Department of Genetics and Plant Breeding

53. **Name of the Department** : Genetics and Plant Breeding

54. **Year of establishment** : 1969

55. **Is the Department part of a School/Faculty of the university?** Yes, Faculty of Agricultue

56. **Names of Programmes / Courses offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., etc.)**

    a. M.Sc.(Ag.)

    b. M.Sc. in Plant Biotechnology (Special Course)

    c. Ph.D. in Genetics and Plant Breeding

57. **Interdisciplinary courses and departments involved** :

    The Department is partly involved in B.Sc.(Ag.) Experiential Learning Courses (a) Seed Technology, (b) Tissue Culture (c) Microbial Technology

58. **Courses in collaboration with other universities, industries, foreign institutions, etc.** : NIL

59. **Details of programmes / courses discontinued, if any, with reasons** : NA

60. **Annual/ Semester/Choice Based Credit System** : Semester (Core and choice based credit system)

61. **Participation of the department in the courses offered by other departments** : A few teachers are involved in imparting teaching of non-credit courses at M.Sc.(Ag.)/Ph.D. level for all Departments of the Institute.

62. **Number of teaching posts sanctioned and filled (Professors/Associate Professors/Asst. Professors)**

	Sanctioned	Filled
Professor	3	2
Associate Professors	10	6
Asst. Professors	15	14

63. Faculty profile with name, qualification, designation and specialisation (D.Sc./D.Litt./ Ph.D./M.Phil., etc.)

Name	Qualification	Designation	Specialization	No. of Years of Experience	No. of Ph.D. students guided for the last 4 years
Dr. J.P. Lal	Ph.D.	Professor	Plant Breeding : Abiotic Stresses	37	02 (+ 5)
Dr. R.P. Singh	Ph. D	Professor	Plant Tissue Culture and Rice Breeding	33	02 (+02)
Dr. V. Vaishampayan	DSC & Ph. D.	Professor	Microbial Genetics and Biological Nitrogen Fixation	38	04 (+01)
Dr. R.K. Singh	Ph.D.	Professor	Microbial Genetics and Biological Nitrogen Fixation	35	01 (+02)
Dr. C.P. Srivastava	Ph. D	Professor	Plant Breeding : Pea and French bean	33	01
Dr. M.N. Singh	Ph.D.	Professor	Cytogenetics and Plant Breeding : Pigeonpea and mungbean	33	02
Dr. A.K. Joshi	Ph. D	Professor	Genetics and Plant Breeding : Wheat	31	01
Dr. S.K. Singh	Ph.D	Professor	Plant Breeding : Rice and Oilseed Crops	22	01 (+05)
Dr. Rajesh Singh	Ph. D	Professor	Molecular Breeding, Genetics and Plant Breeding: Maize	20	0 (+05)
Dr. V. K. Mishra	Ph. D	Professor	Genetics and Plant Breeding : Barley	27	0 (+05)
Dr. R.K. Agrawal	Ph. D	Professor	Genetics and Plant Breeding	34	0 (+02)
Dr. H.K. Jaiswal	Ph.D.	Professor	Plant Breeding: Pulses and Rice	30	0 (+02)
Dr. J.P. Shahi	Ph. D	Professor	Plant Breeding: Maize, Abiotic stresses	26	03
Dr. S.P. Singh	Ph.D.	Professor	Mutation and Plant Breeding: Lentil	32	03
Dr. B. Sinha	Ph.D.	Professor	Genetic and Bio-chemical basis of host-pathogen interaction	28	02
Dr. L.C. Prasad	Ph. D	Professor	Plant Breeding : Barley and Wheat	28	01
Dr. R. Nandan	Ph.D.	Professor	Plant Breeding	33	02
Dr. K. Srivastava	Ph.D.	Associate Professor	Plant Breeding : Vegetables	12	01 (+06)
Dr. P.K. Singh	Ph. D	Associate Professor	Plant Breeding : Maize	15	02
Dr. B. Arun	Ph.D	Assistant Professor	Genetics and Plant Breeding : Wheat Biotechnology	22	0 (+04)
Dr. Anshuman Singh	Ph. D	Assistant Professor		01	-
Dr. Ravindra Kumar	Ph. D	Assistant Professor	Genetics & Plant Breeding Plant Bio-Technology	09	-
Prof. Ram Dhari	Ph. D	Re-employed Professor	Genetics & Plant Breeding (Wheat Breeding)	37	02

(The number shown in () represent the Ph.D. student under supervision.)

64. List of senior Visiting Fellows, faculty, adjunct faculty, emeritus professors

a. Prof. R.M. Singh – Emeritus Professor from 02.08.2006 to 31.07.2012

b.

65. **Percentage of classes taken by temporary faculty – programme-wise information** : 60% by Contractual Assistant Professor (Contractual at RGSC Special Course in Plant Bio-Technology)

66. Programme-wise Student Teacher Ratio

a. M.Sc.(Ag.) - 1:1
b. Ph.D. - 3:1
c. M.Sc.(PBT) - 6:1

67. Number of academic support staff (technical) and administrative staff: sanctioned and filled

S.No.	Staff position	Sanctioned	Filled-up
1.	Supporting staff	30	18
2	Administrative staff (Clerical)	6	5

68. Research thrust areas recognized by funding agencies :

I. Plant Breeding

a. Conventional Breeding:
   i. Varietal development in wheat, barley, rice, maize, pulses and oilseeds through All India Coordinated Research Projects (A.I.C.R.P.s) of Indian Council of Agricultural Research (ICAR).
   ii. Breeding for biotic and abiotic stresses : Genetics of terminal heat stress in wheat and lentil.
b. Mutation breeding through physical and chemical mutagenesis:
c. Molecular breeding :
   i. Established genetic diversity in the germplasm and pathogen isolates
   ii. Finding molecular markers of traits in major crops
d. Farmers' participatory research: Popularization of developed varieties.

II. Biometrical Genetics:

a. Estimation of heterosis and combining ability in important crops
b. Use of biometrical tools for determining biological significance and reproducibility of economically important traits.

III. Microbial Genetic and Tissue Culture:

a. Biodiversity studies of the N_2-fixing organisms
b. Genetics of nitrogen fixation and its regulation in rhizobia and cyanobacteria
c. Genetic analysis of Rhizobiophages and their use
d. Mutagenesis of *Azolla-Anabaena* symbiotic N_2-fixing complex and free living heterotrophic diazotrophs
e. Molecular identification of Plant Growth Promoting Rhizobacteria (PGPR)
f. Application of tissue culture techniques for crop improvement

IV. Cytogenetics :

a. Autotetraploids and interchanges - Development in pea, rapeseed, safflower and pearl millet
b. Crop Improvement through chromosome engineering
c. Application of chromosome banding technique for gene identification.

17. Number of faculty with ongoing projects from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies and grants received project-wise.

A) Plan Projects :

S.No.	Name of the Project	No. of Faculty	Funding agency	Grant received during 11th Plan (Rs.in Lakh)
1.	AICRP on Wheat & Barley Improvement	Prof. Ram Dhari (Retd.on 31-10-2012) for Wheat & Prof. Lal Chand Prasad for Barley from GPB	ICAR, New Delhi	268.62922
2.	AICRP on Rice Improvement	Prof. R.P. Singh, Prof. H.K. Jaiswal from GPB	- do -	140.57000
3.	AICRP on Maize Improvement	Prof. J.P. Shahi from GPB	- do -	116.55000
4.	AICRP on Oilseed (Rapeseed & Mustard) Improvement	Prof. H. Kumar (Retd.on 30-6-2012) from GPB	- do -	60.64000
5.	AICRP on Pigeon pea	Prof. R.K. Singh, Prof. M.N. Singh from GPB	- do -	270.70000
6.	AICRP on MULLaRP	Prof. C.P. Srivastava from GPB	- do -	156.21000
7.	AIC National Seed Project for Breeder Seed Production	Prof. A.K. Joshi (on lien) & Prof. S.P. singh from GPB	- do -	104.00000
			Grand Total	**1117.29922**

B) Ad-hoc Projects :

Name of the teacher	Title of the project	Funding Agency	Amount (Rs. in lakh)	Duration
Prof. Ram Dhari	(i) Multilocation Evaluation of Germplasm of Major Crops	NBPGR	14.00	April, 2004 till date
- do -	(ii) I.G.P. Project : Initial establishment of a farmer based experimentation network in Indo Gangetic plains	DWR/ICAR	2.06	2010-11 contd.
Prof. Ram Dhari (PI) Prof. V.K. Misra (Co-PI) Dr. B. Arun (Co-PI)	(iii) Cereal System Initiative for South Asia (CSISA) Objecitve-4 (Wheat Breeding)	CIMMYT, Mexico	20.77	2009 - 2012
Prof. Ram Dhari (PI) Dr. B. Arun (Co-PI)	(iv) Thermal Tolerance in Wheat : Phenotyping for adaptive mechanisms to facilitate MAS based Wheat Breeding	DWR/ICAR	9.99	2009 - 2012
Prof. Ram Dhari (PI) Dr. B. Arun (Co-PI)	(v) Identification & Development of Thermotolerant Wheat Varieties for Different Agroclimatic Zones of U.P.	UPCAR	22.54	2009 - 2012
Prof. Ram Dhari (PI) Prof. M.N. Singh (Co-PI) Dr. B. Arun (Co-PI)	(vi) NICHE area of Excellence "Molecular breeding for improvement of major crops of eastern Indo Gangetic Plains	ICAR	293.00	2009 - 2012
Prof. J.P. Lal (PI)	(i) AICRP on Linseed - Testing centre & FLD	ICAR	1.14958	2008-2011
- do -	(ii) AICRP on Safflower - Testing centre	ICAR	0.30	2008-2010
- do -	(iii) District Contingency Plan	ICAR	1.00	2010-11
Prof. J.P. Lal (PI) Prof. R.P. Singh (Co-PI) Prof. H. Kumar (Co-PI)	(iv) Ad-hoc Project on Linseed	ICAR	4.52	2010-2012
Prof. J.P. Lal (Co-PI)	(v) NICRA	ICAR	-	2010 - 11 Contd.
Prof. R.P. Singh	Strengthening of tissue culture lab for micro propagation of Banana	NHM - UPCAR	8.00	2010-11
Prof. A. Vaishampayan (Co-PI)	Phage and molecular tagging of indigenous soybean rhizobia to select prominent effective	DBT	30.36	Nov., 2007 - March, 2011

