ANNUAL REPORT

1985-86

RAJENDRA AGRICULTURAL UNIVERSITY, BIHAR
PUSA (Samastipur)-848125

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CONTENTS

PREFACE

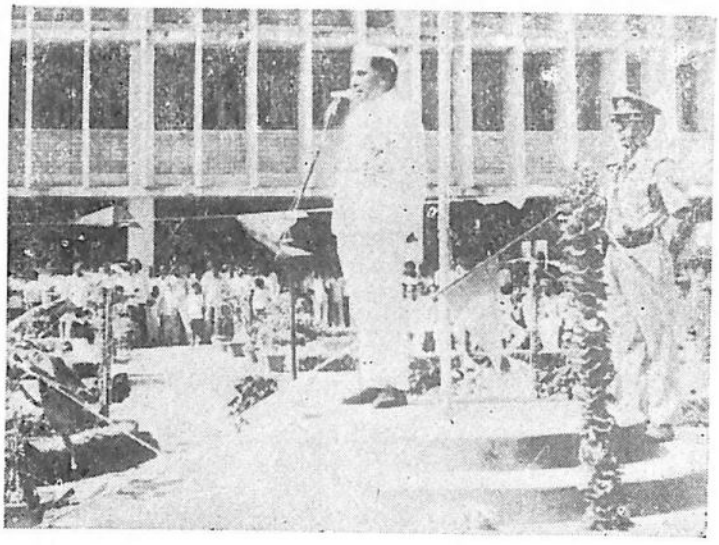
Since the 1960s, Indian Agriculture has experienced a remarkable transformation. Total production of food grains has increased two-fold in the past 20 years and three-fold in the past 35 years. In this process of transformation the establishment of Agricultural Universities in the country is a significant land mark. It has opened a new vista in the agricultural education, research and extension system of the country. The Rajendra Agricultural University is one of the 26 Agricultural Universities of the country spread over 17 States. This university, since inception in the year 1971, has been running the teaching, research and first line extension programmes through its three main campuses located at Sabour (Bhagalpur), Patna and Dholi-Pusa (Samastipur) with a number of Regional Research Stations, sub-stations and centres of the transfer of technology projects located in nine divisions of the state.

The present report, which gives an insight of the major achievements, constraints and a few failures, on teaching, research and extension fronts would provide a better insight to the extension officers and agricultural scientists of the state, in general and the Rajendra Agricultural University, in particular. I believe it will help teachers, researchers and extension workers in the university to augument their programmes of research, teaching and extension in order to keep pace with the challenging task of developing human resource and increasing food production in the state.

The help and assistance rendered by Dr. S. S. N. Sinha Planning Officer, and various officers & scientists of the University in the preparation of this report is thankfully acknowledged.

G. Trivedi

(G. Trivedi)
Vice-Chancellor



Vice-Chancellor addressing Republic day function.

ACADEMIC

AUTHORITIES OF THE UNIVERSITY AND THEIR IMPORTANT DECISIONS

1.1 Authorities of the University and their Constitutions :

(a) Senate–The Senate constituted under Section 10 (1) of the R.A.U. Act, 1971 functioned with the following Ex-Officio Members :

1. Chancellor
2. Vice-Chancellor
3. Agricultural Development Commissioner
4. Finance Commissioner
5. Secretary, Department of Agriculture, Animal Husbandry and Co-operation (Agriculture)
6. Secretary, Department of Agriculture, Animal Husbandry and Co-operation (Animal Husbandry)
7. Chief Conservator of Forests, Bihar, RANCHI
8. Director of Agriculture
9. Director of Animal Husbandry
10. Director, Agriculture Education, Agriculture Department
11. Director, Research, Rajendra Agricultural University, Bihar
12. Director, Extension Education, Rajendra Agricultural University, Bihar
13. Director, Fisheries, Agriculture Department

14-17. Deans of Faculties (Agriculture, Animal Husbandry, Basic Science and Home Science)

18-24. Principals of the constituent colleges and Directors of Research Institution of the Rajendra Agricultural University, Bihar.

Representative Members

25-31. Seven persons to be elected by and from the members of Bihar Legislative Assembly in such manner as may be prescribed by the Speaker of the Assembly

32-33. Two persons to be elected by and from members of Bihar Legislative Council in such manner as may be prescribed by the Chairman of the Council

34-39. Six teachers, other than Principals and Deans of Faculties, having at least five years teaching experience, to be nominated in the

manner prescribed by Statute so as to give representation to all the constituent colleges of the University

40-42. Three persons, one member each to be nominated by the Bihar State Agro-Industries Development Corporation, Bihar State Agricultural marketing Board and Bihar State Seeds Corporation

43. One representative of the Employees Union of the Rajendra Agricultural University

44-45. Two farmers to be nominated by the Chancellor

46-47. Two eminent Agricultural Scientists to be nominated by the Chancellor

48-49. Two eminent Scientists (other than Agricultural Scientists) to be nominated by the Chancellor

50. One meritorious student to be nominated by the Vice-Chancellor in the manner prescribed by the Statute

5 . One student who has distinguished himself in sports and extra-curricullar activities to be nominated by the Vice-Chancellor in the manner prescribed by the Statute.

NOTE Director, Resident Instruction-cum-Dean, P.G. Studies, Director, Administration, Comptroller and Registrar may participate as special invitees.

(b) Syndicate–The Syndicate constituted under Section 11 (1) of the R.A.U. Act, 1971 continued to function with the following members :

1. Vice-Chancellor —Chairman
2. Agriculture Production Commissioner or in his absence the Secretary, Agriculture
3. Director, Animal Husbandry
4. Director, Agriculture

5-7. Three members other than students or the employees of the University or the colleges to be elected in accordance with system of the proportional representation by means of single transferable votes from and by the members other than of the "Senate"

8. One Dean of the Faculty or the Director of the University to be selected by rotation in the manner prescribed in the statutes

9. On head of the University Department by rotation as prescribed in the Statute.

10. A representative of the Indian Council of Agricultural Research
11. Registrar — Non-Member Secretary.

(c) Academic Council—The Academic Council contituted under Section 13 (2) of the R. A. U. Act, 1971 continued to function with the following :

1. Vice-Chancellor — Chairman
2. The Deans
3. The Directors
4. Principals/Associate Deans of the constituent colleges
5. All Chairman of Post-graduate Departments
6. Three teachers of constituent Colleges nominated by the Vice-Chancellor for 2 years
7. Five teachers of the different traditional Universities of Bihar to be nominated by the respective Vice-Chancellor for 2 years
8. Registrar, Rajendra Agricultural University, Bihar-Secretary
9. Such other members as may be prescribed by the Syndicate.

1.2 Important decisions of the authorities :

(A) SENATE :

Due to certain unavoidable circumstances meeting of the Senate could not be held during year under report.

(B) SYNDICATE :

Six meetings of the Syndicate were held during period under report. Following major decisions were taken in these meetings.

1. Appointment to the posts of D.R.I -cum-Dean (P G.); Director, Seeds; Dean, Faculty of Basic Scienc & Humanities; Dean, Home Science; Dean, Agril. Engineering and Registrar were made. Appointments to the posts of Principal, Bihar Agricultural College, Sabour; Director, Sugarcane Research Institute, Pusa; Regional Director, Patna and University Professors in Plant Breeding and Plant Pathology departments were also made. Appointments to all different posts in the rank of Associate Professor-cum-Senior Scientists were also made.

2. 74 Asstt. Professor-cum-Jr. Scientists were promoted in the rank of Associate Professor-cum-Sr. Scientist under Personal Promotion Scheme of the University.

3. Posts of Associate Director Research and Associate Director, Extension Education were created in the scale of Rs. 1500-2500 with a special pay of Rs. 200 P.M.

4. The pay scale of Planning Officer was revised from Rs. 1200-1900 to 1500-2500.

5. Comptroller and Dy. Comptroller were appointed on contract basis.

6 It was decided to allow promotional pay fixation benefit to teachers getting Personal Promotion under the Personal Promotion Scheme of the University. The rate of such benefit was fixed at 12% of basic pay to a maximum of Rs. 150 P.M.

7. The University decided to implement Merit Promotion Scheme for Associate Professor-cum-Senior Scientist to the post of University Professor-cum-Chief Scientist.

8. On recommendation of the Academic Council the Syndicate decided to adopt semester system of education from fresh admissions in the academic session 1985-86.

9. On recommendation of the Academic Council the Syndicate decided to provide fellowship to two top ranking students in each subject taking Agricultural Engineering and one top ranking student in each subject taking B.Sc. Dairy Technology degrees from this University at the rate of Rs. 400 P.M. to enable them to persue their higher studies in any University/Institution of repute in the country.

10. On recommendation of the Academic Council Internship Programme for the students of B V. Sc. and A.H. for a period of six months (2 trimesters or 1 semester) was introduced and it was decided to provide a stipend of Rs. 600 P.M. to each Interns for the said deriod.

11. On recommendation of the Academic Council In-Plant Training programme for the students doing B.Sc. Dairy Technology was also approved and it was also decided that this training progamme shall also be of six months duration (2 trimesters or one semester) and during the period of In-Plant Training the students shall be getting a stipend of Rs. 600 P.M.

12. The Syndicate decided to establish a College of Fisheries in this University in which Ist admission shall be taken in the Academic Session, 1986-87.

13 The Syndicate approved the proposal of Sri Baleshwar Pd. Singh, Endoment Trust to Institute an award in the name of Sri Baleshwar Pd. Singh. For this purpose Sri Baleshwar Prasad Singh Endoment Trust provided a capital fund of Rs. 50,000 to the University.

14. On recommendation of the Academic Council the rate of Junior University Fellowship was raised from Rs. 400 P.M. to Rs 600 P.M. and the rate of

Senior University Fellowship from Rs. 500 P.M. to Rs. 750 P.M. for Ist two years and Rs. 900 P.M. for 3rd year. Similarly the rate of thesis grant was also raised to Rs. 500 for M Sc. and Rs, 750 for Ph.D.

(C) ACADEMIC COUNCIL :

Two meetings of the Academic Council were held during the year under report. Following major decisions were taken in these meetings.

1. The Academic Council after considering the recommendations of the Deans Committee ICAR recommended to the Syndicate to adopt semester system of education in both Under-graduate and Post-graduate programme from the Academic session, 1985-86.

2. Course curriculum of both Undar-graduate and Post-graduate programme for semester system of education was approved.

3. The Academic Council recommended to the Syndicate for providing fellowship of Rs. 400 to two top ranking students in eack subject of Agril. Engineering taking their degree in B. Tech. Agril Engineering and one top ranking student in each subject of Dairy Technology taking B. Sc. Dairy Technology degree from this University to enable them to persue their higher studies leading to Master's degree in their respective subjects.

4. The Council recommended to the Syndicate the proposal to start M Sc. programme in Genetics and Ph. D. programme in Botany and Plant Physiology in the College of Basic Sciences and Humanities. It was also recommended that M. Sc. programme in Agronomy, Soil Science and Plant Breeding may also be started at Bihar Agril College, Sabour. It was also recommended that M. V Sc. programme in L. P. M., Veterinary Surgery and Veterinary Public Health may also be started at Bihar Veterinary College, Patna.

5. The Council decided that Post-graduate programme in Horticulture be bifurcated and from now an onward degrees both Master's and Ph. D. be awarded in Horticulture Pomology and Horticulture Olericulture.

6. The Council recommended to the Syndicate the proposal to raise the rate of Junior University Fellowwhip from Rs. 400 P. M. to Rs. 600 P. M. and Senior University Fellowship from Rs. 500 to Rs. 750 P. M. for 1 st two years and Rs. 900 P.M. for the 3rd year. Similarly it was also recommended to raise to quantum of thesis grant to Rs. 500 for M. Sc. and Rs. 750 for Ph. D.

7. Council also recommended to the Syndicate the proposal to introduce Internship programme of 6 months period for the students of B. V. Sc. and A. H. course during which period the students shall be getting stipend of Rs. 600 P. M. Identical recommendations were also made for the students of Dairy Technology

in which an In-Plant Training of 6 months duration was to be introduced and during the period of In-Plant Training the students were recommended to be paid a stipend of Rs. 600 P. M.

RESIDENT INSTRUCTION

The University imparts instructions in the faculties through the Departments/Colleges detailed as below :

1. Faculty of Post-graduate studies :

(a) Agricultural Sciences :
- (i) Agronomy
- (ii) Plant Breeding & Genetics
- (iii) Soil Science
- (iv) Plant Pathology
- (v) Entomology and Agril. Zoology
- (vi) Agricultural Economics
- (vii) Horticulture (Pomology)
- (viii) Horticulture (Olericulture)
- (ix) Extension Education.

(b) Basic Sciences :
- (i) Statistics & Mathematics
- (ii) Botany & Plant Physiology.

(c) Veterinary Sciences :
- (i) Veterinary Anatomy
- (ii) Veterinary Physiology
- (iii) Veterinary Pathology
- (iv) Veterinary Medicine
- (v) Veterinary Microbiology
- (vi) Veterinary Pharmacology
- (vii) Veterinary Parasitology
- (viii) Animal Nutrition
- (ix) Animal Breeding.

