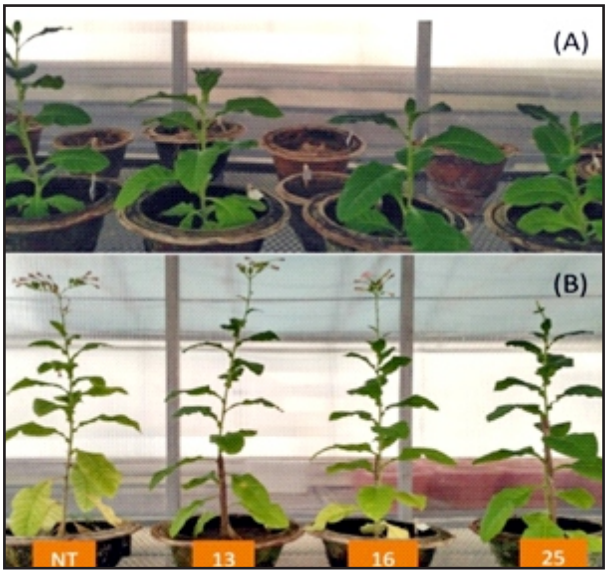
***Associated Markers at p<0.05**

Marker	Earlier Reported For
RM133	Random
RM209	Milling percent, Alkali spreading value, Gel consistency
RM262	Amylose content

GLM Approach					MLM Approach				
SN	Marker	Chr	P*	R^2	SN	Marker	Chr	P*	R^2
1	RM133	6	0.0475	0.146	1	RM133	6	0.0453	0.141
2	RM262	2	0.0471	0.3626	2	RM209	11	0.0468	0.0937
					3	RM262	2	0.0473	0.3617

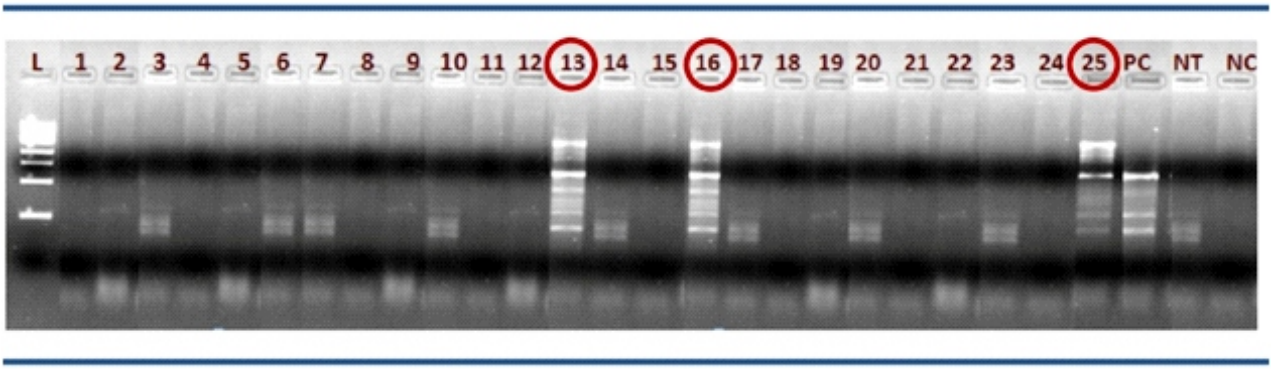
Validation of *EfNAS2* gene isolated from Barnyard millet using transformation

- Plant: Model plant Tobacco (*cv* Petit Havana)
- Construct used: *pCAMBIA 1301- EfNAS2*
- *Method: Agrobacterium* mediated transformation through leaf disc method
- 25 putative transgenics were obtained, 3 plants confirmed to carry the transferred *EfNAS2* gene

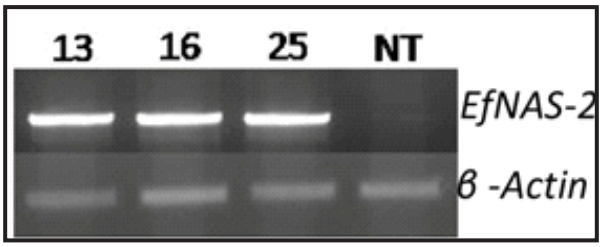


Transgenics carrying *EfNAS2 gene*

PCR screening of tobacco plants showing no. 13, 16 & 25 to be positive for *EfNAS2 gene*