Prof B. Dhar (PI)	strains useful in national breeding programme for enhancing BNF based soybean production			
Prof. R.K. Singh	Role of ACC dominance in plant growth promotion of rice (*Oryza sativa* L.) by endophytic rhizobia	CSIR	15.63	1.7.2010 to 30.6.2013
Prof. R.K. Singh (PI) Prof. A. Vaishampayan (Co-PI)	Mechanism of plant growth promotion and ecology of endophytic rhizobia in rice (*Oryza sativa* L.)	DST	23.50	1.9.2009 to 31.8.2012
Prof. M.N. Singh (PI)	Selection and utilization of waterlogging tolerant cultivars in pigeonpea	DAC (NFSM Cell)	68.53	2011-2017
- do -	Pigeonpea Genomics Initiative (PGI) under Indo-US Agriculture Knowledge Initiative (AKI)	ICAR-Indo-US	44.62	2006-2011
- do -	FLD on Pigeopea	ICAR	0.60	2011-12
- do -	Germplassm evaluation of Chickpea/pigeonpea	ICAR	0.45	2011-12
Prof. M.N. Singh (Co-PI) Prof. R.M. Singh (PI)	Development of drought tolerant cultivars of Pigeonpea	UPCAR	14.57	Aug., 2008-2013
Prof. A.K. Joshi	(i) Bio-fortified wheat for improved human nutrition	IFPRI (USA) & CIMMYT, Mexico	15.0	Nov., 2005 Oct., 2008
- do -	(ii) Development of near immune lines for spot blotch disease of wheat using conventional and molecular approaches	CSIR	13.46	Oct., 2006 Sept., 2009
Prof. Rajesh Singh (P-I)	Hybrid Seed Production of rice and Maize through farmers Participatory Approaches in eastern U.P.	DAC, Ministry of Agriculture Govt. of India	200.00	2007-12
-do-	Tribal Sub Project	ICAR.	3.50	2011-12
Prof. V.K. Misra (PI) Prof. Ram Dhari (Co-PI) Prof. A.K. Joshi (Co-PI) Dr. B. Arun (Co-PI)	Mobilizing QTL Genes for Quality Traits into high yielding wheat varieties through maker assisted selection	DBT, New Delhi	20.10	2011-14
Prof. V.K. Misra (PI)	Enrichment of farmers of Varanasi and Mirzapur regions through procurement and distribution of certified seeds of important Rabi and Kharif crop varieties under seed village programme	DAC, Ministry of Agriculture, Govt. of India	221.18191	2011-2013
Prof. J.P. Shahi (PI)	(vii) BMZ Project	CIMMYT	0.32	2008-09
Prof. J.P. Shahi (PI)	(i) Evaluation of Newly Developed Maize Hybrids	Monsanto India Limited	3.96	2009-2011
Prof. J.P. Shahi (PI) Prof. K. Srivastave (Co-PI)	(ii) Biosafety research trial level-I on transgenic corn	Syngenta Seeds	34.462	Kharif, 2010-11
Prof. J.P. Shahi (PI)	(iii) Need base stregthening of the Maize Research Lab	ICAR	3.50	2010-11
Prof. J.P. Shahi (PI)	(iv) Evaluation of Newly Developed Maize Hybrids yield data	Nuziveedu Seeds Pvt. Ltd.	1.50	2011-12
Prof. J.P. Shahi (PI)	(vi) Front Line Demonstration on Maize	ICAR	13.017	2002-11
Prof. J.P. Shahi (PI)	Tribal Sub Project	ICAR	3.00	2011-12
Prof. S.P. Singh (PI)	Hybrid and varietal Testing of crops.	Founded by private Seed Companies	30.00	
Prof. S.P. Singh (Co-PI) Prof. Jagdamba Singh	(ii) Establishment of National Rice Resource Database	DBT, New Delhi	50.0	Aug. 20, 2009 - Aug. 19, 2014

(PI)				
Dr. K. Srivastava (PI)	Genetic Improvement of Tomato for high temperature stress	UGC	9.47913	2010 - 2013
Dr. P.K. Singh (PI)	(i) Stress tolerance rice for poor farmers of South Africa and Asia phase-I	BMGF – Strasa IRRI	2.72	2009 2011
- do -	(ii) Stress tolerance rice for poor farmers of South Africa and Asia phase-II	BMGF - Strasa IRRI	3.12	2010 2014
- do -	(iii) Quality Seed Management through participatory Seed Production	RKVY, Govt. of U.P.	130.00	2010-2011
- do -	(v) Green revolution in Eastern U.P	UP Gov.	0.72	2011-12
- do -	(vi) Establishment of seed processing infrastructure facilites for vegetable crops	UPCAR, U.P.	11.53	2010-11
- do -	(vii) Enrichment of farmers of Varanasi region through procurement and distribution of certified seeds of important rabi and kharif crop varieties under seed village programmew	Ministry of Agric., GOI	1.20	2009-10
- do -	Cluster Demonstration of Stress Tolerant Rice Varieties under NFSM rice 2012-13	NFSM-IRRI	20.00	2012-13
Dr. P.K. Singh (PI) Dr. Jagadamba Singh (Co-PI)	(ii) From QTL to Variety : Marker Assisted Breeding of Abiotic Stress Tolerance Rice Varieties with Major QTLS for Drought, Submergence and Salt Tolerance	IRRI – DBT India	89.35	2010- 2014
Dr. P.K. Singh (CO-PI) Prof. Jagdamba Singh (PI)	(i) Development of medium duration Hybrid rice for major rice growing agro-ecological situations of U.P.	UPCAR; Lucknow	70.803	July 22, 2008 July 21, 2013
Dr. B. Arun (PI)	Bio-fortified Wheat for Improved Human Nutrition	Harvest Plus. CIMMYT, Mexico	45.00	2008-13
Dr. B. Arun (PI) Prof. Ram Dhari (Co-PI) Prof. V.K. Misra (Co-PI)	Mobilizing QTL/Genes for Quality Traits into high yielding wheat varieties through maker assisted selection	DBT, N. Delhi	72.34	2008-12
		Grand Total	**1644.85262**	

18. Inter-institutional collaborative projects and grants received

b) International

Name of the teacher	Title of the project	Funding Agency	Amount (Rs. in lakh)	Duration
Prof. Ram Dhari (PI) Dr. B. Arun (Co-PI)	(vii)Cereal System Initiative for South Asia (CSISA) Objecitve-4 (Wheat Breeding)	CIMMYT, Mexico	20.77	2009 2012
Prof. A.K. Joshi	(i) Bio-fortified wheat for improved human nutrition	IFPRI (USA) & CIMMYT, Mexico	15.0	Nov., 2005 Oct., 2008
Dr. P.K. Singh (PI)	(i) Stress tolerance rice for poor farmers of South Africa and Asia phase-I	BMGF – Strasa IRRI	2.72	2009 2011
Prof. J.P. Shahi (PI)	(vii) BMZ Project	CIMMYT	0.32	2008-09
- do -	(ii) Stress tolerance rice for poor farmers of South Africa and Asia phase-II	BMGF- Strasa IRRI	3.12	2010 2014
Dr. P.K. Singh (PI) Dr. Jagadamba Singh (Co-PI)	(iv) From QTL to Variety : Marker Assisted Breeding of Abiotic Stress Tolerance Rice Varieties with Major QTLS for Drought, Submergence and Salt Tolerance	IRRI – DBT India	89.35	2010- 2014
Dr. P.K. Singh	Cluster Demonstration of Stress Tolerant Rice Varieties under NFSM rice 2012-13	NFSM-IRRI	20.00	2012-13
Dr. B. Arun (PI)	Bio-fortified Wheat for Improved Human Nutrition	Harvest Plus. CIMMYT,	45.00	2008-13

		Mexico		
	Sub Total	**8**	**196.28**	

c) All India collaboration

Name of the teacher	Title of the project	Funding Agency	Amount (Rs. in lakh)	Duration
Prof. M.N. Singh (PI)	Pigeonpea Genomics Initiative (PGI) under Indo-US Agriculture Knowledge Initiative (AKI)	ICAR-Indo-US	44.62	2006-2011

19. Departmental projects funded by ICAR, DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, etc.; total grants received.

Agency	No. of Project	Total fund received(Rs.in lakh)
ICAR	14	350.08658
CSIR	02	29.09
UGC	01	9.47913
DBT	03	172.8
DST	01	23.5
UPCAR	07	128.163
RKVI	01	130.00
DAC, Ministry of Agril. , Govt. of India	04	490.91191
Private Seed Companies	04	69.922
Sub Total	**37**	**1403.95262**

20. Research facility / centre with

- **State recognition** : Our Varieties of cereals, pulses and oilseeds have been duly recognized through out the states
- **National recognition** : Conventional & Molecular Breeding facilties available in the Department have been recognized at the national level which has resulted a centre for NICHE Area of Excellence Programme. Our Varieties of cereals, pulses and oilseeds have been duly recognized in NEPZ, SZ (HUW-318 of wheat, HUM1 of mungbean), PZ (HUW-510 of wheat, HUDP15 of pea), CZ (MA3 of Pigeonpea & HUM1 of Mungbean, HUR203 of Rajmash)
- **International recognition** : Our research papers are published globally in high impact factor journals.

Facilities, commensurate with our aforesaid recognition have been extended by various agencies.

21. Special research laboratories sponsored by / created by industry or corporate bodies

: - Nil

22. Publications:

* **Number of papers published in peer reviewed journals (national / international)** - 158
* **Monographs** : Nil
* **Chapters in Books** : 26
* **Edited Books** : 01 (RK Singh, **Rajesh Singh**, Guoyou Ye, A Selvi, and RP Rao (2010) Molecular Plant Breeding: Principle, Method & Applications, Studium Press, Houston, USA)
* **Books with ISBN with details of publishers** : 01 (Padap Prajanan Siddhant Aivam Vyaivaharik Prayog (2009) – Published by Anjani Kumar Misra, Visdom Book, Shop No.12, Gyan Mandal Plaza,

Maidagin, Varanasi - 221001

* **Number listed in International Database (For *e.g.* Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)** : Our research papers with high impact factors are listed in the Internatinal Databook o fhte web of science.
* **Citation Index – range / average** :
* **SNIP**
* **SJR**
* **Impact Factor – range / average** : NAAS rating between 2.1 to 7.9
* **h-index** : 0.2 onwards

23. Details of patents and income generated : More than Rs. 102.0 lakh through seed sale

24. Areas of consultancy and income generated : NIL

25. Faculty selected nationally/ internationally to visit other laboratories in India and abroad :

1. Prof. A. Vaishampayan – Visited 15 US Univ. during July-August, 2012 under USAID-AIP Programme.

2. Prof. Rajesh Singh & Prof. S.P. Singh –Visited USA under USAID-AIP programme (Cornell Univ., Tuskegee Univ., Georgea Univ. and Auburn University) USA dated 5th August to 4th October, 2012.

3. Dr. K. Srivastava-

1. Visited Medagascar, Nigeria and South Africa in 2008 on the invitation of AVRDC Tanzania.

2. Visited Velencia, Spain to attend XIVth EUCARPIA Meeting on Genetics & Breeding of Capsicum & Eggplant 30th Aug.-1st Sep., 2010.

4. Dr. P.K. Singh- (i) Rice Breeding Course: Laying the foundation for the Second Green Revolution at IRRI Manila, Philippines, IRRI, Philippines, 21 days, 24th August to 9th Sept., 2009, IRRI, Philippines.
(ii) Quality Rice Seed Production training-cum-worksop, BRRI, Bangladesh, 8 days, 9th to 16th May, 2010, BRRI, Bangladesh.

5. Dr. B. Arun- Visits to abroad in different capacities:

Designation	Institution	Country	Year
1. Post-doc Research Associate	Northwestern University, Chicago	Chicago, USA	2002-03
2. Visiting Research Specialist	University of Illinois at Chicago	Chicago, USA	2006-07
3. visiting Scientist	CIMMYT-Internationa	Obregon, Maxico	2009
4. Member, Scientists delegation	CIMMYT-South Asia	Kathmandu, Nepal	2009
5. Member, Scientists delegation	IRRI/IFPRI Harvest Plus	Dhaka, Bangladesh	2009
6. Member Scientists delegation	CIMMYT-South Asia	Khatmandu, Nepal	2010
7. Participant	Borlaug Global Rust Initiative	St. Petersburg, Russia	2010
8. Participant	8th International Wheat Conf.	St. Petersburg, Russia	2010
9. Participant	5th Harvest Wheat Meeting	St. Petersburg, Russia	2010
10. Member, Scientist delegation	CIMMYT-South Asia	Kathmandu, Nepal	2010
11. Participant	Harvest Plus/IFPRI/CIAT	Washington D.C., USA	2010
12. Participant	Harvest Plus/ICAR/DBT	New Delhi	2011
13. Participant	Swiss Agency for Development and Cooperation and DBT	New Delhi	2011
14. Participant	BGRI Technical Workshop	Minneapolis, USA	2011
15. Participant	6th HarvestPlus Wheat Meeting	Minneapolis, USA	2011
16. Member	Visitor's Week, CIMMYT	Obregon, Mexico	2012

26. Faculty serving in

a) National committees b) International committees c) Editorial Boards d) any other

(please specify)

(1) Prof. A. Vaishampayan: Member in the Editorial Broads of

- J. Applied & Environ. Microbiology, USA
- Australian J. Batany, Sydney
- INSA Biological Section Journal, Delhi
- Karnataka J. Agric. Sc., Bangalore
- J. Agric. Sc., R.A.U., Hyderabad

(2) Prof. C.P. Srivastava:

- Co-Chairman in Crop Improvement Session 2010-11 (held at ARS, Durgapura)
- Chairman in Crop Improvement Session 2011-12 (held at IIPR, Kanpur)

(3) Prof. Rajesh Singh:

- Served as Dy. Coordinator and Member Secretary of the prestigious project "Agriculture Innovation Partnership (AIP)" funded by USAID (United Status Agency for International Development) in the tune of Rs. 50 Crores on Agriculture Education, Research and Extension, involving five US Universities (Illinois, Georgia, Ohio State, Tuskegee and UC-Davis) and three Indian Universities (BHU Varanasi, SVBPUAT Meerut, RAU PUSA Bihar).

