ANNUAL REPORT

2009 - 2010

RAJENDRA AGRICULTURAL UNIVERSITY, BIHAR
PUSA (SAMASTIPUR) – 848 125

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FOREWORD

It gives me immense pleasure to present the Annual Report of Rajendra Agricultural University. It is a compendium of the University's activities during the year 2009-10 highlighting the significant achievements made in the field of education, research and extension education in agriculture and allied sciences through a net work of colleges / research stations / KVKs spread over the entire state of Bihar.

Established in the year 1970, the University is contributing to the overall agricultural development of the state by way of developing quality professionals in the areas of agriculture and allied sciences, conducting demand driven research, fine tuning technologies and capacity building of farmers to facilitate adoption, besides providing consultancy and advisory support to the farmers, government, NGOs & other organizations involved in the agricultural development.

The University is progressing steadily with administrative, financial and technical support from the Government of Bihar, ICAR, Government of India and various national and international funding agencies. The kind guidance received from our Hon'ble Chancellor, Board of Management and the various Statutory Bodies such as the Academic Council, Finance Committee, Extension Council, Research Council propelled the activities of the University to fulfill the aspirations of the students, farming community, government and other stakeholders.

The University has been making continuous efforts to develop new crop varieties and technologies for the benefit of farmers. One new variety of Arvi, Rajendra Arvi-1 was developed and released for Bihar plains. Besides, the technology for betelvine cultivation and intercropping in sugarcane were also developed and released.

The University produced and supplied quality planting materials and seeds of various crops, fish seed, spawn of mushroom, bee colonies etc. to farming community of the state as well as other states of the country. The students and faculty members have brought laurels to the University by exhibiting their excellence in the fields of education, research, extension education, co-curricular and extra curricular activities. The University fraternity is committed to meet the expectations of all its stakeholders.

I thank all my University colleagues without whose tireless contributions, the achievements of Rajendra Agricultural University would not have been possible. Efforts of Dr. S. P. Singh, Dr. Dibyanshu Shekhar, Dr. Neeraj Kumar and Sri Uday Kumar of Technical Cell in compilation and preparation of this document in a commendable manner are greatly appreciated. I am sure that all stakeholders would be benefitted by the information given in this report.

(R. K. Mittal)
Vice-Chancellor

Pusa
April 10, 2013

EXECUTIVE SUMMARY

The Rajendra Agricultural University came into existence on 3rd December, 1970 as a part of process of development of Agricultural Universities in Bihar through an Act of Bihar Legislative Assembly. The jurisdiction of this university includes all the districts of Bihar.

In the reporting year 2009-10, there were six faculties and ten colleges in the University. Faculties were Agriculture, Veterinary and Animal Science, Agricultural Engineering, Basic Sciences & Humanities, Home Science and Post-Graduate Studies while colleges were Bihar Agricultural College, Sabour; Tirhut College of Agriculture, Dholi; Bihar Veterinary College, Patna; College of Home Science, Pusa; College of Agricultural Engineering, Pusa; College of Basic Sciences & Humanities, Pusa; College of Fisheries, Dholi; Sanjay Gandhi Institute of Dairy Technology, Patna; College of Horticulture, Noorsarai and Mandan Bharati Agriculture College, Agwanpur. The main mandate of the University is to promote agricultural productivity in general and to improve the economic condition of rural community in particular through integration of teaching, research and extension education.

The University made significant contributions in its mandated areas of agricultural education, research and extension during the year 2009-10.

The University offered undergraduate programme in the field of Agriculture, Veterinary Science, Home Science, Fisheries, Agricultural Engineering and Dairy Technology and 639 students were admitted in its ten constituent colleges. 110 Students were admitted in post-graduate programme in different subjects. 113 Students at UG level and 50 at PG level successfully completed their degree courses.

The research activities have been carried out in the field of agriculture on different aspects viz. crop improvement, crop production, crop protection, post harvest management and in animal sciences for the betterment of living standard of rural farming community. The efforts of the scientists resulted in development of new crop varieties and technologies for farmers.

Under crop improvement programme, 1330 germplasms of rice were grown and evaluated. 233 Breeding lines of different generations were evaluated and 21 fresh crosses were attempted. Five promising entries were identified for testing and one entry viz. RAU 759-5-41 is in pipeline for release. In maize, 15 trials were conducted out of which 8 trials were on normal maize, 3 trials on specialty corn, one trial on QPM, one station trial and two zonal trials of early maturity and medium maturity. In QPM group, QPM MMH-07-01, a single cross hybrid developed at Dholi centre got Ist rank with respect to yield. In wheat, 631 entries were evaluated and 69 crosses were made under hybridization programmes at different centers. 86 Germplasm lines of pigeonpea were grown for evaluation and characterization. Among moongbean entries in IVT (spring), SML-859 recorded highest yield (2361 kg/ha) and in AVT -1, entry IPM-02-14 gave highest yield (1962 kg/ ha).

Among twelve entries of sweet potato, two entries viz. S-1-60 and Co-3-4 recorded highest marketable tuber yield, harvest index and dry matter. Out of forty three yam bean genotypes tested, DL-28 had maximum fat (0.25 g/100g edible tubers), carbohydrate (14.86 g) and sugar content (6.92 g). Among eleven genotypes of turmeric, Rajendra Sonia was found superior in yield (82.7 t/ha). In mango, out of 43 germplasms, Dudhia Maldah produced maximum fruit yield (56.0 kg/plant) followed by Surajgarha Maldah (53.0 kg/ plant).

Pre harvest treatments of mango with Ca Cl_2.6H20 (2%) extended post harvest life and fruits were marketable upto 12 days. In guava, Allahabad Safeda gave the maximum fruit yield (39.65 kg/plant) and foliar spray of 15% fertilizer grade urea at 50% bloom stage followed by second at 10 days interval was very effective in crop regulation during rainy season. In hybrid trials of brinjal and okra, Pusa Hybrid-6 of brinjal (3720 q/ha) and VROH-8 of okra (102.0 q/ha) gave the highest yield.

Under the research on crop production many important studies were conducted. The agronomic study on rice covered nitrogen varietals trials, cultural management trials and weed management. Rajendra Kasturi and IET19713 were found superior and N responded upto 100% N/ha of RDF at Pusa. Under system of rice intensification, planting of 10 day old seedlings followed by 2 times cono-weeding was significantly superior in increasing grain yield. Application of 100 kg N/ha in rice + dhaincha (1:1 incorporated after 30 DAS) + pre emergence herbicide application + one hand weeding at 60 DAS give highest yield. Early to mid July transplanting for photo insensitive rice (var. Rajendra Kasturi) and late July transplanting for photo sensitive aromatic rice (var. Sugandha) were found significantly superior. In wheat, genotypes evaluated performed better under normal sown condition as compared to late sown condition. Wheat grain yield increased with increasing level of nitrogen application and the maximum grain yield (34.26 q/ha) was recorded with 80 kg N/ha. Permanent bed method of planting in maize recorded maximum grain yield followed by zero-tillage. Under site specific nutrient management in rice-maize cropping system, application of 120:50:30:25 kg N, P, K, Zn per ha in both the crops recorded significantly higher rice equivalent yield. In linseed, the effect of different date of sowing and different level of fertilizer application was evaluated on seed and fiber yield. In pigeonpea, experiments were conducted on integrated nutrient management and on field performance of promising long duration pigeonpea genotypes and rhizobium strains. In urdbean, trials on planting pattern and weed management under urdbean + ragi intercropping system and on population management were conducted.

In tropical fruits, banana responded almost similarly to different nitrogenous fertilizers. In papaya, application of bio-fertilizers had significant influence on growth and productivity of plants. The effect of micro nutrients and fertilizer application on the yield of different vegetables viz. bitter gourd, bottle gourd, cucumber and tomato was evaluated. Under intercropping experiments in tuber crops, elephant foot yam in mango orchard with full dose of fertilizers gave highest corm yield followed by sweat potato. In spices, studies were conducted on response of organic farming in ginger and turmeric. In potato, experiments were conducted on integrated nutrient management, effect of organic fertility levels, water management, selection on N efficient cultivar and shifting of planting date.

Under crop protection, important findings were made in entomology, plant pathology and nematology. In entomology, studies on population dynamics and insect pest management were conducted in rice, maize, pulses, fruits, vegetables and tuber crops. In plant pathology, findings were made on bacterial / fungal diseases affecting rice, wheat, maize, pulses, tropical and sub-tropical fruits, vegetables, spices and potato crops and for their management. Research was also conducted on viral diseases leading to important findings. In nematology, important studies were made on biodiversity, resistance and management in wheat and pulses.

Under weed management, studies were conducted on survey of weeds, effect of time of sowing and weed control methods in direct seeded rice, effect of rice and maize based cropping system on weed dynamics and crop productivity, long term trial on tillage in rice-wheat cropping system, long term herbicidal trial on rice-chickpea, rice-wheat, maize-lentil cropping systems.

In soil test crop response correlation studies, increase in grain and straw yield of rice was recorded with increasing levels of fertilizer. The compost, crop residues and compost + crop residues increased the grain and straw yield of rice. In MAP and betelvine, the studies covered collection and conservation of germplasms of betelvine, effect of planting time and number of node cuttings on yield of different betelvine varieties and their fungal diseases. In mushroom, collection of wild germplasms and evaluation of oyster strains was carried out.

In honey bees and pollinators, studies were conducted on stock improvement and effect of different artificial diets during dearth period on colony development. The artificial diet comprising of soyabean flour (25g) + yeast (10g) + pollen (15g) + skimmed milk powder (5g) + honey (22.5g) + sugar (22.5g) was best suited during dearth period. Extraction of bee vermom and propolis from *Apis mellifera* colonies was also done.

Under crop variety release, Rajendra Arvi-1, a new variety of arvi was released for plains of Bihar. Besides, technology for betelvine cultivation and intercropping in sugarcane were developed and released.

Krishi Vigyan Kendras of the University have conducted 697 training programmes for practicing farmers, practicing farm women, rural youth and extension functionaries in the field of crop improvement, natural resource management, crop protection, fisheries & A.H, home science, farm machinery & engineering and entrepreneurship development etc. The trainings were also conducted by the units. More than 57000 participants got benefited by these trainings. FLDs were conducted by KVKs in about 370 ha area for technology demonstration of various crops. 140 On-farm trials were conducted by KVKs on various technologies. The farmer problems were solved through personal visit and guidance by scientists. 9 Farmers club and 10 seed village were established. Besides, 30 Kisan Mela and 43 Field day were also organized by KVKs. The efforts were made to inform farmers/rural people about technological advancement through TV programme and radio talks delivered by the scientists of the University and folders, leaflets and newsletter published by KVKs.

The seed production unit at Dholi produced 7023.54 q processed seed of different crops. It included breeder, foundation, certified and truthful seed of different crops. The other units of the University also produced planting material of different crops, fish seed, honey and milk.

The University is always looking forward to the welfare of the students through different activities like sports, cultural, spiritual programmes, NSS and educational tour with a view to develop personality, character and high human values in UG and PG students. Inter-college sports and cultural activities were organised by the University. The students participated in two inter-university tournaments viz. XIth All India Inter Agricultural University Sports and Games Meet, 2009-10 held at Marathwada Agricultural University, Parbhani and 3rd Bihar State Inter University Sports Meet – Eklavya 2010 held at J.P. University, Chapra. Educational tours were arranged for the students of all the colleges.

University Library at Pusa is catering to the need of scientists, teachers, students, extension specialists and staff of the main campus as well as of research stations, sub-stations and KVKs. Library has subscribed 42 foreign journals and 125 Indian journals during 2009-10. CD ROM Database facilities are available in the library. 693 New books have been purchased and the total numbers of books available in the library has gone upto 60391.

University Hospital takes care of the health of all staff members and students. During 2009-10, 5166 patients were provided treatment in OPD and the average number of patients treated was 38 (22 male+16 female) per day.

A total of 92 research papers were published in research journals with good impact factors and 36 research papers were presented in seminars, symposia and conferences. Apart from this, a number of books, technical bulletins and popular articles were published during the year.

Thirty three faculty members participated in seminars/symposia/conferences, 22 in short courses/ trainings/ summer school/ winter school/ refresher courses and 46 in workshops/ group meetings. The University organized one International seminar, one national symposium, one group meeting and 13 trainings for farmers and officers. During the year, 32 All India Coordinated Research Projects, 18 Adhoc Research Projects, 4 Foreign Aided Projects, 6 Rashtriya Krishi Vikas Yojana projects and 5 NAIP projects were operating in the University.

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1. INTRODUCTION

1.1 BACKGROUND INFORMATION

Pusa has a great historical importance. The seed of agriculture research and education was sown here about a century ago, when the then Viceroy and Governor General of Imperial British India had laid the foundation stone of the proposed Agriculture Research Institute on April 1, 1905. The grand edifice name of the building, 'Phipps Laboratory' came up during 1907 which was named after its donor, Mr. Henry Phipps. The institute was renamed as "Imperial Agricultural Research Institute" (IARI) in 1919. It was shifted to New Delhi in 1936 on account of extensive damage to the Phipps Laboratory due to the devastating earthquake of 1934. Pusa is also credited to have first Sugarcane Research Institute, which was established in 1936 and is serving the country even today. Other campus of the university, Agricultural College at Sabour, Bhagalpur was established on 17th August, 1908 by Sir Andrew Henderson Leith Freizer, the then Governor of Bihar, Bengal and Orissa. Veterinary College at Patna was established on 2nd April, 1927. When the need of an Agriculture College was felt in North Bihar, the State Government decided to have it at Dholi (Muzaffarpur) a place in the vicinity of Pusa and it was established in 1960. The college was named as Tirhut College of Agriculture. Rajendra Agricultural University, established in December 3, 1970 by reorganizing three Agricultural Colleges at Sabour, Kanke and Dholi, two Veterinary Colleges at Ranchi and Patna, four Regional Agricultural Research Institutes located at Patna, Dholi, Sabour and Kanke and Sugarcane Research Institute, Pusa, the birthplace of agricultural research and education, has played a significant role in enlightenment of people concerned with agriculture.

Later, the University established one college each of Basic Sciences & Humanities, Dairy Technology, Agricultural Engineering, Home Science and Fisheries. The main Administrative Complex, the University Library, the Faculty of Agricultural Engineering, Faculty of Basic Science & Humanities, Faculty of Home Science, Post Graduate Departments of the Faculty of Agriculture, Dairy Farm of the University, Sugarcane Research Institute, University Apiary, Sanchar Kendra, and University Guest House are located at Pusa. The College of Dairy Technology and Bihar Veterinary College are located at Patna and College of Fisheries at Dholi. The Seed Production and Processing Unit of the University is located at Dholi which plays a pivotal role in production of quality seeds for the state.

Subsequently, the University under National Agricultural Research Project established a few research stations, sub-stations, farm science centres, operational research projects and such other wide ranging programmes for the benefit of the rural community. Now, Bihar has the privilege to have one KVK in each district.

1.2 MANDATE OF THE UNIVERSITY

- To impart education in different branches of agriculture and allied fields.
- To undertake basic, strategic and applied research for developing technologies to enhance productivity and quality of agricultural and animal produce.
- To disseminate scientific information to farmers.
- To plan, organize and conduct *on campus* and *off campus* training programmes for different functionaries and clientele in order to develop human resource capability in the field of agriculture.
- To help the state government in supplying breeder seeds towards production and multiplication of foundation and certified seeds.

- To provide consultancy services and expertise in the agricultural research and development to the industries, NGOs and others.
- To serve as a repository of national and international scientific information on various aspects of agricultural and animal production.
- To collaborate with relevant national and international agencies for all round development of agriculture in the state.

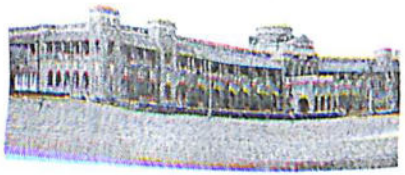
1.3 FACULTIES OF THE UNIVERSITY

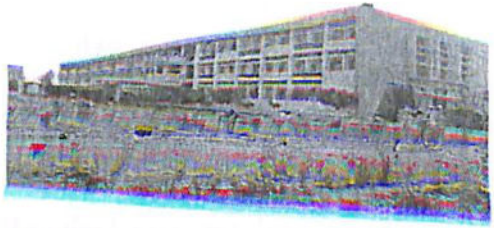
- Faculty of Agriculture
- Faculty of Veterinary and Animal Science
- Faculty of Agricultural Engineering
- Faculty of Basic Sciences & Humanities
- Faculty of Home Science
- Faculty of Post Graduate Studies

1.4 CONSTITUENT UNITS OF THE UNIVERSITY

Bihar Agricultural College, Sabour

Bihar Agricultural College, Sabour is one of the six Agricultural Colleges in India established during 1906 to 1910 and has been a premier Institution of agricultural education and research in the country. It was established on 17th August, 1908.





Tirhut College of Agriculture, Dholi

Tirhut College of Agriculture, Dholi was founded on 18th August, 1960 by first Chief Minister of Bihar Late Dr. Srikrishna Singh. More than four decades have passed after the establishment of the College and during this period notable successes have been achieved in the field of teaching, research and extension.

Bihar Veterinary College, Patna

The Bihar Veterinary College, Patna, one of the four pioneer and the oldest veterinary colleges in undivided India was established on 2nd April, 1927. has actively been involved in development husbandry through

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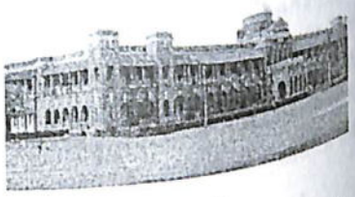

Bihar Veterinary College, Patna

The Bihar Veterinary College, Patna, one of the four pioneer and the oldest veterinary colleges in undivided India was established on 2nd April, 1927. Institution has actively been involved in development of veterinary and animal husbandry through teaching, research and extension.

Tirhut College of Agriculture, Dholi

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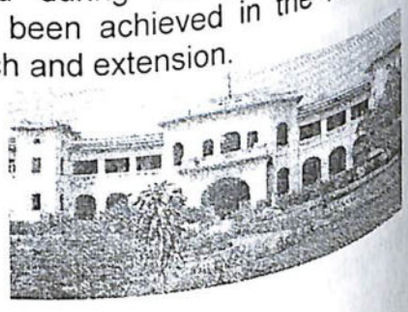
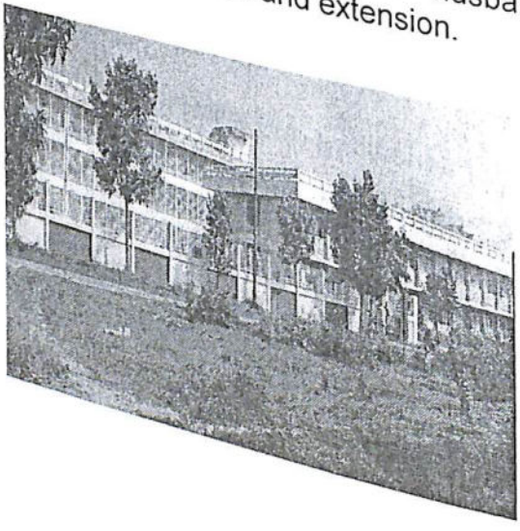




College of Home Science, Pusa

The college of Home Science was established in the year 1982 at Pusa with major objectives to foster the growth, development and well being of individuals, families and communities. The College of Home Science stands for academic excellence, where young women are equipped to meet successfully the challenges of the family and get opportunity. Besides this, the college has also started vocational courses for 6 months duration in different areas of Home Science

College of Agricultural Engineering, Pusa

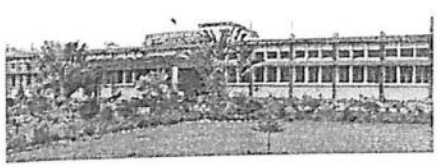
This college is located at Pusa and was established on 7th December, 1983 with the objectives to impart good quality teaching to students for the B.Tech and M.Tech degree, to conduct basic and applied researches in all the aspects of agricultural engineering, to develop suitable technologies for farmers, entrepreneurs, industrialists.

College of Basic Sciences & Humanities, Pusa

College of Basic Sciences and Humanities was establishment in Rajendra Agricultural University, Pusa in November 1981 with the objective to strengthen the teaching and research programme in different disciplines of basic sciences so that it can act as a strong supporting programme for the other faculties

College of Fisheries, Dholi

The college of fisheries was established on 13th January, 1987 at Dholi, Muzaffarpur. This college is creating trained human resource to develop the great potentiality of the fisheries sector in Bihar.



Sanjay Gandhi Institute of Dairy Technology, Patna

The Sanjay Gandhi Institute of Dairy Technology was established on 14th December, 1980 at Patna for creating human resource in the field of dairy technology. The practical aspects of the teaching programme are supported by well equipped laboratories on various aspects of dairy science and technology.

College of Horticulture, Noorsarai (Nalanda) : The College of Horticulture, Noorsarai was established on 15th July, 2006. The college was established specifically for overall development of horticulture in the state and for creating human resource.

Mandan Bharati Agriculture College, Agwanpur : The Mandan Bharati Agricultural College, Agwanpur was established in 2007 at Agwanpur, Saharsa for creating human resource and agricultural development of Kosi region.

1.5 DEGREE PROGRAMMES OF THE UNIVERSITY

- **Under-graduate programme** in the fields of Agriculture, Veterinary Sciences, Home Science, Fisheries, Agricultural Engineering and Dairy Technology.

Degree	Intake capacity
B. Sc. (Ag.)	200
B.Sc. Horticulture	25
B. V. Sc. and A. H.	120
B. Sc. (H. Sc.)	50
B. Tech. (Ag. Engg.)	50
B.Tech. (D.T.)	50
B. F. Sc.	50

- **Post-graduate programme** in 23 fields of specialization with a total intake capacity of 195 students.

S.No.	Discipline	Intake capacity
1.	Agronomy	20
2.	Agricultural Biotechnology	04
3.	Agricultural Economics	12
4.	Agricultural Statistics	04
5.	Animal Breeding & Genetics	05
6.	Animal Nutrition	05
7.	Animal Reproduction & Gynaecology & Obstetrics	05
8.	Botany and Plant Physiology	05
9.	Entomology	12
10.	Extension Education	11
11.	Extension Education (H. Sc.)	04
12.	Family Resource management	03
13.	Food & Nutrition	03
14.	Horticulture	18
15.	Livestock Production & Management	03
16.	Nematology	02
17.	Plant Breeding & Genetics	12
18.	Plant Pathology	12
19.	Post Harvest Technology	03
20.	Soil Science	12
21.	Soil & Water Engineering	05
22.	Veterinary Parasitology	05
23.	MBA	30

- **Ph.D. programme** in 12 departments with a total intake capacity of 40 students.

S.No.	Department	Intake capacity
1.	Agronomy	06
2.	Agricultural Economics	02
3.	Agril. Biotechnology	02
4.	Animal Reproduction & Gynaecology	02
5.	Entomology	04
6.	Extension Education	02
7.	Horticulture (Pomology)	02
8.	Horticulture (Olericulture)	02
9.	Plant Breeding & Genetics	06
10.	Plant Pathology	04
11.	Plant Physiology	02
12.	Soil Science	06

2. SALIENT ACHIEVEMENTS

2.1 EDUCATION

2.1.1 Under-graduate Programme

2.1.1.1 Number of students admitted

S. No.	College	Degree programme	Male	Female	Total
1.	BAC, Sabour	B. Sc. (Ag)	79	44	123
2.	TCA, Dholi	B. Sc. (Ag)	70	41	111
3.	MBAC, Saharsa	B. Sc. (Ag)	42	11	53
4.	CAE, Pusa	B.Tech. (Ag. Engg.)	54	10	64
5.	COHS, Pusa	B. Sc. (H.Sc.)	-	43	43
6.	FBS&H, Pusa	B.Tech. Boitech.	37	10	47
7.	COH, Noorsarai	B. Sc. (Hort).	32	12	44
8.	BVC, Patna	B.V.Sc. & AH	85	15	100
9.	SGIDT, Patna	B. Tech. (DT)	30	12	42
10.	COF, Dholi	B.F.Sc.	08	04	12
		Total :	**437**	**202**	**639**

2.1.1.2 Number of students on roll (year wise)

S. No.	College	Degree programme	Year											
			I		II		III		IV		V		Total	
			M	F	M	F	M	F	M	F	M	F	M	F
1.	BAC, Sabour	B.Sc. (Ag)	37	20	36	21	45	19	47	12	01	09	166	73
2.	TCA, Dholi	B. Sc. (Ag)	34	20	28	16	33	21	51	15	02	01	148	73
3.	MBAC, Saharsa	B. Sc. (Ag)	20	05	21	05	18	05	0	0	0	0	59	15
4.	CAE, Pusa	B.Tech. (Ag. Engg.)	20	03	28	05	30	03	34	06	03	0	115	17
5.	COHS, Pusa	B. Sc. (H.Sc.)	0	21	0	19	0	07	0	01	0	0	0	48
6.	FBS&H, Pusa	B.Tech./ Biotech.	16	08	13	03	13	09	08	05	0	0	50	25
7.	COH, Noorsarai	B. Sc. (Hort.)	12	04	17	07	24	06	07	0	0	0	60	17
8.	BVC, Patna	B.V.Sc. & AH	41	07	14	01	39	12	35	08	20	05	149	33
9.	SGIDT, Patna	B. Tech. (DT)	14	07	12	05	29	04	25	07	02	0	82	16
10.	COF, Dholi	B.F.Sc.	07	05	21	03	20	05	21	05	0	0	69	18
		Total :	**201**	**100**	**190**	**85**	**251**	**91**	**228**	**59**	**28**	**15**	**898**	**335**

2.1.1.3 Number of students passed out

S.No.	College	Degree programme	Number passed out		
			Male	Female	Total
1.	B.A.C., Sabour	B. Sc. (Ag)	21	08	29
2	TCA, Dholi	B. Sc. (Ag)	22	13	35
3	MBAC, Saharsa	B. Sc. (Ag)	-	-	-
4	CAE, Pusa	B.Tech. (Ag. Engg.)	08	04	12
5	COHS, Pusa	B. Sc. (H.Sc.)	-	-	-
6	FBS&H, Pusa	B.Tech. (Boitech.)	-	-	-
7	COH, Noorsarai	B. Sc. (Hort.)	-	-	-
8	BVC, Patna	B.V.Sc. & AH	20	06	26
9	SGIDT, Patna	B. Tech. (DT)	03	-	03
10	COF, Dholi	B.F.Sc.	05	03	08
		Total :	**79**	**34**	**113**

2.1.2 Post-graduate Programme

2.1.2.1 Number of students admitted

S.No.	Department	Master's Degree		Ph.D.	
		M	F	M	F
1.	Agronomy	12	03	-	-
2.	Soil Science	-	-	-	-
3.	Plant Pathology	01	02	-	-
4.	Plant Breeding	04	01	02	-
5.	Entomology	01	01	02	-
6.	Horticulture	09	05	02	-
7.	A. B & M.B	06	03	-	-
8.	Extension Education	06	02	-	-
9.	Agril. Economics	04	02	-	-
10.	MBA	15	07	-	-
11.	M. Tech.	01	-	-	-
12.	Animal Breeding &Genetics	01	-	-	-
13.	Animal Nutrition	06	-	-	-
14.	Livestock Production & Management	03	-	-	-
15.	Veterinary Parasitology	04	-	-	-
16.	Animal Reproduction Gynecology & Obstetrics	03	-	-	-
17.	ARGO	-		1	-
18.	Parasitology	-		1	-
		Total :	**76**	**26**	**08**	**-**