2. Faculty of Agriculture :
- (i) Bihar Agricultral College, Sabour (Bhagalpur)
- (ii) Tirhut College of Agriculture, Dholi (Muzaffarpur).

3. Faculty of Animal Husbandry :
- (i) Bihar Veterinary College, Patna.
- (ii) Sanjay Gandhi Institute of Dairy Technology, Pusa (Samastipur).

4. Faculty of Home Science :
- (i) College of Home Science, Pusa (Samastipur).

5. **Faculty of Basic Sciences & Humanities :**

   (i) College of Basic Sciences & Humanities, Pusa, (Samastipur).

6. **Faculty of Agricultural Engineering :**

   (i) College of Agricultural Engineering, Pusa, (Samastipur).

I. B. Faculty member:

There were 31 University Professors, 111 Associate Professors & 512 Assistant Professors in addition to other supporting staff who were engaged in teaching, research and Extension Education work of the University.

I. C. The University imparts instruction leading to the following degrees

(a) Degree level programme :

(i) B Sc. Agril.
(ii) B. V. Sc. & A H.
(iii) B. Sc. Home Science
(iv) B. Sc. Dairy Technology
(v) B. Tech. Agril. Engineering.

(b) Post-graduate level programme :

1. **M. Sc. Agril. Degree in :**

   (i) Agronomy
   (ii) Soil Science
   (iii) Plant Breeding & Genetics
   (iv) Plant Pathology
   (v) Entomology
   (vi) Horticulture (Pomology)
   (vii) Horticulture (Olericulture)
   (viii) Agricultural Economics
   (ix) Extension Education.

2. **M. V. Sc. degree in :**

   (i) Veterinary Anatomy
   (ii) Veterinary Physiology
   (iii) Veterinary Pathology
   (iv) Veterinary Medicine
   (v) Veterinary Pharmacology
   (vi) Veterinary Parasitology
   (vii) Animal Nutrition
   (viii) Animal Breeding
   (ix) Veterinary Microbiology
   (x) Extension Education.

3. M. Sc./M. Sc. (Ag.) degree in :

(i) Agricultural Statistics
(ii) Botany and Plant Physiology.

(c) Ph. D. degree level programme in :

(i) Agronomy
(ii) Plant Breeding
(iii) Plant Pathology
(iv) Soil Science
(v) Entomology
(vi) Agricultural Economics
(vii) Harticulture (Pomology)
(viii) Horticulture (Otericulture)
(ix) Extension Education.

I. D. System of Education :

The University was following trimester system of education till date, but on the recommendation of the Deans Committee of ICAR, the Academic Council and the Syndicate of the University decided to adopt semester system of education from the fresh admission in both Under-graduate and Post-graduate programme in the Academic Session 1985 86. This has been done keeping in view the general feeling that the semester system of education is superior to that of the trimester system.

(ii) Courses :

Due to introduction of semester system of education from the Academic session 1985-86 the course curriculum for different degree programmes were revised and formulated a fresh, which was duly considered in the meetings of the Board of Studies, faculties and ultimately approved by the Academic Council for adoption.

(iii) Regulations :

Detailed intereme regulation on Resident Instruction for semester system of education has been prepared and adopted. Regulation is yet under consideration and revision for final adoption.

(iv) Admissions:

(a) Under-graduate programme :

(i) For selection of students for admission to different Under-graduate programmes of this University, the University conducts a Combined Competitive Entrance Test Examination every year. For appearing in this examination a candidate must have passed I. Sc. examination with Physics, Chemistry and

Mathematics or Biology for admission in B.Sc. Agril. and B.Sc. Home Science programme; with Physics, Chemistry and Mathematics for admission in B. Tech. Agril. Engineering and B.Sc. Dairy Technology programme and Physics, Chemistry and Biology for admission in B V Sc. and A H. programme. During the year under report a total of 12714 students submitted their applications for appearing in this examination, out of which 9825 students actually appeared. On the basis of marks obtained by the students in this examination 73 students were selected for admission in B.Sc. Agril. course at Tirhut College of Agriculture, Dholi (Muzaffarpur) and 72 students at Bihar Agril. College, Sabour (Bhagalpur); 59 students were selected for admission is B.V.Sc. and A.H. course; 33 students in B. Tech. Agricultural Engineering course; 24 students in B.Sc. Dairy Technology course and 33 students in B Sc. Home Science course.

(ii) A four years B Sc Agril. degree programme is also available specially for the V.L.W's of the Department of Agriculture, Govt. of Bihar and inservice candidates of this University. For admission under this programme also a Competitive Test was conducted during the year under report in which 100 V.L.W's candidates appeared. Out of them 30 V.L W's candidates were admitted to 4 years B Sc. Agril. course.

(b) Post-graduate programme :

Total intake capacity to the Master's degree of Post-graduate faculty is 88 in various subjects of Agriculture, 36 in various subjects of Veterinary & Animal Husbandry and 8 in various subjects of Basic Science. Two seats in each subjects of Agriculture are reserved for the students sponsored by the I.C.A.R. and Department of Agriculture, Govt. of Bihar. Admissions in Master's degree programme are taken on merit prepared on the basis of marks obtained by the students in Under-graduate examination.

During the year under report 14 students were admitted in the M.V.Sc. course in different subjects of Veterinary Science and 67 students were admitted in the M.Sc. (Ag.)/M.Sc. courses of Agriculture and Basic Science subjects.

(c) Ph. D. programme :

During the period under report 17 regular students and 22 inservice students were admitted to Ph. D. programme in different subjects.

II. Enrolment in different faculties :

(i) Under-graduate programme :

The number of students on rolls in different programmes of the faculties is given in Table I.

Table I. No of Under-graduate students on rolls in different faculties during the year 1985-86

Name of faculty/college	Total students on Roll
A. Faculty of Agriculture :	
(i) Bihar Agril. College, Sabour	206
(ii) Tirhut College of Agriculture, Dholi	208
B. Faculty of Animal Husbandry :	
(i) Bihar Vety. College, Patna	121
(ii) Sanjay Gandhi Institute of Dairy Technology, Pusa (Samastipur)	67
C. Faculty of Home Science :	
(i) College of Home Science, Pusa	64
D. Faculty of Agricultural Engineering :	
(i) College of Agricultural Engineering, Pusa	51
E. Basic Science (V.L.W.)	31

II. Post-graduate Programme :

The number of students on roll in different subjects for M. Sc. Ag./M. Sc./M. V. Sc. programme of the faculty of Post-graduate studies is given in Table II.

Table II. Number of students on roll in M. Sc. Ag./M. Sc./M. V Sc. programme during the year 1985-86

Title of the Degree programme	Total students on roll
(A) M. Sc. (Ag.)	270
(B) M. Sc.	7
(C) M. V. Sc.	24

(III) Ph. D. programme :

Regular Ph. D. programme with course work in all the subjects of Agriculture is available in this University.

Total Number of students on roll in Ph. D. Programme during the year 1985-86 was 68 only.

(IV) Under-graduate students who completed degree programme :

Number of students who qualified for various Under-graduate programmes of the University is given in Table IV.

Table IV. Stat-ment shoming number of students who qualified for various Under-graduate programme

Total of degree programme	Number of students qualified in 1985 86
B. Sc. Agril.	82
B. V. Sc. and A. H	16
B. Sc. Home Science	14

(V) Post-graduate students who completed degree programme :

Details of students who qualified for the M. Sc. Agril., M. V. Sc. and Ph. D. degree programme of the University is given in Table V.

Table V. Details of students who qualified for the award of M. Sc. Ag./M. V. Sc. and Ph. D. degree.

(1) Details of Post-graduate students who were declared to have qualified for the award of M. Sc. (Ag.), M. V. Sc. and Ph. D degree programmes during the period under report are given below :

(a) List of students qualified for M Sc. (Ag.) degree

Sl.No.	Name of student	Major subject & title of thesis
1	2	3
		Agronomy
1.	Bashishtha Narayan Singh	"Effect of different doses of Nitrogen and Miraculan on growth, yield and quality of Rice"
2.	Harendra Singh	"Investigations on Fertilizer and Gap Filling need of Sugarcane Ratoon from shy and profuse Tillering varieties"
3.	Sukhavasi Pandu Ranga Vithal	"Studies on the nitrogen requirement of pre-released medium and long duration varieties of Rice"
4.	Ram Vinay Mishra	'Studies on growth and yield structure of gram *(Cicer arietinum)* cultivars at various dates of sowing"
5.	Gokulesh Jha	"To study the effect of Inter cropping with Potato on the growth, yield and quality of Autumn Planted Sugarcane"
6.	Ashwini Kumar Sah	"Response of Ragi varieties to different levels of nitrogen under rainfed conditions"
7.	Md. Mazhar Alam	"Productivity of wheat under limited water supply condition"

1	2	3
8.	Anil Kumar Jha	"Response of wheat to levels of Irrigation and Nitrogen"
9.	Raj Mani Prasad	"To sdudy the effect of different crop Geometries in Relation to Crop Stand and Yield of Wheat"
10.	Sheo Shankar Prasad	"Fertilizer scheduling for the targetted yield of crop under Tobacco-maize cropping pattern"
11.	Awinash Tanti	"Efficiency of Urea Applied before and after irrigation in Wheat"
12.	Bimal Kishore Gupta	"Response of Nitrogen, Phosphorus and Potash on the Yield and Quality of Coori-ander"
		Plant Pathology
1.	Prem Kumar Bhatt	"Investigations on leaf spots disease of Dioscorea under North Bihar condition"
2.	Arun Prasad Bhagat	"Bacterial wilt diseases of Ginger : Causes and Control"
3.	Rajesh Kumar Singh	"Investigations on Diseases of Pan in Bihar"
4.	Sita Ram Kamat	"Investigations on Post-harvest diseases of onion (*Allium cepa* L.) with special reference to Bacterial diseases and their control"
5.	Mukul Prasad	"Investigations on Anthracnose disease of green gram *(Vigna radiata)* caused by *Colletotrichum truncatum* Schw."
6.	Ramesh Chandra Gupta	"Studies on the Stem Rot disease of Til (*Sesamum indicum* L.) caused by *Selero-tium rolfsii* Sace."
7.	Sanjay Kumar	"Studies on some of the Fungal diseases of Papaya *(Carica papaya)* in Bihar"
		Agril. Economics
1.	Chandra Mohan Jha	"A study on technological change in paddy cultivation (District Madhubani, Bihar)"

1	2	3
2.	Dhruv Kishore Sinha	"A study on Trend in Fertilizer Consumption and Its Determinants in Bihar"
3.	Shivendra Kumar	"Study on Sodo-Economics Constraints of HYV Rice Cultivation-A Three village profile (Jaynagar Block, Madhubani)"
4.	Ravi Pratap Narain Singh	"A study on operational efficiency of Commercial and Regional Rural Banks, District Samastipur (Bihar)"
		Plant Breeding
1.	Awadhesh Kumar Prabhat	"Analysis of yield components in Groundnut (*Arachis hypogaea* L.)"
2	Arun Kumar Pandey	"Genetic and Genotype-Environment Interaction Studies in Wheat (*Trilicum aestivum* L.)"
3.	Cherukuri Shankara Rao	"Studies on Combining Ability, Heterosis and Inbreeding Depression in Yellow Sarson (*Brassica campestris* (L.) Var. Yellow Sarson)"
4.	Nitish De	"Genetics variability and Interrelationship studies among the metric traits in Lentil (*Lens culinaris* Medik)"
5.	Prabhash Kumar Singh	"Study of Tillering Pattern & contribution of Aquatic tillers to single Plant Yield in someDeepwater Rice (*Oryza sativa* L.)"
6.	Sheo Shanker Singh	"Genotype-environment Interaction in Proso-Millet (*Panicum milliaccum* L.)"
7.	Mithilesh Kumar Singh	"Correlations and Path Coefficient Analysis in Green Gram (*Vigna radiata* (L.) Wilczek)"
8.	Bibhuti Bhushan Prasad	"Studies on Genotype X Environment Interaction and Stability Parameters in Mungbean (*Vigna radiata* (L.) Wilczek.)
		Horticulture
1.	Rajesh Kumar	"Vegetative and Pomological Studies of few years of Sapota (*Acharas sapota* D.),

1	2	3
		Barhal (*Artocarpus lakocha* Roxg), Jamun (*Syzgiums cuminil*) (*Trapa bipinosa* Roxg) growing around Bhagalpur"
1.'A'	Louis Ngasainao	"Blossom biology and Hybridization studies in Mango (*Mangifera indica* Linn)"
2.	Manoj Kumar Singh	"Vegetative and Pomological Studies of few types of Littchi (*Litchi chinensis* Sonn), Custard Apple, (*Anona squameusa*) & Bael (*Aegle marmelos* Correa) Growing Around Bhagalpur"
3.	Surendra Narain Singh	"To study the effect of growth regulators on growth, flowering of *Physalis piruvium* L."
4.	Dhirendra Kumar Mehta	"Studies on Phenotypic and genotypic variability in some quantitative traits of Fennel (*Feeniculum vulgare* Mill ,"
5.	Vijay Kumar	"Studies on important morphological characteristics of seven varieties of citrus species"
		Siol Science
1.	Prasanna Kumar Bhattacharyya	"Studies on the response of NPK Fertilizers and chemical forms of Fe and Mn in Waterlogged rice soils of Arunachal Pradesh (Apatani Plateau)"
2.	Pashu Pati Nath Sahu	"Effect of single and Combined Inoculation of Azotabacter, Azospirillum and Phosphobacterin at different levels of Nitrogen on wheat and Rice Crops"
3.	Binod Kumar	"Assessment of critical limits and availability of Potassium in North Bihar Soils"
4.	Vijay Kant Mishra	"Studies on the effect of Graded Levels of Fertilizer Application of Yield and Uptake of Major Nutrients by Rabi Crops"
5.	Baijnath Prasad Gupta	"Studies on interaction between Rhizobium strains and chickpea (*Cicer arietinum* L.) Genotypes vis-a-vis symbiotic N-Fixation in saline calcareous soil"