(4) Dr. P.K. Singh:

- Adjunct Faculty, Bhojpuri study centre Faculty of Arts, BHU.
- Member of National monitoring Nucleus/Breeder seed of wheat during rabi 2011-12.
- Member of National Monitoring of different centre of Eastern Zone-I dated 18-20/10/2011.
- Convener of National Monitoring of breeder seed production and experiments of Seed Technology Research centre of AICRP-National Seed Project (Crops), Annual Oilseed Scheme (AOS) & ICAR Seed Project of Central Zone-II.

27. Faculty recharging strategies

(i) Refresher courses, orientation course

(1) Dr. Kartikeya Srivastava:

Name of the Course/Summer School	Institution	Duration	Sponsoring Agency
1. Molecular Marker assisted crop Breeding: principals, methods and applications	Division of genetics, IARI, PUSA, New Delhi	5-25 Jan 2010	ICAR
2. Training course on Molecular breeding in vegetable crops	Indian Institute of vegetable Research Varanasi	23 May-5 June, 2011	National Agricultural Innovation Project, ICAR, New Delhi
3. intensive Maize Training for freshers	Directorate of Maize Research, PUSA, New Delhi	October 11-13, 2010	Directorate of Maize Research, PUSA, New Delhi
4. Training Programme on genetics/genomics data analysis of using SAS. Strengthening statistical computing for NARS	Indian Agricultural Statistics Research Institute	September 19-24, 2011	National Agricultural Innovation Project Consortium, ICAR, New Delhi

(2) Dr. B. Arun

S.No.	Programmes	Duration	Organizer(s)
1.	Phenotyping for physiological trait based breeding (CIMMYT)-Mexico)	25 days (April 13 – May 07, 2009)	CIMMYT-Mexico
2.	8th Refresher course in Agriculture	21 days (January 5-25, 2010)	ASC, BHU

ii) National/International symposium/conference/workshop exposers

(1) Dr. J.P. Lal:

1. Presented B.H.U., Varanasi and presented a Paper in the International Symposium on "Induced Mutations in Plants" Organized by FAO/IAEA, during 12-15 August 2008, at Vienna, Austria.
2. Presented a Paper in The 3rd International Conference on Integrated Approaches to Improve Crop Production under Drought Prone Environments. (INTERDROUGHT III) during October 11-16, 2009, at Shanghai, China.
3. Attended National Symposium on Enhancing Productivity, Nutritional Security and Export potential, Through Arid Legumes held at Jodhpur (CAZRI) during July 28-30, 2008.
4. Attended All India co-ordinated Research Project for Dryland Agriculture Group Meeting held at Jagdalpur, Chhattisgarh during Dec. 16-19, 2008.
5. Attended Annual Group Meeting on Linseed and Safflower, held at OUAT, Bhubaneshwar during September 3-5, 2009.
6. Attended 22nd Biennial Workshop of All India co-ordinated Research Project for Dryland Agriculture held at Sk Nagar Dantiwada, Gujarat during Oct. 6-9, 2009.
7. Attended XIII working group meeting (Workshop) of All India co-ordinated Research Project for Dryland Agriculture held at Central Research Institute for Dryland Agriculture, Hyderabad during Nov. 24-27, 2010
8. Attended Annual Group Meeting on Linseed and Safflower, held at Directorate of
Oilseeds Research, Hyderabad during August 27-29, 2011.
9. Attended Annual Group Meeting on Linseed and Safflower, held at Indira Gandhi Krishi Vishwa Vidyalaya, Raipur, Chhattisgarh during 6-9, Sept, 2012.

(2) Prof.A. Vaishampayan

a) Vaishampayan, A. (2008) Genetically modified micro-algal biofertilizers in wet agriculture. Popolar Lecture at DBT-Sponsored "National Seminar on "Biofertilizers" M.L. Sukhadia University, Udaipur on February 09, 2008, Script printed under Special Lecture Section, pp. 07-17.

b) Anand, A., Jaiswal, S.K., Vaishampayan, V. & Dhar, B. (2009) Isolation and characterization of rhizobiophages virulent for indigenous soybean bradyrhizobia. Presented at "Third Golden Era of Microbiology", Department of Microbiology, University of Pune & National Chemical Laboratories, Pune (December 15-18, 2009), published in Proceedings of 50th Annual Conference of the Association of Microbiologists of India),, AM-012, p. 96-102.

c) Vaishampayan, A. & Mishra, P.K. (2010) Rice yield increases with a derepressed N_2-fixing cyanobacterial mutant as a component in the mixed consortium of biofertilizer. Presented & Published in Proceedings of International Symposium on Phycological Research (Eds. A.K. Rai & R.P. Sinha, J.N.U.), February 25-27, 2010, Centre of Advanced Studies in Botany, Banaras Hindu University, Varanasi, India.

d) Srivastava, K., Kumar, Sunil & Vaishampayan, A. (2010) Screening of tomato lines for high temperature stress. (Presented by Sunil Kumar) at National Symposium on Food Security in Context of Changing Climate, Jointly organized by The Society of Agricultural Professionals, Kanpur; and C.S. Azad University of Agriculture & Technology, Kanpur (October 30-November 01), 3 : 2-11.

e) Anand, A., Jaiswal, S.K., Dhar, B. & Vaishampayan, A. (2010) Phage sensitivity : A useful marker for identification of symbiotically superiorbradyrhizobial strains in soybean (*Glycine max*). Presented at 51st Annual Conference of the Association of Microbiologists of India (International Symposium on Recent Advances in Cross-disciplinary Microbiology : Avenues & Challenges; & International Workshop on rRNA Sequencing, Phylogeny & Next Generation Genome Sequencing), Jointly organized by Department of Biotechnology, Birla Institute of Technology, Ranchi; Central University of Jharkhand, Ranchi; & Birsa Agricultural University, Ranchi (December 14-17), ASM-048, p. 47.

f) Vaishampayan, A. (2010) Molecular genetics of nitrogen fixation and *nif* genetic engineering. Special Lecture on Microbiological Approaches to Environmental Sustainability (Proceedings of MICROENVIRO-2010 National Invited Lecture Series) Jointly Organized by the Department of Microbiology & Food Science and Technology, Gitam Institute of Science, Gitam University, Visakhapatnam (December 21-22, 2010), published in Proceedings of MICROENVIRO-2010 National Invited Lecture Series, pp. 110-112.

g) Vaishampayan, A. & Awasthi, A.K. (2011) A botanical ramble among blue-green algae in diverse natural and artificial symbioses. In: Phycodiversity : Aspects and Prospects (Eds. Prem Kumar Prasad), Daya Publishing House, New Delhi, pp 20-58.

h) Vaishampayan, A. (2011) Cyanobacterial Biotechnology : Nutritional Interactions in free-living and symbiotic forms. Invited Lecture, presented at AICTE Biotechnological Centre, Ranchi on Dec. 23, 2011, published in the Proceedings, entieled "Biotechnology for Sustainable Development" (Eds. S.E. Hasnain, Rashmi, B. Jha & R.N. Sharan), Tata McGraw Hill Education Pvt. Ltd., New Delhi, pp.51-76.

i) Srivastava, K., Kumar, Sunil, Singh, P.K. & Vaishampayan, A. (2011) Evaluation of tomato lines under high temperature stress conditions. (Presented by Sunil Kumar) at International Conference on Preparing Agriculture for Climate Change (Eds. Surinder K. Sandhu, D. Pathak, Navjot Sidhu, Ruchika Bhardwaj and Allah Rang), Organized at the Punjab Agricultural University, Ludhiana, by The Crop Improvement Society of India Agricultural Professionals (February 06-08, 2011) ISSN 0256-0933 *Special Issue*, pp. 163-164.

j) Jaiswal, S.K., Anand, A., Dhar, B. & Vaishampayan, A. (2011) Genotypic characterization of phage-typed indigenous soybean bradyrhizobia and their host range symbiotic effectiveness. Presented and published in Proceedings of International Symposium on Indo-Swiss Collaboration in Biotechnology (ISCB) (Ed. Swiss Agency for Development and Cooperation : SDS), Organized at the Department of Biotechnology, Ministry of Science & Technology, Govt. of India, New Delhi (March 10-11, 2011) *Special Issue* 2: 62-63.

k) Anand, A., Jaiswal, S.K., Dhar, B. & Vaishampayan, A. (2011) Nodulation competitiveness between genetically marked rhizobial strains in soybean. Presented and published in Proceedings of International Conference on Microorganisms in Environmental Management and Biotechnology, Organized at the Department of Biotechnology & Bioinformatics Centre, Barkatullah University, Bhopal (July 01-03, 2011) *Special Issue*, p. 33.

l) 142. Srivastava, Kartikeya, Kumar, Sunil, Kumar, Surendra, Prakash, P. & Vaishampayan, A. (2012) Screening of tomato genotypes for reproductive characters under high temperature stress condition. SABRAO Journal of Breeding & Genetics (IRRI, Philippines) (In Press : MS 12-06).

m) Anand, Akhil, Jaiswal, Sanjay Kumar, Dhar, Banshi & Vaishampayan, A. (2012) A bacteriophage typing system for surveying the diversity and host range symbiotic efficiency of indigenous soybean bradyrhizobia. (Presented by S.K. Jaiswal) at UGC-Sponsored National Conference on Loss of Bio-Diversity : Causes, Consequences and Conservation Strategies, Department of Botany, Jaunpur, India (February 28-29) *Special Issue*, p. 58.

n) Vaishampayan, A., Dey, T., Singh, R.P., Rao, A.L. & Gupta, A.K. (2012) Enhanced rice yields with genetically manipulated thermo-tolerant *Azolla-Anabaena* symbiotic N_2-fixing complex as an efficient bio-N fertilizer in the hot wet-fields of Varanasi. Presented at National Seminar and Southern Regional Conference on Microbial Inoculants, Annamalai University, India (Presented on January 03-05, 2012).

o) Vaishampayan, A., Gupta, A.K., Singh, R.P. & Rao, A.L. (2012) Increase in rice production at low "N" by the use of genetically improved *Azolla-Anabaena* symbiotic N_2-fixing biofertiliser. Presented & Published at National Seminar on Past Present and Future Perspectives in Biofertiliser Technology (Eds. A. K. Yadav, S. Raychaudhuri & N.C. Talukdar), Regional Biofertiliser Development Centre, Ministry of Agriculture, (Imphal) Govt. of India (Feb. 27-29, 2012).

p) Vaishampayan, A. (2012) A comprehensive data-sheet on the phycotechnological advances towards the mass production of genetically engineered photobio-N fertilizers for organic rice farming. Presented & Published in Proceedings of National Seminar on Conservation & Utilization of Greenchip Wealth of Jharkhand (Eds. Rashmi), Centre for Bioinformatics, Society for Nature Education & Health, Ranchi (April 12-14, 2012)

q) Vaishampayan, A. (2012) Molecular genetics of nitrogen fixation and its regulation. Special Lecture at Cornell University, USA (August 03, 2012).

r) Vaishampayan, A. (2012) Role of Scientists in documenting farmers' experience for Agricultural Libraries. Special Lecture at Butler Library, Columbia University, New York, USA (August 16, 2012).