2.1.2.2 Number of students on roll (semester wise)

i) Master's Degree Programme

S. No.	Discipline	Semester									
		I		II		III		IV		Total	
		M	F	M	F	M	F	M	F	M	F
1	Agronomy	-	-	7	2	-	-	3	-	10	2
2	Soil science	-	-	-	-	-	-	1	-	1	-
3	Pl. Breeding	-	-	3	1	-	-	2	-	5	1
4	Entomology	-	-	1	1	-	-	-	-	1	1
5	Extn. Edn.	-	-	6	2	-	-	-	-	6	2
6	Ag. Econ.	-	-	2	1	-	-	-	-	2	1
7	Hort. (Oleri.)	03	01	-	-	-	-	-	-	03	01
8	Nematology	-	-	1	-	-	-	-	-	1	-
9	Hort. (Pomo.)	04	01	-	01	01	01	-	-	05	03
10	M. Tech	1	-	1	-	2	-	2	-	6	-
11	MBA	15	7	15	7	10	6	10	6	50	26
	Total :	**23**	**09**	**36**	**15**	**13**	**7**	**18**	**6**	**90**	**37**

ii) Ph.D. Degree Programme (year wise)

S.No.	Discipline	Year									
		I		II		III		IV		Total	
		M	F	M	F	M	F	M	F	M	F
1	Agronomy	-	-	2	-	-	-	2	-	4	-
2	Soil science	-	-	-	-	-	-	3	1	3	1
3	Pl. Pathology	-	-	-	-	1	-	1	-	2	-
4	Pl. Breeding	-	-	1	-	-	-	1	-	2	-
5	Entomology	2	-	1	-	1	1	-	-	4	2
6	Stat.	-	-	-	-	-	-	-	-	-	-
7	Extn. Edn.	-	-	1	-	-	1	3	-	4	1
8	Hort. (Oleri.)	-	-	-	-	-	-	-	-	-	-
9	Genetics	-	-	-	-	1	25	-	1	1	2
10	Bot. & Pl. Physiology	-	-	-	-	-	-	1	-	1	-
	Total :	**2**	**-**	**5**	**-**	**3**	**27**	**11**	**02**	**21**	**6**

2.1.2.3 Number of students passed out

S.No.	Discipline	Master's		Ph.D.	
		M	F	M	F
1	Agronomy	4	-	-	-
2	Plant Pathology	3	-	-	-
3	Entomology	1	-	-	-
4	Extension Education	1	-	-	-
5	Horticulture (oleri.)	-	-	1	-
6	Home Sc. E.E		1	-	-
7	Horticulture (Pomo.)	-	1	-	-
8	M.V. Sc	11	1	-	-
9	MBA	18	8	-	-
	Total :	38	11	1	-

2.1.2.4 Fellowship/Scholarship awarded

Name of student	Degree programme	Fellowship	Awarding organi-zation	Amount of fellowship (Rs. / pm)
BAC, Sabour				
Suraj Prakash	Ph.D.	RAU Fellowship	RAU, Pusa	1700.00
Chandan Kumar	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
V ijay Shanker Pandey	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Krishna Kumar	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Chandramani	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Soil Science				
Ashwini Kr Chandrawal	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Kanti Kumari	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Varun Kumar	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Abhishek	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Agril. Economics				
Jai Prakash Kumar	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Kumar Rohit	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Swasti Kumari	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Agronomy				
Devendra Mandal	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Manish Ranjan	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Rajan Kumar	Ph.D.	RAU Fellowship	RAU, Pusa	1700.00
Pankaj Kumar	Ph.D.	RAU Fellowship	RAU, Pusa	1700.00
Irshad Alam	Ph. D.	RAU Fellowship	RAU, Pusa	1700.00
Entomology				
Sanjeev Kumar Tanti	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Preeti Kumari	Ph.D.	RAU Fellowship	RAU, Pusa	1700.00
Amit Kumar	Ph.D.	RAU Fellowship	RAU, Pusa	1700.00
Plant Pathology				
Subhra Kumari	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Sunil Kumar	Ph.D.	RAU Fellowship	RAU, Pusa	1700.00

Contd

Plant Breeding & Genetics				
Chandan Kishore	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Pravin Kumar	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
FBS&H, Pusa				
Sugandh Suman	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Sonal Kashyap	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Smitha S. Nair	M.Sc. (Ag)	DBT Fellowship	New Delhi	1200.00
Vandana	M.Sc. (Ag)	DBT Fellowship	New Delhi	1200.00
Demudunaidu Panchada	M.Sc. (Ag)	DBT Fellowship	New Delhi	1200.00
Nand Kishor Sharma	M.Sc. (Ag)	DBT Fellowship	New Delhi	1200.00
Md.Zikrullah Shamim	M.Sc. (Ag)	DBT Fellowship	New Delhi	1200.00
Shashi Bhushan	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Nil Mani Prakash	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Homa Manzar	Ph. D.	RAU Fellowship	RAU, Pusa	1700.00
Archana Rani	Ph. D.	RAU Fellowship	RAU, Pusa	1700.00
Ranju Kumari				
Extension Education				
Adeline Tigga	Ph.D.	Rajiv Gandhi Fellowship		12000/ + contingency (Annually)
Satyanarayan Prasad	Ph.D.	RAU Fellowship	RAU, Pusa	1700.00
Aradhana Sinha	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
Shyama Kumari	M.Sc. (Ag)	RAU Fellowship	RAU, Pusa	1500.00
CAE, Pusa				
Khusbu Kumari	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Rupesh Kumar	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Om Prakash	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Kumari Swati	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Chandan Kr. I	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Man Mohan Deo	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Shalini Krishnam	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Utpal Kr. Mishra	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Zafar Iqbal	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Raushan Kr.	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Kr. Pratyush	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Rahul Kumar	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Anamika Thakur	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Deepanshu Sahay	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Manish Kr.Gupta	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Rajnish Ranjan	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Sweta Kumari	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Ranjeet Kr.	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Yatih Nupur	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Sweeti Kumari	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Shashank Shekhar	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Md. Tauseef Alam	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Pramod Kumar	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester
Sandip Ranjan	B.Tech (Agril Engg.)	Merit Scholarship	RAU, Pusa	1500/ Semester

2.1.3 Thesis Accepted

2.1.3.1 Ph.D.

Department	Name of Student	Name of Advisor	Title of the Thesis
Horticulture	Ashis Ranjan	Dr. Rajesh Kumar	Effect of foliar sprays of growth substances and mineral nutrients on flowering, fruiting and quality of litchi cv. Purbi
	Vinit Kr. Choudhary	Dr. I.D. Prasad	Effect of biofertilizers and chemical fertilizers on growth, yield and quality of onion
	Suraj Prakash	Dr. U.S. Jaiswal	Studies on bearing behaviour of some varieties of banana
Soil Science	Anil Kumar	Dr. K. Yadav	Dynamics of plant growth promoting rhizobacteria in maize-based inter-cropping system
Agronomy	Rajendra Prasad	Dr. V.P. Singh	Effect of earthing up and nitrogen scheduling on tillering, yield and quality of sugarcane (*Saccharum officinerum*)
	Md. Sajid Hussain	Dr. V.P. Singh	Studies of sugarcane intercropped with wheat under different crop geometry and fertilizer management
	Sunil Kumar	Dr. K.K. Sinha	Effect of crop establishmen methods, fertility levels and weed management on rice (*Oryza sativa* Productivity
PBG	Pramod Kumar	Dr. R. N. Sharma	Genetics of stalk borer resistance i quality protein maize
	Sardar Sunil singh	Dr. S.B. Mishra	Gene interaction and geneti divergence study in chickpea

2.1.3.2 M.Sc./M.Sc. (Ag.)/M.V.Sc./M.Tech./M.Sc. (Home Science)

Department	Name of Student	Name of Advisor	Title of the Thesis
Plant Pathology	Kabita Kumari	Dr. P.K. Jha	Bio-control potential of native mycoflora against anthracnose of betelvine
	Rajiv Kumar	Dr. S. Kumar	Studies on wilt disease of sugarcane and its management
	Rajeev Kumar	Dr. R.C. Rai	Eco-friendly management of lentil wilt caused by *Fusarium oxysporum* f. sp. *lentis*
Agronomy	Devendra Mandal	Dr. D. Singh	Effect of date of sowing and weed control methods on growth, yield and quality of direct seeded rice
Entomology	Abhishek Kumar	Dr. R.K. Akhauri	Management of whitefly *Bemisia tabaci* (Aleyrodidae: Hemiptera) in sunflower through varietal resistance, chemical insecticides and bio-products
Genetics	Abdur Rab Taha	Dr. Rajendra Prasad	Combining ability analysis and heterosis in yellow quality protein maize
Extension Education	Rana Rudra Pratap Singh	Dr. Madan Singh	Impact of training on knowledge of mushroom cultivation – A study in Samastipur

2.2 RESEARCH HIGHLIGHTS

2.2.1 Number of Trials Conducted

(A) Crop Improvement Section

S. No.	Crop	IVT / IHT / IET	AVT / AHT / AET	Others	Total	Line tested	No. of entries promoted
1.	Rice	11	14	18	43	836	6
2.	Wheat	10	5	10	25	578	7
3.	Maize (Kharif)	2	3	2	7	125	-
4.	Maize (Rabi)	5	6	4	15	-	19
5.	Pigeonpea	2	1	3	6	605	-
6.	MULLaRP	6	3	3	12	139	-
7.	Small millets	2	4	4	10	167	-
8.	Oilseeds	13	7	3	23	356	-
9.	Tuber	4	1	1	6	342	-
10.	Linseed	7	-	-	7	37	-
11.	Spices	4	-	5	9	205	-
12.	Mango	-	-	8	8	-	-
13.	Guava	-	-	5	5	-	-
14.	Vegetables	4	-	3	7	-	-
15.	Sugarcane	2	6	-	8	108	-

(B) Crop Production Section

S. No.	Crop	Varietal trial	SRI/ Other cropping system	Weed management	Inter-cropping	Date of sowing	Micronutrient/ INM	Phosphorus + Biofertilizer	Others	Total
1.	Rice	5	2	1						8
2.	Maize (kharif)	2					1			3
3.	Maize (rabi)	2								2
4.	Wheat	3				2			1	6
5.	Chickpea					2				2
6.	Pigeonpea	3				1	2			6
7.	MULLaRP	2		2	1		1		2	8
8.	Tuber crops	2				1	1		3	7
9.	Potato	2					1	1	2	6
10.	Spices							1	2	3
11.	Vegetables						1	4		5
12.	Sunflower						1		2	3
13.	Sugarcane					2			3	5
14.	Fruits								5	5
15.	Mango				1			1	3	5
16.	Guava							1		2
17.	Litchi	1						1	1	3
18.	Banana	1						1		1
19.	Papaya									

(C) Crop Protection Section

S. No.	Crop	Disease resistance screening	Insect pest screening	IPM/ IDM	Nemato-logy	Others	Total
1.	Rice	6	3	4		2	15
2.	Maize (kharif)	13	4				17
3.	Maize (rabi)	2	1				3
4.	Wheat	3	1		2		6
5.	Pigeonpea	8	4	1		1	14
6.	Chickpea	3	5		1	2	11
7.	MULLaRP	7	3		3	3	16
8.	Tuber crops	1	2	6		2	11
9.	Jute					1	1
10.	Oilseed	8	3				11
11.	Sunflower	3				1	4
12.	Castor	3					3
13.	Spices	1					1
14.	Sugarcane	2	1	1	4	1	9
15.	Vegetable	1	2	1		1	5
16.	Mango	2				2	4
17.	Litchi					1	1
18.	Banana					2	2
19.	Citrus			1		1	2
20.	Papaya					1	1

(D) Allied Field Research Section

S. No.	Discipline	No. of trials
1.	E.C.F.	3
2.	Cropping system research	6
3.	Weed science	24
4.	Water management	3
5.	STCR	11
6.	Soil survey and land use planning	12
7.	M.N.S.	11
8.	Agro- meteorology	2
9.	Betel vine	13
10.	Ag. Economics	8
11.	Extension Education	3
12.	Seed Technology	7
13.	Forestry	10
14.	Food Science and Technology	4
15.	Agro- forestry	5
16.	AICRP on Honeybee	8
18.	Food & Nutrition	2
19.	Family Resource Management	1
20.	Textile & Apparel Designing	2
21.	Home Science Extension Education	1
23.	Animal Breeding & Genetics	1
24.	Livestock product & Technology	1
25.	Veterinary physiology	1
26	Farm Machinery	2
27	Post Harvest Technology	16
28	Soil & Water Conservation	3
29	Ground Water Utilization	6
30	Water Management	3
31	Ag. Biotechnology &Molecular Biology	5
32	Botany & Plant Physiology	3
33	Microbiology	6
34	Stat. Math. & Computer Application	3
		1

2.2.2 Major Findings of Research Programme

(A) Crop Improvement Section

Rice :

- **Germplasm :** A total number of 1330 cultures were grown and evaluated at Patna, Pusa, Sabour and Tilaundha.
- **Breeding material :** At Patna and Pusa, altogether 233 breeding lines of different generations were evaluated. Considering flowering duration, plant height, grain type and phenotypic acceptability, 547 lines were selected for further evaluation. Besides, 21 fresh crosses were attempted at Patna. At Sabour F_2's of Rajendra Suwasini x Rajendra Kasturi were grown and selection was made.
- **Mutation breeding :** At Patna, tall and slender grain quality rice variety Kala Namak was treated with gamma rays. Desirable semi-dwarf mutant lines were selected and homozygous lines were recovered in M_7 generation.
- **Varietal evaluation :** 11 State, 23 DRR (AICRIP), 2 Shuttle Breeding (ICAR-IRRI) and 4 Mother & 6 Baby trials of STRASA - PVS (BMGF – IRRI) were conducted at Patna, Pusa, Sabour and Bikramganj under different eco-systems.
- **Entries being tested in different trials during Kharif, 2009**

S.No.	DRR Trials	Nominating center	Name of entries
A.	**DRR trials**		
1.	I V T – L	Patna	RAU 748-37-14, RAU 631-9-10
2.	I V T – IM	Patna	RAU 730-20-178, RAU 467-79-60*
3.	AVT – 1E	Pusa	RAU 3055
4.	IVT – IME	Pusa	RAU 3066
B.	**EIRLSBN trials**		
1.	A Y T	Patna	RAU 731-2-20, RAU 671-9
2.	O Y T	Patna	RAU 716, RAU 631-9-10**, RAU 718, RAU 720, RAU 640-204-15**, RAU 751-176-649-108-5 and RAU 729-12-44, RAU 735-17-2 and RAU 467-79-60
		Pusa	RAU 1463-11***, RAU 1459-14, RAU 1459-1**, RAU 1463-15, RAU 1471-10, RAU 1472-22[3]

* Promoted to AVT-1IM for year 2010-11
** Promoted to AYT-SHW for year 2010-11
*** Promoted to AYT-SDW for year 2010-11.

- **Promising entries identified for testing in Agronomy trial and Farmer's field**

Entry No.	Name of trial	Designation
13	UVT-3	RAU 639-200-55
31	UVT-3	RAU 763-15-33
5	SGVT	RAU 3055
36	SGVT	RAU 759-5-41
4	UVT-3	RAU 467-79-60

- **Promising entry in pipe line for release :**

RAU 759-5-41 : This culture is consistently performing well and giving very high yield (5000–5500 kg/ha) at various locations since last 3 years. The culture has fine grain quality and is suitable for medium to shallow lowland condition.

Maize :

- Total 15 trials were conducted during kharif 2009 under maize breeding component of All India Coordinated Maize Improvement Project. Out of 15 trials, 8 trials were on normal maize (Coordinated), 3 trials on specialty corn i.e. pop corn, baby corn, sweet corn, one trial on QPM, one station trial and two zonal trials of early maturity and medium maturity, respectively.
- **IET of full season maturity group :** Total 51 entries were evaluated and PRO-375, a hybrid from Bayer – Bio Science gave significantly highest yield of 72.45 q/ha as compared to the best check Seedtec-2324 (55.68 q/ha).
- **IET of medium maturity group :** PRO-376 gave significantly highest yield of 69.07 q/ha as compared to the best check HM-9(37.95 q/ha) out of a total 38 entries.
- **IET initial evaluation trial of early maturity :** Total of 32 entries were evaluated and MO6-108, a hybrid from Mahyco gave significantly highest yield of 50.72 q/ha as compared to the best check Prakash which yielded 41.58 q/ha and was at par with MO6-108.
- **IET of extra early maturity group :** FQH-55, a hybrid from Almora gave significant highest yield (47.63 q/ha) as compared to the best check Vivek QPM-9 (30.21 q/ha) out of a total 14.
- **Advance evaluation trials – 1st year of full season maturity group group :** Total 18 entries were evaluated and CP-808, a hybrid from charoen Pokhphand gave significantly highest yield of 74.29 q/ha as compared to the best check Seedtec-2324 (59.76 q/ha).
- **AET – 1st year of medium maturity :** BH-40706, a hybrid from Hyderabad gave significantly highest yield of 63.88 q/ha as compared to the best check, Malviya hybrid-2 (42.04 q/ha).
- **AET – 2nd year of full maturity group :** NECH-132, a hybrid from Syngenta gave significantly highest yield of 80.53 q/ha as compared to the best check Seedtec-2324 (57.58 q/ha) out of a total 6 entries.
- **Advance evaluation trials – 2nd year of extra early maturity group :** Total 6 entries were evaluated and FH-3358, a hybrid from Almora gave significantly highest yield of 50.28 q/ha as compared to the best check Vivek hybrid-33 (30.83 q/ha) out of a total six entries.
- **Important performance of QPM experimental hybrid :** In initial evaluation trials of QPM group, QPM MMH 07-1, a single cross hybrid developed from Dholi centre got 1st rank with respect to yield with more than 10% superiority in yield (57.35 q/ha) than the best check HQPM-5 (45.48 q/ha) and promoted to AET – 1st (QPM-2) stage of testing in coordinated trials.
- **Zonal trial of early maturity group :** Total 18 entries were evaluated at different locations and MEH-08-13, a single cross hybrid from Dholi centre ranked first with significantly highest yield of 53.98 q/ha followed by MEH-08-5 (41.12 q/ha), MEH-08-8 (40.25 q/ha), MEH-08-3 (38.78 q/ha) as compared to the best check Prakash (38.06 q/ha).

Wheat :

- **Sabour Centre :** A total of 578 entries from national and international sources in various nurseries were evaluated. Out of which 84 desirable fixed lines and 368 segregating lines were selected for further evaluation and selection. Under hybridization programme, 63 crosses were made with parents having desired agronomic characteristics and resistant to major diseases. Various segregating generations were also grown and 915 desirable plants were selected for further evaluation and selection.
- **Pusa Centre :** Altogether three nurseries and one trial were conducted at Pusa centre. First nursery was conducted with 53 entries under late sown irrigated condition and the genotype GW 2007-80 recorded the highest yield (50.00 q/ha). This along with another

four entries were significantly superior to the best check DBW 14 (32.00 q/ha). Two segregating nurseries were conducted and from them 339 desirable single plants were selected for further evaluation and selection.

- **Patna Centre:** Under hybridization programme, 06 fresh crosses were made and F_1 generation of 15 cross combinations were also grown. A total of 142 single plants were selected from various segregating generations. 10 homozygous lines were selected and harvested in bulk. Altogether five trials were conducted under irrigated late sown condition. In pilot trial, out of 14 entries evaluated, 04 entries viz., Entry No. 11 (2685 kg/ha), Entry No. 03 (2546 kg/ha), Entry No. 01 (2315 kg/ha) and Entry No. 04 (2315 kg/ha) were found promising with respect to check NW 2036 (15.42 q/ha). Station Trial was conducted with 22 entries and 05 genotypes namely, RW 933 (3238 kg/ha), RW 946 (3185 kg/ha), RW 957 (3174 kg/ha), RW 960 (3040 kg/ha) and RW 951 (2963 kg/ha) were significantly out yielded the highest yielding check NW 2036 (2096 kg/ha).

Oilseed Improvement Project

Linseed :

Under genetic enhancement programme, 66 germplasms of linseed were tested at multi-location and the germplasm, namely, EC-1424, 41585, RL-99-4-5, Polf-23, EC-517M, LMS-63-6, NL-260 and SLS-71 were identified for seed type. Similarly, LCK-9211, 89512, 9436, 9209 and GS-288 were identified for dual purpose and GS-401, Polf-31, H-40, LCK-2945, and PCL-12-3-06 were identified for flax type. Fifty-six F_1's crosses of previous year were advanced to the next generation and F_2 seeds of the respective crosses were harvested. New 30 crosses were made and also 103 germplasm of linseed were maintained.

Pulses

Pigeonpea :

- None of the eight pigeon pea entries in AVT (Late), was found significantly superior to the best check i.e. MA-6 (1635 kg/ha). However, two entries viz. MAL-28 (1489 kg/ha) and KBA-11-2 (1427kg/ha) performed significantly better than the second national check i.e. Bahar (968 kg/ha) and proved at par with the third national check i.e. NDA-1 (1416 kg/ha).
- In IVT (Late), out of sixteen entries including four checks evaluated, four viz. IPA-203 (1611 kg/ha), KA-01-8-4 (1592 kg/ha), MAL-30 (1407 kg/ha)and NDA-7-2 (1388 kg/ha) proved significantly superior to the checks like Bahar (1111 kg/ha) and MAL-13 (1240 kg/ha) but none was found significantly better than the remaining two check entries viz. NDA-1 (1666 kg/ha) and MA-6 (1537 kg/ha).
- Out of 95 progenies of chemically induced mutants in M5 generations, 63 were selected for further evaluation and advancement for pre-rabi season.
- 486 desirable single plants of F_2 population were selected for further evaluation and advancement. None of the 35 progenies of F_1 population could survive due to heavy rain fall and prolonged water logging.
- Five fresh crosses were made involving NDA-1, Pusa-9, L-153, L-83 and L-13 as female parents and ICP-8863 as male (donor of wilt resistance)
- 86 germplasm lines of pigeonpea were grown for evaluation and characterization.

MULLaRP (Lentil, Lathyrus, Rajmash & Pea) :

- Among fourteen moong bean entries in IVT (Spring), SML-859 recorded the highest yield (2361 kg/ha) followed by Pusa Vishal (ch) (2088 kg/ha), IPM 02-17 (2083 kg/ha), IPM-05-03-22 (1955 kg/ha) and Pusa 08-31 (1953 kg/ha). None of the high yielding entries matured earlier than Pusa Vishal.

- Out of seven moongbean entries in AVT-1 (Spring), the entry IPM-02-14 gave highest yield (1962 kg/ha) followed by Pusa Vishal (ch) (1853 kg/ha) Pusa 9531 (ch) (1662 kg/ha), Pant M-2 (ch) (1381 kg/ha) and Pusa 0731 (1362 kg/ha)
- Of the seventeen entries of urdbean in IVT (Spring), maximum yield (1166.66 kg/ha) was recorded by the entry SU-557 (Coded) and it was followed by SU-573 (1116.66 kg/ha), SU-560 (1083.32 kg/ha), SU-564 (1072.0 kg/ha) and SU-554 (1038.87 kg/ha).

Tuber Crops (other than potato) :

- **IET on sweet potato:** Among twelve entries only two entries viz., S-1-60 and CO-3-4 recorded significantly highest marketable tuber yield, (32.87 and 33.33 t/ha, respectively), 70.05 and 79.56 percent harvest index as well as 23.15 and 24.66 percent dry matter, respectively as against 25.00 and 28.70 t/ha marketable tuber yield, 31.54 and 26.70 percent dry matter and 62.58 and 80.47 percent harvest index in local check RS-47 and RS-92, respectively.
- **URT on orange fleshed sweet potato :** Among eight OFSP, SV-98 gave highest harvest index (91.88 %), and obtained organoleptic test score 1.3 while the entry 440038 recorded significantly highest dry matter (36.36 %) and marketable tuber yield (23.14 t/ha) as against 71.80, 30.40 percent and 14.14 t/ha harvest index, dry matter and marketable tuber yield, respectively.
- **IET on colocasia (Taro):** Among eleven entries under test, significantly highest cormel yield was obtained with the entry Halkesu (23.33 t/ha) followed by AAUcol-32 (22.23 t/ha) and AAUcol-46 (23.33 t/ha) as against 17.33 t/ha with national check i.e. Sree Kiran.
- **IET on lesser yam :** None of the entry was found to perform better than the national check (Sree Kala) as well as local check (Sree Latha) in respect of tuber yield (20.00 and 22.00 t/ha, respectively). However, DE-11, DE-17 and DE-96 gave better tuber yield (17.50, 16.30 and 16.36 t/ha, respectively) which were at par with each other.
- **MLT on yam bean :** Four promising entries were tested at five different locations and DPH-70 gave highest marketable tuber yield (38.00 t/ha) followed by WF x Deshi as against check RM-1 (33.56 t/ha).
- **Evaluation of nutritional quality of yam bean genotypes :** Forty-three yam bean genotypes were subjected to quality evaluation to select best genotypes for further multiplication. Yam bean is generally eaten as raw tuber after peeling. Therefore, fiber and sugar content are considered to be major criteria for test and acceptability. Out of forty-three yam bean genotypes, DL-28 had maximum fat (0.249 g/100g edible tubers), carbohydrate (14.86 g) and sugar (6.925 g) content while it has third lowest fiber content.

Spices

Ginger :

- Among fourteen promising genotypes including local check Nadia, none of the entries was found significantly superior over check variety Nadia regarding yield. However, genotypes RG-3, RG-43 and RG-35 gave maximum yield (22.77, 21.78 and 20.74 t/ha, respectively) as compared to check variety Nadia i.e. 19.50 t/ha.

Turmeric :

- Eleven genotypes of turmeric were tested under environmental condition of Dholi. Among the varieties, Rajendra Sonia was found significantly superior regarding yield (82.78 t/ha) as compared to other varieties. Next superior variety was found Narendra Haldi–1 (55.89 t/ha). Lowest yield was produced by IISR-Kedaram (16.67 t/ha).

Subtropical Fruits

Mango :

- In germplasm collection & evaluation trial, out of 43 germplasms, Dudhia Maldah produced maximum fruit yield (56.00 kg /plant) followed by Surajgarha Maldah (53.00 kg/plant).Four new germplasms were collected i.e. Tommy Atkins, Arka Neelkiran, Sindhu & Elden .
- Out of 31 seedling germplasms, collection No.10/85 produced maximum fruit yield of 42.00 kg /plant. Ten new promising collections were made during the year.
- In clonal selection, 3 more clones of Langra were added this year.
- **Flowering and fruiting behaviour of mango cultivars in relation to weather parameters:** Variety Mallika recorded the highest yield (42.50 kg/plant). Maximum incidence of powdery mildew was observed in Chausa. Maximum incidence of mango malformation was obtained in Neelam i.e. (43%). Maximum infestation by mango hopper and mealy bug were recorded at the time of flowering & marble stage.
- Variety Mallika showed its superiority also in another released hybrid trial.
- In a plant density trial, 5 densities ranging from 1600 to 3556 plants/ha were compared with different planting geometry. Square system produced maximum fruit yield of 41.00 kg/plant while total fruit yield/plot was maximum 560.00 kg in Double Hedge Row system of planting. Pruning was done by mechanized pruner.
- In the experiment pre harvest treatment for extending the post harvest life of mango, T_2 i.e. $CaCl_2 .6H_2O$ (2%) gave the best performance and the fruits were marketable up to 12 days.
- In the experiment on effect of Ca, B & Sorbitol on pollination & fruit set in mango, the treatment T_6 i.e. Boric acid + Sorbitol noted minimum fruit drop.