Expression analysis of transgene in 3 positive plants showing constitutive expression of *EfNAS2* gene



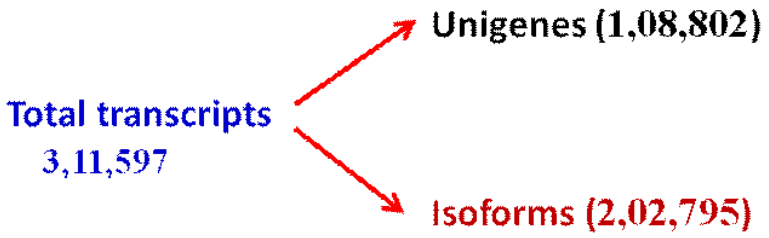
De novo transcriptome sequencing in Little Millet (*Panicum sumatrense*)

a

Objective: To identify novel genes involved in drought tolerance mechanism in Little millet- Highly moisture tress tolerant and iron rich grains

- A total of 3,11,597 assembled transcripts were obtained (Software: Trinity)
- 1,08,802 unigenes obtained (cluster of genes that stem from same transcript locus and perform a particular function)

2,02,795 isoforms (mRNAs that are produced from the same locus but are different in their transcription start sites (TSSs), CDS and potentially altering gene function.)



Panicum sumatrense
Features: Nutr-rich & drought tolerant
Ploidy level: Tetraploid 2n=36
Un-sequenced crop spp.

Novel genes indentified, which needs validation before submitting for patent

Rice flakes derived from Nutri-rich rice CGZR-1 and popular rice variety Mahamaya

Product profiling developed from CGZR-1 and Madhuraj -55

Comparison of Physical properties of rice flakes
(Mahamaya Vs CGZR-1 & Madhuraj)

Parameters	Madhuraj-55		CGZR-1		Mahamaya	
	Thick	Thin	Thick	Thin	Thick	Thin
Sphericity	31.68±2.15	15.50±2.04	28.24	18.01	32.93±2.18	15.68±1.76
Bulk density (gm/ml)	486.40±9.30	47.24±0.35	440.73	43.64	527.10±10.58	54.45±1.10
True density (gm/ml)	1265.43±48.16	1176.90±54.94	1314.25	1077.20	1283.39±50.43	1127.23±40.84
Porosity (%)	61.53±0.96	95.98±0.19	66.41	95.93	58.87±1.95	95.16±0.21
WAI (g/g)	6.68±0.16	6.17±0.14	5.65	5.11	6.68±0.20	5.74±0.25
WSI (%)	6.36±0.34	7.25±0.39	6.57	6.79	5.67±0.16	6.02±1.36
Swelling Power	8.28±0.05	8.57±0.07	6.05	5.63	7.01±0.16	6.11±0.34
Flaking yield (%)	67.72	68.86	67.95	68.82	65.09	68.92

Genetic Improvement of Rice for Rainfed Ecosystem (Dry Direct Seeded - Low Input)

R-Rf- 105 – Short Duration about 110 ± 5 days

MLT 2017	Entry	Grain Yield kg / ha												
		Raipur #4 (rainfed)	Raipur 12 (rainfed)	Raipur 11 (irrigated	Raipur #1 (TSD)	Raipur #2 (TSD)	Raipur (NOP)	Bemetara	Ambikapur	Bilaspur	Kawardha	Raigarh	Jagdalpur	Overall
4	R-RF-105	2540	3420	6451	3105	2895	4360	1964	4513	2167	2317	1932	4302	3331
5	R-RF-127	2268	3528	4856	3149	3521	3570	2458	3407	2500	2850	1891	5425	3285
17	MTU 1010	1328	1913	4488	2618	2432	2086	758	507	2000	1683	2278	3854	2162
18	Danteshwari	1167	2219	3637	1728	2040	850	752	833	2750	1533	2526	4546	2048
19	Sahabhagidhan	1550	2788	5421	2237	2383	1944	793	2690	2833	1867	2564	5567	2720
20	Samleshwari	1852	2034	4725	2091	2533	2042	409	478	2417	1883	2007	7613	2507
21	IBD 1 (94)	1389	1807	3231	2938	2404	2410	664	323	1750	2033	993	4071	2001
22	Arize Xpress	2744	3033	5067	2882	3226	3692	849	1043	3167	2717	2202	5213	2986
23	Arize 6129	2213	2828	6468	2509	2761	4052	1210	1408	3159	1867	1568	3425	2789