(3) Prof. Ram Dhari & Prof. Lal Chand Prasad

i) 47th All India Wheat & Barley worker's workshop, 17-20 Aug, 2008, CCS Haryana Agricultural University, Hisar.

ii) 48th All India Wheat & Barley worker's workshop, 28-31 Aug, 2009, IARI, Pusa Campus, New Delhi.

iii) 49th All India Wheat & Barley worker's workshop, 27-30 Aug, 2010, Punjab Agricultural University Ludhiana.

iv) 50th All India Wheat & Barley worker's workshop, 1- 4 Sep, 2011, NASC-Complex, New Delhi.

v) 51st All India Wheat & Barley worker's workshop, 24-27 Aug, 2012, Agricultural Research Station Durgapura, Jaipur.

(4) Prof. C.P. Srivastava

i) Attended Rabi Pulses Group Meet AICRP on MULLaRP during 2008-09.
ii) Attended Rabi Pulses Group Meet AICRP on MULLaRP during 2009-10.
iii) Attended Rabi Pulses Group Meet AICRP on MULLaRP during 2010-11 and
iv) Attended Rabi Pulses Group Meet AICRP on MULLaRP during 2011-12

(5) Prof. M.N. Singh

i) International conference on Grain Legumes: Quality Improvement, Value Addition and Trade. Indian Institute of Pulses Research, Kanpur, February 14-16, 2009.
ii) International Conference on Managing Sustainable Development of Rural Economic and Agri Business. Institute of Agricultural Sciences, Banaras Hindu University, Varanasi, January, 21-23, 2011.
iii) All India Coordinated Pigeonpea & MULLaRP Workshop/Group Meet. UAS, Bangalore, May 3-6, 2002.
iv) All India Coordinated Pigeonpea (Long duration) Group Meet. I.I.P.R., Kanpur, June 15, 2002.
v) 60. All India Coordinated Chickpea and MULLaRP Group Meet, HAU Hisar, Sept. 10-12, 2002.
vi) State Group Meet for Zaid Pulse Crops, Krishi Bhawan, Lucknow, Jan. 8, 2003.
vii) All India Coordinated Spring/Summer Pulses Group Meet. I.I.P.R., Kanpur, Jan.13, 2003.
viii) All India Coordinated Pigeonpea & MULLaRP Workshop/Group Meet. Gujarat Agricultural University, S.K. Nagar at Vadodara centre, Gujarat, May 8-10 ,2003
ix) All India Coordinated Pigeonpea (Long duration) Group meet I.I.P.R., Kanpur, June 23, 2003.
x) All India Coordinated Chickpea and MULLaRP Group meet, UAS,Bangalore, Sept., 11-13, 2003.
xi) All India Coordinated Spring/Summer Mungbean and Urdbean Group Meet. I.I.P.R., Kanpur, Jan.16-17, 2004.
xii) State Group Meet for Kharif Crops, Krishi Bhawan, Lucknow, April, 19, 2004. All India Coordinated Pigeonpea & MULLaRP Workshop/Group Meet. Marathwada Agricultural University, Parbhani, May, 26-28, 2004.
xiii) All India Coordinated Pigeonpea (Long duration) Group Meet I.I.P.R., Kanpur, June, 23, 2004.
xiv) All India Coordinated Pigeonpea & MULLaRP Workshop/Group Meet. Acharya N.G. Ranga Agricultural Univarsity, Hyderabad, May, 4-6, 2005.
xv) All India Coordinated Pigeonpea (Long duration) Group Meet I.I.P.R., Kanpur, June, 8, 2005.
xvi) All India Coordinated Chickpea and MULLaRP Group Meet, Ramakrishana Mission Ashrama, Nrendrapur, Kolkata Sept., 9-11, 2005
xvii) State Group Meet for Zaid Pulse Crops, Krishi Bhawan, Lucknow, Dec. 27, 2005.
xviii) State Group Meet for nucleus/breeder seed production programme for Zaid/Kharif crops 2004-2006, Krishi Bhawan, Lucknow, Jan. 06, 2006.
xix) All India Coordinated Spring/Summer Mungbean and Urdbean Group Meet. ICAR Research Complex, Agartala (Tripura) Feb. 3-4, 2006.
xx) Long duration pigeonpea breeder's meet. IIPR, Kanpur, March, 25-26, 2006.
xxi) All India Coordinated Pigeonpea & MULLaRP Workshop/Group Meet. Tamilnadu Agril. Univ .Coimbatore, May, 2-4, 2006.
xxii) All India Coordinated Pigeonpea (Long duration) Group Meet. I.I.P.R., Kanpur, June, 19, 2006.
xxiii) All India Coordinated breeders meet (MULLaRP) on "*Vigna* day". IIPR, Kanpur September 23, 2006.
xxiv) Participated in the presentation of the research achievements of the centre before the members of QRT held at BAU Ranchi on 02-11-2006.
xxv) Agriculture Knowledge Initiative "Pigeonpea Genomics Initiative" (AKI-PGI) for detailed planning of the project activities held at Pusa Campus, IARI, New Delhi on 10-11-2006.
xxvi) Group meet of Intensive cropping system of different Zaid crops (Pulses), Krishi Bhawan, Lucknow, December 7, 2006.
xxvii) All India Coordinated Spring/Summer Mungbean and Urdbean Group Meet. IIPR, Kanpur Feb. 9-10, 2007.
xxviii) All India Coordinated Pigeonpea & MULLaRP Workshop/Group Meet. PAU, Ludhiana, May 13-15, 2007.
xxix) All India Coordinated Pigeonpea (Long duration) Group Meet. I.I.P.R., Kanpur, July 04, 2007.
xxx) State Group Meet for Zaid Pulse Crops, Krishi Bhawan, Lucknow, Jan. 8, 2008.

xxxi) Monitoring of pigeonpea trials at TCA, Dholi and IARI, Research station, Pusa on March 16-17, 2008.

xxxii) National workshop on "Harnessing the benefits of biotechnology, under Indo-US Agricultural Knowledge initiative (AKI), National Agricultural Science Centre Complex, New Delhi, March 27-29, 2008.

xxxiii) Technical programme for testing the mungbean varieties during Kharif 2008-2009 at different RATDS, U.P. Krishi Bhawan, Lucknow, April, 11, 2008.

xxxiv) All India Coordinated Pigeonpea & MULLaRP Workshop/Group Meet, S.D. Ag. Univ, Sardar Kushinagar, Gujarat, May 02-04, 2008

xxxv) All India Coordinated Pigeonpea (Long duration) Group Meet, I.I.P.R., Kanpur, June 28, 2008.

xxxvi) Presented the six monthly progress report of AKI-PGI project at National Research Centre for Plant Biotechnology, IARI, New Delhi on October, 20, 2008

xxxvii) State Group Meet for Zaid Pulse Crops, Krishi Bhawan, Lucknow, December 26, 2008

xxxviii) All India Coordinated Spring/Summer Mungbean and Urdbean Group Meet, IIPR, Kanpur January, 06, 2009.

xxxix) State group meet on seed production programme of recent varieties, UPCAR, Kishan Mandi Bhawan, Vibhuti Khand, Gomati Nagar, Lucknow, February 25, 2009.

xl) Monitored the pigeonpea trials, breeder seed production and FLD at RAU, Dholi and IARI Research station, Pusa Campus (Bihar) on March 19, 2009.

xli) State group meet for finalizing the incorporation of pigeonpea and mungbean entries to be tested at different RATDS, U.P. during Kharif Season 2009, Krishi Bhawan, Lucknow on April, 08, 2009

xlii) All India Coordinated Pigeonpea & MULLaRP Workshop/Group Meet, University of Agricultural Sciences, Dharwad (Karnataka), May 25-27, 2009

xliii) All India Coordinated Pigeonpea (Long duration) Group Meet, I.I.P.R., Kanpur, June 26, 2009.

xliv) Monitored the breeder seed production programme of mungbean at JETSAR Farm, Sri Ganganagar, Rajasthan on September 15, 2009.

xlv) State Group Meet for Zaid Pulse Crops, Krishi Bhawan, Lucknow, December 17, 2009.

xlvi) All India Coordinated Spring/Summer Mungbean and Urdbean Group Meet, Lenbuchera, Agartala, January, 27 -28, 2010.

xlvii) Monitored the coordinated trials and breeder seed production programme of pigeonpea at IIPR Kanpur and CSAU Kanpur from April 05-06, 2010.

xlviii) Participated in the review and planning meeting of pigeonpea hybrids, ICRISAT, Patancheru, April 15-16, 2010

xlix) All India Coordinated Pigeonpea & MULLaRP Workshop/Group Meet, CSK, HPKVV, Palampur (H.P.) May 16-18, 2010.

l) All India Coordinated Pigeonpea (Long duration) Group Meet, NBPGR, Pusa Campus, New Delhi, June 23, 2010.

li) Participated in *Vigna* Day, IIPR, Kanpur, September, 23, 2010

lii) Monitored the coordinated trials and breeder seed production programme of pigeonpea at PAU, Ludhiana, HAU, Hisar, Bawal, IARI, New Delhi, GBPUA&T, Pantnagar from October, 27.to November 2, 2010.,

liii) All India Coordinated Spring/Summer Mungbean and Urdbean Group Meet, IIPR Kanpur, January, 24 - 25, 2011.

(6) Prof. S.K. Singh

a) Participated in the 12th International Rapeseed Congress at Wuhan, China to present the research paper during 26-30th March, 2007.

b) Participated in the *6th International Hybrid Rice Symposium*, Hyderabad, 10-12 September, 2012

(7) Prof. Rajesh Singh

a) Visited Cornell University, Ithaca, New York and its Consortium partners of AIP (Agriculture Innovation Partnership) to participate in Food and Agri-Business Management Program and also to study Agriculture Extension Programme w.e.f., August 7th to 19th Aug 2012

b) Visited Tuskegee University of Alabama State of USA to understand Cooperative Extension Programme of Alabama State and University Biotechnology programme 25th Aug to 27th Aug, 2012

c) Visited University of Georgia of Georgia State to get exposure to get exposure to Food Sciences Program, Cooperative Extension Programme, Seed and applied Genetics programme 28th Aug to 30th Aug, 2012

d) Visited Tennessee State University, USA to deliver a lecture to faculty of Agriculture Sciences on BHU and International Relations and discussed the possibilities of research and academic exchange programme between two universities, 31st th Aug to 2nd Sep, 2012

e) Visited University of California, Davis of California State, USA w.e.f. from 19th Aug, 2012 to 25th August, 2012 to study California Cooperative Extension Programme and get exposure to Higher education particularly Biotechnology based Graduate, Undergraduate and Research Programme.