Guava :

- In collection and evaluation of germplasm trial, variety Allahabad Safeda gave the maximum fruit yield (39.65 kg/plant) and average weight of fruit (210.00 g/fruit).
- In guava hybridization experiment, hybrid 1 (Sardar X Allahabad Safeda) recorded highest yield (45.00 kg/plant). New crosses were made.

Vegetables

Brinjal :

- In long group of trials, Variety KS–331 produced the highest yield of 351.3 q/ha, which was at par with the variety Rajendra Baigan–II (335.23 q/ha).

Cowpea :

- Variety VRCP–6 superseded all the varieties in respect of yield and produced maximum yield of 87.87 q/ha.

Dolichosbean (Pole type) :

- In AVT–I trial, variety IIVR–SEM–11 gave the highest yield of 90.68 q / ha which was alike with variety IIVR–SEM–186 (75.24 q/ha) whereas, in AVT–II the highest yield of 92.19 q/ha was observed in variety VRDB – I which was similar to variety Swarna Utkrishta (83.11 q / ha).

Ridgegourd :

- The variety PRG–12 was superior to all the varieties yielding 81.35 q/ha.

Spongegourd :

- In AVT–I trial, the variety VR–2 excelled all the varieties under trial yielding 136.41 q/ha. But in AVT–II trial, variety VR–I gave the maximum yield of 129.51 q/ha which was similar to variety Rajendra Nenua–1 (122.40 q/ha).

Hybrid Trials

Brinjal :

- In hybrid trials of long group, the highest yield of 369.11 q/ha was recorded in Pusa Hybrid – 5 which was alike to the hybrid ARBH–201 (360.51 q/ha) and HABH–13 (332.69 q/ha).
- In hybrid trials on round brinjal, Pusa Hybrid–6 produced the maximum yield of 372.05 q/ha which was at par with Muktakeshi (363.35 q/ha).

Okra :

- *The hybrid VROH–8 gave the highest yield of 102.06 q/ha which was statistically alike to* hybrid VROH–7 (98.11 q/ha).

Cauliflower :

- Cauliflower Early (out of 18 collections, 07 promising), cauliflower Mid season (out of 14 collections, 07 promising), pointed gourd (out of 20 collection, 08 promising) and in tomato (out of 52 collection, 08 promising) were found.

Garlic :

- Local line RAU G-5 produced the highest yield of 135.48 q/ha which was at par with G-282 (123.48 q/ha).

Onion :

- Variety B-780-5-2-2 (AVT II-0-7) gave the highest yield of 341.63 q/ha which was similar to Pusa White Round, AVT II-0-8 (313.33 q/ha).

Tomato Determinate Type :

- Variety VR-415 produced the highest yield of 525.68 q/ha, which was alike to DVRT-2 (509.41 q/ha) and Co-3 (481.11 q/ha).

Tomato Indeterminate Type :

- Maximum yield of 565.21 q/ha was obtained in NDT-9 which was similar to Arka Vikas (518.12 q/ha).

Hybrid Experiments

Bittergourd :

- The hybrid MC-84 produced the highest yield of 196.40 q/ha which was at par with PBIGH-6 (188.90 q/ha).

Bottlegourd :

- The maximum yield of 318.17q/ha was obtained in VRH-1 which was alike to Hybrid NDBGH-4 (311.32 q/ha) and Rajendra Chamatkar (296.30 q/ha).

Cucumber :

- Pusa Sanyog superseded all the hybrids and produced highest yield of 131.53 q/ha.

Tomato Determinate Type :

- The highest yield of 578.15 q/ha was obtained in ARTH-3 which was similar to TH-1389 (542.15 q/ha).

Tomato Indeterminate Type :

- The hybrid ARTH-2104 exhibited the maximum yield of 631.26 q/ha which was at par with VRTH-102 (584.07 q/ha).

Forage Crops :

- **IVT- Bajara :** Among the six Bajara genotypes evaluated , entry IPM-3 recorded highest green fodder yield (383 q/ha) followed by IPM-1(359 q/ha). These two entries were significantly superior over other test entries.
- **AVT- Bajara :** Entry APM-8 produced significantly highest green fodder yield of 377 q/ha followed by APM-1 (324 q/ha) .The percent increase varied from 16 to 42.7.
- **IVT- Ricebean :** Among the six entries of Ricebean, entry IRB-4 recorded the highest green fodder of 319 q/ha which was 7.8% higher over IRB-1(296 q/ha). These two were significantly superior over other test entries.
- **AVT- Ricebean :** Entry ARB-1 recorded significantly highest green fodder yield of 301 q/ha over other test entries, followed by ARB-4 (273 q/ha) and ARB-3(261 q/ha). The percent increase was 10.3 and 15.3, respectively.
- **IVT- Soybean :** Out of 5 entry of soybean, entry ISB-1 recorded highest green fodder yield of 159 q/ha followed ISB-4 (141 q/ha) and ISB-5(134 q/ha).
- **AVT- Soybean :** Five entries were evaluated. Entry ASB-4 (164 q/ha) and ASB-3 (151 q/ha) recorded significantly higher green fodder yield over other test entries. The percent increase recorded by ASB-4 varied from 8.6 to 39.3.
- **IVT- Cowpea :** Out of nine entries tested, entry IC-3 recorded significantly maximum green fodder of 305 q/ha . The next best was IC-1(273 q/ha).
- **AVT-Cowpea :** Six entries were evaluated, out of these AC-6 (316 q/ha) and AC-4 (293 q/ha) recorded significantly higher green fodder yield over other test entries. Entry AC-6 recorded 7.8 to 43.3% increased fodder yield over other test entries.

Potato

New early maturing hybrids :

- Two hybrids were evaluated with three checks. Based on average tuber yield, best check var. RA-3 with 12.04 t/ha & 12.96 t/ha tuber yield was significantly superior to the best hybrid J/97-243 in 60 & 75 days crop duration, respectively.

Trial with old early maturing hybrids :

- Seven hybrids were evaluated with two checks during 2007-08 & 2008-09. In 60 days crop, best check var. K. Ashoka was superior with 23.24 t/ha tuber yield. But in 75 days crop, hybrid J/96-238 with 26.48 t/ha tuber yield was superior to the best check var. K. Ashoka (22.68 t/ha).

Trial with old medium maturing hybrids :

- Three hybrids were evaluated with four checks in the years (2007-08 & 2008-09). As per mean tuber yield none of the hybrids performed better to the best check var. K. Pukar (24.35 t/ha & 27.86 t/ha, tuber yield) in 75 days & 90 days crop respectively.

Trial with processing hybrids :

- Four hybrids were evaluated with five checks during 2007-08 & 2008-09. The hybrid MP/98-172 with 14.77 t/ha tuber yield, 8.33 t/ha processing grade yield and 4.72 t/ha French fry grade (70 mm length) was superior to the best check var. K. Chipsona-3 (tuber yield 8.59 t/ha, 6.67 t/ha processing grade yield and 0.37 t/ha French fry grade yield).

(B) Crop Production Section

Rice

Nitrogen variety trials :

- **Aromatic slender grain (ASG) :** Under ASG cultures, Rajendra Kasturi and IET 19713 were found superior. N responded up to 100% N/ha of RDF at Pusa.
- **Early direct seeded :** Rice var. Narendra 97 produced significantly highest grain yield (3222 q/ha) under direct seeded condition. Nitrogen responded up to 150% N/ha of RDF (90:30:40 NPK kg/ha) at Sabour.
- **Early aerobic :** Maximum grain yield was recorded by the check variety Rasi at Patna and Nitrogen responded up to 100% N/ha of RDF.
- **Medium duration :** Rice culture, RAU 639 recorded significantly maximum grain yield (48.58 q/ha) at Bikramganj. This culture also ranked superior at Patna and non-significant difference at Pusa. Rice culture, RAU 639 was suitable for 50% N application of RDF at Patna and in general yield increased up to 100% N application of RDF at all the locations in medium duration rice cultures.
- **Long duration slender grain :** Under long duration and slender grain cultures, RAU 759 produced significantly superior grain yield at all the test locations. Nitrogen responded up to 150% N/ha of RDF at Bikramganj & Pusa and 100% N/ha of RDF at Patna. In the coordinated trial, late duration culture IET 20262 was found promising at Patna.
- **Near isogenic line (BLB) :** Among the NIL (BLB) cultures, check variety Rajendra Mahsuri-1 recorded highest grain yield. N x V interaction indicated that Rajendra Mahsuri-1 yielded maximum grain yield at 50% N/ha of RDF while in general 100% N/ha of RDF was found significantly superior dose at Patna.
- **Near isogenic line (Sub) :** Among the NIL (Sub) cultures, both the checks Swarna and Rajshree recorded maximum grain yield and N responded up to 150% N/ha of RDF at Pusa.

Cultural management trials :

- **Management practices for rainfed upland :** Maximum grain yield was recorded under Rice + Sunhemp (incorporated after 30 DAS) treatment. Among the nutrient schedules, NPK 80:40:40 kg/ha at Pusa and NPK-Zn 60:40:40:50 kg/ha at Sabour produced significantly higher grain yield.
- **System of rice intensification (SRI) :** Planting of 10 days old seedlings followed by 2 times cono weeding was found significantly superior in increasing grain yield and gave higher economic returns at Pusa. Maximum and significantly superior grain yield was obtained in SRI as compared to recommended & farmers practice at Bikramganj.

- **Agro-techniques for aerobic rice** : Highest grain yield was recorded with the application of 100 kg N/ha in Rice + Dhaincha (1:1 – incorporated after 30 DAS) + pre-emergence herbicide application + one hand weeding at 60 DAS treatment at Patna.
- **Agro-techniques for aromatic rice** : Early to mid July transplanting for photo-insensitive aromatic rice (Rajendra Kasturi) and late July transplanting for photo-sensitive aromatic rice (Sugandha) were found significantly superior at Pusa and Patna, respectively. Among the nutrient schedules, 100% RDF or 50% RDF + 50% N through FYM/vermicompost or 100% N through FYM were found effective in increasing the grain yield of both photo-sensitive / insensitive aromatic rice.
- **Integrated nutrient management (INM)** : Organic source of nutrients like FYM or vermicompost might be substituted either 25 % N or 50 % N of RDF through INM in rice without any significant reduction in grain yield at Bikramganj.
- **Integrated weed & nutrient management (IWNM)** : Application of pretilachlor @ 0.75 kg a.i./ha + one hand weeding at 40 DAT at par to two hand weeding at 20 & 40 DAT and produced higher grain yield. Blending of organic with inorganic fertilizers either 25 or 50% N of RDF produced maximum yield at Bikramganj.
- **Organic rice** : Maximum grain yield was obtained with the application of 100% NPK of RDF and was at par to FYM @ 10 t/ha application. Among organi@ 10 t/ha gave highest grain yield which at par with green manuring @ 5 t/ha. Non-significant differences in rice grain yield was observed with the application of mushroom straw @ 10 t/ha, green manuring @ 5 t/ha and vermicompost @ 5 t/ha at Bikramganj.

- **Deep water rice** :

  (i) Maximum total yield in terms of rice–equivalent was recorded in rice 100% + moong 100% seed rate treatment in deep water rice based pulses mixed cropping system at Pusa.

  (ii) Maximum total yield in terms of rice–equivalent was recorded in Rice 100% + Til 100% seed rate treatment in deep water rice based oilseed mixed cropping system at Pusa.

Weed management :

- **Direct seeded puddle condition** : Weed free and two hand weeding treatments were found effective and superior over herbicides. However, among the new herbicides, metamifop 100 EC @ 75 & 100 g a.i./ha and Clincher 100 EC @ 100 g a.i./ha were at par in managing the weeds under direct seeded puddle condition at Patna.
- **Transplanted condition:**Higher grain yield was recorded in weed free check. However, among the new herbicides Bispyribac – Sodium 100 LSC @ 50 g a.i./ha produced highest grain yield and was also superior to two hand weeding at Patna.

Wheat :

- 10 Genotypes were evaluated under normal and late sown conditions. Wheat genotypes performed significantly better (44.57 q/ha) under normal sown condition than under late sown condition (38.83 q/ha).
- Wheat genotypes recorded significantly higher mean grain yield (37.93 q/ha) under late sown condition than under very late sown condition (31.61 q/ha).
- Wheat genotypes were evaluated at different levels of nitrogen under rain fed condition. It was observed that the grain yield increased with increasing level of nitrogen application. Maximum mean grain yield of 34.26 q/ha was recorded from the plots fertilized with 80 kg N/ha which in turn was at par with the mean grain yield of 33.32 q/ha obtained under 60 kg N/ha and both were significantly superior to the mean grain yield obtained from 40 kg N/ha.

- Application of boron on the productivity of wheat was evaluated. It was observed that the treatment effect of boron application was significant whereas the effect due to genotypes was non-significant.
- Performance of wheat genotypes was evaluated under different tillage practices. Maximum mean grain yield of 37.64 q/ha was obtained from the genotypes sown under traditional tillage practices and it was at par with the mean grain yield obtained from zero tillage technique (37.27 q/ha). In integrated weed management experiment it was observed that hand weeding at 20 and 40 DAS performed best.

Maize :

- In genotype x nutrient management in maize (extra early) experiment, grain yield increased significantly with subsequent increase in fertilizer levels and recorded highest yield (2398 kg/ha) at highest level of fertilizer i.e. 200:80:80 kg/ha N:P:K/ha. Hybrid-9 produced maximum grain yield at highest level of fertilizers among the genotypes.
- In genotype x nutrient management under medium maturity groups of maize, grain yield of maize genotypes increased significantly with increasing levels of fertilizers and recorded maximum grain yield at highest level of fertilizer (3314 kg/ha). Among the test genotypes, JH 31153 recorded highest grain yield at all the fertilizer levels.
- Permanent bed method of planting in maize recorded maximum grain yield (3395 kg/ha) followed with zero tillage (3295 kg/ha) and conventional tillage (2584.33 kg/ha) but differences among the tillage methods was found to be non-significant.
- In tillage management system in maize, permanent bed method of planting produced significantly higher grain yield (4328 kg/ha) than zero tillage (3718 kg/ha), conventional (3738 kg/ha) and fresh bed (35.30 kg/ha) methods of planting.
- In tillage management in rice-maize system, zero-tillage in both the crops produced maximum rice equivalent yield (6058.2 kg/ha) followed by conventional method of tillage in both the crops (5553.3 kg/ha, followed by conventional in rice and bed method of planting in maize (5538.6 kg/ha) followed by conventional in rice and zero tillage in maize (5454.2 kg/ha) though the differences among the tillage management systems were not significant.
- Under site specific nutrient management in rice-maize cropping system, application of 120:50:30:25 kg NPK Zn/ha in both the crops recorded significantly higher rice equivalent yield (7019.12 kg/ha) than rest of the fertilizer levels. Application of 0:30:20:25 kg NPK Zn and 0:0:20:25 kg NPK Zn in both the crops produced similar rice equivalent yield i.e. 3803.66 and 3367.11 kg/ha, respectively to that of control (3509.11 kg/ha).
- Under site specific nutrient management in maize-rice cropping system, all the fertilizer levels produced significant higher maize equivalent yield than control (3003.0 kg/ha). Among the fertilizer management systems, application of 225:105:36:25 kg NPK Zn/ha produced highest maize equivalent yield (9846.0 kg/ha) which was at par with the application of 225:105:0:25 kg NPK Zn/ha (9322.50 kg/ha) and significantly higher than rest of the levels of fertilizer.

Tropical Fruits :

- Banana responded almost similarly to different nitrogenous fertilizers, used either alone or in different combination. Ammonium sulphate was found little more effective than urea alone or different combinations like Urea + Ammonium sulphate or Urea + Ammonium sulphate + CAN. The result was fairly consistent and almost similar to that of R_1 crop but the impact was statistically non-significant.
- In a plant density trial, plant densities ranging from 2500 to 5001 plants /ha were tried. Results indicated that planting three suckers per pit at 1.8x3.6 m distance accommodating 4629 plants/ha have statistically comparable results with 5001 plants at 2 m x 3 m spacing. The B:C ratio was also at par in the two densities and thus a plant density of 4629 plants/ha was recommended for Kothia and Alpan varieties.

- In banana, five bio-fertilizers like vermicompost, *Azospirillum, Tricoderma harzianum,* VAM and PSB were used with 100 percent recommended dose of NPK and 25 and 50 per cent reduction in the recommended dose of fertilizers (RDF). The results indicated that bio-fertilizers had little influence on vegetative growth of banana plants but the yield attributes like bunch mass and number of fingers differed significantly due to the treatments. Twenty-five per cent reduction in the recommended (NPK) dose produced at par results with full dose of NPK when the four bio-fertilizers were used with RDF. When there was 50% reduction in RDF, the yield declined significantly even after all the four bio-fertilizers were applied. The highest benefit: cost ratio was obtained with 100% RDF + VAM + PSB + *Azospirillum*.
- In papaya, application of bio-fertilizers had significant influence on growth and productivity of plants. The best result was obtained with application of 100% RDF + VAM (50 g) + PSB (25 g) + *Azospirillum* (50 g/plant). Fifty percent reduction in RDF brought marked reduction in the fruit yield.

Subtropical Fruits

Mango :

- Variety Mallika recorded the highest yield (42.50 kg/plant). Maximum incidence of powdery mildew was observed in Chausa. Maximum incidence of mango malformation 43% was obtained in Neelam. Maximum infestation by Mango Hopper and Mealy bug were recorded at the time of flowering & marble stage.
- Square system produced maximum fruit yield of 41.00 kg/plant while total fruit yield/plot was maximum 560.00 kg in Double Hedge Row system of planting. Pruning was done by mechanized pruner.
- In the experiment on effect of Ca, B & Sorbitol on pollination & fruit set in mango, the treatment i.e. Boric acid + Sorbitol recorded minimum fruit drop.

Guava :

- In a plant density trial, 5 densities ranging from 204 to 968 plants/ha were compared with different planting geometry. Square system produced maximum fruit yield of 46.00 kg/plant while total fruit yield/plot was maximum 656.00 kg in Double Hedge Row system of planting.
- Foliar spray of 15% fertilizer grade urea at 50% bloom stage and second spray of 15% urea after 10 days of first spray during rainy season was found very effective in crop regulation in guava c.v. Sardar.

Oilseed

Linseed :

- Varieties "Shikha" was found as the highest seed yielder (1376 kg/ha) and LCK-6028 as the highest fiber yielder (563 kg/ha) in three different dates of sowing. However, these varieties performed better in 1st sowing date (22.11.8) than 2nd (07.12. 08) and 3rd (22.12.08).
- In the trial "Different level of fertilizer application experiment", significant differences were found between varieties and fertilizer levels. Out of four varieties, "Shikha" and "Parvati" were found as highest seed yielder (1114 kg/ha) and fiber yielder (402 kg/ha), respectively at 100% RDF.
- In the trial "Phosphorus management experiment in double cropping system in kharif crop paddy", treatment effect was found significant for plant stand and non-significant for seed yield whereas in rabi linseed treatment effect was found to be significant for seed yield and plant stand. The best treatment in kharif was 50% P + PSB + 5 t/ha FYM and in rabi was 75% P + PSB.

Pulses

Pigeonpea :

- Trial on yield performance of three pigeonpea genotypes viz. Bahar, NDA-1 and Pusa-9 under delayed planting conditions revealed that earlier sowing on 6th August produced significantly higher grain yield (13.97 q/ha) than late sowing on 20th August (11.53 q/ha).
- Trial on effect of integrated nutrient management in pigeonpa based intercropping system showed that Pigeonpea + Urdbean intercropping (1:1) with pigeonpea equivalent yield of 18.81 q/ha did not differ significantly from Pigeonpea + Maize (1:1) inter-cropping system (17.11 q/ha).
- Trial on field performance of promising long duration pigeonpea genotypes viz. Bahar, NDA-1, Pusa-9 and Azad under intercropping systems showed that the pigeonpea genotype NDA-1 was highest yielder (16.69 q/ha). However, its yield performance did not differ significantly from that of Pusa-9 (15.29 q/ha) and Azad (15.74 q/ha) but was significantly superior to Bahar (14.87 q/ha).
- Field performance of *Rhizobium* strains under different agro-ecological conditions showed that all the eight *Rhizobium* strains obtained from different coordinating centres enhanced root nodulation and grain yield in pigeonpea c.v. Bahar. The grain yield due to inoculation of these strains increased to the extent of 0.8 to 2.9 q/ha over uninoculated control, the highest yield (10.1 q/ha) being due to CRR-9 (Coimbatore) followed by RA-43 (Varanasi), AKPR-1 (Akola) and LAR-05 (Ludhiana) each of which recorded better yield performance than application of 20 kg N/ha (7.8 q/ha).

MULLaRP :

- In experiment on performance of urdbean genotypes under maize inter cropping system, urdbean sole recorded significantly higher grain yield (883.0 kg/ha) than that under intercropping system. Grain yield of maize remained unaffected due to intercropping of different urdbean genotypes, although yield was more in sole maize (2997.0 kg/ha). Among the urdbean genotypes, KU-300 recorded highest yield (566 kg/ha) which was at par with Pant U-19 (555 kg/ha), Pant U-31 (544 kg/ha) and Type-9 (528 kg/ha) but significantly superior to other genotypes. Over all, urdbean equivalent yield was maximum with Maize + KU-300 (1502 kg/ha) followed by Maize + Pant U-19 (1474 kg/ha), Maize + Pant U-31 (1458 kg/ha) and Maize + Type-9 (1436 kg/ha) which were significantly higher than sole maize and sole urdbean.
- Trial on planting pattern and weed management under urdbean+ ragi intercropping system revealed that the grain was significantly higher under sole cropping. A row ratio of 2:1 recorded significantly higher urdbean equivalent yield (1255 kg/ha) than ragi sole (660 kg/ha) and urdbean + ragi at 1:1 row ratio (992 kg/ha) but proved at par with urdbean sole (1166 kg/ha).
- Trial on population management in urdbean under raised bed system recorded higher grain yield of urdbean (1070 kg/ha) but was at par with flat bed (1015 kg/ha). Maximum yield of 1096 kg/ha was obtained at the seed rate of 20 kg/ha which was at par with the seed rate of 15 kg/ha (1068 kg/ha) but significantly superior to lower seed rate of 10 kg/ha (963 kg/ha). Yield obtained with 100% RDF was significantly higher (1131 kg/ha) than that with 50% RDF (922 kg/ha) but closer with 75% RDF (1073 kg/ha).

Vegetables

Bittergourd :

- Three sprayings of mixture of all micronutrients (B, Zn, Mo, Cu, Fe and Mn) started application at 40 DAS and the next two spraying at an interval of 10 days gave the highest yield (150.25 q/ha) and net profit (Rs. 73978.63/ha) with C:B ratio of 1:2.37 in bittergourd. (Variety: Pusa Do Mausami)

Cucumber :

- Application of half rec. NPK @ 60:30:30 kg/ha + FYM 10 t/ha along with biofertilizer - Azotobacter @ 5 kg/ha exhibited better yield (133.81 q/ha and maximum net profit (Rs. 74263.00/ha) with C:B ratio of 1:2.27 in cucumber (Variety: Balam Khira).

Bottle gourd :

- The maximum yield of 285.60 q/ha was obtained in vermicompost @ 2.5 t/ha + half NPK through fertilizers which was similar to FYM @ 20 t/ha yielding 279.66 q/ha.

Tomato :

- The highest yield of 492.56 q/ha was recorded in zinc sulphate 100 (0.246 g/l) which was alike to boric acid 100 (0.571 g/l) and mixture of all and commercial formulation multiplex 100 ppm yielding 488.26, 475.24 and 465.55 q/ha, respectively.

Tuber Crops (other than Potato) :

- Application of 75% RDF (inorganic) + 25% RDF (organic) along with 5 kg PSB + 5 kg Azospirillum/ha gave significantly superior corm yield (64.4 t/ha) which was at par with 75% RDF (inorganic) + 25% RDF (organic) along with 5 kg AMF + 5 kg Azospirillum/ha (63.3 t/ha). The lowest corm yield (41.1 t/ha) was obtained when only 75% inorganic fertilizer was applied.
- Pre-planting application of FYM @ 10 t/ha along with Azospirillum 5 kg/ha + AMF @ 5 kg/ha + ash 5 t/ha resulted in significantly higher corm yield (38.8 t/ha) which was at par and followed by soil application of FYM @ 10 t/ha along with Azospirillum @ 5 kg/ha + *Phosphobacteria* @ 5 kg/ha + ash @ 5 t/ha (36.6 t/ha) and recommended package of practices for conventional system (36.6 t/ha). The lowest corm yield (30.0 t/ha) was obtained when poultry manure and ash were applied @ 5 t/ha each.
- Among different intercrops, elephant foot yam in mango orchard with full dose of fertilizer (80:60:80 kg NPK/ha) recorded highest corm yield (48.0 t/ha) with net return of Rs. 228507/ha followed by the same crop at half recommended dose (42.0 t/ha) with net return Rs. 187729/ha. Sweet potato was the next best to elephant foot yam in terms of profitability (Rs. 47234/ha) than cassava.

Spices

Ginger :

- **Response of organic farming :** Among the treatments, fully organic gave the highest yield of 12.90 t/ha followed by integrated fertilizer management of organic and inorganic i.e., 11.62 t/ha.

Turmeric :

- **Response of organic farming in turmeric :** Integrated fertilizer management of organic and inorganic (T_2) and fully organic (T_1) gave significant more yield (54.93 & 50.30 t/ha) as compared to fully inorganic (T_3) i.e., 43.00 t/ha. So far, cost:benefit ratio is concerned, integrated fertilizer management i.e., organic and inorganic gave the maximum return of Rs.4.46 per unit cost (1:4.46) followed by fully inorganic (1:3.80).
- **Effect of organic farming on turmeric :**All the treatments gave significantly higher yield as compared to absolute control and vermicompost 20 q/ha (T_2) & FYM 10 q/ha + 10 q/ha vermicompost + 8 q/ha neem oil cake (T_{13}). Among the treatments, FYM 30 t/ha + 20 q/ha vermicompost + 8 q/ha neem oil cake (T_5) gave the highest yield of 48.82 t/ha followed by FYM 30 t/ha + 15 q/ha vermicompost + 8 q/ha neem oil cake (T_8) i.e. 45.07 t/ha over control (29.07t/ha). So far cost:benefit ratio is concerned, FYM 30 t/ha + 20

q/ha vermicompost + 8 q/ha neem oil cake (T_5) gave the maximum return of Rs. 3.64 per unit cost (1:3.64) followed by FYM 30 t/ha + 15 q/ha vermicompost + 8 q/ha (T_8) i.e. Rs. 3.44 per unit cost (1:3.44).

Potato :

- **Potato production through organic fertilizer source :** Out of six organic fertility levels, application of FYM @ 30 t/ha on the basis of recommended dose of N as basal dose produced significantly higher (8.85 t/ha) tuber yield with a net return of Rs. 13, 530/ha.
- **Integrated nutrient management in potato :** Application of FYM @ 20 t/ha + 100 percent recommended dose of NPK produced significantly higher tuber yield (23.26 t/ha) with net return of Rs. 89, 150/ha.
- **Selection of N efficient cultivar for zone-I :** Out of four varieties, var. K. Pukhraj with 180 kg N/ha produced significantly higher (16.98 t/ha) tuber yield with a net return of Rs. 66,280/ha.
- **Water Management in potato :** Irrigation at 20 CPE and mulching with paddy straw at the rate of 5 t/ha produced significantly higher tuber yield (16.94 t/ha) with a net return of Rs. 43,510/ha.
- **Nitrogen requirement of newly released potato cultivar :** For obtaining sustainable yield. The variety K. Ashoka with 150 kg N/ha produced significantly higher tuber yield 19.53 t/ha with a net return of Rs. 71,010/ha.
- ***Studies on the shift of planting date in view of the rising temp. and correlation of yield with temp :*** *The variety K. Pukhraj planted on 2nd Dec. produced significantly* higher tuber yield (19.63 t/ha) with a net return of Rs. 77,860/ha.