1	2	3
6.	Anil Kumar Singh	"Charge characterisation of some acids oils of Bihar with special reference to their genesis"
7.	Jawahar Lal Choudhary	"Differential Performance of Chick Pea Cultivars to Zinc application in a Calcareous Soil"
8.	Ram Niwas Pd. Singh	"Studies on the formation of calcium Carbonate Con-cretions vis-a-vis Cemented Layer in some heavy soils of Bihar"
9.	Balmukund Sharma	"Morphology, Genesis and Classification of some salt affected soils of North Bihar"
10.	Bipul Bura Gohain	"Changes in Hydrothermal Properties of Sandy loam Calcareous soil as influenced by different timings of first irrigation in late sown wheat"
		Agril. Statistics
1.	Shyam Nandan Singh	"Genotype-Environment Interaction"
2.	Anil Kumar Thakur	"Use of Auxiliary information in Estimating Population Ratio in Repeated Surveys"
3.	Ramesh Chandra Bharti	"Some studies on use of Transformed variate in probability Proportional to size sampling"
4.	Naresh Chandra Jha	"A statistical Analysis of growth performance of Agriculture in Nepal"
		Botany & Plant Physiology
1.	Joytsna Verma	"Physiology of Salt Stress Resistance in Paddy during Germination and early Seedling Growth"
		Extension Education
1.	Yummam Dorendra Singh	"Technological gap in Rice Cultivation in the Central District of Manipur"
2.	Anjani Kumar	"Training Needs of Farmers in relation to High Yielding Varieties of Paddy Culture Around KVK Sekhodeora Nawada Dist."
3.	Pashan Ali Shekha	"A study on the Training needs of Subject Matter Specialists in Training and Visit System of Agricultural Extn. in Assam"

1	2	3
		Entomology
1	Raj Kishore Thakur	"Pest complex of Urd *(Vigna mungo* Linn Hopper) in relation to seasonal activity, effect of manuring and their control"
2.	Pramod Kumar Verma	"Toxicity of some insecticides to the larvae of Brinjal shoot and fruit borer *(Leucinods orbonalis* Guen) and sugarcane top borer *(Scirpophaga nivella* F.).
		Entomology & Agril. Zoology
1.	Shashi Bhushan Sharan	"Studies on the biology and control of cabbage aphid *(Brevicoryne brassicae* L.)"
2.	Md. Enamul Haque	"Biology and control of rice Hispa *(Dicladispa armigera* Oliv.) in North Bihar
		(B) List of Students Qulified for PH. D. Degree
		Soil Science
1.	Sharda Nand Prasad	"Studies on the Distribution and mobility of Phosphate and some Associated Cations in Typical Soils in Bihar"
2.	Rabindra Nath Chutia	"Effect of pyrites and FYM amended phosphatic fertilizers on quantity, intensity, supply parameters and release of Phosphorus in relation to phosphorus nutrition of wheat in calcareous soil"
3.	Kameshwar Yadav	"Biodegradation of some organic manures in soil in relation to Mineralization Mumus Constitution And Microbiel Population"
4.	Vijay Kumar Sharma	"Reactions of Zinc Chelates in Rice soils"
5.	Jai Ram Tiwari	"Study of the pedogenetic processes involved in development of black and red soils in Rajmahal Traps of Old Santhal Paragna District"
		Plant Breeding & Genetics
1.	Shree Narayan Roy	"Genetic and Karyotypic investigation in Barley (*Hordeum vulgare*)"

1	2	3
		Agronomy
1.	Sundareshwar Mishra	"Production Potential Economics Energetics and soil fertility dynamics of some high intensity upland rotations under fertilizer constraints in North Bihar"
2.	Raghubar Dayal Pandey	"Nutritional Inter-Relationships of Phosphorus and Zinc and its effect on the Growth, Development, Yield and Quality of Rabi Hybrid Maize"
3.	Md. Shamsuzzaman	"Nitrogen donating ability of some grain legumes at variying levels of Phosphate and Assessment of their residual effect on succeeding maize crop"
4.	Jeeva Narain Jha	"To study the effect of inorganic fertilizer application in conjuction with different organic manures and crop residues on the growth and yeild of Rice"
5.	Harishchandra Thakur	"Production Potential, Soil Fertility Build up and Economics of various cropping patterns including pulses and oilseeds"
6.	Dharm Pal Singh	"Studies on the growth and yield structure of Rabi Maize under Different Agronomic management in Calcareous soil"
		Plant Pathology
1.	Manzoor Ahmed Gora	"Investigations on *Trichoconiella paowicki* (Ganguly) Jain, the ubcutabt of stackburn of Paddy *(Oryza sativa* L.)"
2.	Lachhu Ram Saha	"Investigation on Follicolous diseases of Brassica (Rape seed & Mustard)"
3.	Birendra Kumar Singh	"Investigations of Leaf Blight diseases of Pigeonpea (*Cajanus cajan* (K.) Mill. caused by *Alternaria tenassima* (Kunzer : pers.) Wiltsnire)"
		Extension Education
1.	Akhileshwar Pd. Choudhary	"A critical Analysis of National Adult Education Programme and its impact on Rural Adults"

1	2	3
		Entomology
1.	Rajendra Pd. Sinha	"Studies on the Bionomics and control of Mustard Aphid (*Lipaphis erysimi*) Kalt (Aphididae : Homoptera)"

(C) List of students qualified for M.V.Sc. degree

		Veterinary Medicine
1.	Nazim Ahmad Sudhan	"Studies on Clinical-pathology, Biochemistry and Chemotherapy of Natural and Experimental Bovine Tropical Theileriasis"
2.	Narendra Kumar Singh	"Studies on Microbiotherapy of Ruminal Metabolic Disorders in Bovine"
3.	Bimal Prasad Giri	"Studies on dermatophytoses of animals with reference to diagnosis and Chemotherapy"
4.	Pinaki Ghosh	'Studies on Clinico-biochemical changes and chemotherapy of canine Babesiosis"
		Veterinary Microbiology
1.	Bipin Kumar	"Studies on Mycoplasm from Genital and Respiratory Tracts of Cattle and Buffaloes"
		Veterinary Prasitology
1.	Chandra Shekhar Datta	"Studies on Host-Parasite Relationship and Chemoprophylaxis of Theileriasis in Exotic and Cross-Bred Cattle"
2.	Siddhartha Sanker Das	"Immunological Studies on Cattle tick (*Boophilus microplus*)"
		Veterinary Anatomy
1.	Gayatri Mukherjee	"Studies on the Microscopic structures of the Pancreas of sheep"
		Veterinary Pharmacology
1.	Vijay Kumar Jha	"Pharmacokinetics study of doxycyline and demeclocycline in goat"
		Veterinary Pathology
1.	Miss Alka Sharan	"Studies on the Pathology of Pneumonia in Goats with special reference to mycoplasma infectio"

1	2	3
		Animal Breeding & Genetics
1.	Raj Kumar	"Studies on the performance of *Cross Bred* Cattle and Inheritance of some traits connected with adaptation"

Faculty Development:

(i) A decision was taken to establish a College of Fisheries Sciences in the University and to admit students in the B.F.Sc. course from the session 1986-87.

(ii) A decision was also taken to introduce M. Sc. teaching in Genetics and Ph. D. teaching in Botany and Plant Physiology in the faculty of Basic Science & Humanities. A decision was also taken that M. V. Sc. teaching in L.P.M., Veterinary Surgery and Vety Public Health in the Faculty of Veterinary Sciences at Bihar Veterinary College, Patna may also be started.

(iii) The University also decided to depute two top ranking students from each subjects of Agricultural Engineering and one top ranking students from each subjects of Dairy Technology taking degrees of B Tech. Agril. Engg. and B. Sc. Dairy Technology course respectively of this University for completing Master's Degree programme in selected Institutions/University of the country in their respective subjects.

(iv) Under Faculty Development programme of the University 3 teachers have been deputed to other Institutions for higher studies leading to Ph.D. degree; one staff member has been deputed to Catholic University, Belgium and twenty teachers of this University were selected for admission in Ph.D. programme in Agril. Faculty in different disciplines who took their admission at Rajendra Agril. University, Bihar in Monsoon Trimester, 1985 starting from 29.7.1985

One staff member has been admitted in 4 years B. Sc. Ag. progromme and granted study leave with full salary support.

The candidature of two staff members have also been sponsored for admission in M.Sc. course in Seed Technology at the University of Edinburgh, U. K. under Colombo Plan.

Besides this, one staff member of the Faculty of Basic Science was awarded commonwealth scholarship for doing Ph.D. in Canada.

One staff member has also been deputed to Barrakpore for one year Inland Fisheries Training course.

One staff member of Home Science faculty was deputed for Human Nutrition course at National Institute of Nutrition, Banglore.

(II) The University provides scholarships at under-graduate level, Junior Fellowships at Masters degree level and Ph.D. level to the students based on merit. In addition I.C.A.R. and H. R. D P. fellowships are also availabl. During the year under report following number of scholarships and fellowships at different level from different Heads were provided.

Sl. No.	Name of the programme & scheme	Number of students benefitted					
		Ag.	Vet.	H.Sc.	D.T.	Ag. Engg.	Total
1	2	3	4	5	6	7	8
1.	**Under-graduate programme**						
	(i) Merit scholarship @ Rs. 125/-	43	19	18	15	22	117
	(ii) Merit-cum-means (U.R.) @ Rs. 100/-	37	16	16	5	13	87
	(iii) Merit-cum-means (Resv.) @ Rs. 100/-	44	15	5	11	Nil	75
	(iv) Other I.C.A.R. Scholarship						
	(a) ICAR Merit-cum-means @ Rs. 125	5	—	—	—	—	5
	(b) ICAR HRDP	1	6	1	5	2	15
	(v) Any other (FCI)	1	—	—	—	—	1
2.	**Master Degree programme**						
	(i) University Fellowship	130	16	—	—	—	146
	(ii) ICAR Fellowship	5	—	—	—	—	5
	(iii) ICAR HRDP	11	—	—	—	—	11
	(iv) Any other (USAID)	2	—	—	—	—	2
3.	**Ph. D. programme**						
	(i) University Fellowship	12	—	—	—	—	12
	(ii) ICAR Fellowship	2	—	—	—	—	2
	(iii) ICAR HRDP	4	—	—	—	—	4
	(iv) Any other	—	—	—	—	—	—

RESEARCH

RICE

2.1.1 (a) Rice Breeding :

Research Achievements on the basis of concluded experiments which are required to be forwarded to the State Department of Agriculture/Animal Husbandry for adoption/further field trials and trials under adaptive research are as follows;

One variety BIET 1009 was recommended for release by Research Council of R.A.U. in 1935. This variety is to be considered by State Department of Agriculture for release.

Following promising cultures are in adaptive/Minikit trials; IET 3116 and IET 3279. Early duration varieties suitable for summer cultivation; IET 7273 and UPR 233 Early duration varieties suitable for up-land in Kharif; IR 13540-56-3-2-1 Medium duration variety suitable for medium land; BR 51-74-6 Late duration variety suitable for lowland condition, and TC 80-4 RAU 83-18-6 suitable for shadow rainfed lowland.

Research results of the concluded or continuing experiments in advanced stage that Scientists desire to promote by conducting "On-farm test" in cultivator's field immediately are;

Certain promising entires viz; RAU 77-1, RAU PT I 10-4-97-8, Barogar-6, TCA 4, TCA 262, TCA 22, TCA 177 47-2, were found promising for conducting "On-Farm test" under rainfed lowland condition.

2.1.1 (b) Physiology :

On-farm trials were conducted on Blue-green algae in adopted villages during kharif 1985-86. The efficacy of BSA culture in paddy crop was proved in the trials. It was found to add 25-30 kg N/ha. Blue green algae culture packets were sold among the farmers and the response was encouraging.

(a) *Azolla pinnate* can be grown all the year round around Patna under controlled conditions. Addition of phosphate @ 5 kg/ha was found essential for maximum growth under field condition.

(b) Heavy growth of Blue green algae *phanothece* sp., a native algae, was obtained in vacated seed bed plots when submerged under 20 cms of water for 15 days, during the month of July.

2.1.1 (c) Agronomy :

In weedicide trials, highest yield (4758 kg/ha) was obtained from hand weeding treatment. Amongst the herbicides, Butachlor (Machete) & Benthiocarb

(Saturn) produced better effect on weed control and gave 4394 kg/ha and 4276 kg/ha, respectively.