(8) Prof. V.K. Mishra

a) Joshi, Arun K Chand, R Arun B, Mishra, V. K, Ferrara, G Ortiz Hans Braun, J Singh Ravi P. (2009) Experience with rapid seed multiplication and cultivar replacement targeting race Ug99 resistant wheat varieties in the Eastern Indo-Gangetic Plains. Proceeding of Borlaug Global Rust Initiative March 17-20 2009, Technical workshop, Ciudad Obregon, Mexico. 191 - 198

b) Joshi, Arun K Chand, R Arun B, Mishra, V. K, Ferrara, G Ortiz Hans Braun, J Singh Ravi P. (2009) Initiative and progress through participatory varietal selection in promoting race Ug99 resistant wheat lines in the Eastern Indo-Gangetic Plains. Proceeding of Borlaug Global Rust Initiative March 17-20 2009, Technical workshop, Ciudad Obregon, Mexico. 163

c) Tiwari Chhavi, Mishra V. K., Arun, B., Dhari Ram, Manes Y. and Joshi, A. K. (2010). Evaluating genetic diversity for heat tolerance in a double haploid population of wheat (*Triticum aestivum* L.). SAARC workshop on Biodiversity Conservation, Sept 21-22, 2010.B H U, Varanasi.

d) Tiwari Chhavi, Mishra V. K., Arun, B., Dhari Ram, Wallwork Hugh and Joshi, A. K. (2010). Screening for heat tolerant lines among double haploid population of wheat (*Triticum aestivum* L) .3rd International Group Meeting on "Wheat Productivity Enhancement under changing climate" Feb 9-12, 2011, UAS, Dharwar, Karnataka, India.

e) Ramesh Chand, V.K. Mishra, B. Arun, Ram Dhari and A.K. Joshi (2011) Farmers participatory approach to mitigate the impact of climate change on wheat production and regional food security of NEPZ of India. International Conference on 'Managing Sustainable Development of Rural Economy and Agri-business' Banaras Hindu University, Varanasi, India, January 21-23, 2011.

f) Vishwakarma, Manish K., Yadav, Punam S., Kumar, H., Mishra, V. K., Chand, R., Joshi, A. K. and Arun, B. (2011). Validation of molecular markers for stem rust resistant resistance and high protein content genes/QTLs before introgration in the popular varieties of wheat (Triticum aestivum L. em Thell). National Symposium on "Emerging Trend in Plant Science" Center of Advanced Study, Deptt of Botany, B. H. U., Varanasi, U. P., India. March 3-4, 2011.

g) Vasistha, Neeraj Kumar, Arun, B., Mishra, V. K., Mallik, V. K., Chand, R., and Joshi, A. K., (2011). Pyramiding spot blotch (Bipolaris sorokiniana) resistant QTLs in wheat (Triticum aestivum L. em. Thell) through marker assisted selection. Indo Swiss Collaboration in Biotechnology International Symposium, New Delhi, India, March 10-11, 2011.

h) Vishwakarma, Manish K., Yadav, Punam S., Kumar, H., Mishra, V. K., Joshi, A. K. and Arun, B. (2011). Marker validation for high grain protein content genes/QTLs in some elite wheat (Triticum aestivum L. em Thell) varieties of Indi-Gangetic Plains. Indo Swiss Collaboration in Biotechnology International Symposium, New Delhi, India, March 10-11, 2011.

i) Yadav, Punam S., Vishwakarma, Manish K., Mishra, V. K., Chand, R., Arun, B. and Joshi, A. K. (2011). Identification and validation of markers linked to the stem rust resistant genes in wheat (Triticum aestivum) Indo Swiss Collaboration in Biotechnology International Symposium, New Delhi, India, March 10-11, 2011.

j) Malik, Vipin Kumar., Agrawal, R. K., Mishra, V. K., Arun, B. and Joshi, A. K. (2011).Early generation screening for drought tolerant Recombinant Inbred Lines (RILs) on the basis of chlorophyll content and canopy temperature in spring wheat (*Triticum aestivum* L.). Indo Swiss Collaboration in Biotechnology International Symposium, New Delhi, India, March 10-11, 2011.

k) *Yadav, P. S., Mishra V. K., Arun B., Chand R, Vasistha N. K., Vishwakarm V. K., Bhardwaj S.C., Joshi A. K. (2012).* Identification and introgression of stem rust resistance genes in hexaploid wheat by using molecular marker *2012 – BGRI Technical workshop Sept 1-4, 2012, Beijing, China*

(8) Prof. R.K. Agrawal

Presented a paper in National Conference on "Emphasizing Recent Advances in Oilseed Production and Industrialization with Special Reference to Rapeseed-Mustard", held at I.Ag.Sc., B.H.U., Varanasi, Nov. 21-23, 2008.

(9) Dr. Kartikeya Srivastava

a) Screening of chilli (*Capsicum annuum* L.) germplasm for vitamin C, capsaicin, oleoresin and other qualitative traits. Jyoti Pandey, Kartikeya Srivastava and Jagdish Singh, SAARC Workshop on Biodiversity Conservation, Sep 21-22, 2010, Department of Plant Physiology, Institute of Agricultural Sciences, BHU, Varanasi, India

b) Determination of beta carotene alpha-carotene, 125anthophylls and lycopene content in green vegetables, Jyoti Pandey, A. K. Upadhyay, K Srivastava and Jagdish Singh, National conference of Plant Physiology on Physiological and Molecular Approaches for Crop Improvement under Changing Environment, November 25-27, 2010, Department of Plant Physiology, Institute of Agricultural Sciences, Banaras Hindu University, Varavasi

c) Association between yield and yield attributes in segregating families of pigeon pea (*Cajanus cajan* L Millsp), By:- Naseer Mohammad, Jaggal Somappa, S.K.Verma and K.Srivastava , National conference of Plant Physiology on Physiological and Molecular Approaches for Crop Improvement under Changing Environment, November 25-27, 2010, Department of Plant Physiology, Institute of Agricultural Sciences, Banaras Hindu University, Varavasi

d) Performances of chilli genotypes for capsaicin, oleoresin, extractable colour and colour value content during two seasons, Jyoti Pandey, Kartikeya Srivastava, and Jagdish Singh, Ivth International Conference on Plants And Environmental Pollution, Dec, 8-11, 2010, International Society Of Environmental Botanists And National Botanical Research Institute, Lucknow, India

e) "Effect Of Wellgro Products On Yield And Quality Traits In Chips Variety Of Potato" authored by K.Srivastava and Jyoti Pandey, International Conference on "Managing Sustainable Development of Rural Economy and Agri Business" (ICONBHU11) 21-23 January 2011 , Department of Agricultural Economics, Institute of Agricultural Sciences, Banaras Hindu University

f) Genetics Study for yield and quality traits in tomato (Solanum lycopersicon Mill) Vinod Kumar R. Nandan, Ksrivastava, Ravindra Kumar and M.K.Singh, International Conference on "Managing Sustainable Development of Rural Economy and Agri Business" (ICONBHU11) 21-23 January 2011, Department of Agricultural Economics, Institute of Agricultural Sciences, Banaras Hindu University

g) Assesment of bioassay for resistance to Bruchid (*Callosobruchus chinensis* L) in F_7 inter-specific progenies and parents of pigeon pea (*Cajanus cajan* L Millsp), Jaggal Somappa, Naseer Mohammad, G. C. Bajpai, S.K.Verma and K. Srivastava, International Conference on "Managing Sustainable Development of Rural Economy and Agri Business" (ICONBHU11) 21-23 January 2011, Department of Agricultural Economics, Institute of Agricultural Sciences, Banaras Hindu University

h) Effect of season on qualitative traits in Chilli (*Capsicum annuum* L), Jyoti Pandey, Kartikeya Srivastava, Ashok Kumar Singh and Jagdish Singh,

i) National Conference On Environmental Problems In India And Challenges To Plant Biologist, Feb 4-5, 2011, Department of Botany, Uday Pratap (Autonomous) College, Varanasi, India

j) Evaluation of tomato lines under high temperature stress conditions

k) K Srivastava, Sunil Kumar, P.K.Singh and A.Vaishampayan, International conference on preparing agriculture for climate change

l) Crop Improvement society of India

m) Studies on the Qualitative Traits in Chilli (*Capsicum annuum* L.) Jyoti Pandey, Kartikeya Srivastava, Jagdish Singh and Ajai Kumar Pandey, 13th Indian Agricultural Scientists and Farmers Congress on sustainable developmental Strategies For Food Security, Bio- diversity and Livelihood Security. Feb 19-20, 2011, Bioved Research Institute of Agriculture & Technology, Allahabad, India

n) Studies on Heterosis in Chilli (*Capsicum annuum* L.) Jyoti Pandey, Kartikeya Srivastava, Rajesh Kumar and Jagdish Singh, National Symposium on Emerging Trends in plant sciences, March 3-4,2011, Department of Botany, BHU, Varanasi, India

o) Association analysis for yield and yield component traits in forage maize (*Zea mays* L) Sunil kumar K.Srivastava and R.K.Yadav, National Symposium on Emerging Trends in plant sciences, March 3-4,2011, Department of Botany, BHU, Varanasi, India

p) Evaluation of tomato genotypes to early blight (*Alternaria solani* L.) Ravindra Kumar, K.Srivastava and R.K.Singh, National Symposium on Emerging Trends in plant sciences, March 3-4,2011, Department of Botany, BHU, Varanasi, India

q) Screening of tomato lines for high temperature stress, K. Srivastava, Sunil Kumar and A. Vaishampayan. National Symposium on Food Security in Context of Changing Climate30 October-1 November, 2011. CSAUA&T, Kanpur

r) Water Pollution Causes and Control Jyoti Pandey and K. Srivastava, Controlling Environmental Pollution trough Water conservation for Sustainable Development 26-27 November 2011, Mahima Research Foundation and Social Welfare, Karoundi, Varanasi

s) Stability performance of okra Hybrids (Abelmoschus esculentus(L)Moench) over environment, Kartikeya Srivastava, Judy Aparna, P.K.Singh and Sunil Kumar, National Seminar on "Contemporary Approaches in Crop Improvement" April 22-23, 2011, Indian Society of Genetics and Plant Breeding, UAS,Bangalore

t) Heterosis in relation to combing ability in quality protein maize, P.K.Singh, Nitish Singh Ksrivastava and J.P.Shahi, National Seminar on "Contemporary Approaches in Crop Improvement" April 22-23, 2011, Indian Society of Genetics and Plant Breeding, UAS,Bangalore

u) Effect of stages of maturity on ascorbic acid content of chilli (*Capsicum annuum* L.) Jyoti Pandey, Kartikeya Srivastava, Rajesh Kumar and Jagdish Singh, National Seminar on "Contemporary Approaches in Crop Improvement" April 22-23, 2011, Indian Society of Genetics and Plant Breeding, UAS,Bangalore

v) Evaluation of total soluble solid content in different maize genotypes and hybrids Rajeev Kumar, J.P.Shahi, K.Srivastava and Sunil Kumar, National Seminar on "Contemporary Approaches in Crop Improvement" April 22-23, 2011, Indian Society of Genetics and Plant Breeding, UAS,Bangalore

w) High temperature induces the Morpho-Physiological Changes in tomato (Lycopersicon esculentum Mill.) genotypes S.k.Bishnoi, Pravin Prakash Sunil Kumar, & Kartikeya Srivastava, Advances in Biotechnological Research in Agri-Horticultural crops for sustaining productivity Quality Improvement & Food Security September 14-16,2011, Department of Biochemistry and Physiology, College of Biotechnology, Sardar Vallabh Bhai Patel University of Agri. & Technology, Meerut

x) Importance of Lycopene in Human Health Ravindra Kumar, K Srivastava, Jaggal Somappa, Ravi Kumar and R.K. Singh, Advances in Biotechnological Research in Agri-Horticultural crops for sustaining productivity Quality Improvement & Food Security September 14-16,2011, Department of Biochemistry and Physiology, College of Biotechnology, Sardar Vallabh Bhai Patel University of Agri. & Technology, Meerut

y) Genetic component, character association and Path coefficient analysis in forage maize (Z. mays L.) Sunil Kumar,A.K.Singh K Srivastava,& R.K yadav, International conference on issues for climate change, land use diversification and biotechnological tools for livelihood security October 8-10, 2011, Sardar Vallabh Bhai Patel University of Agri. & Technology, Meerut

z) Chilli (Capsicum spp.): A Diverse crop, National Symposium on Plant Biology and its role in SustainableFood and Energy production, March 17-18,2012, Department of Botany, Guru Ghasidas Vishwavidyalaya, Bilaspur.