(C) Crop Protection Section

Rice

Entomology :

- There was sporadic but low incidence of rice insect pests like stem borer, case worm, leaf hoppers, plant hoppers, leaf folder and mealy bug.
- In epidemiological study at Patna, catches of yellow stem borer, leaf folder, green leaf hopper and plant hoppers (BPH + WBPH) were recorded in light trap. Yellow stem borer was registered in low numbers with its peak activity during 4th week of September. The peak activity of white leaf hopper, BPH and WBPH occurred during the second week of October. During the period of peak activity of these pests, moderate maximum temperature (32.4°c), moderate minimum temperature (24.0°c) and moderate R.H. (79%) occurred.
- In insecticide evaluation trial (IET), flubendimide + buprofenzin (20 SC) @ 875/ha was found promising against plant hoppers. It was followed by flubendiamide (20 WG) @ 175 g/ha and acephate (95 SG) @ 592 g/ha.

Plant Pathology :

- **Patna centre :** Surveillance, evaluation of germplasms/entries and disease management of rice was done during 2009-10. In surveillance, three districts i.e. Patna, Rohtas and Jehanabad were surveyed and Sheath bight disease was found as the major threat to the rice production followed by False smut in all three districts. The incidence of Brown spot and Bacterial leaf blight was below to moderate and mild to moderate, respectively while Sheath rot and Bacterial leaf streak incidence was low to mild. Zinc deficiency was observed in soils having crop sequence of Rice–Wheat system. The zinc deficiency was conspicuously found on the rice plants with varying intensity and observed in scattered form in all the three districts.

  Under the evaluation of germplasms/entries, 851 germplasm/entries were screened against Bacterial blight and Sheath rot diseases. The following germplasms

were found promising and tolerant to Bacterial blight and Sheath rot under different nurseries.

NSH-1 : IET Nos. - 20601, 20760, 20881, 20918, 20706, 20934, 20935, 21070, 21121, 21200, 21219.
NSH-2 : IET Nos. – 20830, 20861, 21305, 21093, 21230, 21233, 21221, 21266, 21281, 21314, 21362, 21394, 21477, 21485, 21511, 21513, 21576, 21625, 21631, 21648, 21666.
NSH : IET Nos. - 21407, 21416, 21429, 21438, 21442, 21449.
DSN : CR 2619-5, VL 31320, VLPR-9, CB 06-135, CB 05-755.

Under disease management, newer fungicides were evaluated against Sheath blight disease. Hexaconazole 5 SC @ 2 ml/l was found effective against Sheath bight disease followed by new fungicide metaminostrobin 20 SC @ 2 ml/l of water.

- **Pusa centre :** Seven trials under host plant resistance were done at Pusa during 2009-10. The following germplasms were found promising (up to score 2) against Brown spot disease under different nurseries.

NSH-1 : IET Nos. – 21190, 20897, 21098, 21100, 20710.
NSH-2 : IET Nos. – 21514, 21523, 21524, 21527, 18850, 21555, 21557, 21558, 21560, 21567, 21568, 21569, 21571, 21572, 21574, 21575, 21577, 21579, 21581, 21582, 21587, 21588, 21580, 21592, 21603, 21604, 21609, 21621, 21629, 21639, 21280, 21287, 21294.
DSN : CR 2642-52.

Under disease observation nursery, the intensity of various diseases of rice was recorded at Pusa centre. The intensity of Brown spot disease was severe in early, medium (normal) and late sown conditions followed by Bacterial leaf blight.

New fungicides were evaluated against the Brown spot disease. Metaminostrobin 20 SC @ 2 ml/l of water and hexacanozole 75 WG @ 2.0 ml/l of water were found effective against Brown spot disease. Nitrogen management practices (86 kg N/ha) and use of resistant variety (Rajshree) had resulted in significant reduction in Bacterial blight intensity.

- **Bikramganj centre :** Under control of Sheath blight disease trial, percent disease incidence reduced with the use of validamycin 1.6 l/ha followed by hexaconazole @ 1.6 l/ha.

Wheat

Plant Pathology (Sabour) :

- One trial on Trap Plot Nursery was conducted. Only brown rust appeared and the first appearance of the disease was recorded on 25.02.09. Out of 20 genotypes grown, only 4 genotypes namely Agra Local, Lal Bahadur, K 8804 and Janak showed disease symptoms and the remaining genotypes were free from rust. Maximum severity of 40s was recorded with Lal Bahadur followed by Agra Local (30s).
- Only two entries, WL 711 and Agra Local were found infected by loose smut in traces while all the genotypes were infected by leaf blight and severity varied from 25 in Lr 24 to 58 in HP 1102.

Nematology (Pusa) :

- Out of 15 places surveyed for ear-cockle disease of wheat, only 02 places revealed the presence of ear-cockle galls. Under the survey of plant parasitic nematodes of wheat,

150 soil samples were collected and analyzed. Nematode species *Tylenchorhynchus* predominated over others. Under rice-wheat cropping system, there was increase in plant parasitic nematodes both after rice as well as after wheat.

- Under the screening of 45 wheat entries of AVT 1st year against root-knot nematode *M. graminicola*, none was found susceptible. Similarly, out of 43 entries of AVT 2nd year none was found susceptible.

Maize

Entomology :

- Out of 4 entries in early maturing group, 3 were moderately susceptible and 1 (one) highly susceptible against *Chilopartellus* (stem borer). In medium maturity group, out of 21 entries 16 were moderately susceptible and 5 were highly susceptible. In full season maturity group, out of 32 entries 26 were found to be moderately susceptible and 6 were observed to be highly susceptible.

Plant Pathology :

- *Altogether 10 trails related to* different maturity groups were conducted. Among the screening trials, altogether 243 entries/varieties were evaluated under artificial inoculated conditions against *Helminthosporium maydis*. Out of 243, only 5 entries/varieties namely KMH SUPPER-244, FH3773, CP-848, VEH QPM-3027 and QPM-5 showed resistant reactions against maydis leaf blight.
- In the survey and surveillance, Maydis leaf blight was recorded in all the surveyed areas under Bihar, Jharkhand and Eastern Uttar Pradesh. In experimental area Pythium stalk rot and Bacterial stalk rot incidence was much higher, Rust and Banded leaf and sheath blight diseases were also recorded in trace amount

Tropical Fruits

Entomology :

- Minimum population of scarring beetle (*Basilepta subcostatum)* on banana was observed in the second fortnight of October, whereas maximum population in the second fortnight of August.
- In Vaishali Zone (Zone 1) of Bihar, four insect pests viz. scarring beetle, pseudostem borer, corm weevil and aphid caused major loss to banana crop.

Plant Pathology :

- The combined application of Copper oxychloride (CoC) @ 3g/l + Streptocycline @ 0.3 g/l was most effective against citrus canker and which showed maximum inhibition of disease (92.88%) with least lesion/leaf (1.66 lesion/leaf).
- Eye spot disease of banana incited by *Drechslera gigantea* was first time reported from Koshi belt of Bihar. Its PDI was observed to vary between 10-16.5%.
- Carbendazim and biocontrol agents (*Trichoderma viride*, *Pseudomonas fluorescence* and neem cake) were used alone or in combination to combat the Panama wilt disease of banana. Planting disease free suckers after dipping in 0.2% carbendazim for 45 minutes showed minimum disease incidence which was significantly superior to rest of the treatments. Use of disease free sucker + application of neem cake @ 250 g/plant + soil application of *Trichoderma* @ 10 g/sucker thrice was the second best treatment.
- PRSV incidence was most rampant showing cent percent incidence in all the districts under survey.

- First time bud necrosis viral disease of papaya was noticed from Pusa. But its incidence was quite less (trace).
- The minimum incidence of PRSV disease (i.e. 76.67%) was recorded when a combination of neem oil (1%) + dimethoate (1.5%) was applied at 15 day interval, 30 days after planting and recorded maximum yield. Two rows of maize as border crop + Zn (0.5%) + B (0.1) spray showed 81.67% incidence as against 100% in the control. This was the second best treatment.

Subtropical Fruits

Entomology :

- In population dynamics of major pests of mango (hopper & fruit fly), the hopper population was recorded higher during April to June & December-March. Fruit fly was maximum during June-September.
- In crop loss assessment of mango hopper, three foliar sprays of imidacloprid @ 0.005% at panicle emergence followed by two sprays of endosulfan @ 0.07% after 21 days at 15 days interval were found most effective and recorded highest yield (71.90 kg/plant).
- In integrated pest management, imidacloprid followed by NSKE and endosulfan was found very effective in controlling mango hopper with highest yield (111.6 kg/plant).
- In the survey and surveillance of pollinators trial, honey bee, stingless bee and coccinillid were found to play a major role.

Plant Pathology :

- **Mango malformation (Floral)** : Out of 43 germplasms, Amrapali was highly affected (27%) followed by Erwin (24%) and the remaining had below1-10% incidence.
- **Powdery mildew** : During investigation, 43 germplasms have been taken into consideration, out of which 4 germplasms namely Calcuttia maldah, Maldah (Surajgarha) and Maldah (Dholi kothi) were free from the incidence. Rest were infested below 10%.
- **Anthracnose :** The foliar spray of 0.1% carbendazim was found to be very effective.
- **Blossom blight :** Mancozeb 0.2% foliar spray was found to be the best.
- Survey for the seasonal occurrence of diseases: Anthracnose, blossom blight and red rust were the major diseases found in this area.

Pulses

Pigeonpea

Entomology :

- Among 16 genotypes of late maturity, four genotypes viz. KA-01-8, DA-05-1, IPA-07 along with the check entries viz. Bahar, NDA-1 and MAL-6 showed relatively higher level of resistance against pod fly as well as *Heliothis*.
- Out of six genotypes of long maturity group, three entries PA 303, MAL-28 and KBA-11-2 were found less susceptible to both pod fly as well as *Heliothis*.
- Among the newer insecticides evaluated against pod borer complex on pigeonpea c.v. Bahar, indoxacarb 14.5 SC (60.0 g a.i./ha) recorded lowest pod fly infestation (15.3%).

Plant Pathology :

- In National nursery for evaluation of pigeonpea entries in IVT and AVT against *Fusarium* wilt in sick plot, out of 69 entries only one entry BDN 2001-9 exhibited resistant reaction against the disease.

- In identification of races of *Fusarium udum* through host plant differentials, out of ten pigeonpea differentials, three viz. ICP 8858, ICP 9174 and BDN-2 recorded resistant reaction while two viz. Bahar and ICP 2376 showed highly susceptible reaction to the disease.
- In multilocation evaluation of promising entries of pigeonpea for identification of donors against wilt, out of 37 entries only five viz. AKT 222492, IPA 8FD, IPA 204,JSA 59 and NDA 65 exhibited resistance against wilt.
- In National nursery for evaluation of pigeon pea, entries of AVT and IVT against sterility mosaic, out of 56 entries only two viz. BDN 2004-1 and IPA 8F showed resistant reaction against the disease under epiphytotic conditions.
- The entry IPA 8F was found promising to wilt and SMD as well.
- In National nursery for evaluation of long duration pigeon pea, of the nine entries evaluated against wilt and sterility mosaic under high disease pressure, two viz. IPA 92 and NDA 7-5 showed resistance against wilt, while IPA 92 and MAL 28 were resistant to SMD. IPA 92 showed dual resistance against both the diseases.
- In pigeon pea wilt and sterility mosaic disease nursery, out of 30 entries from ICRISAT evaluated along with two susceptible checks, only two entries ICPL 20094 and ICPL 20106 recorded moderate resistance against sterility mosaic under high disease pressure. In wilt trial disease pressure was low.

Nematology :

- Out of 21 pigeonpea lines/ cultivars evaluated for resistance against root-knot nematode (*Meloidogyne incognita*), two entries (coded) viz. IVT-3 and IVT-14 showed highly resistant reaction while four entries (coded) viz. IVT-10, IVT-13, IVT-15 and IVT-21 were found resistant against the nematode. Five entries (coded) viz. IVT-1,IVT-2, IVT-5, IVT-8 and IVT-19 proved moderately resistant while remaining entries were susceptible.
- Among 12 germplasms of pigeonpea screened under pot conditions, two entries (coded) viz. G-4 and G-10 were found highly resistant while two entries (coded) viz. G-5 and G-6 showed moderately resistant reaction against root knot nematode. Remaining entries were susceptible.
- Results of the first year experiment on management of root-knot nematode with organic manuring and seed treatment revealed that all the treatments viz. soil application of vermicompost (1.0 t/ ha), neem cake (0.5 t/ha), seed dressing with carbosulfan 25 SD (3.0% w/w), vermicompost (0.5 t/ha)+seed dressing with carbosulfan 25 SD and neem cake (0.25 t/ha)+ seed dressing with carbosulfan 25 SD (3.0% w/w) significantly superior to untreated control in suppressing root knot formation and final nematode population on pigonpea c.v. Bahar. However, the soil application of neem cake (0.5 t/ha) gave the best results followed by neem cake (0.25 t/ha) + seed dressing with carbosulfan (3.0% w/w).
- The first year trial on efficacy of seed treatments revealed that soaking of Pigeonpea seeds c.v. Bahar in imidacloprid 17.5 EC (0.3%) and carbosulfan 25 SD (3.0%) for four hours significantly increased shoot length in comparison to untreated control while root length, fresh shoot weight and fresh root weight at 45 DAS recorded non-significant effect of the treatments. Both the seed treatments however, significantly reduced root knot formation and final nematode population.

MULLaRP

Entomology :

- Among 25 mungbean genotypes, six viz. IPM-05-2-8, MH-564, IPM-05-3-22, IPM-02-16, IPM-06-10 and NDM-6-62 recorded considerably low thrips infestation (10.5-15.5 thrips/50 flowers) as against the same being quite high (44.5-58.8 thrips/50 flowers) in

the check i.e. PDM-11. Two genotypes viz. Samrat and MH-565 suffered minimum due to pod borer with mean pod damage of 8.8-9.6 percent while the genotypes like NDM-6-62 and MH-564 suffered most due to this pest (30.0-33.3 %).

- Of the eleven urdbean genotypes, two viz. Pant U-40 and Pant U-31 recorded significantly less damage (5.4-5.5%) due to Bihar hairy caterpillar as against the same being highest (15.5%) in the genotype TU-94-2. Mean pod borer damage ranged from 9.4 percent in T-9 to 28.5 percent in Pant U-40. From productivity point of view, two genotypes viz. Pant U-19 and Pant U-31 with mean grain yield of 658.0 and 616.60 kg/ha were at par with the best check i.e. T-9 (624.60 kg/ha).
- Neither of the two bioinoculants viz. *Beauveria bassiana* ST and *Pseudomonas florescens* ST either alone or in combination proved more efficacious in reducing the infestation of pod borer and Bihar hairy caterpillar or enhancing the productivity in urdbean c.v. Pant U-19 in comparison to untreated control. Seed inoculation with *Pseudomonas florescens* or *Beuveria bassiana* followed by one spraying of profenophos (2g/l) recorded significantly lower pod borer damage (8.3-10.4%) as well as Bihar hairy caterpillar infestation (8.1-10.5%) and higher grain yield (1388.80-1557.70 kg/ha) in comparison to control which yielded as low as 931.0 kg/ha.
- IPM module consisting of seed treatment with imidacloprid (3 ml/kg seed) + trichoderma (4g/kg seed), inter-cropping with sorghum (4:2 row ratio), mechanical collection and destruction of gregarious caterpillars of Bihar hairy caterpillar and spraying of spinosad 45 SC (60 g a.i./ha) at pod initiation stage recorded lower foliage as well as pod damage, higher grain yield (1570.0 kg/ha) and better cost benefit ratio (1:3.5) as compared to higher level of corresponding pest damage (21.2 and 19.4%), low grain yield (1050.0 kg/ha) and poor cost benefit ratio (1:1.4) in non IPM plot of urdbean c.v. Pant U-19.

Plant Pathology :

- A local survey was conducted at farmers' field of Muzaffarpur and Samastipur district in the first fortnight of June, to record the status of yellow mosaic on local varieties of mungbean. The observations clearly indicated that local varieties of mungbean grown by farmers were highly susceptible to yellow mosaic disease in summer season. The disease incidence ranged between 60-80%.
- In National nursery for evaluation of IVT, AVT and germplasm entries against important diseases, out of 34 mungbean entries, P1038 (coded) exhibited resistance against yellow mosaic and P 1021 (coded) against *Cercospora* leaf spot disease.
- Out of 24 entries of urdbean IVT, AVT and germplasms evaluated in National nursery, twelve (coded) viz. P1051, P1052, P1053, P1055, P1056, P1059, P1061, P1064 P1065, P1068, P1070 and P1072 showed showed resistance against YMV and two viz. P1075 and P1093 against powdery mildew disease.
- Studies on variability in MYMV and PM disease infecting mungbean and urdbean revealed that mungbean differential PAU 911 and urdbean differentials T9, DPU 88-31, IPU 94-1 and M 1-1 were resistant to yellow mosaic disease while urdbean entry Pragya was resistant to powdery mildew.
- In evaluation of Genetic stock nursery, of mung and urdbean, out of 29 entries of mungbean, five viz. ML 1354, ML 1392, ML 1451, ML 1476 and PDM 139 recorded resistant reaction against YMV disease. Out of 21 entries of urdbean, three viz. KUG 205, UL 416 and IPU 94-1 showed resistance against YMV and LBG 752, DPU 88-31 and BDU-1 against powdery mildew.
- The area under mungbean and urdbean in kharif season in farmers plot was negligible in this locality. However, observations on experimental plots at Dholi and Muraul indicated high disease pressure of yellow mosaic, 4-6 in urdbean and 4-9 in 1-9 rating scale in

mungbean. Cercospora leaf spot was severe in mungbean with score of 6-7 in 1-9 rating scale. Powdery mildew was severe in both the crops (4-5 in 0-5 rating scale).

Nematology :

- Of the three urdbean genotypes, U-2007-1 showed resistant reaction against *M. incognita* while, U-2007-2 was found moderately resistant.
- All the four mungbean entries evaluated for resistance were found susceptible to the root knot nematode

Vegetables

Disease management :

- **Resistant varietal trial on bhindi against YVMV (AVT-I) :** Out of 12 entries, none of the entry was found tolerant against yellow vein mosaic virus.
- **Integrated management of YVMV disease of okra :** Amongst the treatments, seed treatment with imidacloprid (0.5 g/kg) followed by four sprayings of different chemicals as acephate (1.5 g/lt), imidacloprid (0.5 ml/lt) admine (2 g/lt) and hostathion (1 ml/lt) at 10 days interval recorded lowest disease incidence of 10.3% as compared to control (46.8%). This treatment combination also recorded the maximum yield of 85.22 q/ha.
- **Integrated management of downy mildew of cucurbits (spongegourd) :** Seed treatment with ridomil (M_2) (0.25%) followed by removal of lower leaves three times in the morning at different intervals and spray of mancozeb (0.25%) in afternoon were found effective in reducing the disease intensity in both conventional and bower system of cultivation. Bower system recorded 4.6 PDI with an average yield of 104.44 q/ha while in conventional, it was found to be 5.6 PDI with an average of 100.245 q/ha.

Insect pest management :

- **Sex pheromone based technology against brinjal borer :** Use of pheromone trap @ 100/h along with shoot clipping at weekly interval and NSKE (4%) sprays recorded lowest damage of fruits (13.25%) with a max. yield of 318.27 q/ha (var. Muktakeshi).
- **Bio-efficacy of chemicals against brinjal borer :** Spraying of emamectin @ 0.4 g/lt and spinosad @ 0.5 ml/lt recorded a lowest fruit damage of 6.10 and 7.28 % and max. yield of 359.27 and 346.70 q/ha, respectively. The spraying was started after 45 days of planting and the rest four sprays were done at 15 days interval (var. Muktakeshi).
- **Protection package for management of brinjal borer :** IPM package consisting different aspects-seedling root dip in imidacloprid @ 1.0 ml/lt for 3 hr, maize barrier crop, pheromone trap, shoot clipping at weekly intervals, alternate sprays of commercial neem products @ 3.0 ml/lt with triazophos @ 2.0 ml/lt after flowering with 5 sprays (70, 80, 90,100 & 110 DAT) recorded lowest fruit damage of 7.32 % with max. yield of 325.18 q/ha (var. Rajendra Baigan-II).
- **Evaluation of different modules against okra insect-pests :** Chemical module consisting of seed treatment with thiomethoxam @ 3.0 g/kg, spraying of imidacloprid @ 0.3 ml/lt at 40 DAS, spoinsoad @ 0.3 ml /lt at 50 DAS, emamectin @ 0.4 g/lt at 65 DAS and spinosad @ 3 ml/lt at 80 DAS was found to be effective with lowest fruit damage of 5.07% with max. yield of 87.37 q/ha (var. Arka Anamika).

Tuber Crops (other than Potato)

Entomology :

- Among 12 entries tested against sweet potato weevil and termite under natural conditions, entries IGSP-14 and S-1-60 recorded lowest weevil infested tubers varying from 2.97 to 6.20 % as against 4.37 & 5.37 percent in local check RS-47 and RS-92,

respectively. Only two entries POL-19-9-3 and S-1-60 performed better against termite in respect of tuber infestation (8.59 and 9.40%, respectively).

- Among 8 cultivars tested under natural condition, the mean percent tuber infestation varied form 0.73 to 17.89 percent with minimum and maximum being in 440127 and Cross-4, respectively. Among remaining entries, CIPSWA-2, S-594 and 440035 recorded lowest weevil infested tubers (559-6.98%). Among different entries, SV-98, 440127 and Kamlasundari recorded lowest termite infested tubers varying from 9.35 to 10.74 percent as against 15.32 percent in local check i.e. Cross-4.
- Among different treatments, barrier crops of sweet potato and yam bean at 2:1 ratio recorded lowest weevil infested tubers (7.49%) and highest marketable tuber yield (19.19 t/ha) as against 23.03 percent and 13.94 t/ha, tuber infestation & marketable tuber yield in sole crop, respectively.
- Soil application of neem cake (10 t/ha) recorded lowest weevil infested tubers (5.62%) and gave highest marketable tuber yield (19.42 t/ha) which was at par with neem cake 5 t/ha (7.13%) and at par with chemical control (7.92%) in respect of tuber infestation.
- Pre-planting soil application of neem cake @ 2 t/ha afforded maximum protection (7.70%) to sweet potato tubers against termite which was at par with neem cake @ 1 t/ha and YBSP (5%) @ 20 kg/ha and gave highest marketable tuber yield (27.08 t/ha) as against 21.58 percent tuber infestation and 17.36 t/ha marketable tuber yield in untreated control, respectively.
- Among various treatments, foliar spray of dimethoate (0.03 %) showed its superiority in minimizing pod borer infestation (9.33 %) and recorded highest seed yield (1.67 t/ha) which was at par with foliar spray of NSKE 5% i.e. (1.42 t/ha) and carbaryl (1.25 t/ha). Among neem products, foliar spray of NSKE 5% performed better and recorded lower pod infestation (16.00%) which was at par with neem gold (16.67%) and neem oil (17.33%).
- Among various formulations of tuber crops, YBSE (5 and 2% aqueous) proved most effective in minimizing aphid population (6.7 and 14.3/plant) and gave maximum reduction 81.5 and 73.9 percent at 10^{th} days after 2^{nd} spray and at par with endosulfan (82.4%). The highest seed yield (11.0 q/ha) was recorded with endosulfan which was at par with YBSE (5 and 2% aqueous) 10.70 & 10.00 q/ha, respectively.

Plant Pathology :

- Among twelve Colocasia lines, C-32 and Muktakeshi recorded lowest disease incidence (6.70 %) and intensity (4.3 %), respectively as against susceptible variety Telia (37.8 and 25.7%, disease incidence and intensity, respectively). Maximum side tuber yield (12.30 t/ha) was recorded with Muktakeshi while lowest in Telia (8.50 t/ha).
- Minimum disease incidence (10.71, 5.00 and 16.43%) and intensity (5.43, 2.14 and 9.57%) of leaf spot, mosaic and collar rot, respectively were recorded under IDM package followed by chemical control (12.86, 9.29, 18.5 % and 8.43, 3.17 and 11.28%, respectively). The highest and lowest corm yield 34.5 and 24.3 t/ha was recorded under IDM and farmers practices, respectively. The lowest disease incidence (10.78%) and intensity (4.45%) were recorded in soil mulching with straw and Muktakeshi, respectively. The highest corm yield (12.97 t/ha) was recorded with Muktakeshi as resistant variety and lowest yield in Telia (7.63 t/ha) as susceptible variety.

Spices

Ginger :

- Diseased rhizome of ginger collected from Samastipur and Muzaffarpur districts of state were found to be associated with bacterial wilt disease caused by *Ralstonia sp.*
- Maximum germination count (69.50%), minimum bacterial wilt incidence (30.00%) and highest yield (6.96 t/ha) was recorded in soil fumigated treatment using mustard. Second highest germination count (63.50%) and second lowest bacterial wilt incidence

(38.00%) were recorded in the treatment having rhizome treated by endophytic bacterial antagonist (IISR-GEB) and highest yield (6.29 t/ha) was recorded in the rhizobacterial antagonist (IISR-GRB) treated rhizome.

- Lowest PDI of bacterial wilt incidence (2.00), highest germination count (96.00%), and yield (9.58 t/ha) were found when bio-fumigation on soil was done using cabbage. Second lowest PDI of bacterial wilt incidence (23.00) and second highest germination count (76.50%) were recorded in treatment having rhizome treated with mancozeb 72% WP (1.25 g/l) while second highest rhizome yield (7.50 t/ha) was recorded in rhizome treated by endophytic bacterial antagonist (IISR-GEB).
- Highest germination count (47.00%) and lowest PDI of bacterial wilt incidence (48.00) with highest rhizome yield (5.08 t/ha) were recorded in soil treatment with bio-fumigation using mustard and rhizome treatment by endophytic bacterial antagonist (IISR-GEB), respectively over control. Second lowest PDI of bacterial wilt incidence (52.00) and second highest germination count (42.50%), rhizome yield (4.87 t/ha) over control was recorded in rhizomes treated by heat.
- *Highest germination count (47.00%) with lowest bacterial wilt incidence (PDI = 54.00) and highest yield (4.67 t/ha) were recorded in the soil treatment by bio-fumigation using* cabbage followed by rhizome treatment by heat giving germination count (42.50%), PDI of bacterial wilt incidence (58.00) and rhizome yield (4.21 t/ha) over control. During the experimentation period, no incidence of soft rot, shoot borer and leaf spot were recorded.

Turmeric :

- Highest germination (95.33%), lowest PDI (4.00) and highest reduction in disease incidence (92.31%) resulting in highest yield (38.55 t/ha) were recorded over control in the treatment having foliar spray with tricylozole (0.1%) on 45 and 90 DAP followed by rhizome treatment with propiconazole (0.1%) + foliar spray with propiconazole (0.1%) on 45 and 90 DAP registering germination (90%), PDI (6.00), reduction in disease incidence (88.46%) with yield (37.22 t/ha) over control

Potato :

- Out of five varieties, var. K. Pushkar was least affected by major potato diseases (Late blight, Early blight, phoma & leaf roll). Aphids, (*Myzus persicae* & *Aphis gossypii*), population was recorded in the early sown crop with overall heavy loss of crop growth & yield.

D) Allied Field Research

Department of Farm Power & Renewable Energy :

- Food cooked in solar cooker is nutritious. About 10-20% of protein retention is more as compared to that in conventional cooking. Vitamin - thiamine retention is about 20 to 30% more where as vitamin A is retained 5 to 10% more when it is cooked in solar cooker.