MLT Kharif 2016					Rainfed condition (Normal rainfall year)								
S. No.	Entry	Irrigated	TSD1	TSD2	RF	Ambikapur	Bilaspur	Kawardja	Raigarh	Jagdalpur	Average	% imp over MTU 1010	% imp over best hybrid
6	R-RF-105	5109	881	1016	1369	1420	2927	3977	3635	2829	2574	4.81	-
38	Samleshwari	4813	780	818	1198	1185	2433	3537	3555	2158	2275		
41	Sahabhagi dhan	5794	894	977	1442	1180	1333	3403	4683	1975	2409		
42	MTU 1010	5246	756	988	1013	1195	1500	4030	4485	2888	2456		
MLT Kharif 2015					Rainfed condition (Normal rainfall year)								
S. No.	Entry	Irrigated	Irrigated	TSD	RF	RF	RF	Bilaspur	Kawardha	Raigarh	Jagdalpur	Average	% imp over MTU 1010
14	R-RF-105	5715	4981	1462	2326	5080	5075	1133	2692	1533	2765	3276	20.10
26	Sahabhagi dhan	4957	2916	1064	1671	4550	3608	1433	4533	985	3083	2880	
27	MTU 1010	4779	4290	1079	962	3600	3266	1533	4400	1192	2178	2728	
35	Samleshwari	4190	4397	737	1106	4600	3983	1700	2775	88	2116	2569	

- Stable: Consistent performance in 3 years
- Yield potential ~ 6 tons (Irrigated) & ~ 4 tons (Rainfed)
- Tolerate mild water stress, N & P Def

IVT Trial Data – 2014

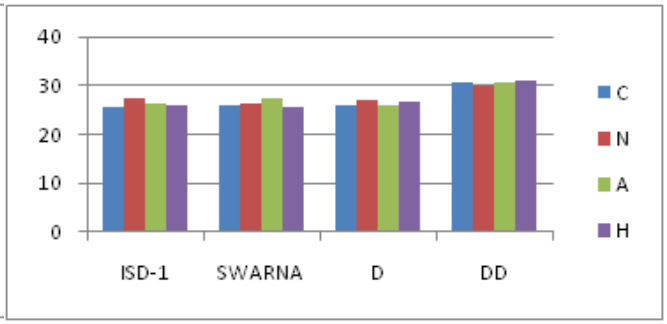
Rank	IET No/ Designation/ Cross combination	GY/ FD/ GT	Yield adv (%) over NC/RC/LC	% increase over best check			
				State		Region	
				Rank/ Yield	% BC	Rank/ Yield	% BC
1	24692 RCPR-16-IR84894-143-CRA-17-1 IR77080-B-34-3/IRRI 132	2673 68 SB	*17.24* 24.27 30.39	JH-6 WB-1	17.55 16.88	R3-5	17.24
2	24679 R 1672-126-1-24-1 R 1027-2282-2-1/Danteswari	2581	*13.20*	JH-3	16.43	R3-2	13.20
3	24690 R-RF 105 Selection from IR 84887-B-153-CRA-25-1 74371-51-1-1/IR 78877-208-B-1-1						
	National Check (NC)						
	Regional Check (RC)						
	Local Check (LC)						

IET 24690 (R-RF-105) showed 8.73, 15.25 and 20.93% higher yield than the national, regional and local checks, respectively.
❖ 1st rank in Jharkhand it showed 22.45% yield gain

Bold italics: Best check & over the best check;NC- National check; RC-Regional check; LC- Local check; GY- Grain yield; FD- Days to 50% flowering; GT-Grain type

Genetic Improvement of Rice for Nitrogen Use Efficiency

- Nitrogen is absorbed as Ammonical (NH_4^+) form in Irrigated conditions or Nitrate NO_3^{2-} form in Aerobic Condition
- Key Nutrient Factor – Growth of Dry Direct Seeded Rice in Rainfed
- Adaptation or capability for both forms of Nitrogen to improve Nitrogen Use Efficiency in adverse conditions (Water Stress, Uneven Rainfall etc.)