Research results of the concluded or continuing experiments in advance stage that the Scientists desire to promote by conducting 'On-farm test' in cultivators' field immediately, are as follows :

In summer IET 6148 (4875 kg/ha) and IET 3279 (4861 kg/ha) alongwith Saket 4 (411 kg/ha) have given higher yield in comparision to other varieties. Nitrogen applied through Uria super granules has given 15 % more yield than prilled urea applied as basalin long duration varieties.

In fine rice groups, RAU SES 80-5311 (2572/kg/ha), Katarni selection (2583 kg/ha) and Sugandha (2311 kg/aa) have given better yields and responce of N was upto 40 kg/ha.

2 1. 1 (d) Entomology :

Observations from daily-light trap catches in the field have shown that the weak period of infestation/population of most rice pests reaches either during the second fortnight of September or first fortnight of October. it becomes the critical period for insecticidal application.

Sowing the early duration variety Pusa 2.21 or Saket-4 in first week of June and transplanting 25 days thereafter showed minimum insect pressure and maximum yield, than either sown earlier or late on succeeding dates at fortnightly intervals. Similar results in case of medium (Jaya) and late (Pankaj) duration varieties were observed during previous years experiments.

Among eight pre-release varieties tested under maximum protection trial, IET 7278 showed to be resistant at Patna and Sabour against pest complex and RAU SBS 80-622 and TCA 808 at Pusa showed less insect pressure and least difference in yield between protected and unprotected sets.

Two foliar insecticides (Ekalux 25 EC and Zolone 35 EC) at O. 5 kg a.i/ha and the granular insecticide (Thimet 10G) at 1.0 kg a. i./ha tested at Patna were observed economical and effective to be applied only once at a critical time at 51 days after transplanting (when the insect-pest population/infestation reached to its economic threshold) than applied 2-4 times at different intervals.

Out of eight foliar insecticides including *Neem suspension* tested at Pusa under deep water condition, monocrotophos followed by phosphamidon were the best in suppressing borer infestation and increasing grain yield.

2. 1. 1. (e) Pathology :

In South Bihar, the surveillance work revealed that the over all disease incidence during 1985 remained very low, however the false smut was reported to be

fairly wide spread. Zinc deficiency was also wide spread. Nonavailability of Zinc sulphate was reported by many cultivators. The survey,conducted in chaur areas revealed the presence of bacterial blight, brown spot and zinc deficiency.

In North Bihar, presence of bacterial leaf streak (BLS), bacterial blight (BB), false smut, sheath rot, brown spot, Zinc & Iron defficiency were observed. In case of BLS the commonly affected varieties were Saket 4 (CR44-35), Rajendra Dhan 201, Radha and Pankaj. In case of false smut, the worst affected varieties were Sita, Mansuri and Rajendra Dhan 201. Sugandha was however free from the diseases

2. 1. 1. (f) Soil Science :

Two hundred eighty three soils samples were collected for the evaluation of the fertility status of Telgarha Chaur (Vaishali). Soil samples have been analysed for pH, organic carbon, available P_2O_5 and available K_2O. Other studies are in progress.

Soil moisture variation has been studied at different parts spread in all the directions of the chaur. The sampling has commonly been done from 7.5, 22.5, 45, 105 cm depths from all the points for soil moisture estimation. However in some case it went upto 195 cm depth for study. Bulk density observations revealed a comparatively compacted layer at 22.5 cm depth in the area. The capillary fringe was found to be of 10 cm thickness all around except in the northern portion of the chaur (22.5 cm). The depth of water table in the chaur area as observed through wells situated around Telgarth chaur indicates that it starts rising fast in July and occupies the highest level in October. Thereafter it begins to decline. Its declining rate is slow as compared to its rise.

2.1 2 WHEAT AND BARLEY

2.1.2 (a) Breeding (Wheat) :

The main object of the wheat improvement programme has been to evolve high yielding disease resistant varieties suitable for different Agro-climatic situations under rainfed, normal sown irrigated and late sown irrigated conditions. The programme also aims at testing and investigating the suitability of wheat variety bred at different breeding centres in India and abroad and recommend them for cultivation in Bihar, if found suitable.

R.A.U. wheat variety BR 3016 has been evaluated in All India Co-ordinated Trials for the last three years (1982-83 to 1984-85) under rainfed condition and has been found to be very promising. This is required to be forwarded for Adaptive trials. At Pusa during 1882-83 BR 3016 (20 70 q/ha) was statistically at par with standard check C 306 (21.20 q ha) but it outyielded this check during 1983-84 by 8 per cent.

R.A.U. wheat variety BR 326 has been under All India Co-ordinated testing since last 4 years under irrigated timely sown condition and has proved

satisfactorily. BR 326 (42.20 q/ha) was found to be significantly superior to the standard check HP 1102 (37.90 q/ha) during 1983-84 and had the distinction of having the second rank in the entire North Eastern plain zone and first rank in Bihar and timely sown irrigated condition. During 1984-85 BR 326 (mean yield 35.13 q/ha) was significantly superior to the check HP 1102 (mean yield 27.24 q/ha) at Sabour and Patna and at par with this check at Pusa.

On the basis of research results RAU wheat varieties BR 380, BR 346 and BR 3142 are found to be very promising and as such they need to be tested in "On Farm Test" in cultivators' fields.

RAU wheat varieties BR 380, BR 346 and BR 3142 developed for rainfed, timely and late sown conditions respectively have been found significantly superior to their respective checks C 306, HP 1102 and HP 1209.

2.1.2 (b) Agronomy (Wheat) :

Top dressing of nitrogen was superior when applied to C.R.I. and late jointing stage followed by top dressing of nitrogen after Ist irrigation i.e. at C.R.I. stage.

Application of Urea after irrigation has been found superior to application before irrigation in sandy loam soil.

Farm test trial on closer spacing (15 cm-20 cm) versus normal spacing may be conducted to boost up the productivity of the wheat crop.

2.1.2. (c) Barely Breeding :

Keeping in view the above facts, research on improvement of barley has been mainly directed to develop hull-less genotypes having high yield and good grain quality suitable for different agro-climatic conditions of the State especially for rainfed and late sown condition.

(a) Two hull-less barley strains viz. Karan 18 and Karan 19 which have been found very suitable in Bihar have been recommended to the State Varietal Release Committee.

(b) On the basis of research results of continuing experiments, the hull-less barely variety W 508 (rainfed condition) and Karan 743 have been found promising and shall be tested in "On Farm Test" in cultivator's field.

The hull-less barley variety W 508 recorded grain yield of 21.47 q/ha under rainfed condition.

Hull-less variety Karan 743 yielding 29.33 q/ha has been found promising.

Hulled varieties BR 3147, BR 3148 and BR 3170 recording grain yield of 25.36, 25.00 and 26.81 q/ha against BR 31, K 125 and P 147 yielding 18.48,

21.00 and 26 81 q/ha, respectively under rainfed conditions have been promoted to Co-ordinated trials.

2.1.2 (d) Plant Pathology :

Seed treatment with Bavistin @ 1 g/kg seed followed by two spraying with 0 5% Bavistin reduced the foliar blight of wheat and increased the yield (4.7 q/ha increase) considerably.

2.1.2 (e) Nematology :

It is observed that the early sowing of wheat (Nov. 1 to Dec 1) escapes "Tundu infection Only Ear-Cockle disease dominates and this can easily be controlled by use of certified disease free seeds.

2.1.2 (f) Entomology (Wheat and Barley) :

The percentage damaged effective tillers per meter row and number of damaged effective tillers/ha due to termite were low in case of T_5 (Lindane @ 0.4 kg a.i./ha) followed by T_6 (Chlorpyriphos @ 0.4 a.i./ha) and T_1 (Aldrin @ 0.30 kg a i./ha).

2 1.3. PULSES

2.1.3 (a) Arhar :

Three arhar varieties viz., DA-2, DA-11 and DA-6 performed consistently well in pre-rabi coordinated varietal trials conducted at Dholi during last 3 years (1983-84 to 1985-86). They may be tried in adaptive trials/on farm tests under autumn planting (Ist week of September).

All the 3 proposed varieties are resistant to Alternaria blight which is the most sought for trait for a cultivar to find place in pre-rabi cropping. Besides, they are capable of giving similar yields as that of the check Bahar which is highly susceptible to Alternaria. Da-11 has an edge over others because of its multiple resistance against the 3 important diseases ane DA-6 by virtue of its very early maturity (140 days) fits well in multiple cropping system.

Three years' (1983-84 to 1985-86) study on the contribution of different production components have indicated substantial gain (28%) over control due to application of fertilizers (20 kg N + 50 kg P_2O_5) alone as against 40% owing to the adoption of full package (Fertilizer + weed control + pest control). As the farmers hardly use any input in arhar crop, it is desirable to convince them about the usefulness of the inputs in boosting arhar yields by laying out adaptive trials using one component, i.e., fertilizer, to start with.

Last 3 years' (1983-84 to 1985-86) trials have shown that neem seed extract (5%) and Karanj oil (2%) are as effective as the recommended insecticide Endosulfan (0.07%) in checking the incidence of Pod borers.

2 1.3. (b) Gram :

Two gram varieties viz, B-256 and BG (M) 425 consistently encelled the checks in CVT conducted at Dholi-during last 3 years (1982-83 to 1984-85). They may be tested under adaptive trial.

A new gram variety RAU-52 developed at Patna has been released by the State Variety Release Committee in view of its high yield and resistance to wilt for Patna region.

In the Station Trial DG 85-25 (26-8 q/ha). DG 85-28 (25.4 q/ha) and DG 82-2 (25.1 q/ha) at Dholi and SG 30-7 (30.4 q/ha). SGS 82-2 (30.0 q/ha) SB 12.5 (30.09/ha) at Sabour were found to be promising. These six lines will be tested in a state level trial at Dholi, Sabour, Musheri, Banka, Patna and Rajpur Tal. Thev will also be included in the coordinated trials and subsequently will be put to On-farm test.

2.1.3. (c) Lentil :

Last year one lentil variety PL 77-2 has been identified for NPE zone in the rabi workshop (1984) and another variety PL 77-12 has been releastd by the State Variety Release Committee for Bihar.

2.1.3. (d) Pea

Advance lines DP 82.1 (21.2 q/ha) at Dholi, 80-1-5 (21-6 q/ha) and 80-1.2 (20.5 q/ha) at Sabour showed consistent high performance for the last 2 years.

'Kerao' lines 80-60-5, DP 278 (21.5 q/ha) at Sabour and DR-15, DP-14 and DP-278 (12.2 to 13.4 q/ha at Patna excelled others.

2.1 3 (e) Lathyrus :

In CVT one entry Ph.K. 118 (18.4 q/ha) recorded highest yield for the second successive year.

2.1.3 (f) Rajmash :

For the first time 11 selected lines were tried in CVT at Dholi to see the feasibility of growing Rajmash under Bihar condition as a rabi crop.

2.1:3 (g) Vicia :

215 collections made from Darbhanga, Madhubani, Samastipur, Sitamarhi, Muzaffarpur, Begusarai, E & West Champaran, Saran, Siwan and Gopalganj districts were grown. On the basis of morphological characters the off types were rogued out.

2.1.3 (h) Mung (Summer) :

Two varieties viz.. 11/395 and Pusa 107 performed consistently well during last 3 years at Dholi. They may be tried under daptive trials.

Under the breeding programme, variety 11/395 (11.7 q/ha) being at par with DM-1 (10.0 q/ha) out yielded the rest significantly in the coordinated varietal trial conducted at Dholi. In 1984 Kharif also 11/395 (9.7 q/ha) ranked first. Thus 11/395 may prove a suitable substitute to Amrit for taking as a catch crop in the time lag between maize and wheat by virtue of its one-week earlier maturity and resistance to YMV and CIS.

Among the advance generation lines DM-5 (K 851 x ML 5) and DM-3 (11/99 x 12/333) were found promising with higher grain yield (11.8 and 11.2 q/ha) and earlier maturity (70 to 72 days) as compared to the better chock Amrit which yielded 9 4 q/ha and matured in 87 days at Dholi.

Under mutation breeding programme to improve the seed colour of otherwise two very promising lines viz, 11/395 and 12/333, 40 M 4 lenes were screened. Twenty two promising lines and 45 single plants with green seeds and resistance to YMV, CIS and PMD were selected a Dholi.

One hundred single plants were isolated from F 3 generation of 15 crosses for progeny test at Sabour and Dholi.

2.1.3 (1) Urd

DU-4 (11.8 q/ha) recorded highest yield in the coordinated varietal trial at Dholi. Others in the top-significant group were DU-2 (11.2 q/ha) and the check Pant U-19 (11.0 q/ha). At Sabour, however, no entry yielded higher than the check Pant-U-19 (10.07 q/ha).

At Sabour, 4 advance generation lines viz; 84-1-4 (12.96 q/ha), 84 4-2 (12.08 q/ha), 84 1-3 (12.04 q/ha) and SU 80-327 (13.27 q/ha) performed significantly better then the checks. These lines will be promoted to coordinated varietal trial.