aa) Recent Advances in Hybrid Breeding in Pigeonpea: A Review

bb) Jaggal Somappa, K Srivastava, R Saxesena, R Kumar, L B Gaur, Agricultural Education, Research and Extension:Problem, Solution and Prospects 11 April,2012, KVK, IAS, BHU, RGSC, Barkachha, Mirzapur (UP)

cc) Magnitude of heterosis for yield and yield attributing traits in tomato.

dd) Ravindra Kumar, K Srivastava, R.K Singh and Vinod Kumar, Agricultural Education, Research and Extension:Problem, Solution and Prospects 11 April,2012, KVK, IAS, BHU, RGSC, Barkachha, Mirzapur (UP)

ee) Epidemiology and evaluation for resistance to tomato early blight (*Alternaria solani*), Jaggal Somappa, K.Srivastava, R. Chand, B.K. Sarma, and Ravindra Kumar, Recent Advances and New Inclinations in Biological Sciences April 8, 2012, Society of Biological Sciences, Department of Biological Sciences, S H I ATS, Allahabad.

ff) Yield and quality performance of Basmati genoytypes under varying nitrogen levels, Parth Brat Yadav Chetan Singh Jaggal Somappa, K Srivastava, and D.K.Singh, Recent Advances and New Inclinations in Biological Sciences April 8, 2012, Society of Biological Sciences, Department of Biological Sciences, S H I ATS, Allahabad.

gg) Effects Of Temperature on tomato(Lycopersicon esculentum Mill.) productivity in a variable and Changing Climate.. K.Srivastava Sunil Kumar, Surendra kumar, Pravin Prakash and A.Vaishampayan, National Seminar on Environmental Concerns and Sustainable, Development Issues and Challenges for India 2-4 March,2012, Institute of Environmental and Sustainable Development, BHU, Varanasi

hh) Effect on colour quality in chilli ----- -- - - - after storage, Jyoti Pandey, K. Srivastava, International conference on mycology and plant pathology biotechnological approaches February 27-29, 2012, Centre of advanced study in Botany BHU, Varanasi

ii) Screening of F1 hybrid against early blight (*Alternaria solani*) of tomato, Ravindra Kumar, K.Srivastava, R.K.Singh and Jaggal Somappa, National Seminar on Emerging Trends in Biotechnological Research (ETBR-2012) 28 October, 2012, Mewar Institute, Gaziabad

(10) Dr. P.K. Singh

i) Participatory varietal selection training cum planning workshop, NDUAT, Kumarganj, Faizabad, India, 21st - 23rd May, 2008

ii) Rice Breeding Course : Laying the foundation for the Second Green Revolution at IRRI Manila, Philippines. IRRI, Philippines, 24th Augsut to 9th Sept., 2009

iii) Quality Rice Seed Production training-cum-workshop, BRRI, Bangladesh, 9th to 16th May, 2010

iv) Seed Industry Programme on "Traits-Markets- Growth- Leadership", Carnell University, College of Agriculture and Life Science, & SATHGURU at Goa, India, 5th -8th March, 2012

v) Innovative Teaching for Improved Learning, USAID, University of Illinois at Urbana- Champaign, Urbana, IL & Cornell University at New Delhi, India, 16th -18th July, 2012

vi) Training-cum Workshop on E-Learning in Agriculture, Banaras Hindu University, Varanasi, India, 4th -11th September, 2012

(11) Dr. B. Arun

(i) Annual Meeting of India Biofortification program and Harvest Plus, July 8-10, 2009, Jointly organized by Deptt. Biotechnology (Govt. of India), HarvestPlus (USA) and ICRISAT(India).

(ii) Ist Workshop on Wheat Breeding (Objective4) of the project Cereal Systems Initiative for South Asia (CSISA) Sept. 10-13, 2009, Organized by CIMMYT-South Asia at Kathmandu, Nepal.

(iii) Workshop on 'Adoption and Diffusion of Modern Rice Varieties in Bangladesh and Eastern India', Oct 3-4, 2009, Organized by the IRRI-IFPRI-CIAT Harvest Plus project at Dhaka, Bangladesh.

(iv) Workplan meeting of DBT Quality project at CCSU, Merrut Nov 4, 2009.

(v) Workshop on "Molecular Marker-assisted Breeding for Crop Improvement" Dec 15-16, 2009, Organized by DBT, Govt. of India at IARI, New Delhi.

(vi) Meeting on Drought and Heat Tolerance in Wheat February 6, 2010 at DWR (ICAR) Karnal.

(vii) Wheat breeding roving seminar (Objective 4) of the project Cereal Systems Initiative for South Asia (CSISA) March 20-26, 2010, Organized by CIMMYT-South Asia at Kathmandu, Nepal.

(viii) 5th HarvestPlus Wheat Crop Meeting, June 5-6, 2010, Saint Petersburg, Russia.

(ix) 8th International Wheat Conference, June 1-4, 2010, Saint Petersburg, Russia.

(x) Borlaug Global Rust Initiative meeting, May 30-31 2010, Saint Petersburg, Russia.

(xi) Meeting of network partners at UP Council of Agricultural Research, Aug. 10th 2010, Lucknow.

(xii) 1st meeting of Project Management Committee under DBT funded Accelerated Crop Improvement Program Aug. 20-21, 2010 IARI, New Delhi

(xiii) 49th All India Wheat and Barley Workers Workshop, Aug 27-30, 2010, PAU, Ludhiana.

(xiv) Workshop on "Strategic Planning and Partnering for Durable Rust Resistance in Wheat" Oct.19-20, 2010, New Delhi (convened by Cornell University, U.S.A.: DBT and ICAR, Govt. of India)

(xv) 1st Global Conference on Biofortification, 7th-10th Nov 2010, Washington DC, USA

(xvi) Meeting on "Crop Biofortification Research and Development from 7th- 9th Feb 2011" New Delhi, jointly organized by HarvestPlus, DBT and ICAR Govt. of India.

(xvii) 3rd International Group meeting on Wheat Productivity Enhancement under Changing Climate" 9th-12th Feb 2011 at Univ. of Agri. Sc. Dharwad, India.

(xviii) 2nd Indo-Swiss Collaboration in Biotechnology (ISCB) Symposium, 10th - 11th March 2011, New Delhi

(xix) Borlaug Global Rust Initiative meeting, June 13-16 2011, St. Paul Minnesota ,USA

(xx) 3rd International zinc symposium, Oct 10-14, 2011, Hyderabad

(xxi) Wheat biofortification planning meeting, Oct 15,2011, ICRISAT, Hyderabad

(xxii) 6th Harvest Plus Wheat Crop Meeting, June 17-18, 2011, St. Paul Minnesota, USA

(xxiii) 7th International HarvestPlus Wheat Crop meeting, Feb 27-Mar.1, 2012

28. Student projects

- percentage of students who have done in-house projects including inter-departmental projects : 100%
- percentage of students doing projects in collaboration with other universities / industry / institute : 12%

29. Awards / recognitions received at the national and international level by

- **Faculty** : -
- **Doctoral / post doctoral fellows** : (a) Dr. S.K. Jaiswal - UGC Kothari Post Doctoral Fellow w.e.f. 01.08.2011, International Young Scientist Exchange Fellowship of National Microbiological Institute of Africa

(b) Dr. Shiveta Sharma – Got Post Doctoral Fellowship of CSIR, Japan, Tokyo
(c) Dr. Jyoti Pandey – Got UGC Kothari

- **Students** :

30. Seminars/ Conferences/Workshops organized and the source of funding (national / international) with details of outstanding participants, if any.

31. Code of ethics for research followed by the departments :

(a) The research is aimed at fulfilling the needs at the grass level society in and around Varanasi alongwith the entire Uttar Pradesh and also the adjoining states. (b) We have been doubly cautions to see that our research are highly reproducible and acceptable by the world authorities of scientific knowledge of agriculture in general and Genetics and Plant Breeding particular

32. Student profile course-wise during last five years :

Name of the Course (refer to question no. 4)	Applications received	Selected		Pass percentage	
		Male	Female	Male	Female
M.Sc.(Ag.)		66	19		
M.Sc.(PBT)		150			
Ph.D.(Ag.)		44	09		

33. Diversity of students (2008-2012)

Name of the Course (refer to question no. 4)	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
M.Sc.(Ag.)	19.3%	21.5%	54.5%	4.5%
Ph.D.	29.6%	22.2%	48.1%	NIL

34. How many students have cleared Civil Services and Defence Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.

35. Student progression

Student progression		Percentage against enrolled
UG to PG	(21/88)	23.8%
PG to M.Phil.	-	-
PG to Ph.D.	(15/54)	27.7%
Ph.D. to Post-Doctoral		
Employed		
• Campus selection		
• Other than campus recruitment		
Entrepreneurs		

36. Diversity of staff

Percentage of faculty who are graduates	
of the same university	30
from other universities within the State	06
from universities from other States	-
from universities outside the country	Nil

37. Number of faculty who were awarded Ph.D., D.Sc. and D.Litt. during the assessment period : NIL

38. Present details of infrastructural facilities with regard to

a) Library : Library is managed at Institute

Level

b) Internet facilities for staff and students : Yes

c) Total number of class rooms : Two

d) Class rooms with ICT facility : One

e) Students' laboratories : One

f) Research laboratories : Eleven

39. List of doctoral, post-doctoral students and Research Associates

A. List of Doctoral Students

S.No.	Name of the Student	Year/ Semester	S.No.	Name of the Student	Year/ Semester
1.	Mr. Manindra Nath Upadhyay	2008-09	27.	Mr. Prem Kumar	2010-11
2.	Mr. Mukesh Kumar Singh	- do -	28.	Mr. Lal Bahadur Gaur	- do -
3	Mr. Vijay Kumar	- do -	29.	Mr. Showkat Ahmad Waza	- do -
4.	Mr. Neeraj Kumar Vasistha	- do	30.	Ms. Amita Sharma	- do -
5.	Mr. Vinod Kumar	- do -	31.	Mr. Parney Kumar	- do -
6.	Mr. Bijendra Singh Boudh	- do -	32.	Mr. Ajay Singh	- do -
7.	Mr. Satish Chandra Narain	- do -	33.	Mr. Bornare Satish Santosh	- do
8.	Mr. Vipin Kumar Malik	- do -	34.	Mr. Surendra Kumar Ghritlahre	- do -
9	Mr. Rajeev Kumar	- do -	35.	Mr. Ravi Rajna Saxesena	- do -
10	Mr. Sudbir Kumar	Jan., 2009	36.	Mr. Dhairyashil Madhukar Langade	- do -
11.	Mr. Mahesh Rao	- do	37.	Sri Arun Sonaji Chavan	2011-12
12.	Ms. Punam Singh Yadav	- do	38.	Sri Prakash Singh	- do -
13.	Ms. Jayasudha S.	- do -	39.	Sri Deepak Kumar Baranwal	- do
14.	Ms. Saumya Awasthi	- do -	40.	Sri Samir Yadaorao Dhurai	- do -
15.	Mr. Sunil Kumar	- do	41.	Sri Anil Kumar Singh	- do -
16.	Mr. Vishal Kumar Agrawal	2009-10	42.	Sri Pradeep Kumar Bhati	- do -
17.	Mr. Mainsh Kumar Mishra	- do -	43.	Sri Lekharam	- do -
18.	Ms. Shubhra Natasha Kujur	- do	44.	Mr. Ram Narayan Ahirwar	2012-13
19.	Mr. Ramesh Chandra Suyal	- do -	45.	Mr. Sandeep Kumar Chauhan	- do -
20.	Mr. Radhe Shyam Vaishnav		46.	Mr. Prabhat Kumar	- do
21.	Mr. Jaggal Somappa	- do -	47.	Mr. T. Sravan	- do
22.	Mr. Ravindra Kumar	- do -	48.	Mr. G. Eswara Reddy	- do -
23.	Ms. Nidhi Pathak	- do	49.	Mr. Mukh Ram	- do
24.	Mr. Sudhir Kumar	2010-11	50.	Mr. Anant Madakemohekar	- do
25.	Ms. Mudra Khare	- do -	51.	Mr. Mula Pratap Reddy	- do
26.	Ms. Shama Parveen	- do -	52.	Mrs. Madhuri Arya	- do -