Expression of nitrate transporter (NRT2.3) gene in Contrasting genotypes in Root and Shoot Tissue

Expression of "Nitrate Reductase Transporter" gene (NRT2.3 b-1) for NO_3^{2-} transport corelated with "drought tolerant line" Dagaddeshi – Consistent with its Better Performance for Nitrogen Use

PMBB 10 – Evaluation and Identification of Phosphorus efficient rice genotypes

- ❖ Significant Difference between P Depleted and Supplies Sits – Precise Screening Facility
- ❖ Genotypes Screened in last 3 years
  - – Direct Seeded & Transplanted
  - – Reduction in Grain Yield /sq m
  - – Tissue P Content
  - – P Utilization Efficiency
  - – Yield Evaluation in 10 sqm plot size
- ❖ P at 15cm depth: 7.5 Kg/Ha
- ❖ P at 30 cm depth: 5.8 Kg/Ha

P Deficient field

P supplemented field

Donors Identified

- R-Rf-78,
- G38,
- Shenong
- G – 169,

Identified Genotypes with Higher Yield with Lesser Yield Penalty Under P deficiency Stress

ABLs Developed

- SXR111,
- SXR 117,
- SXR 84,
- SXR 9
- R-Rf-105

Study of Rice Response under Long Term and Short Term P deficiency Stress in Hydroponics: Evaluate P uptake and P utilization Efficiency

Hydroponics Culture

- Long Term P deficiency: Inherent Low P in soil
- Temporary/ Intermittent Low P : Factors – pH, other nutrient or metal, Less Fertilizer, type of fertilizer etc.
- Long Term – plant Grown in 1/10th of P since germination
- Short Term – Plant transferred to low P 30 Days after germination
- Root Traits and Gene Expression – Different in Both the Conditions

SHOOT	**P concentration(mg/g)**			**P uptake Efficiency**			**P utilization Efficiency**		
GENOTYPE	P+	ST P-	LT P -	P+	ST P-	LT P -	P+	ST P-	LT P -
SWARNA	3.88	2.54	2.54	22.92	8.62	17.03	1.52	1.34	2.64
MTU 1010	2.67	2.56	1.96	16.28	13.77	12.54	2.29	2.09	3.27
R RF- 78	2.79	2.71	1.77	9.99	23.16	12.86	1.28	3.15	4.10
SAHBHAGI	3.15	-	3.03	17.87	-	15.25	1.80	-	1.67
SHENONG	3.26	1.94	1.60	31.92	18.18	15.35	3.01	4.85	5.99
SXR- 77	3.47	2.28	1.66	28.85	18.33	17.30	2.39	3.52	6.27
G-38	2.64	2.01	1.61	15.57	11.71	12.18	2.24	2.90	4.72
SXR-9	3.27	2.21	1.87	25.10	17.30	17.08	2.35	3.55	4.91
Average	3.14	2.03	2.00	21.06	13.88	14.95	2.11	2.98	3.88
ROOT	**P concentration(mg/g)**			**P uptake Efficiency**			**P utilization Efficiency**		
GENOTYPE	P+	ST P-	LT P -	P+	ST P-	LT P -	P+	ST P-	LT P -
SWARNA	3.5	3.1	2.5	6.92	6.34	5.29	0.58	0.65	0.86
MTU 1010	3.2	2.6	2.1	4.42	4.25	5.49	0.42	0.61	1.21
R RF- 78	5.8	3.1	2.1	12.07	7.68	3.69	0.36	0.79	0.82
SAHBHAGI	4.4	-	2.2	4.66	-	4.05	0.24	-	0.84
SHENONG	3.0	2.4	2.1	7.63	6.66	5.79	0.85	1.19	1.35
SXR- 77	4.7	3.1	2.2	8.49	7.97	5.78	0.38	0.85	1.15
G-38	4.2	2.4	1.7	7.58	3.52	4.79	0.43	0.63	1.75
SXR-9	3.3	2.5	2.2	6.18	6.59	5.08	0.55	1.07	1.05
Average	4.0	2.4	2.1	7.24	5.38	4.99	0.45	0.93	0.22

P content = mg of P/g dry matter of Plant

P Content X Dry Matter Produced = Uptake Efficiency

Dry Matter Per unit of P (mg/g) = Utilization Efficiency

Genotypes Characterized for PUpE & PutE

- Swarna: High P content in Shoot & Root; BUT LOW P uptake or Utilization Eff in Both Long & Short Term Def.

- Shenong: High P Uptake and Utilization Eff in Both Long & Short Term Def.
- R-Rf-78: Moderate P Content; High uptake and Utilization in Short Term Def.
- SXR 77 : Better Utilization in Both Long & Short term Def
- SXR 9 & G 38 : Better P utilization Eff in long term Def.