Out of 44 F5 families evaluated at Sabour 12 were found promising.

2.14 MAIZE

The yield superiority of EVM 9 was 12.4% over Lakshmi Composite Its maturity is at par with Lakshmi. The grain type is bold, flint and white in colour (Table 1 appended).

On the basis of trials conducted during 1984-85 rabi the following experimental varieties Viz M33 (61 q/ha) M38 (61 q/ha) M27 (57 q/ha) M44 (59 q/ha) have yielded 11% to 44% higher than the check variety 'Lakshmi composite (53 q/ha).

Experimental hybrids (CM400 × CM300) × M21, (CM400 × CM300) × M44, (CM400 × CM300) × M27 have yield 77.76 q/ha and 73 q/ha respectively against

the check Histarch yielding 63 q/ha Two white crosses namely CM 601×CM 300 (75 q/ha) and M9×CM 400 (74 q/ha) and two yellow crosses M 10×CM 111 (59 q/ha) and M 21×CM 111 (57 q/ha) have given superior yields. These will be tested in further given superior yields. They will be contributed as entries in National trals. This station has contributed 15 entries in National trials for for testing during rabi, 1984-85.

A study was initiated to identify suitable early germplasms for growing in higher plant densities. In all 8 germplasm and their all possible crosses were tried at 60, 90, 120 and 150 thousand plant densities per hectare. The crosses involving M 16, EC 123535, EC 123540 & EC 123555 have exhibited higher yield with increasing densities. The yield leave declined drastically after 120 thousand Plant density. Promising germplasm will be tried at intermediate densities of 60 to 120 at the interval of 10.

Out of 15 germplasm screened one germplasm J 54 CTC 4 was found to be tolerant to cold.

For chemical control of maize rust *(P. sorghi)* 3 sprayings of Bayleton 0.03% was found to be effective (1.4 rating) and increased the yield by 25 q over the control yielding 30 q/ha.

For the control of climbing cut worm *(R. hercules)* damage, one granular application of Phorat 10 g and Carbofuran 3 g in Plant whorls when the infestation was noticed kept the damage to low level.

For late sowing conditions, it was decided that early germplasm trials will be sown late. The variety J 54, CT 4 will be used as check.

Incidence of late wilt caused due to *Coephalosporeum maydis* is being noticed during rabi. Study will be initiated to isolate and test the pathogenecity of the organism. The available genetic stock will be screened under natural conditions to identify resistant sources.

2.1.5 Oil Seeds

A tori culture Up-70-SC-17 tested in state trials and also in other states under ICAR Coordinated Oilseeds Projects Entry RAUTS-17 has performed much better than the existing local and national checks both under rainfed and irrigated situations. It has the same maturity and seed size as those of BR 23 (local check (and T-9) National Check) but is superior to them in *Alternaria* disease and aphids pest reaction.

This variety has shown highest potentiality in Diara land experiments with seed yield of 22.22 q/ha in 1984-85.

'Release proposal' A *Sesamum* (Till) variety RAU-SS-17/4 (Krishna)

Groundnut JL 24 (Phule Pragti) released by the CVRC is quite comparable to AK 12-24 in yield and maturity.

2.1.6 MILLETS

(a) Genotype RAUM-5 maintain its consistant high yield performance in the co-ordinated trials conducted during summer season (1983-1985).

(b) Seed treatment with Captan @ 2 g/kg of seed + one spraying at earhead empergence stage proved to be superior in decreasing leaf blight incidence and increasing the yield over the control (No. spraying).

(c) Sowing of Cheena crop around 5th March exhibited minimum dead heart and white earhead infestation caused by shootfly.

Genotype 9700 and 9711 have recorded higher yield to the check variety BR-7. Significant yield response has been obtained upto 60 kg N and 20 kg P_2O_5/ha. Different methods of Azospirillum application i.e. Soil or seed or FYM or in combinations at the same levels of Nitrogen had no significant effect.

Genotypes RAUM-8 exhibited infestation of shootfly in respect of earhead and dead hearts.

Elite F_3 and F_4 progenies being tested to release good genotype for higher yield production alongwith disease and post resistance.

2.1.7. S U G A R C A N E

1.7. (a) Sugarcane Agronomy :

(i) Shy tilloring and shy geraintng varieties viz. B.O. 70 should be planted at 75 cm row spacing with 1.25 times more seed rate.

(ii) The intercrop of sugarcane + Garlic should be popularised for autumn planted cane.

(iii) The early variety B.O. 102 which is high sugared variety with normal yield and is free fromed rot should be put under-Co-ordinated testing.

(iv) B. O. 110 which is already under Co-ordinated testing has proved very good in different factory reserve area and it is expected that this may be released for general cultivation in near future. It is an excellent ratener and does well even under low land condition. The recovery on the basis of hand mill test is good.

2.1.7 (b) Sugarcane Chemistry and Soil Science :

(i) To test the variety nitrogen response, six sugarcane varieties (B.O. 99, B.O. 109, B.O. 91, B.O. 104, B.O. 88 and Co. 1148) were tested at 5 levels of N

from O to 240 kg/ha on the Basis of three years data, 180 kg N/ha is the optimum arose which gave significantly higher yields (83.8 t/ha) over 120 kg N/ha (76.0 t/ha). From the response curve 97 kg N/ha giving cane yietd of 71.9 t/ha is the economic dose: Early variety B.O. 109 gave higher yield over B.O. 99 but mid early variety B.O. 104 is at par with B.O. 91.

The time of application of nitrogenous fertilizer with and without C.BHC confirmed the earlier findings of this Institute i.e. highest yield (variety B.O. 99) in the treatment receiving ½ N at planting, ¼ N at tillering and ¼ N at earthing up with C.BHC (79.0 t/ha) as compared to no. G.BHC (70.1 t/ha). Also this treatment was found superior to full dose of N at planting and tillering. However, wherever, BHC was included in the treatments it improved the yield.

2.1.7 (a) Sugarcane Nematology :

On the basis of pot experiments, results of all the three consequitive years proved that mixed population of plant parasitic nematodes agravates the wilt disease of sugarcane suggesting that in a wilt sick plot nematode population must be kept under control. Similar type of results have also been observed at other centres of All India-Co-ordinated Research Project.

Similarly two soil fungi namely *Rhizoctonia* and *Sclerotium* independetly were found producing root rot in very low intensity (14 and 13%) but when they combined with plant parasitic nemetodes namely *Hoplolaimus indicus* and *Tylenchorhynchus nudus* the root rotting was enhanced to a greater extent (25-57%). Hence for minimising root rot disease nematode population must be kept under control.

2.1.8 SPICES

2.1.8 (a) Spices Breeding :

On the basis of 4 years of continous experimentation, it was observed that variety RH-10 produced 18.29% higher yield of fresh rhizome over best check G.I. Puram I and 76.36% higher over local. It contains 6.5% curcumin and 19.95% dry matter. It is resistant to colletorichum and matures within 210 days. After harvesting this variety, wheat can be grown easily. It is best for turmeric + Maize + Arhar crop rotation.

This variety was grawn in "On farm Test" at Muraul, Malinagar, Mura Harilochanpur where it yielded 432.36 q, 451.60 q and 4079/ha respectively. This year also, it will be grown under "On Farm test" at different location to observe its performance in farmers field.

2.1.8 (b) Spices Agronomy :

An experiment was carried out for three successive years (1983-84, 1984-85 and 1985-86) to standardised the deses of ferrous sulphate and Zine sulphate for

higher yield of turmerse. Three years average yield data revealedthat 20 kg $ZnSo_4$+15 kg Feso4/ha produced significantly higher yield of 291.33 q/ha over control (192 23 q/ha).

2.1.8 (c) Spiccs Pathology :

Survey of disease infestation was made and was observed that Giner was affected with *colletotrichum Capsici*, *Alternaria alternats*, *cuvalaria lunata Drochslera Spicifere* and *Cercospora Zingibericola*, *pythium graminicolum* and *Fusarium solari* where as turmeric was affected with *Colletorichum capsici*, *Taphrina maculens*, *Altoruarianalternaris Cercospora cureumae*, *Alternaria tenuissim* and *pythium garminicolum*.

2.1.3 JUTE AND ALLIED FIBRES

2.1. (a) Research achievemntes on the basis of concluding experiments :

(i) It is encouraging to note that short duration paddy variety (Pusa 2·21) transplanted after the harvest of Capsularis Jute at the and of August/begining of September recorded mean (3 years) paddy yield of 24.04 q/he. and the residual effect of Jute did not allow any significant difference between the nitrogen doses of 40 kg/ha. and 60 kg.ha. It is alsa intcresting that there was no significant differences in the yield of paddy due to different levels of Potash application (10 kg and 20 kg/ha).

(ii) On the basis of three years experimentation it was found that application of 10 to 20 kg N is only, required in *olitorious* Jute grown for seed production with standard dose 30 kg each of potash and prosphate per ha.

(iii) The application of Nitrogen at 60 kg/ha, without Boron recorded the highest yield of 31.39 q/ha. of *capsularis* Jute fibre when there was applied as foliar, and rest as basal and top dressing in equal instalments along with 30 kg each of P_2O_5 and K 20/ha.

(iv) A mean loss in fibre yield of Jute to the tune of 40.70, 35.24 and 36 88 percentages were recorded due toJute Semilooper in the years 1983, 1984 and 1985 respectively proving semilooper as a major pest of Jute.

2.1.9 (b) Research results of continuing experimets :

(i) Sowing of Jute *(Olitorius)* at 30 cm row distances in the last week of May or first week of June was found to be better than late June or July sowing for seed production.

(ii) Seed treatment with Bavistin @ 2 g/kg seed followed by two foliar sprays of Bavistin (0.1%) has consistantly given best control of root and stem rot of Jute.

2.1.9 (c) Promising indications of continuing experiments :

(i) On the basis of two years experimentation it was recorded that for seed production/*olitoring* Jute, 40 kg P_2O_5 and 20 kg K_2O was optimum dose alongwith 30 kg N and 25 kg $ZnSO_4$/ha.

(ii) Application of Nitrogen upto 60 kg/ha was found beneficial in *capsularis* Jute for fibre production.

2.1.9 (d) Problems to be solved through proposed new experiments :

(i) To find out resistance against major diseases and posts *capsularis* (196) and *olitorius* (55) germplasms will be screened.

(ii) Standardisation of NPK doses for Jute seed production. Experiments has been started for hybrid seed production in *capsularis* Jute with the exploitation of male sterile lime.

2 1.10 FRUITS

There are altogether 25 on going trials on 16 fruit crops including Banana, Papaya, Pineapple, Coconut and other minor fruits. 18 trials are being conducted at Sabour 3 each at Hajipur and Dholi and one at Jute Research Station, Katihar.

2.1.10 (a) Breeding expts :

(i) **Banana :** 121 germ-Plasms are being maintained at Banana Research Station, Hajipur, 119 were evaluated earlier. This year, the details of one variety Bhimkel have been studied. This appeared to be a promising table type.

(ii) **Pineapple :** Out of 5 types the cv Kew appears to be promising under semi-shady, conditions in comparision, to Queen and Singapuri, Maximum yield was also obtained in Kew (8:11 q/ha).

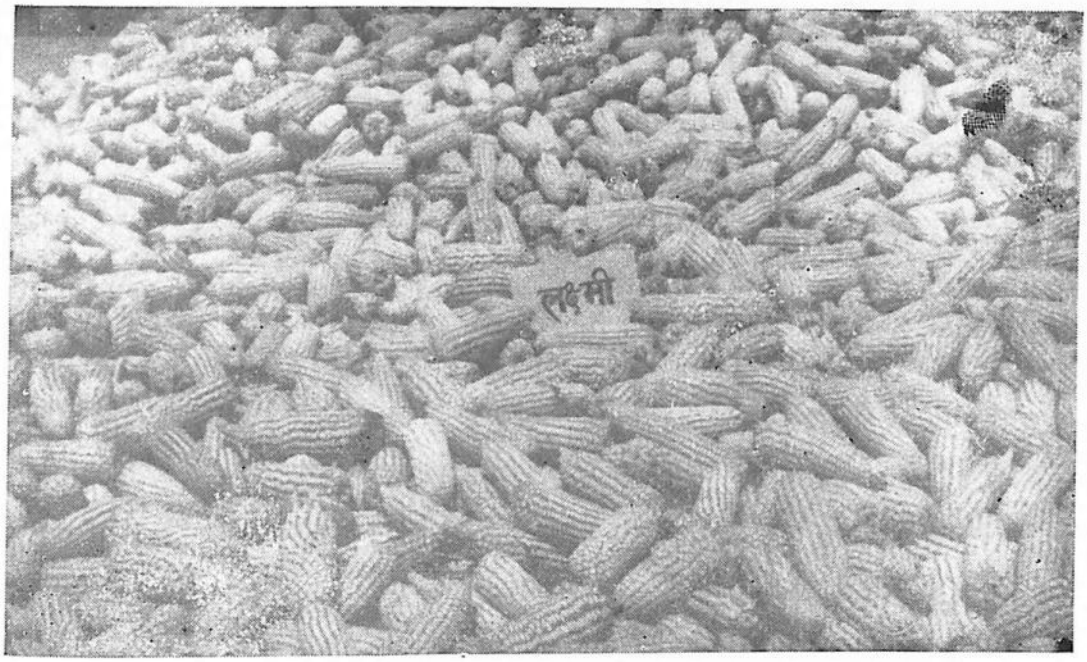
2.1.10 (b) Agronomical :

One manurial trial on Pineapple at J.R.S. Katihar revealed that 16 g nitrogen per plant per year in addition to basic dose of 10 g of K_2O per plant per year and 10 tonnes of FYM per ha. resulted in better performance of the plant in respect of growth. Flowering is expected from this year.