B. List of Post-Doctoral Students

(i) Dr. S.K. Jaiswal (from host university)
(ii) Dr. Jyoti Pandey (from other university)

C. List of Research Associate

(i) Dr. Anil Kumar Singh (From host university)
(ii) Dr. Ved Pradask Rai (From host university)
(iii) Dr. Dhirendra Kumar Singh (From host university)

a) from the host university : 100%

b) from other universities : NIL

40. Number of post graduate students getting financial assistance from the university. :

M.Sc.(Ag.) - NIL: Ph.D. : 100% CRET Qualified students

41. **Was any need assessment exercise undertaken before the development of new programme(s)? If so, highlight the methodology.** : Before starting any new programme, ordinances and courses are finalized by
(a) Board of Studies
(b) Institute PPC
(c) Faculty Meeting
(d) Academic Council.
On the basis of above exercise, we have introduced a new special course i.e. M.Sc. in Plant Bio-technology, started in 2008

42. **Does the department obtain feedback from**

d. **faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?** : Yes

(a) Our Board of Studies comprises two external experts who advice the curriculum development.

(b) If needed we interact another external expert also, a provision to which is there at faculty level, we accept some of the good suggestions, incorporate in our curriculum.

e.**students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?** : We welcome the students advice (at M.Sc. and Ph.D. Levels) regarding useful and new ideas which are being incorporated in curriculum and also for enhancement of facilities for practical and theory teaching. The recommendations of the students for procure of the new books useful to the them are procured at the Institute Level.

f.**alumni and employers on the programmes offered and how does the department utilize the feedback?** : We infiltrate the positive ideas towards the improvement of our curriculum coming from Alumni serving in renowned institutions and superior authorities including national and international organizations and the employer, with the concerted efforts to make our academic programme in accordance to the global needs of the time.

43. **List the distinguished alumni of the department (maximum 10)**

Dr. Mangala Rai (M.Sc.(Ag.) – 1969; Ph.D. – 1973), Director General, ICAR, New Delhi & Secretary DARE , Govt. of India, New Delhi 110 001.
Prof. G. Kalloo (M.Sc.(Ag.) – 1966; Ph.D. – 1969), Dy. Director General, ICAR, New Delhi – 110 001
Prof. C.B. Singh (M.Sc.(Ag.) – 1966), Dean, Faculty of Agriculture, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur - 482 004.
Dr. P.R. Kumar(M.Sc.(Ag.) – 1965; Ph.D. – 1965), Ex-Director, Indian Institute of Oilseed Research, Bharatpur
Prof. N.C. Subramaniyam (M.Sc.(Ag.) – 1968), Professor, Central University, Hyderabad.
Dr. Devendra Kumar (M.Sc.(Ag.) – 1969, Ph.D. – 1965), Project Coordinator, Arid Legumes, Central Arid Zone Research Institute, Jodhpur – 342 003.
Dr. S.S. Malik (M.Sc.(Ag.) – 1969), Principal Scientist and Head, Plant Exploration Division, NBPGR, Pusa, New Delhi – 110 012.
Prof. A. Satyanarayana (M.Sc.(Ag.) – 1969, Ph.D. – 1972), Director (Extension), ANG Univ. of Agric. & Tech., Hyderabad
Dr. Ravi Prakash Singh (M.Sc.(Ag.) – 1979), Principal Scientist & Coordinator, CIMMYT Intl., Apartado Postal 6-641, El Batan, Mexico – 06600, Mexico D.F.

44. **Give details of student enrichment programmes (special lectures / workshops /**

seminar) involving external experts. : Often the department organizes, specialized lectures for the benefits of our students in the newly emerging areas.

45. **List the teaching methods adopted by the faculty for different programmes.** : Use of LCD Projectors and other audio-visual aids to strengthen the students in-depth understanding of the subjects.

46. **How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?** : Based on the performance of the students in mid term, end term examinations, seminars, comprehensive examination (both written and oral)

47. **Highlight the participation of students and faculty in extension activities.** : Students are actively participating in farmers fair and displaying their practically useful research results through models and live materials.

48. Give details of "beyond syllabus scholarly activities" of the department. :

(i) Debate on academic issues.

(ii) National Essay contest

(iii) Cultural Programmes

(iv) Excursion tours

(v) Sports and athletics

49. State whether the programme/ department is accredited/ graded by other agencies? If yes, give details. Assigned as one of the best Departments, by SCOPUS International (at the Institute Level)

50. Briefly highlight the contributions of the department in generating new knowledge, basic or applied.

A. Basic

- Autotetraploids developed in pea, rapeseed, safflower and pearlmillet.
- Somatic chromosomes studied in safflower, pea and pearlmillet.
- Pioneered the isolation and characterization of bacteriophages active against root-nodule bacteria from India.
- Studied the occurrence, distribution and seasonal incidence of rhizobiophages in Indian soils.
- Development of (a) highly effective *Rhizobium* strains for mungbean (MO-5), pea (P-5), chickpea (G-567 SMR, GHUR-15, GHUR-22) and Frenchbean (HURR-3 and Raj-2), recognized at National level; (b) *Azosprillium* (Alm-19), and BGA/*Azolla* strains (mixed consortium) for biofertilizer-responsive rice and wheat cultivars.
- Establishment of inter-/intra-generic *nif/nrd* gene transfer in phototrophic and heterotrphic N_2 fixers.
- Establishment of symbiotic association of Frenchbean rhizobia with rice cultivars.
- Mutagenesis of *Azolla-Anabaena* symbiotic N_2-fixing complex for reduced P requirement, insect-pest infestation, thermo-insensitivity and profused sporulation/spore germination.
- Use of phage typing system for identification of biodiversity among the soybean rhizobia present in Indian soils and selection of symbiotically effective *Bradyrhizobium japonicum* strains for soybean cultivars.
- Establishment of variation for (i) spot blotch resistance in wheat and barley and (ii) leaf angle, stay green trait, and terminal heat stress tolerance in wheat.
- Establishment of genetic basis of resistance to spot blotch and leaf rust in wheat.
- Establishment of genetics of leaf angle and stay green trait in wheat and their association with resistance to spot blotch.
- Identification of leaf tip necrosis (Ltn) as morphological marker for resistance to spot blotch in wheat.
- Study of molecular variability in the isolates of spot blotch pathogen of wheat and barley.
- Mutagenesis of cyanobacteria and *Azosprillum* for derepressed N_2 fixation in inorganic N fertilized fields.
- Identification and tagging of genes providing resistance to spot blotch of wheat and rust (*Uromyces fabae*) of pea.

B. Applied : Our improved crop varieties listed below have been out standing not only in the Uttar Pradesh but entire recommended area, helping in major way the gross root level society and a solution to country's food problem, reflected as our commendable contribution of applied value.

Crop	Varieties	Year of release/ identification	For zone/ state	Improved features
Wheat	1. HUW-12 (Malaviya Wheat-12)	1977/1979	NEPZ	Timely sown, high fertility under irrigated conditions. Double dwarf with yield potential : 45-48 q/ha
	2. HUW-37 (Malaviya Wheat-37)	1980/1982	NEPZ	Timely sown, medium to high fertility under irrigated conditions. Single gene dwarf with yield potential : 45-50 q/ha
	3. HUW-55 (Malaviya Wheat-55)	1981/1983	NEPZ	Timely sown, medium to high fertility under irrigated conditions. Single gene dwarf with yield potential : 48-52 q/ha
	4. HUW-206 (Malaviya Wheat-206)	1983/1985	NEPZ	Timely sown, medium to high fertility under irrigated conditions. Single gene dwarf with yield potential: 50-55 q/ha. Carries alien genes Lr 26 + Lr 26 + Sr 31 + Yr 9 due to 1B/1R translocation form Imperial rye.
	5. HUW-213 (Malaviya Wheat-213)	1983/1985	NEPZ	Late sown, high fertility under irrigated conditions. Double dwarf with yield potential : 45-48 q/ha. Carries *Lr 14a* + *Sr 11* for rust resistance.
	6. HUW-234 (Malaviya Wheat-234)*	1983/1985	NEPZ	Late sown, high fertility under irrigated conditions. Double dwarf with yield potential: 45-50 q/ha. Carries *Lr 14a* + *Sr 9b* + *Yr 2* genes for rust resistance.
	7. HUW-251 (Malaviya Wheat-251)	1988	Nepal	Timely/Late sown, high fertility under irrigated conditions of tarai area. Double dwarf with yield potential: 48-52 q/ha. Carries *Lr 14a* + *Sr 11* for rust resistance.
	8. HUW-318 (Malaviya Wheat-318)	1989/1991	SHZ	Timely sown, high fertility under irrigated conditions. Single dwarf with yield potential: 50-55 q/ha. It carries *Lr 26* + *Lr 28* + *Sr 2* + *Sr 31* + *Yr 9* genes.
	9. HUW-468 (Malaviya Wheat-468)	1997/1999	NEPZ	Timely sown, high fertility under irrigated conditions. Single dwarf with yield potential: 50-55 q/ha
	10. HUW-510 (Malaviya Wheat-510)	1999/2000	PZ	Late sown, high fertility under irrigated conditions. Double dwarf with yield potential: 48-52 q/ha.
	11. HUW-533 (Malaviya Wheat-533)	2001	NEPZ	Timely sown, medium fertility, rainfed conditions. Tall with yield potential: 28-30 q/ha.
Rice	1. HUR-36 (Malaviya Dhan-36)	1986/1990	UP, WB	Timely sown, developed by mutagenesis of the local Mahsuri. Early maturing with yield potential of 5 tons per hectare under low nutrient management.
	2. HUBR 2-1 (Malaviya Basmati-1)	2004	UP	Released by SVRC (U.P.). Pedigree (HBR92 Pusa Basmati/Kasturi). Scented fine grained with yield potential of 40-45 q/ha. Tolerant to BLB, blast and stem borer. Maturity period: 125-130 days.
	3. HUR 3022 (Malaviya Dhan 3022)	2004	UP	Released by SVRC (U.P.). Pedigree (IR36/HR137). Fine grain with yield potential of 45-55 q/ha. Tolerant to BLB and stem borer and resistant to leaf and neck blast. Maturity 95-100 days.
	4. HUR 105 (Malaviya Dhan 105)*	2008	UP	For whole U.P., very high yielding
	5. HUR 4-3 (Malaviya Dan 4-3)	2008	UP	For eastern & western zones of U.P. very high yielding
	6. HUR 46005	2010 (SVRC)	UP	Semi-dwarf, ghihly scented, high yielding (60 Q/ha) medium slender grain variety with 145 days maturity, at par to Kalanamak and Gr-32 in taste and quality
	7. HUR 5-1	2010 (SVRC)	UP	Slender grain high yielding variety with 140-142 days maturity and good panel taste