AICRP on Weed Control :

- **Phytosociological survey of weeds :** During *kharif* season of 2009, nineteen types of weed species were observed in the field of *kharif* maize. Out of which *Cyperus rotundus*, *Cynodon dactylon* and *Caesulia axillaries* were highly dominant weeds. In direct seeded upland rice, twenty four types of weed species were recorded. *Echinocloa colonum* recorded the highest IVI value followed by *Cyperus rotundus* and *Paspalum difficun*. Transplanted rice was found infested with nineteen numbers of weed species. *Echinocloa colonum*, *Monochoria vaginalis* and *Echinochloa grabernalum* were highly dominant weeds. In kharif pigeonpea, fourteen types of weed species were found to be

prevalent in which the highest IVI value was recorded under *Anagalis arvensis* followed by *Dactyloctenium aegyptium* and *Launea pinatifida*.

- **Ethnobotanical survey of weeds :** During ethnobotanical survey of Buxar district, some weed species were identified as medicinal and aromatic plants. The yellow juice of stem of *Argimone mexicana* was found to be used for healing wounds, if used twice a day for one week and also for the treatment of eye diseases and the seed oil as an illuminant. *Lucus aspera* (Guma) of *Verbinaceae* family was observed to cure body wounds. The root of *Cirsium arvense* was observed to be used as tonic, diuretic, astringent, antiphlogistic and hepatic and chewed as a remedy for toothache. A decoction of the roots was found to be used for the treatment of worms in children.
- **Weed surveillance study :** A climber weed *Mikania cordata* belonging *Asteraceae* family was found spreaded over many trees in Buxar district. This weed invaded the whole tree and checked its photosynthetic process by making embankment of solar radiation. The infestation of *Mikania* is 17 percent mostly on acasia, ziziphus and mango plants.
- **Effect of time of sowing and weed control methods in direct seeded rice :** The sowing after onset of monsoon resulted in comparatively less weed density and weed dry matter. The lowest weed count and weed dry weight were recorded in weed free treatment. Application of butachlor 1.5 kg/ha PE + one hand weeding resulted in reduced weeds and higher yield of rice. The lowest grain yield was obtained in weed free treatment which was at par with butachlor 1.5 kg/ha PE + one hand weeding treatment.
- **Effect of rice establishment techniques under different weed management practices :** System of rice intensification method of rice establishment was comparatively efficient in minimizing weeds and obtaining higher grain yield of rice. Among the weed management practices, the highest grain yield was recorded in two hand weedings which was at par with pyrazosulfuron + mechanical weeding.
- **Effect of rice based cropping systems on weed dynamics and crop productivity :** The lowest weed count and weed dry weight were recorded in hand weeding (rice -2HW, rabi crop-1HW) in all the cropping system followed by recommended herbicide. The highest rice yield equivalence was obtained in direct seeded rice-wheat cropping system under hand weeding followed by direct seeded rice-potato and direct seeded rice and mustard cropping system.
- **Effect of maize based cropping system on weed dynamics, soil health and crop productivity :** The lowest weed count and weed dry weight were recorded in hand weeding followed by recommended herbicide in all the cropping system. The highest maize yield equivalence was recorded in maize-potato-green gram cropping system followed by maize-wheat and maize-mustard cropping system.
- **Long term trial on tillage in rice-wheat cropping system :** In rice crop, tillage and weed management treatments significantly reduced the weed count and weed dry weight. The lowest weed count and weed dry weight were recorded in CT-ZT followed by CT-CT and the highest weed count and weed dry weight were observed in ZT-ZT. Among the weed management treatments, the lowest weed count and weed dry weight were recorded in hand weeding followed by recommended herbicide i.e. butachlor @ 1 kg/ha. The highest grain yield of rice was recorded in CT-ZT followed by CT-CT. Under weed management treatments, the highest grain and straw yields were recorded in the treatment of one hand weeding which was followed by the treatment of recommended herbicide i.e. butachlor @1 kg/ha. In wheat crop, the system showed significantly lower weed count and weed dry weight in CT-ZT which was closely followed by ZT-ZT. Among the weed management treatments, the lowest weed count and weed dry weight were recorded in hand weeding which was closely followed by recommended herbicide (2,4-D @ 0.8 kg/ha). The highest grain and straw yields were recorded in CT-ZT treatment which were followed by the treatment ZT-ZT. Among the weed management treatments, hand weeding recorded the highest grain and straw yields which was at par with recommended herbicide i.e. 2,4-D @ 0.8 kg/ha. Not much change in micoflora like bacteria and fungi population, with or without tillage system was recorded. However,

there was a quantum improvement in soil microbial population due to hand weeding in the cropping system.

- **Weed seed bank studies under long term trial on tillage in rice-wheat cropping system :** During rabi season (before wheat sowing) altogether fourteen weed species were observed in long term trial on tillage in rice-wheat cropping system in which three were grasses, two sedges and nine broad leaved weeds. The lowest number of grasses and broad leaved weeds were observed in CT-ZT. However, the lowest sedges were observed in ZT-ZT. During kharif season (before rice planting), the lowest grasses, sedges and broad leaved weeds were recorded in CT-CT. However, during both the season the lowest grasses, sedges and broad leaved weeds were observed in recommended herbicide.
- **Long term herbicidal trial on weed management in direct seeded rice-chickpea cropping system :** In rice crop, the lowest weed count and weed dry weight were recorded under the treatment of butachlor @1.5 kg/ha + 1 HW which was followed by anilophos @ 0.5 kg/ha + 1 HW. The highest grain and straw yields of rice were recorded with butachlor @1.5 kg/ha + 1 HW which was followed by anilophos @ 0.5 kg/ha + 1 HW. However, in case of chickpea, the lowest weed count and weed dry weight were recorded in pendimethalin treatment @ 0.75 kg/ha + 1 HW followed by mechanical weeding twice. The highest grain and straw yield of chickpea were recorded with mechanical weeding twice which was at par with the pendimethalin treatment @ 0.75 kg/ha + one hand weeding.
- **Weed seed bank studies in long term herbicidal trial on rice-chickpea cropping system :** During rabi season (before sowing of chickpea), altogether fourteen weed species were observed in the experimental field out of which three were grasses, two were sedge and nine were broad leaf weeds. The lowest number of grasses were observed in anilophos @ 0.5 kg/ha + HW, however, the lowest number of sedges and broad leaf weeds were recorded in mechanical weeding (twice). During kharif season (before sowing of rice), eighteen weed species were observed out of which five were grasses, five were sedges and eight were broad leaf weeds. The lowest weed count of grasses, sedges and broad leaf weeds were observed in pendimethalin treatment @ 0.75 kg/ha + 1 HW.
- **Long term herbicidal trial on rice-wheat cropping system : In rice crop,** the lowest weed count and weed dry weight were recorded under fb mechanical weeding (2) and butachlor @ 1.5 kg/ha and anilophos @ 0.5 kg/ha. The highest grain and straw yields of rice were recorded under butachlor @ 1.5 kg/ha which was at par with anilophos @ 0.5 kg/ha. In case of wheat crop in the system, the lowest weed count and weed dry weight were recorded under mechanical weeding which was at par with sulphosulphuron treatment @ 30 g/ha. However, the highest grain and straw yields of wheat were recorded with mechanical weeding which was at par with sulphosulphuron @ 30 g/ha. The highest WCE was recorded in mechanical weeding.
- **Long term herbicidal trial on maize-lentil cropping system :** All the weed control treatments reduced the weed count and weed dry weight significantly in both the crops. The lowest weed count and weed dry weight were recorded with atrazine @ 0.75 kg/ha followed by 2, 4-D @ 0.5 kg/ha in maize crop which was followed by atrazine @1.0 kg/ha PE and mechanical weeding (twice). The highest maize grain yield was recorded in mechanical weeding (twice) which was at par with atrazine @ 0.75 kg/ha *fb* 2, 4-D @ 0.5 kg/ha. In lentil crop, the lowest weed count and weed dry weight were recorded under pendimethalin treatment @ 0.75 kg/ha *fb* mechanical weeding which was closely followed by mechanical weeding (twice). The highest grain and straw yields of lentil were recorded with mechanical weeding (twice) followed by pendimethalin @ 0.75 kg/ha *fb* mechanical weeding. The highest weed control efficiency was recorded with mechanical weeding (twice). Crop population of lentil was lower in the plots where atrazine was used in previous maize crop.
- **Management of parthenium by Mexican beetles :** Mexican beetles were seen emerging from soil after breaking hibernation and defoliate the parthenium [illegible] from

July, increased gradually upto November and decreased drastically there after. Similar trends were observed in case of egg, larva and adult population. They remained active between July to September at all the three sites. The emergence of beetle did not continue because it depends on rainfall & environment and the extent of damage was not similar at all the sites. During the survey, low growth rate of Mexican beetles in the season was found. Thousand of beetles were collected from source and spreaded in new area of Buxar district. Mexican beetles received from DWSR were also spreaded in Buxar district.

- **Yield loss estimation study in transplanted rice in Buxar district :** The yield loss due to grasses was 46.7% followed by sedges (27.5%) and by broad leaved weeds (25.8%) out of total anticipated yield loss of 24-41% in transplanted rice. Due to the severe shortage of labourers during the peak period and the hand weeding is time consuming and costly, the farmers are using herbicides or integrated approach for weed control in rice.

AICRP on Soil Test Crop Response Correlation :

- **Nutrient recycling through crop residues :** Grain and straw yield of rice (42nd crops) increased significantly with increasing levels of fertilizers up to 100% NPK. However, grain and straw yield at 150% NPK were at par with 100% NPK. The relative performance of organic manure and crop residues on the yield of rice varied in the order: Compost + crop residues > compost > crop residues > no compost or no crop residues. The results indicate that the crop residues could substitute compost @ 10 t/ha. Compost + crop residues could save 50% recommended dose of NPK *i.e.* 60 kg N, 30 kg P_2O_5 and 20 kg K_2O/ha. The compost, crop residues and compost + crop residues increased the grain yield of rice 27.78, 19.13 and 42.45%, respectively and that of straw yield 30.32, 20.65 and 44.45%, respectively.

AICRP on MAP & Betelvine :

- **Maintenance of germplasm of betelvine :** 20 Germplasms of betelvine are being maintained in the conservatory.
- **Collection and conservation of germplasm :** Germplasms of Brahmi (*Bacopa monnieri)* and Mandook Parni (*Centella asiatica*) are being collected from various parts of state. Ten collections of *Centella asiatica* and three collections of *Bacopa monnieri* have been conserved for their characterization.
- **Effect of planting time and number of node cuttings (saplings) on yield of *Bacopa monnieri* :** The crop planted in the middle of July with 4-node cuttings (sapling) recorded maximum herbage yield (316.97 q/ha). The crop planted earlier (May–June) showed quite lower yield. The planting of crop with only 2 or three node cuttings was found to reduce the total herbage yield as compared to crop planted with 4-node cuttings.
- **Effect of planting time and no. of node cuttings (saplings) on yield of *Centella asiatica* :** The crop planted in the middle of July with 4-node cuttings(sapling) recorded maximum herbage yield (121.24 q/ha). The crop planted earlier (May–June) showed quite lower yield. The planting of crop with only 2 or three node cuttings was found to reduce the total herbage yield as compared to crop planted with 4-node cuttings.
- **Study of diseases of *Bacopa monnieri* and *Centella asiatica:*** The crop of *Bacopa monnieri* was free from pest and diseases through out the year; but *Centella asiatica* was found to show typical symptoms of stolon rot during rainy season (Jul–August).The fungus- *Fusarium* sp. was frequently isolated from the disease specimen and purified to confirm the pathogenicity of fungus.

AICRP on Honey Bees and Pollinators :

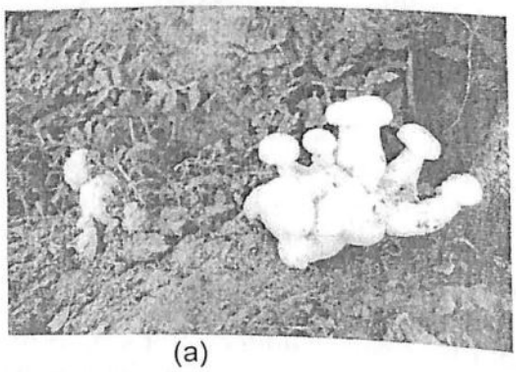
- **Stock improvement through selection and multiplication of better performing colonies :** Among the better performing colonies, performance of colony no. G was

best followed by colony no. E & colony no. D while least performance was observed in colony no. F. There was no significant variation in bee strength, brood area, pollen load, pollen forager and cleanliness of *Apis mellifera* selected colonies. The honey store was highest in colony no. E (4.67 kg) while lowest (2.33 kg) in colony no. B of *A. mellifera*. The egg laying capacity varied significantly among the colonies and ranged between 710.67 to 900.67 eggs per day. The queen weight varied between 172.00 to 204.33 mg, Pollen forager between 3.33 to 4.67 per minute, aggressiveness between 15.33 to 24.67 and cleanliness between 0.72 to 1.33 g in selected colonies.

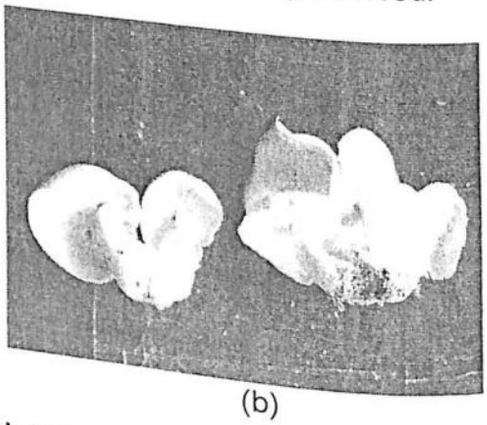
- **Effect of different artificial diets during dearth period (July-October) on colony development :** The artificial diet comprising of Soybean flour (25 g) + Yeast (10 g) + Pollen (15 g) + Skimmed milk powder (5 g) + Honey (22.5 g) + Sugar (22.5 g) was best suited for colony development during dearth period.
- **Data base of pollinators other than honey bees :** Among the pollinator fauna complex other than honey bees, five species visited on pigeonpea, nine species on brassica and five species on coriander.
- **Extraction of bee venom from *Apis mellifera* colonies :** The data recorded in January-February indicated that 40.58 mg bee venom can be obtained by collecting thrice, 23.57 mg when collected twice and 13.56 mg when collected once from one colony of *Apis mellifera*. When no. of extraction was increased there was detrimental effect on bee strength and brood area and colony also get aggressive.
- **Production of propolis from *Apis mellifera* colonies :** The maximum propolis was extracted in the month of rainy seasons i.e. August (38.55 g), September (51.05 g) and October (43.85 g) and lowest in the month on May (6.35 g). Among the different methods of propolis collection, maximum production was obtained in scrapping (27.71 g) followed by plastic net placed on stick (24.71 g) and lowest in plastic net placed on bottom board (13.13 g). On an average of 23.32 g of propolis could be extracted from a colony in a month in a year.
- **Survey of bee diseases and enemies :** The status of diseases and pests of honey bees in Bihar during 2009-10 was gathered through visit of apiary. About 54 apiaries in different districts having more than 50 colonies were visited. Mites were the serious problem in the apiaries.

AICRP on Mushroom :

- **Collection of wild germplasm** : Out of 3 collections, one was identified as *Calocybe* sp. (Milky white mushroom). The spore print as well culture have been preserved.



(a)



(b)

Fig. 1 : *Calocybe indica* (a) Natural Habitat (b) After harvesting

- **Evaluation of oyster strains :** Out of four strains of PSC and PF, PSC 05 and PF 04 gave maximum yield of 60 kg and 52.54 kg per 100 kg of substrate, respectively.

Disease survey :

- *Trichoderma viride* and *Coprinus* spp. were frequently observed in Oyster bags/beds from spawn run to harvesting.
- *Aspergillus niger, A. flavus* and *Neurospora sitophila* were also observed in oyster beds.

(E) Crop Variety Released

- **Tuber crops :**

  Rajendra Arvi-1 : Erect, tall with droopy leaves, moderately susceptible to leaf blight, early maturing. Maturity 160-180 days, Yield 180 q/ha. Suitable for plains of Bihar.

(F) Technology Released

- **Betelvine Cultivation :**

Plant Population	:	1.5 lakh plants/ha
Nutrient Management	:	200:100:100 kg NPK/ha as organic & inorganic with Phosphobacter @ 5 kg/ha + Azotobacter @ 5 kg/ha incubated in FYM 100 kg
Integrated Crop Management	:	INM + IDM : The betelvine crop is planted at the density of 1.5 lakh/ha with recommended dose of NPK (200:100:100 kg/ha) as organic + sanitation of bareja integrated with 3-drenching of Bordeaux Mixture (1%) and 6 – sprays of BM (0.5%) or 4 – application of bio-agent – *Trichoderma viride* applied with MOC (5 kg Trichoderma in 500 kg MOC/ha)

- **Intercropping in Sugarcane :** Autumn planted Sugarcane + Linseed (Var. Garima) in 1:3 row ratio.

2.3 EXTENSION ACTIVITIES

2.3.1 Trainings Conducted by KVKs

S.No.	Name of KVK	Name of Training	Type of Training	No. of Training	No. of Participants		
					Male	Female	Total
1	Muzaffarpur	Crop Improvement	PF	3	78	-	78
		Natural Resource Management	PF, PFW, RY	46	4302	253	4555
		Crop Protection	PF, PFW, RY	22	1630	24	1654
		Fisheries & A. H	PF, PFW	18	425	60	485
		Home Science	PFM	4	-	89	89
		Farm Machinery & Engg.	PF, PFM	17	447	512	959
		Entrepreneurship Development	PF, PFM	9	235	78	313
		Other Misc. Trainings	PF, PFM	10	328	52	380
			Total :	**129**	**7445**	**1068**	**8513**
2	Vaishali	Natural Resource Management	PF, PFW, RY	6	6713	385	7098
		Crop Protection	EF, PF	38	6364	249	6613
		Fisheries & A. H	-	42	-	-	-
		Home Science	Rural Youth	18	-	439	439
		Farm Machinery & Engg.	-	-	-	-	-
		Entrepreneurship Development	PF, RY	12	238	0	238
			Total :	**116**	**13315**	**1073**	**14388**
3	Samastipur	Natural Resource Management	PF, RY, EF	19	1870	140	2010
			Total :	**19**	**1870**	**140**	**2010**
4	Sheohar	Natural Resource Management	PF,EF	22	631	11	642
		Crop Protection	PF,EF	7	255	8	263
			Total :	**29**	**886**	**19**	**905**
5	Darbhanga	Natural Resource Management	PF, RY, EF	25	738	-	738
		Crop Protection	PF, EF	3	100	-	100
		Home Science	RY	11		286	286
		Entrepreneurship Development	PF	1	50	-	50
			Total :	**40**	**888**	**286**	**1174**
6	Gopalganj	Natural Resource Management	PF	45	2340	105	2445
		Crop Protection	PF, EF	3	100	0	100
		Fisheries & A. H	PF	3	62	0	62
		Entrepreneurship Development		27	2318	485	2803
			Total :	**78**	**4820**	**590**	**5410**
7	East Champaran	Natural Resource Management	PF	19	700	641	1341
		Crop Protection	PF, EF	7	370	215	585
		Entrepreneurship Development	PF, EF	4	14	147	161
			Total :	30	1084	1003	2087

S.No.	Name of KVK	Name of Training	Type of Training	No. of Training	No. of Participants		
					Male	Female	Total
8	West Champaran	Natural Resource Management	PFW, RY, PF	32	803	48	851
		Crop Protection		17	456	45	501
		Fisheries & A. H	PFW, RY	10	297	25	322
		Farm Machinery & Engg.	RY, PFW	10	386	44	430
		Entrepreneurship Development	PFW, RY	7	189	14	203
			Total :	**76**	**2131**	**176**	**2307**
9	Begusarai	Natural Resource Management	PF, RY, EP	30	5997	275	6272
		Crop Protection	PF, EP	8	2292	67	2359
		Fisheries & A. H	RY, PF	10	2482	78	2560
		Home Science	RY	1		52	52
		Farm Machinery & Engg.	PF, RY	14	3974	135	4109
		Entrepreneurship Development	PF, RY	10	112	290	402
			Total :	**73**	**14857**	**897**	**15754**
10	Saran	Natural Resource Management	PF, PFW, RY	81	2176	157	2333
		Fisheries & A. H	PF, PFW, RY	19	389	9	398
		Entrepreneurship Development	RY	7	29	77	106
			Total :	**107**	**2594**	**243**	**2837**

PF = Practicing Farmers, PFW = Practicing Farm Women, RY = Rural Youth, EF = Extension Functionaries

2.3.2 Trainings Conducted by Units

Name of Unit	Name of Training	Period	No. of Participants
BVC, Patna	Advances in vet. diagnostic techniques	01.06.09 to 03.06.09	54
	Commercial A.H.	24.06.09 to 25.06.09	41
	Integrated livestock management	29.06.09 to 30.06.09	53
	Improved A.H. practices	03.07.09 to 04.07.09	
	Integrated nutritional management for livestock	05.07.09 to 06.07.09	50
	Infection diseases of livestock and poultry	27.07.09 to 29.07.09	59
	Animal husbandry & management	12.08.09 to 14.08.09	40
	Animal husbandry & management	17.08.09 to 19.08.09	47
	Tr. of coordinators of farm schools	22.08.09 to 24.08.09	15
	Integrated nutritional management for livestock	25.08.09 to 27.08.09	40
	Integrated livestock management	06.09.09 to 08.09.09	41
	Integrated livestock management	09.09.09 to 11.09.09	40
	Recent advances in animal reproduction	15.09.09 to 18.09.09	76
FBS&H, Pusa	On job training on agriculture biotechnology	June-July, 2009	15
	State level seminar cum training on emerging trends in cultivation of medicinal and aromatic plants	27.10.09 to - 28.10.09	60
	Mushroom production technology	14.09.09 to 19.9.09	18
	Mushroom production technology	21.12.09 to 26.12.09	21
	Mushroom production technology	11.01.10 to 16.1.10	28
	Mushroom production technology	30.10.2009	30
	Mushroom production technology	21.03.10	72

Name of Unit	Name of Training	Period	No. of Participants
COF, Dholi	Preparation of value-added fish products	30.05.09	39
	Fish seed production	25.06.09	40
	Fish seed production	08.09.09	22
FOA, Pusa	15 days training on soil- water-plant analysis for Soil Testing Technical Officers (Bihar Govt.) belonging to various districts of Bihar.	13.11.09 to 27.11.09	14
	Vermicompost - A soil improver	17.09.09 to 18.09.09, 29.10.09 to 30.10.09	200
	Honey bee management	17 trainings on different dates	682
SRI, Pusa	Cultivation of sugarcane	26.5.09	71
	Complete package and practices of sugarcane cultivation	30.05.09	
	Complete package and practices of sugarcane cultivation	9.06.09	
	Complete package and practices of sugarcane cultivation	12.06.09	
	Complete Package and practices of sugarcane cultivation	26.06.09	
	Complete Package and practices of sugarcane cultivation	17.07.09	
	Complete Package and practices of sugarcane cultivation	20.07.09	
	Complete Package and practices of sugarcane cultivation	26.07.09	
	Cultivation of Sugarcane	13.10.09	
	Cultivation of Sugarcane	2012.09	
	Cultivation of Sugarcane	19.1.10	
	Cultivation of Sugarcane	20.1.10	

2.3.3 FLDs Conducted by KVKs

Name of KVK	Technology demonstrated	Area in ha	No. of Partici-pants	Crop	Impact of demonstration
Muzaffarpur	Performance of variety under late sown condition	10	40	Mustard	Large scale adoption
	Performance of variety under timely sowing	5	20	Green gram	Large scale adoption
	Performance of variety under deep water paddy	6	30	Paddy	Large scale adoption
	Performance of variety of summer vegetables	1.95	44	Okra, Sponge gourd, Bottle gourd , Bitter gourd, Cucumber Barseem, Oat	Large scale adoption
Vaishali	Varietal performance	10	30	Paddy (Rajendra Subhasani)	Good
	Varietal performance	9.71	31	Wheat(K 307, HD [illegible])	Good
	Varietal performance	3.5	19	Red gram (Malv[illegible])	Good

Name of KVK	Technology demonstrated	Area in ha	No. of Partici-pants	Crop	Impact of demonstration
	Varietal performance	5	11	Maize (Shaktiman – 4)	Good
	Varietal performance	5	9	Rai (Rajendra 05)	Good
Samastipur	Use of biofertilizer	10	25	Arhar	Good
	Use of biofertilizer	8	22	Lentil	Good
	Varietal performance	8	17	Rai	Good
	Varietal performance	5	12	Onion (Kharif)	Good
	Biological control	10	30	Brinjal	Good
	Varietal performance	2	11	Onion (Rabi)	Good
	Nursery production technology	1	5	Marigold	Good
	Varietal performance	2	4	Wheat	Good
	Varietal performance	8	27	Maize	Good
Sheohar	Varietal performance	5	20	Mustard (R. Anukool)	Increase of yield over local variety
	Varietal performance	2	20	Sarson (Krishna)	Increase of yield over local variety
	Varietal performance	5	20	Lentil (Arun)	Increase of yield over local variety
	Varietal performance	5	20	Moong (SMP – 68)	Increase of yield over local variety
Darbhanga	Integrated crop management in paddy	5	26	Paddy (R. Mahsuri)	42 % Increase in yield
	Integrated crop management in pigeonpea	5	45	Pigeonpea (Malviya – 31)	47 % Increase in yield
	Integrated crop management in wheat	2	30	Wheat (HD-2733)	34 % Increase in yield
	Integrated crop management in gram	2	40	Gram (Vardan)	28 % Increase in yield
	Integrated crop management in mustard	5	25	Mustard (R. Suflam)	54 % Increase in yield
	Integrated crop management in moong	5	40	Moong (Pusa Vishal)	32 % Increase in yield
Gopalganj	Varietal performance	6	9	Lobia (Hep–4)	18.37 % increase in yield over local check
	Varietal performance	26	61	Paddy (PHB-71,RM-1)	20-40 % increase in yield over local check
	Varietal performance	3.6	9	Pea (P-5)	25.2 % increase in yield
	Varietal performance	1	13	Potato (K.Kanchan)	12. 4% increase in yield
	Varietal performance	10	13	Mustard (R. Anukul)	30.4 % increase in yield
East Champaran	Use of high yielding variety	10	11	Red gram	
	Use of bio fertilizer	2.5	10	Lentil	
	Use of high yielding variety over local variety	6	18	Rapeseed and mustard	

Name of KVK	Technology demonstrated	Area in ha	No. of Partici-pants	Crop	Impact of demonstration
	Use of high yielding variety over local variety	10	30	Paddy	
	Production enhancement through scientific method	2	05	Turmeric	
West Champaran	Prabhat	1.6	04	Paddy	
	Malviya - 13	1.8	07	Arhar	
	NDA - 1	2.2	09	Arhar	
	HD – 2733	1	02	Wheat	
	PBW - 502	1	01	Wheat	
	PBW – 343	2	09	Wheat	
	Arun	2	04	Lentil	
	Rajendra Anukul	0.5	02	Mustard	
	Suflam	2	06	Mustard	
Begusarai	Varietal performance	4	19	Moong (Pusa Vishal)	Main choice of the farmers is to grow Pusa Vishal
	Varietal performance	8	15	Mustard (R.Suflam)	R. Suflam is resistance to stock rot hence more accepted by farmers
Saran	Product, production and procedure of red gram. Suitability of high yielding varieties over local varieties. Management of insect pests of red gram. Method of seed treatment with biofertilizers. Seed production techniques.	30	148	Red gram (NDA-1)	Demonstration yield 15.97 q/ha and local check 9.96 q/ha. Increase in 60.34% yield due to technology demonstrated. Benefit-Cost Ratio for demonstration 4.54 and local check 2.99
	Product, production and procedure of lentil. Suitability of high yielding varieties over local varieties. Method of seed treatment with biofertilizers.	10	32	Lentil (PL 406)	Demonstration yield 12.82 q/ha and local check 8.70 q/ha. Increase 47.35% yield due to technology demonstrated. Benefit-Cost Ratio for demonstration 3.55 and local check 2.67
	Product, production and procedure of gram. Suitability of high yielding varieties over local varieties. Method of seed treatment with biofertilizers.	10	31	Gram (PG 114)	Demonstration yield 14.83 q/ha and local check 9.20 q/ha. Increase 56.35% yield due to technology demonstrated. Benefit-Cost Ratio for demonstration 3.34 and local check 2.34