2.1.11 (c) Fruit Preservation :

(i) **Ber Products :** Squash and jam prepared from Bound Deshi and Oval Baransi type were found to be optimum quality even after 12 months of storage.

(ii) **Custard apple squash :** Squashes prepared with 30 and 40% juice with 45 and 40% sugar with addition of 0.8% citric acid were preserved successful, upto 12 months using 0.06 potassium matabisulphate.



LAXMI MAIZE—A GIFT TO FARMERS

Sweet-Potato Variety from a demonstration field,

(iii) Storage of sapota : Fruits can be stored for 12 days without any loss in weight with polythene wrapping and with Fruit Waxol emulsion alongwith newspaper or polythene wrapping without any spoilage.

2.1.11 (d) Mango :

39 mango hybrids are under screening apart from 327 seedlings and varieties-34. For regulation of flower bearing, habit, it was found that orthophosphoric acid (1%) followed by Cycocel (1000 ppm) gave maximum yield in "OFF" year.

2.1.11 (e) Litchi :

Apart from newly 80 hybrids (Few have come in flowering this year), spraying of CEPA enhanced harvest period by 8 days, where as Alar and Cycocel deferred maturity from 9-11 days.

2.1.11 (f) Guava :

265 hybrids are under screening and 18 cultivars are being maintained.

2.1.11 VEGETABLES

2.1.11 (a) Winter Vegetables :

(i) Entomological : Orion-Inspecticidal-Sabour : The combined statistical analysis of three years' data evinced the superiority oprayings of permethrin and fenvalrate @ 0.1 lit a.i./ha. of each, yielding 174 77 and 159.14 q/ha of onion bulb and reducing the infestation by trips to 18.58 and 21.92 per cent respectively.

(ii) Pathological : Pea Pathological-Sabour : Three years experimentation revealed consipicuous effectivity of fungicides expressed as the per cent disease control, three sprays of karathane (0.15%), calixin (0.05%), sulfex (0.2%) and bavistin (0.05%) result in 69.49, 60.72, 48.33 and 40.01 percent, respectively. These fungicides fetched an additional yield of 9.43, 6.00, 4.89 and 2.97 quintals per hectare, respectively over control.

(iii) Agronomical : Onion-Weedicidal-Sabour : The combined statistical analysis of three years yield data revealed that the treatment comprising of Basalin @ 2.0 kg a i./ha as pre-plant incorporation alongwith one hand weeding 45 days after transplanting proved superior to rest of the treatments except weed free (4 weedings) with which it was at par.

(iv) Agronomical-Tomato-Weedicidal Sabour : The combined statistical analysis of three years yield data revealed that Goal @ 0.25 kg a.i./ha as pre plant incorporation was as good as weed free (4 weedings) treatment of weed control and yield, resulting in 231.54 and 234.03 q/ha of fruit yields. These in turn proved significantly superior to rest of the treatments.

(v) **Verietal (Hybrids) Tomato (Patna)**—The combined statistical analysis of thre years yield data revealed that vaishali Marathum and Mangla were at par in respect of yield. The higher yield of vaishali (369.73 q/ha was as good statistically as that of Mangla having 329.82 q/ha. The performance of all these varieties has been very poor in 1984-85 as compared to previous years. The yearwise C.V. and C.D. is also variable suggesting thereby to assess the performance of these varieties one year more alongwith the pest and disease reaction before exposing these varieties on farm test.

(vi) **Varietal Tomato Patna :** The combined analysis of three years yield data reveals the superiority of Punjab Keshari & H.S. 101 over others However, the highest yield of 412.97 q/ha in Punjab Keshari is at per statistically with 339.88 q/ha of H.S. 101.

(vii) **Varietal-Parwal-Sabour :** The highest yield (7.50 q/ha) was recorded in variety Dandali followed by variety Nimia (87.50 q/ha).

(viii) **Varietal-Pea-Sabour :** In mid-seasion vegetable pea these varieties are proposed to be tested in farmers field as on farm test in order to know the farmers reaction towards their acceptability.

(ix) **Summer Bottleground-Sabour :** On the basis of two years yield data sel. 78-2 (Patnai) out-yielded all other varieties exhibiting 162 25 q/ha followed by Pusa Summer Prolific Long (131.50 q/ha) and Sel. 7 (128.75 q/ha).

(x) **Varietal-Cabbage-Sabour :** The highest yield was recorded in variety MCH (353.58 q/ha) followed by RAU glory (325.06 q/ha) and Sel. 8 (290.11 q/ha) in golden Acre group (main season crp).

(xi) **Varietal Onion Sabour :** The maximum yield was recorded in variety Arka Kalyan (327.78 q/ha) and VL-1 (270.37 q/ha).

(xii) **Varietal-Early Pea-Sabour :** The highest yield was recorded in variety VP 8085 (42.64 q/ha) followed by variety Arkel (37.22 q/ha).

(xiii) **Tomato-Sabour :** The highest yield was recorded in variety Mangla hybrid (305.35 q/ha) followed by Pusa Ruby (294.19 q/ha) in hybrid group.

Kharif vegetables consist of a large no. of crops *viz., Bhindi*, Brinjal, Chillies, Cowpea, Cucurbits, (bottegoured, bitter gourd, cucumber & lufla) and *Kharif onion.*

Kharif vegetables occupy approximately 1.15 lakh ha. out of a total areas of about 4 lakh ha. i.e. 30% approximately of the total area under vegetables in the state. Kharif vegetables generally face a very adverse weather particularly due to heavy and continous rains right from middle of June to mid-October. The cultivation of vegetable crops involves lot of problems and complications due to waterlogging, inoperative soil and high atmospharic humidity.

(i) Detailed soil servey of 2, 69, 770.8 ha. of the command areas of Gandak, Sone, Koelkarp and Mahananda of Bihar have been completed report and maps prepared and sent to the command authorities. Detailed Soil Survey of remaning areas will continue. Soils of Bihar have been tentatively classified according to soil taxonomy. A clay mineralogical map of Bihar have been prepared. These maps and reports are to be used for planning and development of the areas.

(ii) The fertilizer schedules for yield targeting for Wheat, Sugarcane, Patato, Tobaco, Mustard, Grauudnut, Pulsas and Oilseeds crops based on soil test values in different agro-climatino zones of Bihar have been developed. Ready reckoners have been prepared for yield targetting of crops. The results are ready for adoption in the soil testing laboratories of Bihar for advisory services of farmers.

(iii) Application of zinc for rice and maize cultivation have already been recommended on package of practices and Kisan Diary. Iron deficiency in rice seedlings can be successfully controlled by foliar application of 1% $FeSO_4$ solution (2 sprays). This has been confired in field trials at Pusa and Dholi farms and in farmer's field. This is ready for the trial in cultivator field and adoption.

(iv) Application of Mussorie Rock-Phosphate in 1:2 ratio with pyrites is beneficial for rice-wheat sequence in calcareous soils. MRP applied alone @ 60kg. P_2O_5/ha. is as good as T.S.T. for Kharif crop but residual effect is inferior to that of T.S.P. This is ready for trials in cultivators' field.

(v) The application of rice busk @ h/ha. increased grain yield of rice and wheat over control 15 and 25 percent respectively in havy soils of Bhagalpur district. The soil physical conditions are also improved by reduction in bulk density. This is being taken as a part of operational research in that particular area as per programme of the I C.A.R.

(vi) Technology for reclamation of salt affected soils with pyrite has been perfacted. Pyrite @ 2 t/ha. alongwith 2 t organic matter/ha. mixed thoroughly with soils one month befor transplanting of rice, followed by wheat. This should be tried in cultivator's field.

2.3 SOIL AND WATER MANAGEMENT

3. Research Achievements:

(a) Concluded experiments which are required to be forwarded to State Government:

2.3.1 Water requirement of paddy: The general practice of irrigation in paddy is to keep standing water in the field continously to a depth of 5-10 ton. Such practice might minimise the weed population, but leads to heavy percula-

tion loss and thereby increased water requirement. Crop does not require standing water all the time for growth and grain yield Irrigation at 3 days after disapperance of ponded water at per to continuous submergence for grain production. Thus, water should be applied in the field 3 days after disappearance of ponded water if rain does not occur. Such system leads to about 50% saving in irrigation water as compared to continuous submergence without any appreaciable reduction in grain yield.

2.3.2 Water management of Kharif maize : Effect of water stagnation on response of kharif maize was studied for the last four years. These use be about 40-60% reduction in grain yield due to water stagnation in field by continuous rainfall for four days at knee high stage. Even 2 days water stagnation at knee high or 3 days at knee high stage. Even 2 days water stagnation at knee high or 3 days water stagnation at flowering and grain formation stages can reduce yield of kharif maize substantially (25-38%). However, one day water stagnation could be tolerated at flowering and grain formation stages.

In order to obtain higher yield of kharif maize, sowing may be advanced atleast by 15 days with provision of one to two irrigations. This would allow the crop to akip critical stage of knee high from water stagnation due to monsoon rain. Moreover, ground water rise may also not damage the crop if it is planted during last week of april.

2.3.3 Puddling implements : The puddling of paddy field is essential to check the percolation loss and minimise the weed population. Two ploughings by mould board plough undersubmerged condition followed by two plankings have been found to be optimum for puddling the paddy field in north Bihar. Reduction of percolation loss due to puddling is about 25 per cent as compared to uppuddled field.

ANIMAL SCIENCES
PARASITOLOGY

Studies on the incidence, epidemiology, biology and immuno diagnosis of Sarcocystis in cattle, buffaloes, bigs and goats in Bihar :

During the course of investigation on Sarcocystis species ot the Indian water buffalow *(Ba-balus bubalis)*, it was regularly observed that two distinct species of *Sarcocystis* occur in this region, viz., the species forming larger, grossly visible cysts (microcysts). Transmission expermiments with kittens and pups provided conclusive evidence thot the sexual stage (gamonts, gametes, sporocysts) of macroform species develop only in thefeline definitive hots i. e. kittens. These were mor-phologically and biologically indistinguishable with the descriptions of *S. fusiformis* (Raillet, 1987). In contrast to this, the sarcocysts of microform species were specifically infective only to the canine hosts i.e. pups, having close

resemblence with *S. levinei* Dissanike and Kan 1978 both morphologically and biologically.

Studies on the immunization of cattle against common ixodid tick, Boophilus microplus (Hindustan Lever Research Foundation Scheme) :

Sixteen rabbits were immunized with intradermal inocultion of tick tissue extract @ 1.2 ml/kg body weight with final protein concentration of 2 mg/ml prepared from either fully engorged (Antigen I) or partially replete (Antigen II) female Boophilus microplus ticks. It was observed that the inoculation of whole-tick-tissue extracts frome fully or partially engorged ticks induced significant degree of host-resistance ($p < 0.01$) to subsequent application of larval B. microplus ticks. This immunological response was also accompanied with several alberrations in the feeding behaviour of the developing tick stages and minor alternations in their physical appearance. Surch pheno-menon of resistance was characterised by a comparatively reduced larval attechment rate, reduction in the number of resultant engored larvae, nymph and adult ticks and absence of complete feeding in the females recovered from immunized rabbits as compared with those of the non-immunized controls.

"Comparative study of efficacy of infection treatment method and tissue culture vaccine against bovine theileriasis". (Approved for financial support from ICAR)

In an experimental study conducted to assess the efficacy of oxytetracycline hydrochloride injectable for the chemoprophylactic immunization of Jersey calves against *Theileria annulata* infection under natural farm conditions 15 calves were housed in *Theileria* positive sheds heavily infested with *Hyalomma anatolicum* ticks. Five calves were kept as unifeoted untreated control As soon as the calves started exhibiting schizonts of *T. annulata* in their lymph node biopsy smears and swelling of prescapular lymph glands, these were treated with oxytetracycline hydrocloride at 10, 15 or 20 mg/kg. at an interval of 4 days between each treatment for a total of seven such intramuscular injections. The calves of the control group were neither infacted nor given any therapy. During the course of the therapy all the fifteen calves temperature and restoration of the heamatological values to near normal level.

MICROBIOLOGY

Epidemiological Studies on FMD Studies on the immune response to various serotypes of foot and mouth disease virus and its sero cancersion in bovines :

Epidemiological :

1 Altogether 35 FMD outbreaks were recorded during the period under report of which 34 were detected under village condition and one in organised farm. Of these outbreaks, 26 were recorded from strategic areas and 9 from non

strategic areas and 29 of these outbreaks were fresh while 6 were extension of the old outbreaks.