PMBB 11 : miRNA profiling to Understand Gene Regulation Under Stress in Rice to identify Genomics Assisted Breeding Targets

RT-PCR based miRNA Profiling in QUANTSTUDIO ABI

Amplification Plot

Differential miRNA Expression in Contrasting Genotypes

Six Genotypes

1. R-RF-78: High P Uptake and Utilization
2. MTU-1010: Check, Moderate P uptake
3. Ramjiyawan: PUP1 Haplotype, Good Root
4. Shenong: High P Uptake and Utilization
5. Kalokuchi: PUP1 haplotype, Root System
6. Swarna: Popular Rice genotypes (Check)

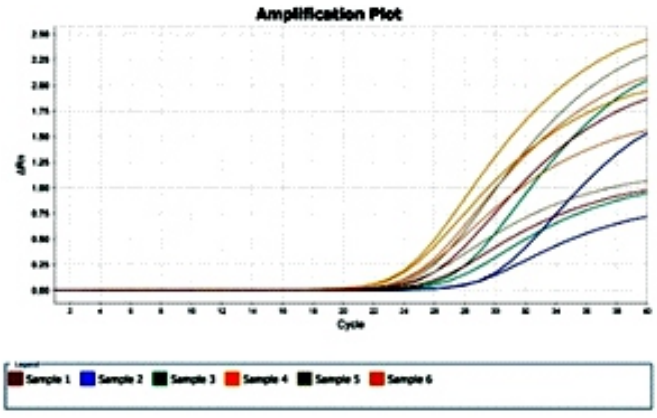
miR169a – regulated in drought

7. miR395a – Drought Stress
8. miR395b – Drought Stress
9. miR399a Phosphate Deficiency
10. miR399b - Phosphate Deficiency
11. miR827– Cadmium Stress Tolerance (Iron Toxicity)
12. miR-7113-5p – Based on P transporter Gene

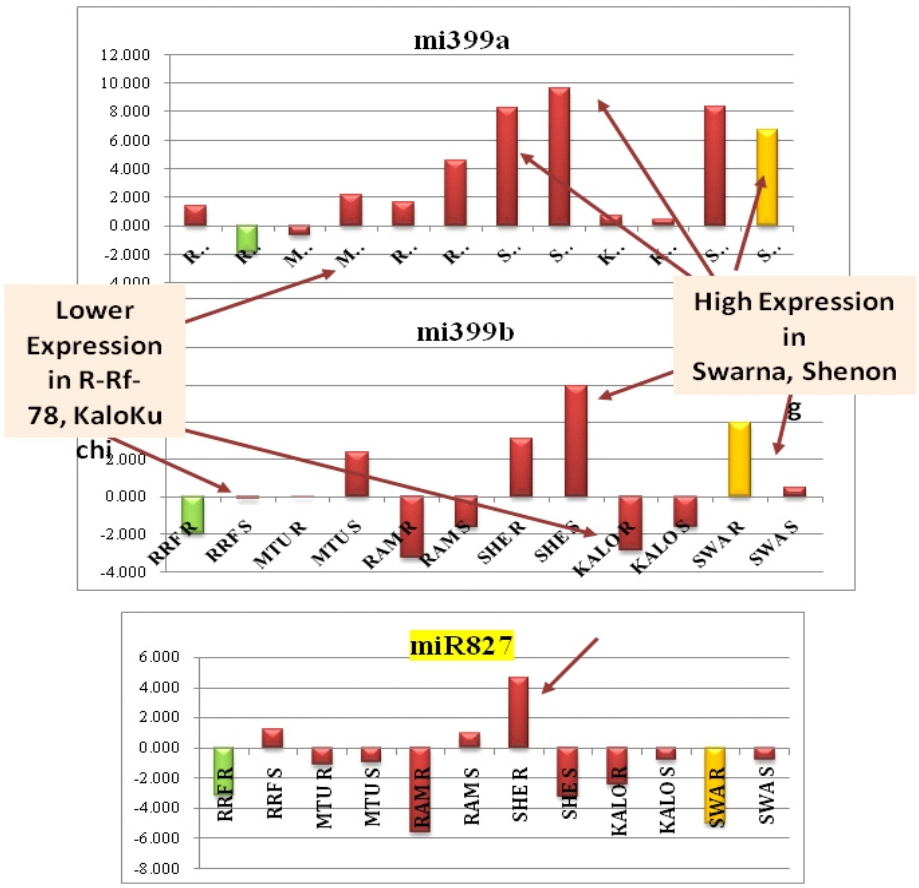
miRNA	**Correlation with Trait Under P stress**
miR399 a	Root Volume & Surface
miR399 b	High P content in tissue
miR 827	Tolerance to Iron (Metal Toxicity)