Name of KVK	Technology demonstrated	Area in ha	No. of Partici-pants	Crop	Impact of demonstration
	Product, production and procedure of sesamum. Suitability of high yielding varieties over local varieties. Management of insect pests of sesamum.	10	28	Sesamum (Krishna)	Demonstration yield 6.7 q/ha and local check 4.2 q/ha. Increase 59.52% yield due to technology demonstrated. Benefit-Cost Ratio for demonstration 4.05 and local check 2.7
	Product, production and procedure of rapeseed and mustard. Suitability of high yielding varieties over local varieties. Management of insect pests of rapeseed and mustard.	10	77	Rapeseed and mustard (R. suflam)	Demonstration yield 15.3 q/ha and local check 9.1 q/ha. Increase 68.02% yield due to technology demonstrated. Benefit-Cost Ratio for demonstration 2.99 and local check 1.88
	Product, production and procedure. Suitability of high yielding varieties over local varieties. Management of insect pests. Method of seed treatment. Seed production techniques.	38.25	109	Paddy	Demonstration yield 32.5 q/ha and local check 26.25 q/ha. Increase 23.8% yield due to technology demonstrated. Benefit-Cost Ratio for demonstration 1.73 and local check 1.38
	Product, production and procedure of wheat, Suitability of high yielding varieties over local varieties. Management of insect pests of wheat. Method of seed treatment. Seed production techniques.	12	25	Wheat (PBW 502)	Demonstration yield 40 q/ha and local check 32 q/ha. Increase 28.12% yield due to technology demonstrated. Benefit-Cost Ratio for demonstration 2.23 and local check 1.89

2.3.4 OFTs Conducted at KVKs

Name of KVK	Technology tested	No. of trials	Crop	Result	Feed back
Vaishali	Resource conservation technology	7	Paddy	Highest yield of SRI i.e., 60.03 q/ha with Rs. 41781/ ha net return income against to farmers practices yield of 25.27 q/ha and net return Rs. 7484/ha.	Farmers are ready to adopt
	Varietal evaluation	6	French bean	Swarn priya produced highest 73.51 q/ha yield with Rs. 66610/ha net return against local variety yield of 51.76 q/ha and return Rs. 33985/ha.	Fertilizer management gives better yield
Samastipur	T_1 - Manual transplanting of root washed seedlings T_2 - Pre germinated seeding by drum seeder T_2 - SRI Method Farmers' Practice Farmers generally used synthetic chemicals like endosulphan 35 EC and diamethoate 30 EC @ 2ml/l of water T_1 – Pheromone traps + damaged shoot clipping and removal of damaged fruits at weekly interval T_2 – Spinosad 45SC @ 0.4 ml/l of water + azadiraction 15 % @ 2 ml/l of water + damaged shoot clipping and removal of damaged fruits at weekly interval T_3 – Spinosad 45SC @ 0.4ml/l of water + damaged shoot clipping and removal of damaged fruits at weekly interval.	5 10	Paddy (P-44)	Treatment T_3 has given maximum yield (22q/ha) but treatment T_2 has given maximum return (Rs.15280.00/ ha) and B:C ratio 3.47. Treatment T_2 has minimum shoot damage (12.16 %) and fruit damage (13.74%) as well as also gave maximum yield (160.24 q/ha) and maximum return (Rs. 38537/ha) but T_3 gave B:C ratio (14.06)	

Sheohar	Variety of late sown wheat	8	Wheat	Variety K-307 performed well in comparison to DBW-14 & PBW-373 in terms of yield / ha	Variety K-307 popularizatio n under late sown condition and increase in yield
	Inter cropping of mustard & tomato in cauliflower for control of diamond back moth (DBM)	6	Cauli-flower	Inter cropping of mustard was found effective in control of DBM in cauliflower	Quality and yield of cauliflower improved
Gopalganj	Varietal performance	5	Paddy	Sugandh-2 as most suitable cultivar	Positive farmers response
	Micronutrient and PGR	5	Litchi	Two sprayings of Boron a @ 0.2 gm/l of water was best technology option	Positive farmers response
	Varietal performance	5	Okra	VRO-6 as most suitable cultivar of okra	Positive farmers response
	Supplementation of micronutrient and deworming to manage anoestrus cows	5	Livestock	Deworming +mineral supplementation with phosphorus preparation and vitamin ADE is most suitable for anoestrus cows	Positive farmers response
	Intramanmmary infusion alongwith parenteral application for mastitis management.	7	Livestock	Mammmitel as iniramammary infusion along with Ampicillin + cloxacillin as parenteral injection is most suitable option to manage mastitis.	Positive farmers response
East Champran	Enhancement of land use efficiency in winter maize + potato + chilli intercropping system	5	Maize	Maximum B:C ratio 3.06 was recorded in technology option 1 (maize + potato + chilli)	Farmers were satisfied with this methods
	Response of summer moong under zero tillage and use of rhizobium culture	5	Moong	Maximum B:C ratio 3.21 was recorded when the crop was sown with rhizobium culture treated seed	Lack of knowledge regarding application of rhizobium
	Management of pod borer in pigeon pea by insecticides	5	Pigeon-pea	Three sprays of cypermethin 25% EC @ 2 ml/lit. of water was found to be most effective and recorded maximum yield (14.45 q/ha)	Availability of quality plant protection chemicals in local market

West Champaran	Assessment of SRI methods of rice over conventional and recommended method	10	Paddy	SRI method was found significantly superior over recommended and traditional method of rice cultivation. Yield was found maximum (67.0 q/ha)
	Response of application of phosphogypsum and gypmite on yield of wheat in calcareous soil	10	Wheat	Application of phosphogypsum @ 125 kg/ha + gypmite @ 125 kg/ha with recommended dose of fertilizer gave maximum yield of wheat (43.7q/ha) as compared to farmers' practice the yield of wheat was 36.69 q/ha.
	Standardization of manuring for enhancement of fish productivity	8	Fish	Proper manuring with application of cow dung @ 10 ton/ha and keeping stocking density 7500 no./ha, produced 11.71 q/ha fish over farmers practice(8.46 q/ha)
Begusarai	Response of fungicides in their different combinations on disease occurrence and yield of brinjal	6	Brinjal	Two alternate spray of hexaconazole @ 0.15% and two alternated spray of propioconazole @ 0.15% was found promising to control fruit rot of brinjal.
	Response of INM and seed inoculation with antibiotics for the management of stock rot of maize.	8	Maize	Maize seed treatment with streptocyclin 90% + tetracycline 10% @ 0.5 g/kg of seed + MOP at tasseling stage @ 35 kg/ha with vermin compost at tussling stage

Saran	**Farmers practice** One ploughing by MB Plough, 2 ploughing by 9 tyne cultivator followed by puddling and transplanting of 30 days old seedlings **Technology option I** One ploughing by MB Plough, 2 ploughing by 9 tyne cultivator followed by puddling and broadcasting 48-72 hours soaked seeds of direct Seeded Rice (Wet Seeding) **Technology option II** Sowing by multipurpose Zero till cum ferti-seed drill **Technology option III** Crop establishment through SRI	1	Paddy	Experiment has been conducted for one year only. So final recommendation shall be coming in the next season after due verification, however, it seems that SRI technology is good from yield point of view but from economic point of view, zero tillage sown paddy was found to be the best.	1. The trial must be done taking other rice establishment methods like dry seeding, drum seeding and FIRB system 2. It is very difficult to convince the farmers about the feasibility of OFTs, however they are very much satisfied after conduction of the trial.
	Farmers practice Paddy-Wheat farming system without green manuring **Technology option I** Incorporation of Sesbania before paddy in paddy-wheat system **Technology option II** Taking Sesbania + paddy and of spraying of 2, 4-D @ 500 g/ha on Sesbania in paddy-wheat system	1	Sesbania Paddy-wheat cropping system	Experiment has been conducted for one year only. So final recommendation shall be coming in the next season after due verification, however, it seems that Direct sown paddy with sesbania as intercrop was the best option in all respects - yield, economics and fertility point of view.	1. Growing sesbnia was done in dry seeded rice. The method must be tested in other methods of crop establishment like wet seeding, drum seeding, machine transplanting, Zero tillage and FIRB planting 2. It is very difficult to convince the farmers about the feasibility of OFTs, however they are very much satisfied after the trial.

	Farmers practice Rice-Wheat **Technology option I** Rice-Wheat- Green gram **Technology option II** Rice-Potato-Green gram **Technology option III** Rice-Maize + Potato-Green gram	1	Paddy-wheat cropping system	Experiment has been conducted for one year only. So final recommendation shall be coming in the next 6 seasons after due verification, however, it seems that system productivity as well as the rice equivalent yield shall be greater in the more intensive cropping system provided crop competition is not there.	1. This cropping system is only feasible in upland irrigated lands where there is no chance of grazing because three are some social problems and farmers generally do not take crop in the summer. *People leave* their cattle as vagabond *just after* wheat harvest till onset of Kharif season. 2. It is very difficult to convince the farmers about the feasibility of OFTs, however they are very much satisfied after the trial.
	Farmers practice Rice-Mustard cropping System without sulphur **Technology option I** Application of Phoshpgypsum (14%) @ 220 kg/ha in Mustard in the Rice-Mustard cropping System **Technology option II** Application of organic manure treated Phoshpgypsum (14%) @ 220 kg/ha in Mustard in the Rice-Mustard cropping System	1	Rice - Mustard cropping System	Experiment has been conducted for one year only. So final recommendation shall be coming in the next 6 seasons after due verification, however, it seems that system productivity as well as the rice equivalent yield shall be greater in the more intensive cropping system provided crop competition is not there.	It is very difficult to convince the farmers about the feasibility of OFTs, however they are very much satisfied after the trial.

	Farmers practice Cultivation of gram without coriander **Technology option I** Cultivation of gram with coriander @4 kg /ha **Technology option II** Cultivation of gram with coriander @6 kg /ha **Technology option III** Cultivation of gram with coriander @8 kg / ha	1	Gram	Experiment has been conducted for one year only. So final recommendation shall be in the next season after due verification, however, it seems that system productivity as well as the insect load is lesser in coriander at a higher seed rate.	1. As per recommendation coriander be sown as an intercrop in between the rows of gram but farmers found it difficult and so the concept of seed rate came into existence. Of course, this solves the purpose of insect repellence. 2. It is very difficult to convince the farmers about the feasibility of OFTs, however they are very much satisfied after the trial.
	Farmers practice Growing crop without sulphur (NPK 80:40:40 in the form of urea, DAP and MOP) **Technology option I** Application of SSP at recommended dose @ 40 kg P_2O_5/ha (NPK 80:40:40 in the form of urea, SSP and MOP) **Technology option II :** Application of Phoshpgypsum @ 220 kg/ha (NPK 80:40:40 in the form of urea, DAP and MOP+ Phosphogypsum as source of sulphur)	2	Rapeseed and Mustard	Present recommendation is that application of sulphur in the form of Phophogypsum @220 kg/ha was most effective in increasing yield and economics.	1. It is very difficult to convince the farmers about the feasibility of OFTs, however they are very much satisfied after the trial. 2. There is no availability of SSP in the market. So farmers do not use it as a source of sulphur

Farmers practice Farmers practice of growing paddy by transplanting 5-6 seedlings in a zigzag manner at 30-35 DAS. **Technology option I** Transplanting of 1 seedling at 21 DAS at a spacing of 25 cm row to row and plant to plant **Technology option II** System of Rice Intensification with one seedling at 12 DAS at a spacing of 25 cm row to row and plant to plant	1	Paddy	Experiment has been conducted for one year only. So final recommendation shall be coming in the next season after due verification, however, it seems that SRI technology is good from yield point of view but from economic point of view SRI paddy was found to be the best.	1. It is very difficult to convince the farmers about the feasibility of OFTs, however they are very much satisfied after the trial.
Farmers practice Feeding (Feeding without mineral mixture and deworming) **Technology option I** Feeding with deworming drug (Albendazol @ 1 g/ 100 kg body weight) **Technology option II** Feeding with mineral mixture @ 60 g/animal/ day in divided dose **Technology option III** Feeding with deworming drug @ 1 g/100 kg body weight and mineral mixture @ 60 g/animal/ day	2	Milk Product-ion	It is recommended to go for farmers practice of feeding with deworming drug @ 1 g/100 kg body weight at an interval of 15 days and mineral mixture @ 60 g/animal/ day.	1. There is a general thinking of the farmers that there is no relation between milk production and feeding mineral mixture in combination with dewormer drugs.
Farmers practice Feeding without mineral mixture and dewormer **Technology option I** Feeding with mineral mixture @ 60 g/animal/ day in divided dose up to 35 days **Technology option II** Feeding with bamboo leaves, feeding @ of 1/4 kg increasing to aid libitum up to 35 days	2	Milk Product-ion	It is recommended to go for feeding with mineral mixture @ 60 g/animal/day in divided dose up to 35 days	There is a general thinking of the farmers that there is no relation between ancestrous and dewormer drugs.

Farmers practice Rearing animals without use of external insecticides **Technology option I** Rearing animals with external insecticide (Deltamethrin @ 2 ml/l of water) **Technology option II** Rearing animals with external herbal insecticide (Honey 100 ml + Lemon juice 100 ml Tobacco leaf juice 100 ml in ½ lt of water)	2	Animal Husbandry	It is recommended to go for external insecticide (Deltamethrin @ 2 ml/lt of water) or use herbal insecticide (Honey 100 ml + Lemon juice 100 ml Tobacco leaf juice 100 ml in ½ lt of water)	There is a general thinking of the farmers that there is no linkage between external parasites and health problems such as Babesiosis, Thaleriasis of animals.

2.3.5 Farmers Club Established

Name of KVK	No. of club established	Village	Block	District
Sheohar	3	Sriphnagar, Khearma, Kothia	Sheohar	Sheohar
Jale	4	Reodha, Ratanpur, Brahmpur, Jale	Jale	Darbhanga
Gopalganj	NIL	-	-	-
East Champaran	2	Banjara, Jhakra	Banjara, Piprakothi	E.Champran

2.3.6 Seed Village Formed

Name of KVK	No. of Seed village formed	Seed production	
		Crop	Quantity (q)
Muzaffarpur	2	-	-
Samastipur	-	Wheat	308
		Moong	135
	1	Paddy	90
Darbhanga	-	Wheat	13
East Champaran		Paddy	22
		Lentil	20
	7	Wheat	1365
Begusarai			

2.3.7 Kisan Mela/Field Day Organized

Name of KVK	Kisan Mela		Field Day	
	Number	No. of Participants	Number	No. of Participants
Muzaffarpur	6	Not counted	2	45
Vaishali	4	793	8	196
Samastipur	4	1271	6	229
Darbhanga	2	500	-	-
Gopalganj	2	159	4	148
West Champaran	-	-	-	-
Begusarai	1	Not counted	-	-
Siwan	7	213	23	653
Saran	4	1368		

2.3.8 Radio & TV Talks

Name of Scientist/ KVK	Topic	Radio/ TV talk	Name of Radio/ DD Station
Dr. A.K. Chaudhary	Role of extension education in agriculture	TV talk	DD,, Patna
Dr. Ajay Kumar	Boro rice	TV talk	ETV, Bihar
	Rice varieties	TV talk	ETV, Bihar
	Nursery management of rice	TV talk	ETV, Bihar
	Direct seeded rice	TV talk	ETV, Bihar
	Rice cultivation	TV talk	ETV, Bihar
	Alternate Agriculture	TV talk	ETV, Bihar
	S R I	TV talk	ETV, Bihar
	Hybrid Rice	TV talk	ETV, Bihar
	Management of kharif crops	TV talk	ETV, Bihar
	Cultivation of early rabi crops	TV talk	ETV, Bihar
	Management of rabi crops	TV talk	DD, Patna
	Care of standing rice crop	TV talk	ETV, Bihar
	Water management kin rice	TV talk	ETV, Bihar
	Crop planning in Koshi region	TV talk	ETV, Bihar
	Cultivation of tomato	TV talk	ETV, Bihar
	Cultivation of lentil	TV talk	DD, Patna
	Cultivation of wheat	TV talk	Hamara, TV
	Cultivation of china	TV talk	DD, Patna
	Farming system	TV talk	DD, Patna
Dr. A. K. Prasad	Mitti ki pehchan aur kheti	TV talk	DD, Patna
Dr. D.K. Das	Krishi vaniki ke liye upyukta vibhinna brichha prajatia	TV talk	DD, Muzaffarpur
	Poplar ke ETP ki taiyari	TV talk	DD, Muzaffarpur
	Poplar ETP ke ropan pashchat prabandhan	TV talk	DD, Muzaffarpur
	Paryawaran evam krishi vaniki	TV talk	Sahara Samay
	Krishi vaniki ki awasyakta	Radio talk	AIR, Darbhanga
Dr. Dayaram	Mushroom utpadan kaise kare	TV talk	DD, Patna
	Mushroom utpadan se Adhik aay	TV Talk	DD, Muzaffarpur
Dr. Dilip Kumar	Amliya mitti evam uska prabandhan	TV talk	DD, Patna
Dr. J. Prasad	Mukhay poshak tatwo ka prabandhan	TV talk	DD, Patna
Dr. M.S. Ali	Van mahotsav	Radio talk	AIR, Darbhanga
Dr. R.K. Sinha	Samasya grasit mittiyon ka prabandhan	TV talk	DD, Patna
	Amliya mitti ka sudhar	TV talk	DD, Patna
	Mitti sanrachna men sudhar ke upay	TV talk	DD, Patna
	Sukshm poshak tatwa ki upyogita	TV talk	DD, Patna
Dr. R.K. Jha	Krishi kshetron me vaniki ka mahatwa	TV talk	DD, Muzaffarpur
	Shisham ko thaila me kaise lagayen	TV talk	DD, Muzaffarpur
	Bans ki prajatiyan	TV talk	DD, Muzaffarpur
	Bans ugane ki bidhi	TV talk	DD, Muzaffarpur
	Bans ke upyog	TV talk	DD, Muzaffarpur

	Vaniki brikshon ka bij sanchayan evam sangrahan	TV talk	DD, Muzaffarpur
	Vaniki bijo ki sangrahan vidhiyan	TV talk	DD, Muzaffarpur
	Poplar ka ETP lagana	TV talk	DD, Muzaffarpur
	Van brikshon ko lagane ke liye polythene ki taiyari evam mitti bharna	TV talk	DD, Muzaffarpur
	Kisan mela ke dwara vaniki taknik ka prasar	Radio talk	AIR, Darbhanga
Dr. R.N. Sharma	Aerobic rice	TV talk	Mahua TV
	Aerobic rice	TV talk	ETV Bihar
	Quality seed production of rice	TV talk	Mahua TV
Dr R. Singh	Madhumakhi palan : Ek vyavsay ke roop me	TV talk	DD,, Patna
Dr. R.R. Singh and Dr. S. Jha	Adhik phasloutpadan ke liye mitee janch avashayk	TV talk	DD, Patna
Dr. Ram Suresh	Micro irrigation	TV talk	DD, Muzaffarpur
	Micro irrigation		ETV, Bihar
Dr S.C Rai	Matsya palan-Ek labhkari vayabsaya		AIR, Patna
Dr. V. Kumar	Replies of queries of farmers on telephone line	Radio talk	AIR, Darbhanga
KVK, Muzaffarpur	11	TV talk	DD, Muzaffarpur
KVK, Samastipur	3	TV talk	DD, Darbhanga
KVK, Vaishali	4	TV talk	DD, Patna
Mr. A. Sattar	Weather forecast & agro advisory	Radio talk	AIR, Darbhanga
	Contingency crop planning for farmers under drought condition in Bihar	TV talk	DD, Patna
Sri Shanti Bushan	Garmi ke mausam me dhan phasal ki dekh bhal (in hindi)	TV talk	DD, Patna

2.4 SEED PRODUCTION

2.4.1 Seed Production at Dholi

Name of Unit	Crop	Quantity (q) Breeder Seed
Breeder Seed Production Unit, Dholi	Paddy	146.61
	Wheat	71.59
	Pulses	09.89

2.4.2 Account of Seed & Non Seed sold from Krishi Sewa Kendra, Dholi from *01.04.2009 to 31.03.22010*

Breeder seed (Rs)	F/S,C/S,& T/S (Rs)	Sold on credit	Sold to ATIC Cell	Total (Rs.)
2079130.00	11001610.00	4358055.00	289148.00	17727943.00

2.4.3 Seed Production by Seed Processing Plant, Dholi

Crop	Raw Seed (q)	Processed Seed (q)	B/S (q)	F/S (q)	C/S (q)	T/F (q)	Graded N/S (q)	Under Sized N/S (q)
Wheat	3043.44	2868.00	957.95	1646.97	14.20	201.48	47.55	162.54
Lentil	101.56	95.85	5.60	79.84	-	10.41	-	04.93
Rai, Tori, Sarson	50.76	42.03	1.70	6.80	-	31.03	03.00	07.29
Gram	12.68	11.615	0.95	4.24	05.47	00.69	00.265	00.395
Rajmah	6.88	6.62	0.40	1.79	-	04.43	-	00.08
Sunflower	0.83	0.83	0.83	-	-	-	-	-
Linseed	5.63	5.63	1.41	2.00	-	01.80	0.06	00.19
Moong	86.80	80.84	14.97	54.77	-	11.10	-	04.19
Urd	0.59	0.58	0.58	-	-	-	-	-
Maize	70.80	63.00	-	34.87	-	13.12	15.80	-
Arhar	35.81	31.59	5.98	25.61	-	-	-	03.52
Til	3.05	2.59	0.38	02.00	-	00.21	-	00.40
Paddy	4385.70	3814.23	128.13	2590.67	569.48	350.58	241.87	201.00
Total :	7804.53	7023.54	1118.88	4449.41	**589.15**	**654.85**	308.54	384.54

2.4.4 Seed Production by KVKs

Name of KVK	Crop	Quantity (q)
Muzaffarpur	Wheat	7.7
	Potato	15.91
Vaishali	Paddy	2
	Rai	3
	Elephant foot YAM	14
Samastipur	Wheat	51.17
	Paddy	38.34
	Moong	2.25
	Arhar	0.25
	Rai	0.31
	Sesamum	0.065
	Potato	72.5
	Ol	21.68
Sheohar	Paddy (F/S)	23.20
	Wheat (F/S)	26.5
	Lentil (F/S)	21.90
Darbhanga	Paddy (F/S)	111.5
	Wheat (F/S)	40.28
	Mustard (T/F)	3.45
	Lentil (T/F)	4.69
	Moong (T/F)	8.025
	Gram (T/F)	1.14
	Paddy (F/S)	344
Gopalganj	Wheat (F/S)	345.5
	Lentil (F/S)	13.00
	Gram (F/S)	19.00
	Lobia (T/F)	11.00
	Tomato (T/F)	0.2
	Moong (F/S)	3.79
	Paddy (C/S)	76.60
East Champaran	Paddy (F/S)	16.40
	Paddy (T/F)	18.45
	Tori (T/F)	2.34
	Yellow mustard (F/S)	4.50
	Lentil (F/S)	22.50
	Line seed (F/S)	2.52
	Wheat (F/S)	88.34
	Arhar (C/S)	1.76
	Maize (C/S)	7.50
	Sugarcane (T/F)	251.75
	Sugarcane (T/F)	3.5
	Wheat (F/S)	17
	Paddy (F/S)	65
West Champaran	Sugarcane (B/S)	10.11
	NIL	NIL
Begusarai	Red gram harvesting April 2009	6.00 (F/S)
	Oilseeds Rape seed harvesting April 2009	2.18 (F/S)
Saran	Pulse Lentil harvesting April 2009	8.50 (F/S)
	Cereals Wheat HW 2045 harvesting	90.00 (F/S)

April 2009		
Wheat DBW 14 harvesting April 2009	38.85	(F/S)
Potato harvesting April 2009	55.00	(F/S)
Paddy, Prabhat	18.4	(F/S)
Paddy, Rajendra Mehsuri	50.4	(F/S)
Paddy, Rajendra Bhagwati	12.8	(F/S)
Pea , Kashi Nandini	4	(F/S)

2.4.5 Planting Material Produced

Name of Unit/KVK	Crop	Quantity produced (q/no.)	Value in Rs.
S.R.I., Pusa	Sugarcane	3784 quintals	756800.00
KVKs	Mango	20590	
	Guava	1244	
	Papaya	385	
	Lemon	112	
	Litchi	1578	
	Banana	600	
	Citrus	42	
	Jackfruit	4	
	Vegetables	24075	
TCA, Dholi	Tuber Crops (Other than Potato)	1630.5 kg	5014.00
	Mango	2125 Nos.	84,200.00
	Litchi	1414 Nos.	33,805.00
	Guava	476 Nos.	10,400.00
	Citrus	175 Nos.	2,625.00
AICRP on Tuber Crops (Other than Potato)	Elephant Foot Yam (Vav. Gajendra)	3668.00	588.00
	Yam bean Seed (Var. RM-1)	273.00	253.00
	Arvi (Var. RM-1)	600.00	388.00
	Sweet Potato Vine (Var. Cross-4, RS-47 etc)	200.00	100.00
	Lesser Yam (Var. Sree Latha, Lotni)	599.00	483.5
	Cassava (Sree Jaya, Sri Vijaya)	--	500 cuttings
Department of Horticulture, T. C. A., Dholi	Mango		
	Litchi	2005 Nos.	80,200.00
	Guava	1314 Nos.	32,805.00
	Citrus	376 Nos.	9,400.00
AICRP on Agro Forestry	Mahogani	175 Nos.	2,625.00
	Kadam	289	1445.00
	Poplar(cutting)	66	188.00
	Poplar(ETPs)	530	1060.00
	Green Semal	159	695.00
	Sindur	665	1330.00
	Sammi	33	56.00
	Sagwan	3	45.00
	Bamboo	2842	4584.00
	Shisham	26	490.00
	Chah	358	7[illegible]
		140	28[illegible]

	Desi Semal	830	1560.00
	Arjun	677	1254.00
	Gamhar	737	1474.00
	Neem	29	62.00
	Kala shisham (Plant)	33	60.00
	Kala shisham (cutting)	195	470.00
	Jamun	257	594.00
	Kathal	37	64.00
	Goldmohar	10	20.00
	Tun	5	5.00
	Khair	2	4.00
	Karanj	3	6.00
	Palash	4	10.00
	Aonla fruit	7 kg	70.00
Vaishali	Tubrose	50000	47000
	Banana	5000	25000
	Mango	1250	50000
	Litchi	192	4800
	Guava	650	11250
	Lemon	238	5950
East Champaran	Guava	3000	1.35 Lakh
West Champaran	Mango	125	6250.00
	Litchi	191	5730.00
	Guava	223	5575.00

2.4.6 Fish Seed Produced

Name of Unit	Species	Stage	Quantity (No.)	Value in Rs.
COF, Dholi	Catla	Spawn	1200014	13,195.00
		Fry	-	-
		Fingerling	-	-
	Common Carp	Spawn	1175033	7,585.00
		Fry	26625	5,571.00
		Fingerling	1603	465.00
	Aquarium Fish	--	56 Pair	590.00

2.4.7 Honey Produced

Name of Unit	Type	Quantity (Kg)	Value in Rs.
AICRP on honey bees & pollinators	Mustard	362.00	38560.00
	Litchi	1134.50	137485.00

2.4.8 Milk Produced

Name of Unit/KVK	Type	Quantity (lt)	Value in Rs.
Cattle Farm, Pusa	Cow	16307.00	2064789.00
	Bufallo	114710.50	326140.00
KVK, Saran	Buffalo	388.50	7770.00

3. STUDENTS' WELFARE ACTIVITIES

3.1 Games and Sports

The games and sports activities create keenness amongst the students to themselves acquainted and familiar to each other. During the year, the sports activities in colleges of the university were organized. The students have taken keen interest in sp activities and the regular classes of games & sports for participation of students in the in college & inter university games & sports.