2. A total of 16321 animals were found to be at risk of which 817 were affected with overall morbidity rate of 5.008. The maximum morbidity rate was recorded in cattle (6871/681-9.909%) followed by buffaloes (4492/986-2.181%), pigs (805/16-1.987%), goats (2745/18-0.655%) and sheep (1192/4 0.335%). A total of 12 calves succubmed to disease with oveall morbidity rate of (0.073%).

3. Studies on theseasonal occurrence of FMD out breaks revealed that maximum number of 7 outbreaks were recorded during November, followed by September & October (6 each), February and March (4 each), April (3), May-July and December (1 each) and non during January and June.

Virological :

A total of 93 clinical samples were collected from FMD affected animals from 35 ou breaks of which 16 proved to be non-viable and 77 ('O'-32, 'Asia-1'-31, 'A'-6, 'A-22'-3 and 'C'-2) samples yield due to virus serotypes. Maximum were multiple 'O' and 'Asia-1' (13 each) followed by 'A' (6), 'A-22' (3), 'C' (2) and cross reacting 'Asia-1/A' (1).

Study on Seroconversion and Immune Response :

9. Study on Sero-conversion of various FMD virus serotypes under field condition included isolation of 'O' serotypes involved in causing outbreaks in vaccinated cattle. Cross immunity relationship between field strains and vaccine strains in experimental animals is going on. The capability of the field strain to break through the immunity of vaccine strain is under study.

10. Serological studies were conducted to assess neutralizing antibody titres in animals after natural infection and following vaccination. The antibody titre in catte vaccinated with monovelent 'O', 'A' O, 'C' and 'Asia-1' vaccines and polyvalent vaccine indicated that the four serotypes induced antibody titre in the same pattern i.e. the antibody titre continued to rise from days 7 till days 30, then remained almost static till days 60 and thereafter began to decline from days 120 till days 180.

Studies on infectious infertility in bovines with special reference to filterable agents and fungi :

PATHOLOGY

Pathology of Mycoplasma infections in respiratory and reproductive organs of sheep and goats :

(i) Suspected lung specimens from 114 days goats were collected processed for histo-pathological examination. 13.9% lungs showed different types of pneumonia.

15th trids under 1 year of age were experimentaly infected with Mycoplasma Mycoides sub sp. mycoides (anisolate from R.V.C., Ranchi). The gross microscopic and heametological changes were observed. The bronchopneumonia.

(iii) Two different routes of infection (I/T and I/V) were followed Clinical symptems and gross and mycrocific lesions of mycroplasm infection were observed in experimental infected goats. Highrise of temperature and nasal discharge, lacrimation and snlezing symptoms.

MEDICINE

Studies on Toxoplasmosis in goats :

A total of 79 meat samples collected from slaughter houses were processed for isolation of *Toxoplasma gondiii* by peptic digestion technique and inoculated intraperitoneally into batches of five mice for each sample. Three out of 5 inoculated ice with pooled diaphgram homogenate showed sluggishness. The peritoneal exudate from these mice when inoculated in to fresh mice, *Toxoplasma* techyzoites were isolated on 14th day post inoculation. In the first passage the techyzoites were not virulent enough to kill the mice but on 3rd passage, they killed the mice. This isolation confirms the evidence of Toxoplasma infection in goats in Bihar.

2. A study of microbiotheraphy of non-specific neonatal diarrhoea in cross-bred calves :

Indiscriminate use of antibiotics were found in all clinical cases, confirming diarrhoea due to either excessive loss of enteric flora or due to the development of drug resistant organisms in the gut. The use of lactisyn in the present study has been found to alter the ruminal pH and discouraged colonization of pathogenic bacteria. Laviest, a rich source of vitamin B complex forming organisms given orally was observed to suppress the growth of pathogenic organisms and overcome Vitamin B complex dificiency caused by earlier antibiotic theraphy. All treated calves showed excellent signs of recovery on the second day and they were found clinically cured on 5th day of the treatment.

3. A study of the treatment of peracute mastitis in cross-bred dairy cows :

Cultural examination of affected quarter milk samples revealed six isolates from all the six affected cows. Of six isolates, three were *staph. aureus* from three cows, two were *Coryne bacterium pyogenes* from two cows and one isolates was of *klebsiella pneumoniae* from one cow. All strains were found to be sensitive to Trimethoprim (either 4+ or 3+) in vitro drug sensitivity test. These animals when treated with oriprim (Cadila) injectable 5ml mixed with equal volume of N.S.S alongwith 2.5 ml Dexona (Cadila) intramammary and

1.5 ml (Dexona) intramuscularly for 4 days responded well. Four of the six cows completely cured whereas two having *Staph. aureus* infections did not responded and the affected quarters were permanently blocked with 1% Acriflavine solution 30 ml intramammary twice weekly for two injections only.

PHARMACOLOGY

1. Pharmacokinetics of chemotherapeutic agents with particular reference to their distribution in the uterine fluid, milk and blood of she-buffalocs :

Systemic study—The pharmacokinetic study of the antimicrobial agents revealed the following :—

(i) For effective therapy of susceptible systemic microbial infection oxytetracycline and sulphadimidine can be administered every 24 hourly, Ampicillin and Streptomycin every 12 hourly and penicillin G every 6 hourly by parenteral route while sulphadimethoxine can be given by oral route in the doses recommended in the present investigation.

(ii) For treating uterine and mammary gland infection, oxytetracycline, sulphadimidine and ampicillin can be used in recommended therapeutic dose by parenteral route since only these drugs maintained the therapeutic concentration in uterine fluid and milk.

(iii) Milk from treated animal should be withdrawn from human consumption atleast for a period of 3 days for oxytetracycline, sulphadimidine and sulphadimethoxine, for 1 day in case of ampicillin, streptomycin and penicillin G. post administration of the drugs.

Intrauterine study :

(i) Intrauterine study of these drugs reveal that oxtetracyline (5 mg/kg), streptomycin (10 mg/kg) and sulphadimidine (50 mg/kg) and ampicillin (6 mg/kg) can be repeated every 36, 24, 12 and 12 hourly, respectively for the treatment of intrauterine infections of susceptible microorganisms,

(ii) Milk from treated animals should be withdrawn for public consumption for atleast 12, 24 and 72 hour post intrauterine administration of ampicillin, sulphadimidine and oxytetracycline, respectively. Streptomycin which was not detected in milk and hence, no withdrawal period has been suggested.

Protein binding (in vitro study) :

The highest protein binding was obtained for oxtetracycline (54.3± 0.55 %), followed by sulphadimidine (49.6±0.51 %), ampicillin (45.6±0.36 %), penicillin G (40.8±0.57 %) and streptomycin (29,2±0,67 %).

2. Pharmacokinetic study of Doxycycline and Demeclocycline in geat :

With single dose (5 ml/kg I.V.), the therapeutic concentration of doxy-cycline was maintained from 0-2, 4-12, 2-24 and 0-48 hrs, in plasma, interstitial

fluid, milk and urine, respectively while for demeclocycline the therapeutic concentration was maintained from 0–36, 0.5–24, 1–36 and 0–48 hrs. in plasma, interstial fluid, milk and urine. Pharmacokinetic parameters of these compounds were calculated and appropriate in systemic infections since it maintains therapeutic concentration even at lower doses in goat.

3. **Pharmaeokinetic study of oxytetracycline in pneumonic buffalo calves.**

(i) Estimation of the drug has been standardized.

(ii) Standardization of production of experimental preuamonia in buffalo calves is in progress.

ANATOMY

1. **Histological and Histochemical studies on the organs of digestive and respiratory systems of Indian buffalo :**

The extra pulmonary stem bronchi of both the lungs and the tracheal bronchus of the right cranial lobe revealed four tunics. These tunics were as follows from within outward.

(i) Lamina epithelialis.
(ii) Lamina propria submucosa.
(iii) Cartilage layer/tunica muscularis.
(iv) Tunica adventitia.

The lamina epithelialis was characterized with the presence of unicellular glands interspersed in the pseudostratified ciliated columnar epithelium.

The lamina propria-submucosa was made up of loose connective tissue. The predominating cell types were fibroblasts and histocytes. The elastic fibres were prominent among the fibrous component. Branched, coiled tubuloalveolar mucous glands were seen extending into the depths.

The cartilaginous framework was made up Hyaline variety with typical shape of horse shoe. The smooth trachealis muscle was noticed extending between the open ends of the cartilages. The tunica adventitia was comprised for loose connective tissue which blended with the surrounding fascia.

The intrapulmonary bronchi were found to be the modifications of the extra-pulmonary bronchi. The trachealis muscle was poitioned as the lamina muscularis mucosa. The mural constitutents of intrapulmonary bronchi resumbled those of the extrapulmonary ones. But the highly folded tunica mucosa was a marked feature. Usually the mucosal glands diminished in number towards the tertiary bronchi. The cartilaginous rings became cartiliaginous plaques.

The bronchioles were distinguishable with the possession of simple columnar or cuboidal cells in the lamina epithelialis .The unicellular glands were

lacking. The cilia were present in primary bronchioles but absent in tertiary bronchioles.

The lamina muscularis mucosae was continous. The cartilages were found to be absent in bronchioles.

The respiratory bronchioles were characterized with the presence of alveolar inset. The lamina epithelialis was made up of cuboidal cells. Smooth muscle was present but loosely arranged beneath the cuboidal epithelium. These bronchioles were observed infrequently.

Alveoler ducts, saccules and artria were completely lined by alveoli. Two types of cells viz , membranous pneumonocytes (type-I) and granular pneumonocytes (type II giant cells) were found in the pulmonary alveoli.

The attenuation in the cytoplasmic component was significantly noted in the membranous (agranular) pneumonocyte.

The type II cells revealed secretory material at the luminal end of the cell where concavity of the juxtanuclear halo was discernible. Thus, it appeared that these cells were not macrophages as considered earlier rather surfactant cells used for the reduction of the alveolar surface tension and thereby prevention of alveolar collapse.

PHYSIOLOGY

1. Studies on some aspects of Physiology, during prolonged injection of insulin in chicken :

Insulin, being a very important metabolic hormone, is being reported to increase appetite and feed intake. The increased feed assimilation is an important factor for hastening growth and the sexual maturity. This lowers feed cost and may go a long way in producing cheap meat and eggs. This being so, it is essential to know whether the prolonged administration of insulin, even in physiological dose, has any deleterious effect on any part of the animal body. With this end in view a research project entitled ' Studies on some aspects of physiology, during prolonged injection of insulin in chicken'' was worked upon with the following conclusive results :

1. Serum sp. gr. and total serum protein remained unchanged.
2. No immunity to insulin was found.
3. Succiric dehydrogenase activity remained unaltered in liver but was 12 % increased in kidney.

Histologically liver presented certain inflammatory changes in blood vessels and hepaticcells in form of congestion, swelling and vacuolation in perinuclear cytoplasm with indistinct cell boundary.

Kidney produced milk degenerative changes specially in distal part of collecting tubales.

Pancreas showed degenerative changes in isolets of langerhans with higher doses of insulin (60 I.U./kg. B.W./week) for 13 weeks in chicken.

GYNEACOLOGY

1. **Immunological and physiochemical characteristics cervical mucus of normal and repeat breeder cows :**

The study was conducted to assess the quality and interaction of the sperms in the astrual mucus of normal and repeat breeder cows.

The motility profile and certain morphological characters of sperms were studied by mixing the sperms with the cervical mucus of normal and repeat breeder cow. The percentage of motile sperms was higher in the cervical mucus of normal cows than that of repeat breeder cows. The percentage of dead sperms, abnormal sperms and abnormal acresomes was higher in the cervical mucus of repeat breeder cows than the normal cows.

Cases of repeat breeding due to anocular heat were treated with tonophosphan alone and combination of Tonophosphan and Prepaline forte. In genreal, better response was observed in cases treated with combination of Tonophosphan and Prepaline forte. Interestingly, Tonophosphan alone gave better response in rural cattle.

Cases of repeat breeding due to obscured etiology were treated with Bacterium (injectable). Response was fairly encouraging.

ANIMAL PRODUCTION/MANAGEMENT

During the year 1985-86, the total milk produced was 1,66,948 liters. The wet average for Hariana 50, 50 % exotic and 75 % exotic cross-breds were recorded to be 3.414, 6.967 and 6.774 liters respectively with the overall average to 5.924 liters. The heard average irrespective of genetic groups was 3.936 liters. The highest lactation yield in Hariana, 50 % exotic and 75 % exotic cows was 2163.9, 3425.3 and 2166.7 liters taking 305 days as lactation length. The average peak yield was 8.6.21.6 liters in Hariana, 50 % and 75 % exotic cows respectively.

The average lactation length in Hariana, 50%, 75% exotic cross-bred cows was recorded as 303.6, 350.0 and 349.3 days respectively.

The average dry period in Hariana, 50 %, 75 % exotic cross bred cows recorded as 136.5, 62.3 and 90.0 days. The results revealed a significant improvement in this trait particularly in the case of Hariana cows.

ANIMAL REPRODUCTION

The average age at first calving in Hariana, 50% and cross-bred cattle was 44.0, 35.0 and 38 0 months respectively, while the average service period was 86 days in Hariana, 89 days in 50% cross-breds and 92 days in 75% cross-breds. These findings are indicative of the better reproductive performance of 50% as compared to 75% cross-bred under the Agro-climatic condition of Pusa, Bihar.