RT-PCR based miRNA Profiling in QUANTSTUDIO ABI

Amplification Plot



Differential miRNA Expression in Contrasting Genotypes



Promising Genotypes Identified (As Donors) and Developed (for MLT) based on Genomics Approaches (Field, PUE, Gene and miRNA expression)

High PutE & Yield
R- RF- 105
SXR 114
SXR 119
SxR-9
SXR 77
SXR 111
SX R 81

High PUtE (Donors)
RRF-78
G-38
Shenong
Sah. Dhan
Ramjiywan
Swarna
MTU 1010

Further

- ❖ Evaluation of Promising lines in Direct Seeded and Transplanted conditions
  - Evaluation of selected ABLs & population (SDX R-Rf-78)
  - Assessment of Yield and PUtE
- ❖ Identification of potential genes/markers for Phosphorus use Efficiency in ***Indica*** **rice**
  - Transcriptome Analysis (Sequencing, RT PCR)
  - Validation of Gens with leads

- Allele Mining for PUtE

❖ Identification of DNA markers for MAS in *Indica* background

❖ Attempt New crosses with Distinctly performing genotypes

- With Shenong, Swarna and ABLs identified

❖ Budget : 6.0 Lakhs (PMBB 10)

❖ PMBB 11 – concluded with leads to be used in PMBB 10

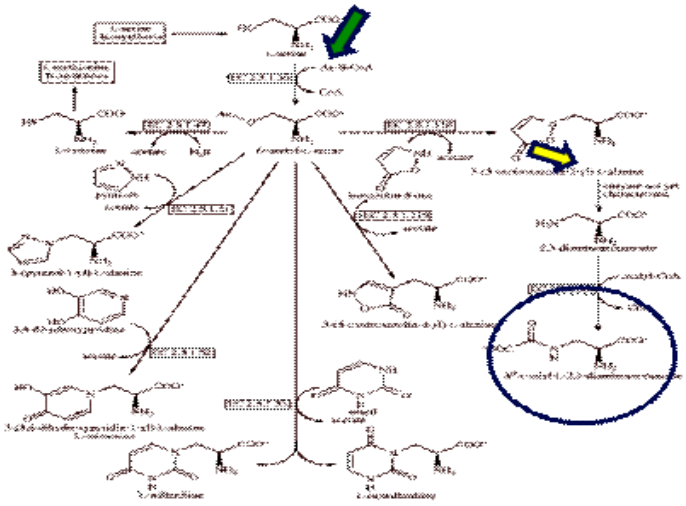
PMBB 13: Identification and Characterization of ODAP Biosynthesis related genes

- *De-novo* transcriptome sequencing of Lathyrus Leaf in RLK1950 (HIGH ODAP) & Mahateora (LOW)
- No Genomic/ Gene information available in Lathyrus
- FIRST REPORT ON LATHYRUS TRANSCRIPTOME FOR ODAP
- High Quality Sequences Obtained showing ~ 28,5000 genes expressing gin Lathyrus leaf tissue
- 3967 Transcripts were MAPPED with known Gene/ Protein Database in Pea, Medicago and Arabidopsis
- Transcripts classified based on Protein Domain Acetyl/ Oxalyl synthetase or amino-transferase activity
- Out of 3967 - Putative Genes (195) Selected based on Protein Domain Study

RLK1950 (HIGH ODAP)	No of sequences
Reads mapped in pairs	16,205,062
Reads mapped in broken pairs	5,740,956
Reads not mapped	17,219,294
Total	39,165,312

Mahateora (Low ODAP)	No of sequences
Reads mapped in pairs	16,893,882
Reads mapped in broken pairs	5,515,964
Reads not mapped	17,658,680
Total	40,068,526