3.2 University Level Games and Sports

During the reported period, the Annual Athletic Meet & Inter College Tournament including different events, such as 100M, 200M, 400M, 800M, 1500M, 4x100M Relay, High Jump, Long Jump, Shot Put, Javelline Throw, Table Tennis, Badminton, Carrom, Chess & Volley Ball were organized at TCA Dholi from 22 to 26 January, 2010. About 285 boys & girls of different Colleges of RAU participated in Annual Athletic Meet and Games & Sports Tournaments. Hon'ble Vice-Chancellor inaugurated the tournament and encouraged the participants. On the basis of the best performance in different events, the participants were awarded gold, silver & bronze medals.

In field and track event, Mr. Akhilesh Kumar (CAE, Pusa) and Mr. Vinit Kumar Singh (PG, Pusa) were declared joint champion in individual performance for boys, while Ms. Sabita Kumari of Home Science was declared champion among the girls in individual performance. The over all college level championship went to SGIDT, Patna for boys and college of Home Science, Pusa for girls securing 36 points and 33 points, respectively.

Tally of different Colleges in Athletic & Sports Meet :

S.No.	College	Gold	Silver	Bronze	Total
1	College of Home Science, Pusa	4	4	1	9
2	CAE, Pusa	4	5	3	12
3	FBSH (Biotech), Pusa	2	4	4	10
4	TCA, Dholi	5	5	5	15
5	BAC, Sabour	2	4	3	9
6	SGIDT, Patna	5	3	2	10
7	COF, Dholi	1	-	1	2
8	COH, Noorsarai	-	1	1	2
9	Post Graduate Faculty, Pusa	3	-	-	3
10	BVC, Patna	-	-	1	1
11	MBAC, Saharsa	-	-	1	1

3.3 Participation of RAU Team in XIth All India Inter Agricultural University Sports & Games Meet 2009-10 held at Marathwada Agricultural University, Parbhani, Maharashtra

Based on the performance during the Annual Athletic & Sports Meet 2009-10 and tournaments, 25 boys and 17 girls were selected to represent the University Team for participation in the XIth All India Inter Agricultural University Sports & Games Meet

(2009-10) at Marathawada Agricultural University, Parbhani, Maharshtra from 23 -26 February 2010.

3.4 Participation of RAU team in 3rd Bihar State Inter University Sports Meet "EKLAVYA -2009-10" at J.P. University, Chapra

The selected University team also participated in the 3rd Bihar State Inter University Sports Meet **"EKLAVYA"** -2010 held at J.P. University Chapra from 9th-12th April, 2010 where their performance was very satisfactory.

3.5 Participation of University team in University Level & State level Cultural activities

During the reported period, a selection trial was conducted at RAU, Pusa from 17-19 March, 2010 for selection of boys & girls to constitute the University Team for various cultural events such as Classical Song, Semi Classical Song, Light Song, Folk Song, Classical Instrumental, Light Instrumental, Classical Dance, Semi Classical Dance, Folk Dance, Balley, Short Drama, Commics, Kavya Path, Debate, Elocution, Painting, Flower Bouquet & Handicrafts. About 150 students of different colleges participated in the selection trial. Based on the performance in the aforesaid events, a University Team consisting of 32 boys & girls participants was constituted for participation in the 3rd Bihar State Inter University Cultural Meet **"TARANG"** 2009-10 held at Lalit Narayan Mithila University, Darbhanga from 22 -24 March, 2010.

The University team bagged one gold medal in handicraft, 1 silver medal in bouquet and 1 bronze medal in elocution competition in the above cultural festival.

List of winners of the 3rd Bihar State Cultural Festival Tarang :

Sl.No.	Name of student	College	Event	Position
1.	Swati Kumari & Prem Pritam	B.Tech Biotech, Pusa	Handicraft	1st position
2.	Swiny Sandhvi	Home Sc., Pusa	Bouquet	2nd position
3.	Anamika Thakur	CAE, Pusa	Elocution	3rd position

3.6 University Level National Cadet Crops

National Cadet Crops, an unit of Rajendra Agricultural University, Pusa is running with an authorized strength of fifty-five cadets and one NCC Officer, Lt. (Dr.) Uma Shankar Singh. Apart from regular class and parades, in which cadets were trained in relevant course content, they also took part in Independence Day celebration, Republic Day celebration and different functions of the College and the University.

3.6.1 Participation in Camps

The following cadets represented this unit by their active participation in the Combined Annual Training Camp held at Muzaffarpur from 9–18 September, 2009 (1) Jitendra Kumar (2) Ashutosh Kumar (3) Aman Kumar Ravi (4) Ajit Das (5) Ajeet Kumar (6) Ranjit Kumar Paswan (7) Vikash Kumar Vikrant (8) Manish Kumar Gupta (9) Gautam Kumar Choudhary (10) Kaushal Kunal (11) Manish Kumar Sah. Cadet Ashutosh Kumar was awarded with two cups for best anchoring and solo dance whereas Cadet Jitendra Kumar was awarded with a cup for solo/mono song during the Camp.

3.6.2 Certificate Examination

Sgt. Ranjeet Kumar (B.Tech., Agril. Engg.) appeared for "C" certificate Examination of NCC and was declared successful and awarded with Momento and Medal on the occasion of Republic Day, 2010.

Cdt. Raushan Kumar and Cdt. Sujeet Kumar Bhagat (B.Tech., Agril. Engg.) appeared for "B" Certificate Examination of NCC and were declared successful

3.7 Hostel

The RAU provides hostel accommodation to each and every student admitted under various programme of Under-graduate, Post-graduate & Ph.D. alongwith common room and mess facilities in all campuses viz; Bihar Agriculture College, Sabour, Tirhut College of Agriculture, Dholi, Muzaffarpur; College of Horticulture, Noorsarai, Nalanda; Mandan Bharati Agriculture College, Agwanpur, Saharsa; Bihar Veterinary College, Patna; Sanjay Gandhi Institute of Dairy Technology, Patna; College of Fisheries, Dholi, Muzaffarpur; College of Agricultural Engineering, Pusa, Samastipur; College of Home Science, Pusa, Samastipur; College of B.Tech. Biotech, Pusa, Samastipur; College of MBA (Agri-business), Pusa, Samastipur under the control of concerned Assoc. Dean with Warden & Hostel Superintendent.

During the reported year, the common room of RAU Hostel, Pusa was provided with fans, curtain doors, fitting of water supply system, electrification and two refrigerators.

3.8 Training & Placement

To provide the employment opportunity to the students of RAU, a Training & Placement Cell is working under the Coordinatorship of Dr. K.N. Pathak, Chairman, Department of Nematology. During the reported year, 71 applications of B.Sc. (Ag.) Students have been forwarded to the Bank of India, Kurla Complex, Bandra (E), Mumbai for appointment opportunity on the post of Agriculture Officer in Junior Management Grade-I.

Besides, one Digital copier with voltage stabilizer and trolley have been purchased and orders for purchase of furniture, computer with peripherals, inverter with batteries, LCD Projector with ceiling mounting kit, telephone etc. have been placed. The renovation work of conference hall and coordinator office has also been done.

3.9 Educational Tour

South & North India tours to 70 students of Bihar Veterinary College, Patna; 30 students of Sanjay Gandhi Institute of Dairy Technology, Patna; 64 students of Bihar Agriculture College, Sabour; 30 students of College of Horticulture, Noorsarai, Nalanda; 8 students of College of Fisheries, Dholi & 50 students of College of Agricultural Engineering, Pusa have been sanctioned.

4. UNIVERSITY LIBRARY

University Library, Pusa has been catering to the need of scientists, teachers, extension specialists, students and staff of the main campus of the university as well as scientific staff of the research stations, sub-stations and KVKs of the University.

1.	Opening hours	:	9.00 AM to 05.00 PM	
	Circulation hours	:	10.00 AM to 04.30PM	
2.	Documents in the library	:	61043	
3.	Additions during the year	:	Books on 31.03.2009	- 59698
			Books by purchase	- 693
			Documents on gratis	- 652
			Theses by students	- 058
			Total addition	- 1345
4.	Indian journals subscribed (2010)	:	125	
5.	Foreign journals subscribed (2010)	:	42	
6.	CD ROM Databases available	:	1. CAB Abstracts (1984 – Present) 2. CROP CD (1973-2003) 3. CABPEST CD (1973-2004) 4. AGRIS CD (1991 – 2003) 5. AGRICOLA (1984 – 2003) 6. CABSAC (1973 – 1997) 7. Food & Hum. Nutr. CD (1975–2004)	
7.	Circulation of books	:	Books issued	- 5288
			Books returned	- 5109
			Total	- 10397
8.	No. of readers registered during the year	:	Teachers/ Scientists	- 150
			PG Students	- 103
			UG Students	- 225
			Staff	- 092
			Total	- 570
9.	No. of visitors during the year	:	Teachers/ Scientists	- 3327
			Students and others	- 17652
			Total	- 20979
10.	No. of photocopies produced	:		9059
11.	No. of staff	:	1. Technical/Professional	- 02
			2. Ministerial Staff	- 05
			3. Support Staff	- 04
12.	Courses offered	:	TW – 501	

5. UNIVERSITY HOSPITAL

Number of patients treated in the University Hospital during the year :

S.No.	Particulars	Male	Female
1.	No. of patients treated	4411	755
2.	Av. no. of patients treated per day	22	16
3.	Blood grouping	148	42
4.	No. of patients recommended for specialized treatment	67	26
5.	Mass immunization	468	-
6.	Dressing	588	-
7.	Blood sugar	226	-
8.	Hb % of blood	32	-
9.	Total count of WBC	136	-
10.	Differential count of WBC	110	-
11.	ESR	86	-
12.	BT(Bleding time)	33	-
13.	CT (Clotting time)	14	-
14.	Urine examination	62	-
15.	Stool examination	32	-
16.	X-ray	92	-

6. DIRECTOR ADMINISTRATION

Number of sanctioned and filled posts (Non Plan, Plan, ICAR, KVKs separately) :

1. Non-Plan

S.No.	Post	Sanctioned	Filled	Vacant
1.	Deans / Directors / Registrar / Comptroller	22	00	22
2.	Univ. Prof.- cum-Chief Scientist / Chief Scientist- cum- Univ. Prof.	77	03	74
3.	Assoc. Prof.- cum-Senior Scientist / Senior Scientist-cum-Assoc. Prof.	220	49	171
4.	Asstt. Prof. -cum- Junior. Scientist / Junior Scientist- cum- Asstt. Prof.	645	329	316
5.	Technical Staff	1752	860	891
6.	Supporting Staff & Auxiliary Staff	1498	770	774

2. Plan

S.No.	Unit	Univ. Prof.			Assoc. Prof.			Asstt. Prof.			Technical Staff			Supporting Staff		
		S	F	V	S	F	V	S	F	V	S	F	V	S	F	V
1.	MBAC, Saharsa	06	00	06	11	00	11	25	00	25	48	00	48	175	00	175
2.	COH, Nalanda	11	00	11	26	00	26	52	00	52	36	00	36	184	00	184
	Total	17	00	17	37	00	37	77	00	77	84	00	84	443	00	443

S = Sanctioned, F = Filled, V = Vacant

3. ICAR

S.No.	Post	Sanctioned	Filled	Vacant
1.	Univ. Prof	05	00	05
2.	Assoc. Prof	44	31	13
3.	Asstt. Prof	91	91	00

4. KVKs

S.No.	Post	Sanctioned	Filled	Vacant
1.	Programme Coordinator	29	01	28
2.	SMS	174	97	77
3.	Technical Staff	87	26	61
4.	Supporting staff	176	142	34

7. ANNUAL ACCOUNT (2009-10)

1. RECEIPT :

S.No.	Particulars	Amount (Rs.)
1.	State Non-Plan	800000000.00
2.	State Plan	554840200.00
3.	ICAR	307598223.00
4.	KVK	121875375.00
5.	Misc. Scheme	97355628.00
6.	Other scheme	52735001.00
7.	Revolving Fund	108056268.27
8.	GIS	7320220.68
9.	University Receipt	79203658.96
10.	Students Fund	7157203.40
	Total :	**2106141778.31**
	Add Opening Balance :	**1153634244.34**
	Grand Total :	**3259776022.65**

2. EXPENDITURE :

S.No.	Particulars	Amount (Rs.)
1.	Non- Plan	629851502.53
2.	Plan	126116544.04
3.	Add 25% ICAR, Scheme	18989017.00
4.	ICAR, Scheme	114991254.40
5.	Less 25% state share	18989017.00
6.	ICAR, Plan	734794415.56
7.	KVK, A/C	116244515.56
8.	Misc. Scheme	68395358.33
9.	Other scheme	32475544.10
10.	Revolving Fund	94586501.41
11.	GIS	5403415.00
12.	Remittances adjustable	- 28228375.94
13.	University Receipt	3066388.39
14.	Students Fund	4804787.00
	Total :	**1241186850.53**
	Closing Balance :	**2018589172.12**
	Grand Total :	**3259776022.65**

8. SEMINAR/SYMPOSIUM/SHORT COURSE/TRAINING/ WORKSHOP ORGANIZED

- International Seminar during 14-15 July, 2009 at Bihar Veterinary College, Patna on the topic Disaster Management of Livestock During Flood in collaboration with other funding agency viz. WSPA, Thailand : USAID, PCI, USA and RAU, Pusa.
- National Symposium on Animal Husbandry-Vision 2020 organized by Bihar Veterinary Association, Patna at Institute of Animal Health & Production, Bihar, Patna .
- Farmers Training on Scaling Up of Water Productivity in Agriculture for Livelihoods through Teaching cum Demonstration during May 27 - June 03, 2009 by College of Agricultural Engineering, Pusa.
- Farmers Training on Scaling Up of Water Productivity in Agriculture for Livelihoods through Teaching cum Demonstration during June 26-27, 2009 by College of Agricultural Engineering, Pusa
- Farmers Training on Laser Leveler Technology by College of Agricultural Engineering, Pusa during May 29–30, 2009.
- Farmers Training on Zero-tillage Technology by NGO at CAE, Pusa on June 7, 2009.
- Training to Master's Trainer on Integrated Nutrient Management by ARI, Patna.
- Training to Master's Trainer on Importance of Soil Testing by ARI, Patna.
- Training to Horticultural Officers on Importance of Vermicompost in Agriculture at ARI, Patna.
- Supervisors Training for Horticulture Supervisors on December 7, 2009 at Deptt. of Horticulture, BAC, Sabour .
- Farmers Training on Soil Sampling at Mirzapur, Sabour on May 17, 2009.
- Officers Training on Soil Testing at BAC, Sabour during July 6-12, 2009.
- Farmers Training of NABARD during March 18-20, 2010 at Mandar Hill, Bausi by Deptt. of Soil Science, BAC, Sabour.
- Farmers Training on Agricultural Machinery for Sugarcane Cultivation at Deptt. of Agril. Engineering, BAC, Sabour during May 15-22, 2009.
- Farmers Training on Selection, Operation, Safety and Maintenance of Improved Agricultural Machinery at BAC, Sabour during April 20-30, 2010.
- Group Meetings of AICRP on Sugarcane for Presentation of achievements of last year and Technical Programme of coming year at SRI, Pusa during November 6-8, 2009.

9. PARTICIPATION OF SCIENTISTS IN SEMINAR/ SYMPOSIUM/CONFERENCE

- Dr (Mrs.) Vibha, participated in 5th International Conference on Plant Pathology in the Globalized Era organized by Indian Phytopathological Society, IARI, New Delhi during November 10-13, 2010.
- Dr. A. P. Bhagat participated in 5th International Conference organized by Indian Phytipathological Society at IARI, New Delhi during November 10-14, 2009.
- Dr. C. Jaichandran and Dr. Nirbhay Kumar attended the National Symposium on Xenobiotic Residues and Food Safety and Pharmacogenomics and Toxicogenomics: New Horizons in Veterinary Pharmacology & Toxicology held at College of Veterinary Science & Animal Husbandry, Anand Agricultural University from November 5-7, 2009.
- Dr. Devendra Singh, Dr. D.K. Roy and Mr. Dharminder participated in National Symposium on Weed Management organized by IGKV, Raipur & ISWS & ICAR during February 25-26, 2010.
- Dr. Dibyanshu Shekhar participated in Seminar on Linkages between NGO & RAU organized by RAU at BVC, Patna.
- Dr. Dilip Kumar participated in State Level Seminar on Integrated Nutrient Management organised by Diara Development Project, Bihar at BVC, Patna on September 15, 2009.
- Dr. J. P. Upadhaya participated in 5th International Conference on Plant Pathology In Globlised Era organized by Indian Phytopathological Society at IARI, New Delhi during November 10-13, 2009.
- Dr. M. Alam participated in 18th International Symposium on Alcohol Fuel organized by All India Distillery Association at New Delhi during March 9-12, 2010.
- Dr. M. Alam participated in 70th Annual Convention of STAI organized by Sugarcane Technologist Association of India at Udaipur during August 26-29, 2009.
- Dr. M. Shrivastava participated in Capacity Building and Drudgery Reduction of Farm/Rural Women through new Farm Tools and Processing Machines organized by BAMETI, Patna at DNS, RICM, Patna during August 17-19, 2009.
- Dr. M. Shrivastava participated in Role of Post Harvest Processing in Enhancing Food Availability organized by Govt. of Bihar at Patna during July 23-24, 2009.
- Dr. Meera Singh participated in National Seminar on Empowerment of Women: Emerging Challenges organized by PAU, Ludhiana during February 18-19, 2010.
- Dr. Mukesh Shrivastava and Er. R. Kumar participated in 44th ISAE Convention organized by IARI, New Delhi, 2010.
- Dr. Nikhat Yasmin participated in State Level Seminar on Integrated Nutrient Management organised by Diara Development Project, Bihar at Hajipur, Vaishali during September 2-3, 2009.
- Dr. Nilanjaya and Dr. Ashish Narayan participated in National Symposium on Climate Change and Rainfed Agriculture at CRIDA, Hyderabad organized by CRIDA, Hyderabad during February 18-20, 2010.
- Dr. P.K. Jha participated in 5th International Conference on Plant Pathology in the Globalized Era organized by Indian Phytopathological Society, IARI, New Delhi during November 10-13, 2010.

- Dr. P.P Singh participated in Symposium on Problems and Prospective in Eco-friendly Innovations to Plant Protection at CSAUT, Kanpur during January 24-25, 2010.
- Dr. R.K. Jha participated in State level Seminar-cum-Training on Emerging Trends in Cultivation of Medicinal and Aromatic Plants organized by RAU, Pusa during October 27-28, 2009.
- Dr. S. R. Singh attended Conservation of Threatened Breeds of Livestock & Poultry organized by BAMETI, in collaboration with Directorate of Animal Husbandry, Govt. of Bihar & Bihar Veterinary College, Patna organized at Tara Mandal.
- Dr. S. R. Singh, and Dr. K. G. Mandal attended 7th National Symposium on Challenges to Domestic Animal Bio-diversity and Action Plan for its Management & Utilization held at Anand Agril. Univ., Anand during February 10-11, 2010.
- Dr. S.N. Kashyap participated in All India Seminar for Ergonomics for Improved Productivity organized by the institution of Engineers India Aligarh Local Centre, Aligarh during November 21-22, 2009.
- Dr. S.R. Sarkar participated in Biennial National Conference of Home Science at Kolkata during December 7-9, 2010.
- Dr. Sangeeta Deo participated in Biennial National Conference of Home Science at Kolkata during December 7-9, 2010.
- Dr. Sangeeta Deo participated in Enhancing Efficiency of Extension for Sustainable Agriculture and Livestock Production organized by IVRI, Izatnagar at Bareily during December 29-30, 2009.
- Dr. V.K. Gond participated in International Conference on Disaster Management of Livestock in Flood at BVC, Patna during July 14-15, 2009.
- Er. Manish Kumar, Dr. (Mrs.) P.D. Sharma and Er. Vishal Kumar participated in 44th ISAE Convention organized by IARI, New Delhi, 2010.
- Er. Subhash Chandra participated in Role of Mechanization for Ensuring Food Security organized by NGO, Patna at Taramandal, Patna on November 15, 2009.
- Md. A. Sattar participated in National Symposium on Climate Change and Rainfed Agriculture organized by Central Research Institute for Dryland Agriculture, Hyderabad during February 18-20, 2010.
- Mr. Animesh Sil and R.K.Choudhary participated in 63rd Annual Conference & ISAS at RAU, Pusa during December 3-5, 2009.
- Mr. S.N. Suman participated in Platinum Jubilee Symposium on Soil Science in Meeting Challenges to Food Security and Environmental Quality organized by Indian Society of Soil Science at IARI, New Delhi during December 22 - 25, 2009.
- Mrs Madhuri Arya participated in National Seminar on Designing Crops in Changing Climate organized by ISGPB, New Delhi at BAU, Kanke during October 30-31, 2009.
- Ms. Tatheer Fatma participated in National Conference on Traditional and Contemporary Trainings in Family and Community Studies organized by BBA University at Lucknow during November 24-25, 2009.
- Smt Rita Kumari participated in 8th National Symposium on Problems and Prospective in Eco-Friendly Innovatives to Plant Protection at CAS university of Agriculture and Tech. Kanpur during January 24-25, 2010.

10. PARTICIPATION OF SCIENTISTS IN SHORT COURSE/TRAINING/ SUMMER SCHOOL/WINTER SCHOOL/REFRESHER COURSE

- Dr. Ajay Kumar participated in one day training on Quality Seed Production of Rice organized by IRRI, Philippines on November 1, 2009 at RAU, Pusa.
- Dr. B.K. Yadav participated in CATIA training organized by AICRP on FIM at Pune in June, 2009
- Dr. P.K. Ray and Mr. S. Kumar participated in training on Prospects of Floriculture in Bihar organized by RAU, Pusa during January 2-3, 2010.
- Dr. P.K. Ray and Dr S.K. Singh participated in training on Organic Litchi Production and Certification organized by International Panaacea Limited, New Delhi during June 24-25, 2009.
- Dr. P.K. Ray participated in training on Medicinal and Aromatic Plants organized by RAU, Pusa during March 13-26, 2010.
- Dr. P.K. Ray participated in training on Protected Cultivation of Flowers and Vegetables organized by RAU, Pusa during March 25-26, 2010.
- Dr. R N Sharma participated in one day training on Quality Seed Production of Rice organized by IRRI, Philippines on November 1, 2009 at RAU, Pusa.
- Dr. R.P.K. Ray participated in orientation course organized by BRABU, Muzaffarpur during July 8 - August 4, 2009.
- Dr. R.K. Jha participated in training on Statistical Analysis and Interpretation of Agro forestry Experimental Data organized by National Research Centre for Agro-forestry, Jhansi during February 11-12, 2010.
- Dr. S.K.Sinha participated in National seminar organized by NBAIM, Mau Nath Bhanjan, UP during August 31 - September 22, 2009.
- Dr. S.P. Singh participated in winter school on Improving Sodic Soil Quality , Input Use Efficiency & Crop Productivity through INM organized by Central Soil Salinity Research during November 21 - December 11, 2009.
- Dr. Santosh Kr. Singh participated in winter school on Decision Making in Agriculture Using Data Mining organized by National Center for Agriculture, New Delhi during October 27 - November 16, 2009.
- Dr. Vikram Bharati participated in refresher courses on RCT- Conserving Resources for Enhancing, Food Security & Improvement of Livelihood.
- Dr. Vipin Kumar participated in short term training on Plant Nutrient Uptake Modeling organized by PAU, Ludhiana during February 23 - March 5, 2010.
- Mrs. Pramila participated in refresher courses on Improved Quality Seed Potato Production through Micro Propagation organized by CPRI, Modipuram January, 2010.
- Ms. Tatheer Fatma participated in winter school organized by University of Agril. Sciences, Dharwad at Dharwad during January 5 – 25, 2010.

- Sanjay Kumar Mandal participated in winter school on Improved Management of Water and Plant Nutrients in Crops under Rainfed Agro-system organized by BAU, Kanke during November 10-30, 2009.
- Shanti Bhushan participated in Experimental Design & Data Analysis for Plant Breeders organized by IRRI, Philippines at CRRI, Cuttack during September 7-11, 2009.
- Shanti Bhushan participated in one day training on Quality Seed Production of Rice organized by IRRI, Philippines on November 1, 2009 at RAU, Pusa.
- Smt. Rita Kumari and Sri Dinesh Rai participated in training programme on Plant Pathology organized by CAFT in Plant Pathology, GB Pant University of Agriculture & Technology at Pantnagar during March 22 - April 11, 2010.
- Sri Kamal Kant and Sri Satish Kumar participated in summer school on Heterosis Breeding in Vegetable Crops organized by Y.S. Parmar University of Hort. & Forestry, Solan during May 12 - June 1, 2009.
- Sri Shailesh Kumar participated in winter school on Application of Molecular Tools for Crop Improvement organized by Sugarcane Breeding Institute, Coimbatore, Tamil Nadu, 2010.

11. PARTICIPATION OF SCIENTISTS IN WORKSHOP/ GROUP MEETING

- Dr. A. P. Singh participated in CAC Group Meeting of NAIP organized by B.A.U., Ranchi during February 4-5, 2010.
- Dr. Ajay Kumar participated in Annual Group Meeting of Maize Workers at SKUA & T, Kashmir during April 10-12, 2010.
- Dr. B.K. Yadav participated in Coordination Committee meeting organized by AICRP on FIM, Gangtok during May 4-6, 2009.
- Dr. B. Kumar participated in Crop Simulation Model Workshop organized by OUAT, Bhubaneswar during August 3-6, 2009.
- Dr. D. K. Roy participated in Workshop on National Consultation on Weed Utilization organized by DWSR, Jabalpur during October 23-24, 2009.
- Dr. D.K. Das participated in Annual Workshop of AICRP on Agro-forestry organized by National Research Centre for Agro forestry, Jhansi at PDKV College of Agriculture, Nagpur during July 4-8, 2009.
- Dr. D.K. Sinha participated in Review meeting of the research project Ailing Agricultural Productivity in Economically Fragile Region of India : An Analysis of Synergy between Public Investment & Farmers' Capacity organized by OUAT, Bhubaneswar, June 24-25, 2009.
- Dr. Dayaram participated in Workshop organized by Directorate of Mushroom Research, Solan, December 27-28, 2008.
- Dr. Devendra Singh participated in Biennial Workshop of AICRP on Weed Control organized by IGKV, Raipur.
- Dr. Devendra Singh participated in Workshop on Weed Threats organized by DWSR, Jabalpur &TNAU, Coimbatore during August 2-3, 2009.
- Dr. Dibyanshu Shekhar participated in Farmers Interaction Workshop of NAIP, RAU at Kalwara, Roshera.
- Dr. G. Jha participated in Workshop on AICRP on Potato at Dharwad during August 10-12, 2009.
- Dr. I.D. Prasad participated in Group Meeting of AICRP on Vegetables organized by Director, IIVR, Varanasi at IIHR, Bangalore during Jan 16-19, 2010.
- Dr. J. Prasad participated in Group Meeting of AICRP on STCR organized by ANGROU, Hyderabad during June 6-8, 2009.
- Dr. K. Choudhary and Dr. Vipin Kumar participated in Workshop of AICRP on Micronutrients organized by CSKHPKV, Palampur during October 7-9, 2009.
- Dr. Kavita participated in 2nd CAC meeting at Indian Institute of Soil Science, Bhopal during February 4-5, 2010.