Maize	1. Hybrid Makka-2 *	2007/2008	UP	(HUZM-185 x HKI-1105, having single cross, 85 days to maturity, with yield potential of 50-55 Q/ha)
	2. Hybrid Makka-3	2010 (SVRC)	U.P.	Early in Maturity, yield potential : 50-60 Q/ha for Rabi Season.
Pigeonpea	1. MA-3 (Malaviya Vikalp)	1999	CZ	Kharif season, medium tall, resistant to pod fly, wilt and SMD. Yield potential: 4300 kg/ha.
	2. MA-6 (Malaviya Vikas)	2002/2003	NEPZ	Rainfed-Kharif, semi-spreading, pod purple, tolerant to wilt and resistant to SMD. Medium tall with synchronous maturity (250 days). Yield potential: 3800 kg/ha.
	3. MAL-13 (Malaviya Chamatkar)	2005	NEPZ	Rainfed as well as irrigated conditions for Kharif and pre-Rabi seasons, resistant to wilt and SMD and tolerant to PB, spreading, medium height, long green constricted pod with black streaks and bold seeds (13 g/100 seeds) and matures within 230 days
Mungbean	1. HUM-1 (Malaviya Jyoti)	1995/1999	CZ, SZ	Spring season, resistant to C.L.S, PM, MYMV. Yield potential: 16-18 q/ha and matures within 65 days.
	2. HUM-2 (Malaviya Jagriti)	1999/2000	UP, Uttranchal	Zaid season, moderately resistant to MYMV, medium bold seed, Maturity duration: 65 days.
	3. HUM-6 (Malaviya Janpriya)	2001	UP	Zaid season, early maturity (62 days), green seed having 26% high protein.
	4. HUM-12 (Malaviya Janchetna)	2002/2003	NEPZ	Summer season, dwarf, early maturity (60 days). Seeds are green and medium bold (5 g/100-seeds). Moderately resistant to MYMV. Average yield of 16-20 q/ha in timely sown
	5. HUM-16 (Malaviya Jankalyani)*	2005/2006		Dwarf, long podded, (clusters) containing green and bold seeds (5.73 g/100 seeds) and resistant to MYMV
Pea	1. HUP-2 (Malaviya Matar-2)	1986/1988	NEPZ, EZ	Tall, semi leafless variety, resistant to powdery mildew disease. Maturity period : 120 days. It carries yield potential of 20-25 qt/ha and possesses excellent cooking quality
	2. HUDP-15 (Malaviya Matar-15)*	1999	NEPZ, PHZ	Dwarf, semi-leafless, resistant to powdery mildew and rust, yield potential up to 40 q/ha. Due to dwarf and semi leafless nature, the crop does not lodge and the loss due to bird damage is minimized.
Rajmash	1. HUR-15	1984/1987	NEPZ	It is white seeded variety with good cooking quality having high yield potential of 18-20 q/ha. It is tolerant to the prevalent diseases of this crop.
	2. HUR-137	1990/1991	NEPZ	Its seeds are reddish dark brown with attractive shine. This variety also carries high yield potential of 20-22 q/ha
	3. HUR-203	2006	CZ	Its seeds are kidney bean shaped, brown in colour with red spot. An early duration (100 days), having high yield potential of 20-25 q/ha.
Lentil	1. HUL-57*	2005	NEPZ	Timely sown under rainfed condition having yield potential of 21-23 q/ha. Resistant to rust and moderately resistant to wilt. It is small seeded having better cooking quality.
Safflower	1. HUS-305*	1986/1988	NEPZ	Timely sown in normal/salt affected soils. It has yield potential of 1100 – 1300 kg/ha under rainfed condition. Tolerant to leaf-blight, wilt and root rot. High tolerant to salinity. Oil content is 35-36%.

* The varieties which have occupied in the largest area of cultivation in the country, recognized far and wide.

51. Future plans of the department.

(A) **Cytogenetics :**

(i) Establishment of cytogenetic stock (interchange, autotetraploids and synthetic allopolyploids).

(ii) Crop Improvement through chromosome engineering – distant hybridization.

(iii) Exploitation of haploids in crop improvement.

(iv) Exploitation of balanced tertiary trisomics in liquid seed production.

(v) Use of chromosome banding techniques in karyotype analysis.

(B) Plant Breeding

In addition to yield enhancement, synchronous maturity and improved plant type; following traits will be concentrated upon (crop-wise) in the coming decade for crop improvement involving conventional and modern approaches :-

(1) Wheat	(a) Blight and rust resistance under different agro-climatic conditions. (b) Tolerance/resistance to temperature for late sown condition. (c) Qualitative improvement for protein content.
(2) Barley	(a) Suited to rainfed conditions/Diara land. (b) Resistance for blight, rusts and aphid under timely and late sown conditions.
(3) Rice	(a) Raising medium maturing and late maturing genotypes suitable for rice-wheat cropping system. (b) Identification, isolation, cloning and introducing of disease resistance gene(s) in the established high yielding varieties. (c) Distance hybridization for raising dwarf, high tillering, long panicle bearing, C_4 plant type for realizing maximal grain yield. (d) Identification of maintainer and restorer lines from rice germplasms through CMS lines and their use in hybrid production. (e) Mutation breeding for improvement of traditional fine grain rice varieties.
(4) Maize	(a) Development of single cross hybrid for medium and full season maturity. (b) Development of quality protein maize variety for full season maturity. (c) Identification of stable germplasm for resistance/tolerance to drought and excess moisture.
(5) Pigeonpea	Resistance/tolerance to sterility mosaic virus, wilt, *Phytophthora* blight, water logging, pod fly, pod borer, photo-thermo sensitivity and quality traits.
(6) Field pea	Resistance/tolerance to rust, terminal heat stress and quality traits.
(7) Lentil	Resistance/tolerance to rust, wilt blight, drought and terminal heat stress.
(8) Rajmash	Resistance/tolerance to common bean mosaic virus and schlerotenia diseases.
(9) Green gram	Resistance/tolerance to yellow mosaic virus, cercospora leaf spot, thrips and leaf curl.
(10) Oil seeds	(a) High oil content with less than 2% erucic acid and 30 µM glucosinolate/gm of defated oilcake, tolerance/resistance to aphids, *Alternaria* blight diseases in rapeseed/mustard. (b) Resistance to water logging and phylody in sesame.
(11) Vegetables	(a) Improvement for resistance to biotic and abiotic stress factors, yield and quality traits. (b) Varietal development and hybrid seed production in farmers' participation.
(12) Molecular approaches	Use of molecular markers in the improvement of some selected cereals, pulses, oilseed and vegetable crops for oligogenic characters.

It is important to point out here that the generation of information regarding nature and magnitude of gene actions and genetic variance for understanding of inheritance, coupled with exploitation of economically important characters in the crops, referred to above, will also be analyzed biometrically for establishing the biological significance and suitability of employed breeding techniques in crop improvement programme.

(C) Microbial Genetics :

For achieving (i) improved N_2 fixation (asymbiotic and symbiotic) and (ii) soil enrichment through growth hormone additions, P solublization and improved efficiency as a biocontrol agent, the following objectives are proposed to be carried out :-

(a) Biodiversity studies of Plant Growth Promoting Rhizobacteria (PGPR) – Isolation, Authentication and Molecular Characterization.

(b) Identification of symbiotically efficient rhizobial strains for promising cultivars of different pulse crops and their field application (quality culture production for farmer's use).

(c) Development of mixed consortium of crop-specific biofertilizers.

(d) Molecular basis of plant microbe interaction between endophytes and non-leguminous crops.

(D) Plant Biotechnology :

(a) Anther culture for haploid production and isolation of homozygous doubled lines in short period in various cereal crops.
(b) Isolation of somaclonal variants for biotic and abiotic stresses in crop plants.
(c) Quality protein gene isolation and transfer to cereal crop genome to improve nutritional values.
(d) Development of new plant type in cereal crops through wide crosses and embryo rescue/protoplast fusion to obtain plant with C_4 physiological cycle to realize maximum grain yield.
(e) Micropropagation of Banana, Guava and endangered plant species.

(E) Seed Technology :

(a) Research for enhancing the extent of genetic purity of seeds (seed testing and breaking of dormancy).
(b) Improvement of the seed quality with respect to (i) biochemical quality, and (ii) longer viability.
(c) Quality Seed Production of nucleus seeds, foundation seeds and certified seeds of major field crops (rice, wheat, maize, millets, pulses and oilseeds).
(d) Sufficient quantity of nucleus seed of each varieties of different crops need to be done and for that fund should not be limiting factor.
(e) Farmers' participatory seed production programme should be encouraged on large scale.
(f) Breeding sesame varieties suitable for intercropping system, drought tolerance and water logging.
(g) Maintenance breeding for HUL-57 (MalaviyaVishwanath).
(h) Improvement of lentil variety, HUL-57 for *Fusarium*wilt and rust diseases through mutation breeding.
(i) Keeping in view the global warming, rice crop seems to be problematic. Hence, future action should be in such a way that they may yield high with low water requirement which will help to reduce the harm to Ozone layer.

52. Detail any five Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.

A. Strength

1. The Department has expert faculty in all the four major thrust areas.
2. The Department has been periodically developing sophisticated research laboratory e.g. (a) Molecular Breeding (b) Quality Lab
3. We have 07 Plan Projects (AICRP on different crops) funded by ICAR, New Delhi
4. We have also NICHE Area of Excellence Project funded by ICAR, New Delhi
5. Mega Seed Project to cater the needs of the adjoining farmers.

B. Weaknesses

1. Paucity of space for developing new lab and accommodating the faculty on vacant positions.
2. Lack of sufficient recurring funds to maintain the existing equipments and cost of chemicals.
3. We do not have sufficient travel grant for germplasm collection from out station, literature consultation and research analyses work.
4. We lack the facilities of faculty exchange for providing advance training to our teachers in new emerging sophisticated research areas.
5. We lack space for Plant Breeding Museum, store and furniture for our new Seminar Room + Faculty sitting chamber.

C. Opportunities - With the expertise available in the Department of Genetics and Plant Breeding the Institute of Agricultural Sciences and the commendable contributions made in terms of standard publications, release of improved crop varieties and sanction of research projects consistently

over the last 2-3 decades, the department wishes to add the following two new thrust areas of our existing disciplines.

1. Breeding for stress tolerance in crop plants.

2. Microbial Genetics and Bio-fertilizer Research

D. Challenges : The greatest challenge is to identify the crucial researchable areas that may help to feed the exploding population of Varanasi and adjoining areas. Obviously, these relate to the change scenario in Agriculture due to gross climatic variation (temperature and rainfall) rapid land shrinkage, urbanization and declining soil fertility in order to develop sustainable varieties of different crop plants to yield desirably under all odds.

Post-accreditation Initiatives

If the university has already undergone the accreditation process by NAAC, please highlight the significant quality sustenance and enhancement measures undertaken during the last four years. The narrative may not exceed ten pages.

The department is not aware of the overall NAAC suggestions passed on to the Central Registry of the Banaras Hindu University, based on its accreditation assessment made earlier.

Yet in view of the suggestions based by the **NAAC** members visiting the Institute of Agricultural Sciences, we have concentrated upon the major thrust areas approved by them (as described in the proceedings sections) and made best possible efforts to improve our course curricular at various levels and research specializations/laboratories towards the square development of the department considering the inter disciplinary importance in regional, national and international context.