Target for Gene Discovery – Silencing in *ODAP Biosynthesis Pathway*

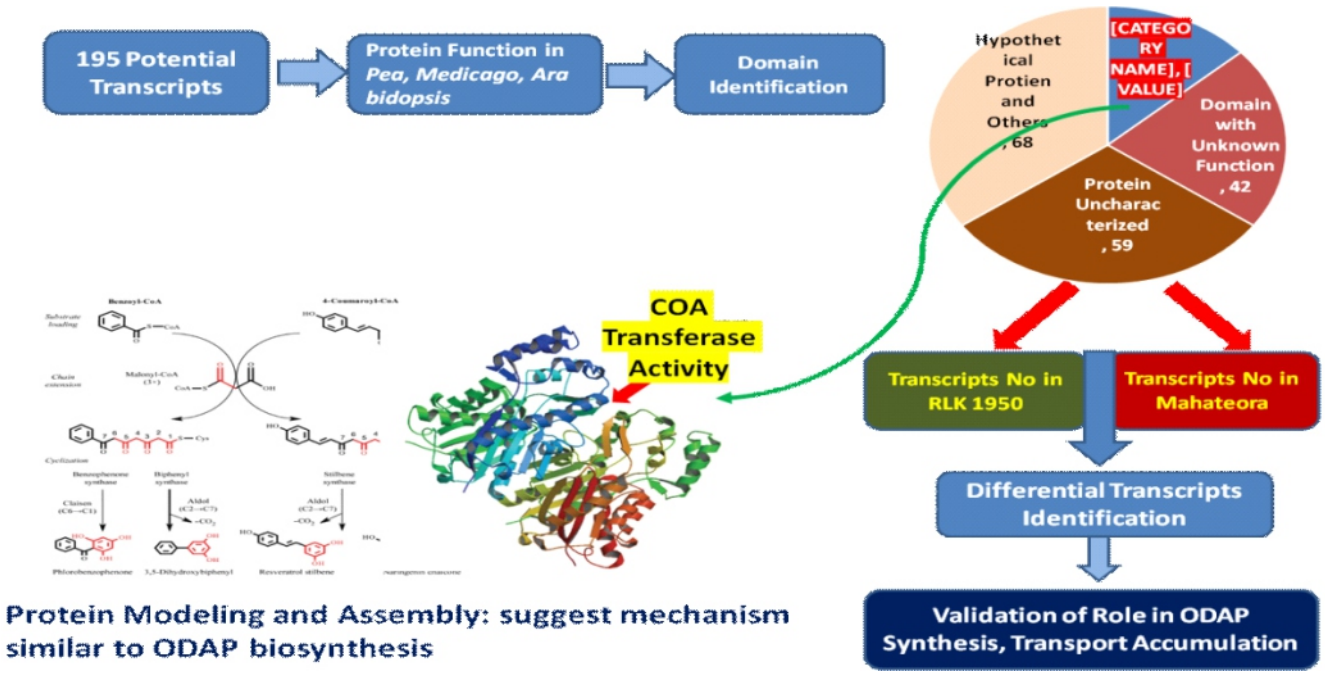


Raw Results obtained from Transcriptome Sequencing

EC 2.3.1.58 2,3-diaminopropionate *N*-oxalyl transferase

EC 2.5.1.118 β-(isoxazolin-5-on-2-yl)-L-alanine synthase

Homologous Sequence Analysis & Protein Modeling for 'putative gene" Identification – Gene Discovery



Genetic Improvement of Rice for Biotic Stresses
(GM, BLB, Blast)
Genotypes with multiple resistance

BC2F1			BLB	BLAST	GM
1	SRSPS	**559**	xa5 + Xa21	Pi1	GM 4
2	SRSPS	**1564**	xa5 + Xa21	Pi1	GM 4
3	SRSPS	**1628**	xa5 + Xa21	Pi1	GM 4
4	SRSPS	**1652**	xa5 + Xa21	Pi1	GM 4
5	SRSPS	**1669**	xa5 + Xa21	Pi1	GM 4
6	SRSPS	**1694**	Xa21	Pi1 + Pi2	GM 4
7	SRSPS	**1698**	Xa21	Pi1 + Pi2	GM 4
8	SRSPS	**1895**	Xa21	Pi1 + Pi2	GM 4
9	SRSPS	**1970**	Xa21	Pi1 + Pi2	GM 4
10	DRDPDA	**2140**	Xa21	Pi1	GM4 + GM8
11	DRDPDA	**2160**	Xa21	Pi1	GM4 + GM8
12	DRDPDA	**2212**	Xa21	Pi1	GM8
13	DRDPDA	**2236**	Xa21	Pi1	GM8