- Dr. L. M. Yadav participated in National Workshop of AICRP on Potato at UAS, Dharwad during August 10-12, 2009.
- Dr. M.S. Ali participated in District level Workshop on Bamboo Plantation organized by NAREGA, D.M., Sheohar during February 20-22, 2010.
- Dr. Nitish De participated in Annual Workshop on Wheat & Barley organized by Director, IARI, New Delhi during August 28-31, 2009.
- Dr. P. P. Singh participated in Biennial Group Meeting of AICRP on Tuber Crops at OUAT, Bhubaneswar during October 9-11, 2009.
- Dr. P.K Singh participated in 44th Annual Rice Group Meeting organized by Project Director, Hyderabad at DRR, Hyderabad during May 9-12, 2009.
- Dr. P.K. Ray participated in Brain Storming Session on Setting Research Priorities for Improving Production and Quality of Litchi organized by NRCL, Muzaffarpur, September 1- 2, 2009.
- Dr. P.K. Ray, Dr. U. Mukherjee, Dr. S.K. Singh and Mr. S. Kumar participated in Biennial Group Discussion of AICRP (TF) organized by Kerala Agricultural University, Thrisur, November 16-19, 2009.
- Dr. R.N. Yadav participated in Review meeting for Fixation of Minimum Support Prices of Kharif Crops for 2010-11 organized by Commission for Agricultural Costs and Prices (CACP), Ministry of Agriculture, New Delhi, February, 2010.
- Dr. R.N. Yadav participated in Review meeting for Fixation of Minimum Support Prices of Rabi Crops for 2009-10 organized by Commission for Agricultural Costs and Prices (CACP), Ministry of Agriculture, New Delhi, June, 2009.
- Dr. R.P.Sharma participated in Brain Storming Session and Launching Workshop of Integrated Farming Systems and Biennial Group Meeting organized by Kerala Agril. University, Trishur at ARS Karmapa, Trivandrum during March 6-9, 2010.
- Dr. R.S. Singh participated in Workshop of AICRP on R & M at Junagarh, Gujarat during May 7-9, 2010.
- Dr. Rajesh Kumar, Dr.S.N. Roy and Sri Mithlesh Kumar participated in Group Meeting of AICRP (STF) organized by Project Director, AICRP (STF) CISH, Lucknow at BSKVV, Dapoli during December 14-17, 2009.
- Dr. S. K. Singh participated in Annual Group Meeting of AICRP on Small Millets at BAU, Ranchi during April 9-11, 2010.
- Dr. S. S. Pandey, Dr. Harendra Singh, Dr. G. P. Dwiwedi, Dr. S. K. Thakur and Dr. Md. Minnatullah participated in Group Meetings of AICRP on Sugarcane organized by Director, Sugarcane, SRI, Pusa during November 6-8, 2009.
- Dr. S. S. Prasad participated in Regional Workshop of NAIP at BAU, Kanke during March 4-5, 2010.
- Dr. S.B. Mishra participated in Annual Group Meeting of Summer and Spring Moong bean during January 27-28, 2010.
- Dr. S.K. Singh participated in Annual Workshop of NAIP at CAIE, Bhopal during June 1-2, 2009.

- Dr. Sangeeta Deo participated in Workshop organized by Agro Textiles at New Delhi on September 18, 2009.
- Dr. Sanjay Tiwari participated in Networking meeting on Submergence, Salinity and Breeding Aspect organized by Bill & Milinda Gates Foundation sponsored by International Rice ResearchInstitute, Philippines (IRRI) and ICAR, New Delhi at Central Institute of Sub- Tropical Horticulture, Lucknow during March 9-11, 2010.
- Dr. U. S. Jaiswal participated in Group Meeting of AICRP on Palm organized by Navsari, Gujarat during October 12-14, 2009.
- Dr. U.K. Singh participated in Annual Group Meeting of SF Breeding during May 21-23, 2009.
- Dr. V.N. Sahai, Dr. B. B. P. Sinha, Dr. Ajay Kumar and Shanti Bhushan participated in Group Meeting of RAU Rice Research organized by Rice Section, A R I, Patna on April 6, 2009.
- Dr. V.K. Shahi participated in AMAAS Review meeting organized by Central Plantation Crops Research Institute (CPCRI) Kasargod, Kerela, November 16-17, 2009.
- Dr. V.K.Shahi participated in Coordinator meeting organized by JNU, New Delhi July 3-5 2009.
- Dr. Vipin Kumar participated in CIC Meeting of NAIP organized by NAIP, IISS, Bhopal on October 29, 2009.
- Md. A. Sattar participated in Working Group Meeting AICRP on Agro-met organized by Thrishur, Kerala during December 21-22, 2009.
- Sri Shanti Bhushan participated in 44th Annual Rice Group Meeting organized by DRR, Hyderabad & ICAR, New Delhi at DRR, Hyderabad during May 9-12, 2009.
- Sri Shanti Bhushan participated in Annual Workshop organized by IRRI, Philippines at CISH, Lucknow on March, 2010.
- Sri R.K. Ranjan participated in 24th Annual Group Meeting of AICRP-NSP (crops) organized by TNAU, Coimbatore during April 2-4, 2009.
- Sri Udit Kumar participated in National Workshop of 1st AICRP on Onion & Garlic at Srinagar during April 25-26, 2009.

12. PUBLICATIONS

12.1 Research Papers published

Choudhary, S.K., Rao, A.R., Waini, S.D. and Prabhakaran, V.T. (2010). An index of simultaneous selection of genotypes for high yielding and stability. *Indian Journal of Genetics* (Accepted).

Ali, M. S., Choudhary, S.C., Alam, I., Kumar, D., Chakraborty, A.K. and Kumar, R. (2009). Pattern of variation of seedling characters in *Pangamia pinnata* L. (Karanja). *Indian Journal of Agroforestry*, **11**(1): 101-102.

Ali, M.S. and Mandal, M.P. (2009). Effect of aqueous extract of *Jatropha curcas* on growth of moong. *Tropical Forestry*, **25**(iii & iv): 27-31.

Bala, Shivani (2009). Relationship of socio-personal and economic variables with community resource utilization pattern of female headed migrant households of Bihar. *RAU Journal of Research*, **19**(1 & 2): 52-53.

Bhagat, I. B., Kumar, R. R. and Kumar, A. (2009). Design, development and evaluation of low cost greenhouse technology to suit cold desert conditions. *Environment & Ecology*, **27 (1A)** : 465-471

Chand, P.C. and Mallik, M.K. (2009). Response of fenugreek (*Trigonella foenum-gracecum*) genotypes to sinorhizobium inoculation in calcareous soil in North Bihar. *RAU Journal of Research*, **19**(1 & 2): 14-18.

Choudhary, A.K., Pramhansh, P and Mishra, S.B. (2010). Character association and path analysis for yield and component traits in boro rice. *Ecology & Environment.* **27**: 1720-1729.

Choudhary, D.K., Bhartati, V., Kumar, Vinod and Kumar, A. (2009). Evaluation of water regimes and NPK levels on growth, yield attributes, yield and economics of mid duration rice (*Oryza sativa* L.). *RAU Journal of Research*, **19**(1 & 2): 49-51.

Choudhary, S,.K., Mukherjee, U. and Ahmad, M.A. (2009). Pesticide use pattern on banana against scaring beetle, *Basilepta subcostatum* jacoby in Bihar. *RAU Journal of Research*, **19**(1 & 2): 54-56.

Choudhary, S.K., Rao, A.R., Waini, S.D. and Prabhakaran, V.T. (2009). Performance of simultaneous selection index against missing observations in genotype X environment data. *ICFAI University Journal of Genetics*, No. 2: 36-42.

Das , Shivnath, Kumar, Rajan, Singh, J. P. and Prasad, S. K. (2009). Effect of nitrogen and potassium levels on growth and yield of hybrid rice (*Oryza sativa*). *Environment & Ecology*, **27 (1A)**: 430-432.

Das, D.K. and Chaturvedi, O.P. (2009). Energy dynamics and bioenergy production of *Populus deltoides* G-3 Marsh plantation in eastern India. *Biomass and Bioenergy*, **33**: 144-148.

Dayaram (2009). Cultivation of milky white mushroom in Bihar. *Indian Jounal of Mycology and Plant Pathology*, **39**(2): 283-285.

Dwivedi, D. K., Kumar, Rajan and Das, Shivnath (2009). Efficacy and biodynamic of bio-fertilizer and farm yard manure on betel vine (*Piper betel*) crop. *Environment & Ecology*, **27**(4A): 1660-1663.

Jha, R.K. (2009). *Cassia siamea* (Lamk) Irwin and Barneby based agri-silvicultural system in eastern Bihar: an economic analysis. *Range Management and Agro-forestry*, **30**(2): 153-154.

Jha, R.K. (2009). Variability, associations, path coefficient and stability analysis in Poplar (*Populus deltoides* Bartr. Ex Marsh). *Indian Journal of Agroforestry*, **11**(1): 32-40.

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Kaushik, P., Singh, D. K., Chaudhary, P., Tiwari, A.K., Shukla, G. and Dayal, S. (2010). Protection of mice against *Brucella abortus* 544 challenge by vaccination with recombinant omp 28 adjuvanted with CpG oligonucleotides. *Veterinary Research Communications*, **34**: 119-132.

Kumar, A. and Prasad, R. (2009). Gene action and degree of dominance through diallel analysis in maize (*Zea mays* L.). *RAU Journal of Research*, **19**(1 & 2): 57-58.

Kumar, Alok, Singh, S.R., Prakash, Satya and Kumar, A. (2009). Farmers opinion about Kisan call center: A way of farm communication. *Journal of Communication Studies*, **28**: 58-54.

Kumar, Ashok, Haque, S. and Shekhar, Pallav (2010). Preweaning kid mortality in an organized farm. *Intas Polivet*, No. 11: 295-297.

Kumar, B., Pandey, S.S., and Kamat, D.N. (2010). Phenotype stability for yield and quality in sugarcane. *Indian Sugar*, **51**(11): 33-37.

Kumar, Balwant (2009). Selection in finger millet (*Eleusine coracana* L.). *RAU Journal of Research*, **19**(1 & 2): 26-28.

Kumar, M., Kumar, Rajesh and Singh, R.R. (2009). Effect of micronutrients and plant growth regulators on fruiting of litchi. *International Agricultural Science*, **59**: 521-524.

Kumar, Manish, Sharma, P.D. and Kumar, Vishal (2009). Jatropha curcas for oil extraction, *Environment & Ecology* (Accepted).

Kumar, Manish, Sharma, P.D. and Kumar, Vishal (2009). Physical properties of Jatropha seed, *Environment & Ecology* (Accepted).

Kumar, N., Sinha, S.R.P., Kuntal, A. and Mohan, Krishna (2009). Countering effect of turmeric (*Curcumin longa*) on experimental salt toxicity in cockerel: A histopatholoical study. *Indian Journal of Pathology*, **33** (2): 207-208.

Kumar, Navneet, Kumar, J., Sinha, U.P. and Paswan, S. (2010). Correlation and regression studies in sugarcane. *Environment & Ecology*, **28**(1A): 407-409.

Kumar, Navneet, Sinha, U.P and Paswan, S. (2009). Correlation and regression studies in sugarcane. *Environment & Ecology*, **27**(3): 1183-1185.

Kumar, Navnit (2009). Growth, yield and quality assessment of sugarcane (*Saccharum officinarum* L.) varieties under waterlogged condition. *RAU Journal of Research*, **19** (1 & 2): 19-22.

Kumar, Praveen, Das, D.K., Laik, R. and Chaturvedi, O.P. (2009). Nitrogen supplementation by leguminous tree leaves for rice (*Oryza sativa* L.) cultivation. *Indian Journal of Agroforestry,* **11**(1): 70-75.

Kumar, R. Nandan, R, Kumar, V. Prasad, S and Singh D. (2009). Response of summer mungbean (*Vigna radiata*) cultivars to sowing time and seed rate. *Indian Journal of Agricultural Sciences*, **79**(4): 309-312.

Kumar, Rajesh, Nadan, R., Kumar, Vinod, Prasad, S. and Singh, D. (2009). Response of summer mungbean cultivars to sowing time and seed rate. *Indian Journal of Agricultural Science*, **79**(4): 309-12.

Kumar, Sanjeet, Rai, A.K. and Agarwal, M.L. (2009). Effect of abiotic factors on the infestation of *Acanthiophilus helianthi* (Rossi) (Diptera: Tephritidae) on cornflower, *Centaurea cyanus* Linnaeus. *RAU Journal of Research*, **19**(1 & 2): 1-3.

Kumar, Suman, Kumar, Ajit, and Samantaray, S. (2009). Treatment of sub-clinical cases of surra in buffaloes. *Indian Veterinary Journal*, **86**(4): 407-408.

Kumar, Sunil (2009). Impact of long term effect of green manuring on vertical distribution of DTPA-Zn and organic carbon. *Journal of Indian Society of Soil Science* (Accepted).

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Kumar, Vishal, Bhagat, I.B. and Kumar, Manish (2010). Design and development of a centrifugal clarifier based on principle of hydro cyclone for sugarcane juice. *Environment & Ecology* (Accepted).

Kumar, Vishal, Kumar, Gunjan and Sharma, P.D. (2010). Osmo-convective drying of litchi. *Journal of Agricultural Engineering* (Accepted).

Kumari, Bobby (2009). Dietary management and preventional steps taken against malnutrition by Government of Bihar. *RAU Journal of Research,* **19**(1 & 2): 43-45.

Kumari, Renu and Singh, R.R. (2009). Strategy adopted by the NGOs for empowerment of the women. *Agricultural Extension Review* (Accepted).

Kumari, Sunita and Nidhi (2009). Impact of weaning food on infant's growth. *RAU Journal of Research,* **19**(1 & 2): 40-42.

Laik, R., Kumar, Kaushlendra and Das, D. K. (2009). Organic carbon and nutrient build-up in a calciorthent soil under six forest tree species. *Forests, Trees & Livelihoods,* **19**: 81-92.

Laik, R., Kumar, Kaushlendra, Das, D.K and Chaturvedi, O.P. (2009). Labile soil organic matter pools in a calciorthent after 18 years of afforestation by different plantations. *Applied Soil Ecology,* **42**: 71-78.

Mamey, B.R., Ram, H. and Prasad, S.S. (2009). Impact of soil amendment on properties of the salt affected soil. *Journal of Indian Society of Soil Science*, **57**(3).

Mishra, R.R. (2009). Influence of socio- economic variables on dairy farmers' decision regarding milk marketing system. *Environment & Ecology,* **27**(4): 1449-1451.

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under rice-wheat cropping system in calciorthents. *Environment & Ecol*
1440-1443.

Prasad, S.N. and Choudhary, A.K. (2009). Knowledge and adoption of re
package of practices of boro rice. *RAU Journal of Research,* **19**(1 & 2): 2

Prasad, Sudarshan, Kumar, R. R. and Sharma, H.C. (2010). Probability analys
District, Uttar Pradesh. *Env*

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Prasad, S.N. and Choudhary, A.K. (2009). Knowledge and adoption of recommended package of practices of boro rice. *RAU Journal of Research,* **19**(1 & 2): 23-25.

Prasad, Sudarshan, Kumar, R. R. and Sharma, H.C. (2010). Probability analysis of annual maximum daily rainfall of Sahjahanpur District, Uttar Pradesh. *Environment & Ecology,* **28**(2).

Rahul, Kumar, R.R. and Bhagat, I.B. (2009). Development of a mathematical model for temperature prediction inside the green house. *RAU Journal of Research,* **19**(1 & 2): 4-8.

Rajak, K. K. and Kumar, Harsh (2009). Studies on tissue culture in sapindaceae : a review. *International Journal of Plant Sciences,* **4:** 321-327.

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Siag, M., Ajay, V. and Bhagat, I.B. (2009). Efficient use of canal water through drip irrigation in cotton (*Gossypium hirsutum*). *Indian Journal of Agricultural Sciences,* **79**(10): 794 – 797.

Singh, S., Singh, R.N., Sarkar, A.K. and Prasad, S.S. (2009). INM for higher productivity of rice-pea cropping system and experience from copper mines area. *Indian Journal of Fertilizer,* **6**: 43-48.

Singh, S.K., Jha, P.K. and Ray, P.K. (2010). Integrated management of papaya ring spot virus (PRSV) in agro ecological conditions of Bihar. *ISHS Acta Horticulture,* **851**: 487-494.

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Singh, S.K., Kumar, Anil and Choudhary, V.K. (2009). Heterosis and transgressive

12.2 Research Papers Presented in Seminar / Symposium

12.2 Research Papers Presented in Seminar / Symposium

Chaudhary, P.K., Rai, R.C. and Rai, B. (2009). Effect of homoeopathic drugs on conidial germination, growth and sporulation of *Drechslera oryzae* of rice. In : *5th International Conference on Plant Pathology in the Globalized Era* organized by Indian Phytopathological Society, IARI, New Delhi, November, 10-13, 2009.

Chaudhary, P.K., Rai, R.C. and Rai, B. (2009). Effect of pre and post storage seed treatment by homoeopathic drugs on *Drechslera oryzae* and germination of rice. In : *5th International conference on Plant Pathology in the Globalized Era* organized by Indian Phytopathological Society, IARI, New Delhi, November 10-13, 2009.

Dayaram and Singh, A.K. (2009). Knowledge and awareness about mushroom cultivation under macromode management project. In : *Souvenir of National Seminar on Innovative Extension Strategies for Agricultural Development and Rural Prosperity*, RAU, Pusa, p. 387-391,

Deo, Sangeeta (2010). Enhancing efficiency of extension. In National Seminar held at IVRI, Izatnagar, December 29-30, 2009.

Deo, Sangeeta (2010). Influence of education and communication media on the clothing awareness and purchasing practices of tribal girls. In National Conference held at Kolkata.

Fatma, Tatheer (2009). Child labour problems and prospects: socio legal measures. In: *Souvenir of Seminar* held at BBA University Lucknow, November 24-25, 2009.

Jha, R.K. (2009). Nakshatra Vanam, A tree garden for meditation, medication and melioration. In : *Souvenir of State level Seminar cum Training on Emerging Trends in Cultivation of Medicinal and Aromatic Plants*, RAU, Pusa, October 27-28, 2009.

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Kumar, Manish, Sharma, P.D. and Kumar, Vishal (2010). Jatropha curcas for oil extraction. In: 44th ISAE Convention at IARI, New Delhi.

Kumar, Rajeev (2009). Medicinal assets of wetland. In: *Souvenir of State level Seminar cum Training on Emerging Trends in Cultivation of Medicinal and Aromatic Plants*, RAU, Pusa, October 27-28, 2009, p.11-12.

Kumar, Sunil, Tiwari, S., Singh, Pankaj, Kumar, Vipin and Singh, S.P. (2009). Impact of conjoint use of organics and chemical fertilizer on nutrient use efficiency in rice vunder rice-wheat cropping system in calciorthents. In: *Abstracts of Platinum Jubilee Celebration and 74th Annual Convention of Indian Society of Soil Science*, New Delhi, p. 170.

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13. RESEARCH PROJECTS IN OPERATION

13.1 All India Coordinated Research Projects

S.No.	Name of the Project	Name of P.I.	Place of operation	Budget (Rs. in Lakh)
1.	AICRP on Honey Bee	Dr. M.L. Agarwal	Faculty of Agriculture	43.68
2.	AICRP on Medicinal & Aromatic Plants	Dr. P. K. Jha	-do-	23.26
3.	AICRP on Soil Testing Correlation Response	Dr. J. Prasad	-do-	32.07
4.	AICRP on Micronutrient in Soil & Plants	Dr. M.P. Singh	-do-	58.16
5.	AICRP on Rice	Dr. N.K. Singh	-do-	49.78
6.	AICRP on Agroforestry	Dr. D. K. Das	-do-	28.70
7.	AICRP on Agrotemeorology	Dr. A. Sattar	-do-	12.15
8.	AICRP on Water Management	Dr. V. Kumar	-do-	59.40
9.	AICRP on Tropical Fruits	Dr. P.K. Roy	-do-	78.30
10.	AICRP on Mushroom	Dr. Dayaram	-do-	12.83
11.	AICRP on Vegetable	Sri Udit Kumar	-do-	7.65
12.	AICRP on Floriculture	Dr. A.K. Singh	-do-	7.73
13.	AICRP on Post Harvest Technology	Dr. M. Srivastava	C.A.E., Pusa	37.73
14.	AICRP on Farm Implement & Machinery	Sri S. Chandra	-do-	26.32
15.	AICRP on Ground Water Utilization	Dr. S.K. Jain	-do-	27.24
16.	All India Networking Project on Biofertilizer	Dr. M.N. Jha	F.B.S. & H., Pusa	27.71
17.	AICRP on Sugarcane	Dr. S.S. Pandey	SRI, Pusa	57.83
18.	AICRP on Oil Palm (Madhopur)	Dr. P.N. Mandal	RRS, Madhopur	12.62
19.	AICRP on Weed Control	Dr. Y. Singh	DOR, RAU, Pusa	25.78
20.	AICRP on Seed Technology	Dr. S.K. Varshney	TCA, Dholi	49.31
21.	AICRP on Maize	Dr. M. Kumar	-do-	58.07
22.	AICRP on MULLaRP	Dr. D. Singh	-do-	34.04
23.	AICRP on Chickpea	-do-	-do-	22.58
24.	AICRP on Pigeonpea	-do-	-do-	12.06
25.	AICRP on Small Millet	Dr. S.K. Singh	-do-	8.49
26.	AICRP on Tuber Crops	Dr. P.P. Singh	-do-	58.43
27.	AICRP on Potato	Dr. L.M. Yadav	-do-	33.38
28.	AICRP on Spices	Dr. S.P. Singh	-do-	22.56
29.	AICRP on Rapeseed & Mustard	Dr. Anil Pandy	-do-	49.19
30.	AICRP on Sunflower	-do-	-do-	32.09
31.	AICRP on Onion & Garlic	Sri Udit Kumar	-do-	14.15
32.	AICRP on Breeder Seed Production	Dr. S.K.Varshney	D.S.F., Dholi	35.39

13.2 Ad-hoc Research Projects

S. No.	Name of the Project	Funding

13.3 Foreign Aided Projects

S. No.	Name of Project	PI	Place of operation

13.3 Foreign Aided Projects

S. No.	Name of Project	PI	Place of operation
1.	Eastern India rainfed low land shuttle breeding network	Dr.N.K. Singh	R.A.U., Pusa
2.	Stress tolerant rice for poor farmers of Africa and South Asia- (STRASA-BMGF).	Dr.A.K. Singh	R.A.U., Pusa
3.	IFAD Project	Dr.N.K. Singh	R.A.U., Pusa
4.	DBT India – IRRI, Network Project "QTL to variety – marker assisted selection for a biotic stress tolerant rice"	Dr.Rajesh Kumar	R.A.U., Pusa

13.4 Rastriya Krishi Vikas Yojna Projects (2010-11)

S. No.	Name of Project	Name of P.I.	Place of Operation
1	(RKVY-01) Promotion and	Dr. A. K. Mishra University	Dept. of Entomology, RAU, Pusa

13.3 Foreign Aided Projects

S. No.	Name of Project	PI	Place of operation	Budget (Rs. in lakh)
1.	Eastern India rainfed low land shuttle breeding network	Dr.N.K. Singh	R.A.U., Pusa	2.5
2.	Stress tolerant rice for poor farmers of Africa and South Asia- (STRASA-BMGF).	Dr.A.K. Singh	R.A.U., Pusa	5.0
3.	IFAD Project	Dr.N.K. Singh	R.A.U., Pusa	1.0
4.	DBT India – IRRI, Network Project "QTL to variety – marker assisted selection for a biotic stress tolerant rice"	Dr.Rajesh Kumar	R.A.U., Pusa	9.0

13.4 Rastriya Krishi Vikas Yojna Projects (2010-11)

S. No.	Name of Project	Name of P.I.	Place of Operation	Budget (Rs. in lakh)
1.	**(RKVY-01)** Promotion and adoption of insect sex-pheromones and bio-agents at farmers field for the management of major rice insect pest (stem borer and leaf folder) in Bihar	Dr. A. K. Mishra University Professor	Dept. of Entomology, RAU, Pusa	33.62
2.	**(RKVY-02)** Development of golden rice for diverse agroecologies of Bihar	Dr. V. K. Sharma Associate Professor	Dept. of AB&MB, RAU, Pusa	143.86
3.	**(RKVY-03)** Production and popularization of bio-fertilizer for nutrient availability and crop production	Dr. R. K. Pandey University Professor	Dept. of Soil Science, RAU, Pusa	115.85
4.	**(RKVY-04)** Enhancement of heat tolerance in locally adapted wheat cultivars of Bihar	Dr. Rajeev Kumar Assistant Professor	Dept. of AB& MB, RAU, Pusa	115.81
5.	**(RKVY-05)** Development of aerobic rice for sustainable rice production in Bihar	Dr. Nilanjaya Assistant Professor	Dept. of PB&G, RAU, Pusa	120.00
6.	**(RKVY-06)** Protected cultivation of vegetable and flowers in Bihar	Dr. A. K. Singh, Assistant Professor	Dept. of Horticulture, RAU, Pusa	528.92

13.5 NAIP Projects

S. No.	Name of Project	Name of P.I./ CO-PI/CCPI
1.	**NAIP (Samastipur)** Sustainable Livelihood Improvement through Need Based Integrated Farming System Models in Disadvantaged District of Bihar	Dr. Dr. K.N. Pathak University Professor (Nematology), RAU, Pusa & Co-PI, NAIP(Samastipur)
2.	**NAIP (Muz. & Sheo.)** Improving Livelihood Security in Salt-affected Watersheds of Muzaffarpur and Sheohar Districts of Bihar	Dr. S S. Prasad, Assistant Professor Soil Science, TCA, Dholi & CPI, NAIP(Muz. & Sheo.)
3.	***NAIP (Comp-IV), BVC, Patna*** Understanding the mechanism of variation in status of a few nutritionally important micronutrients in some important food crops and the mechanism of micronutrient enrichment in plant parts" (Component-IV) at BVC, Patna Centre.	*Dr. Pramod Kumar,* Assistant Professor, BVC, Patna & CCPI, NAIP(Comp-IV), BVC, Patna
4.	**NAIP (Comp.-IV), RAU, Pusa** Understanding the mechanism of variation in status of a few nutritionally important micronutrients in some important food crops and the mechanism of micronutrient enrichment in plant parts (Component-IV) at Department of Soil Science, RAU, Pusa.	Dr. Vipin Kumar Assistant Professor Soil Science, RAU, Pusa & CCPI, NAIP(Comp.-IV), RAU, Pusa
5.	To promote Sustainable Livelihoods of the small and marginal farmers with a focus on women's empowerment in Nawada & Purnea district of Bihar	Dr. V. V. Jha, Programme Coordinator, KVK, Jalalgarh, Purnea