ANIMAL HEALTH

The total number of animals died during the year under report was 26. The incidence of mortality in different genetic gronps of animals were 19.23% (Hariana), 34.6% (50% cross-breds) and 46.16% (75 % cross-bred) indicating that the 75% cross-breds animals are more prone to desuases as compared to 50% cross-breds and Hariana (least prone).

EXTENSION EDUCATION

The main objectives of the Extension Division are to provide technical expertise to the field extension personnel of various development departments, to disseminate scientific and technological information to the farmers through a variety of media and to provide technical assistance to voluntary service organisations, other institutions etc. These programmes are being implemented through the Information Centre, the Communication Centre, and the Training, Advisory and Consultation services. The Communication Centre of the Extension Wing comprises of these units-the Information, Publicatton, Exhibition and the Rajendra Agricultural University Press. Books on various crops, both Hindi and English, in the form of persuasive massage helpful to both farmers and Extension workers, are published from the Publication Unit. The Extension Education activities are also carried out with cooperation of State Department of Agriculture, Indian Council of Agricultural Research and other organisations. These agencies involve themselves in the development of Agriculture and allied fields, through various media of personal group and mass communication. A sales counter is also functioning under this wing. The activities of the Extension Wing are summarised in the following pages.

TRAINING PROGRAMMES

A number of training programmes for field functionaries of the Department of Agriculture, Field Officers and Asstt. Agronomists of input manufacturing firms like IFFCO, Indo-British Fertiliser Educational Project, Officers of the Commercial Banks and farmers were organised during the period under report. Various kinds of training programmes were organised at Pusa-Dholi, Patna and Sabour campuses as well as research stations/ centres and Krishi Vigyan Kendras like Munger, Banka, Bikramganj, Madhepura, Araria and Katihar. Monthly Workshop-cum-Training for the Subject Matter Specialists working in world Bank Extension Project (T & V) in different parts of the State were organised at Pusa, Patna and Sabour campuses regularly. Details of training programmes organised during the year appear below :

1. Inter State Training-cum-Discussion Seminar on Maize Production Technology :

Sponsored by Govt. of India, Ministry of Agriculture, Directorate of Extension (Training) was organised at Pusa Campus from 1.3.86 to 10.3.86 in which 22 subject Matter Specialists from Orissa, Andhra Pradesh, Mizoram and Bihar participated. In this Seminar emphasis was given on skill oriented practical aspects for increasing Winter Maize production in different parts of the country. Participants were also taken to standing Maize crop plots of progressive farmers of North Bihar.

2. Inter State Training-cum-Discussion Seminar on Ratoon Management (Sugarcane):

Sponsored by Govt. of India, Directorate of Extension (Training) was organised at Pusa from 2.12.85 to 11.12.85 in which thirty Subject Matter Specialists (Sugarcane) from Orissa, West Bengal and Bihar participated. Emphasis in this programme was given on field demonstrations and skill training for higher production of Sugarcane for different parts of the country.

3. Training Programme on Soil Survey and Soil Management :

A two day Training Programme on Soil Survey and Soil Management was organised by Soil Survey Scheme, Bihar Agricultural College, Sabour Campus of Rajendra Agril. University, from 22nd to 23rd November, 1985 for field officers of K. B. Command Area Development Agency, Bhagalpur, thirty officers of C A.D.A and fifteen Scientists from the University actively participated in this training programme.

During the course of the programme the participants were exposed to the soil survey technique, general properties of the soils falling under K B. Command, interpretative use of soil, management of problems of soils. efficient use of fertiliser and cropping sequence for these areas.

4. Workshop on Orientation Communication and Extension Teaching Methods :

A special Workshop on Orientation, Communication and Extension teaching methods for the subject Matter Specialists, Subdivisional Agricultural Officers (Extension) and Senior AEOs of Vaishali, Champaran, Muzaffarpur, Chapra, Siwan districts was organised at Pusa campus from 20.11.85 to 27 11.85 by training experts of Extension Education Institute, Nilokheri. 35 Officers from the T & V area were imparted practical training on handling of Audio-Visual aids, posters and charts preparations, Photography, Extension talks, handling group and individual situations, conducting field demonstration etc. This workshop was very useful for field functionaries working in Training and Visit System (Benor Project). This four days orientation training-cum-workshop was also organised at Sabour campus for subject Matter Specialists.

5. Training on Wheat Production Technology :

A State level training-cum-discussion Seminar on Wheat Production Technology sponsored by Government of India, Ministry of Agriculture and Directorate of Extension (Training) was organised at Pusa campus from 30th October to 2nd November 1985 in which 28 field officers of Department of Agriculture participated. At the out set, field problems related to wheat cultivation under different situations were discussed. Wheat Scientists of this University imparted training on recent advancement for increasing wheat production in Bihar. Apart from training, discussions were also organised on wheat experiment plots.

6. Winter Maize Production Technology Training :

A four days training programme on Winter Maize Production Technology for the extension officers of Tirhut, Saran and Darbhanga division was organised at Pusa from 6.11.85 to 9.11.85 in which 20 field Officers of Department of Agriculture participated. Problems of increasing winter maize area/production were discussed in detail and technologies were communicated to them. Field demonstration was organised by the concerned Scientists and trainees were also provided with printed lecture notes.

7. State Level Rabi Workshop :

A State level Rabi Workshop for the extension Officers of Department of Agriculture was organised at Pusa Campus from 23rd September to 25th September, 1985. Field problems for increasing rabi crops production in different parts of the State were discussed in detail with the scientists/specialists of the University and recent advancement in rabi crops were communicated. Valuable suggestions & guidelines from Agricultural Production Commissioner, Vice-Chancellor, Rajendra Agril. University, pusa, Vice-Chancelior, B.A.U., Kanke and Director Agriculture Bihar were given to the participants.

In concluding session useful decisions and impact points were communicated for their adoption in the field. About 100 Senior Officers actively participated in this workshop.

8. Kharif Rice Training Programme:

Kharif Rice-Training Programmes for extension Officers of Agriculture Department sponsored by Govt. of India, Ministry of Agriculture, Directorate of Rice Development were organised at Sabour and Pusa Campus from 9.7.85 to 12.7.85 and 11 6.85 to 14.6.85 respectively. Problems and possibilities for increasing rice production in kharif season in different parts of the State were discussed and rice Scientists imparted training on rice production technology. Field trips & visit of experimental plots were also organised for the trainees. Out of 30 Officers deputed in these programmes 14 Officers at Sabour and 26 Officers at Pusa campus participated. Participants were exposed to water/fertiliser/weed/soil management practices for increasing kharif Rice production.

9: Kharif Maize Training Programme:

A four days Training Programme on Kharif Maize Production Technology was organised at Pusa campus from 11th June to 14th June, 1985 for extension Officers of Department of Agriculture. During the course of the programme the participants were exposed to water/fertiliser soil management for increasing Kharif Maize production. Out of 30 field officers deputed in this programme 27 officers participated.

10. Minor Millet Production Training :

A Kharif Minor Millet Production Technology training was organised at Pusa Campus from 17.6.85 to 19.6.85 for the field officers of Department of Agriculture. During the course of the programme, possibilities for increasing mainor millet production in Kharif season were discussed with the scientist of this University. Out of 30 Officers deputed in this training programme only 19 officers participated. Field trips were organised and trainees were also provided with printed lecture notes.

11. Training Programme on Tuber Crops Production Technology :

A three days Training Programme on Tuber crops production Technology was organised at Pusa Campus from 1st July to 3rd July, 1985 for the officers (Potato Secction) of the Department of Agriculture. During the course of the programme the participants were exposed to the production technologies for sweet Potato, Zinger. Garlic, Tuimeric etc. with emphasis on soil/water/fertiliser management and cropping sequence of these crops. The participants were provided with printed lecture notes. Twenty five field officer of Agriculture Department from tuber crops growing area participated in this programme.

12. Summer/Boro/Rice Production Training :

A four days special training programme for increasing summer rice production/areas sponsored by Directorate of Rice Development was organised at Patna and Sabour Campuses in March, 1986 for the extension officers of the Department of Agriculture. Problems/possibilities/technologies were discussed with the rice scientists and participants were also provided with printed lecture notes. 29 officers and 26 officers of State Deptt. of Agriculture participated respectively at Sabour and Patna campus.

13. Training for Field Officers of I.B.F.E.P. :

Crop Specialists of the University Headquarters imparted training for increasing Kharif production with emphasis on fertiliser/water management and low cost technology for the field officers of Indo-British Fertiliser Education Project of Bihar on 26.6.85 to 27.6.85. Field problems of farmers of different Zones as reported by the participants were discussed in detail and in the light of these problems recommendations were given by the concerned crop specialist.

14. Training for Assistant Agronomists :

A State level Training Programme for the Agronomist working in Indo-British Fertiliser Educational Project of Bihar was organised at Mithapur Farm, Patna on 9.5.85. Recent advancemeut in major crops production technologies were communicated to the participating Agronomists and their field problems

were also discussed with the Scientists. In a two days training programme of Agronomists of Indo-British Fertiliser Education Pproject on 3.4.86, twenty field officers were imparted practical training on efficient soil and water management practices.

16. Farmers Training Programme under TRYSEM :

A three month training programme on plant protection under TRYSEM was organised at Pusa by the Deptt. of Entomology/Plant Pathology from 2.1.86 to 31.3.86. Twenty small/marginal farmers of Kalyanpur, Morwa and Pusa Block participated in this training progamme. A thorough training was imparted on various aspects of Plant protection. The trainees actually learnt by doing themselves.

Bee-keeping :

A one month training programme on Bee-keeping under TRYSEM was organised at Pusa by the Entomology/Pathology Departments from 15.2.86 to 15.3.86. Twenty small farmers from Pusa, Morwa Block were imparted training on Bee-Keeping as per well designed training programme.

Pumping Sets :

A training programme of six month duration on repairing and maintenance of pumps and pumping set and maintenance of tractors has been organised by College of Agril. Engineering, Pusa. Out of 40 small farmers deputed for this training 32 farmers are attending regular training courses.

Training of Farmers from other states :

A group of 35 farmers from West Bengal, Assam and Orissa visited Pusa-Dholi campus on 6th to 7th February, 1986. During their 3 days stay at the campus they were very well exposed with the cropping pattern of North Bihar, the activities of this University related to farm and farmers' development with emphasis on Winter Maize and Tuber crops. They were also taken round to the villages adopted by Pusa-Dholi camps.

17. Training programme for Rural Women :

Under DWCAR (Development of Women and Children in Rural Area) 3 training programmes were organised by College of Home Science for rural women from the areas of the State participated in the programme of 10 days duration each. This programme was s/pmspred fomamced butje UNICEF. The objective of this trainiog was to develop leadership qualities in the ladies so that they may organise group discussion on topics related to human development.

18. Training of subject matter specialists under T & V Extension system :

This University has been organising a two days Workshop in everymonth

for imparting training to the field functionaries at different levels in the districts covered under the T & V system The monthly worshop is held regularly each month for two days at the main centres of the University at Pusa, Sabour and Patna in which Subject Matter Specialists, Sub-Divisional Agriculture Officers, Asstt. Agronomists and District Agricultural Officers of Deptt. of Agriculture participate.

The training is imparted by the Master Trainers identified by the University for each main campus. The lessions of training correspond to the Agro-operations to be followed during the next month by the farmers in different districts. Annual schedule of training is prepareed and circulated well in advance before commencement of the year. On concluding day, formulation of message is made in the form of a hand out or leaflet which is discussion with concerned Master Trainers. Messages are prepared in Hindi so these may be easily understood by the VLWs as well as the farmers.

List of Participants in monthly workshop organised at different centres during 1685-86

Month	Pusa	Patna	Sabour
April, 1985	14	23	11
May, 1985	23	30	19
June, 1985	23	32	11
July, 1985	34	34	12
August, 1985	25	33	6
September, 1985	23	34	6
October, 1985	19	35	9
November, 1985	17	29	8
December, 1985	19	21	7
Jan. '86	28	29	15
Feb. '86	17	36	20
March '86	18	24	14

LAB TO LAND PROGRAMME

The Lab to land programme was launched by the I.C.A.R. in June 1979 as a part of its Golden Jubilee Celebrations. The main objective was to select and adopt small, marginal farmers and landless labourers belonging to the weaker section of the society. Surveys of their farms and resources were also envisaged under the programme to help in making realistic development programmes for them.

The Rajendra Agricultural University took up this challenging programme with 2,000 farm families spread over 10 districts of Bihar. In adoption of

families, care has been taken to follow cluster approach and consider proximity to the TTCS. Maximum emphasis was laid upon scheduled tribes, scheduled casts and b ckward community. The major thrust during this phase was to identify and put stress upon community based input, infrastructural development for agricultural and animal husbandry enterprises.

Tha centre-wise allotment of farm families is given in Table–1.

Table–1

	No. of families adopted
1. Dholi-Pusa Campus	
(a) T C.A., Dholi	650
(b) S.R.I , Pusa	50
2. Patna Compus	
(a) B.V.C., Patna	150
(b) A. .I., Patna	150
(c) O.R.P , Adhaura	50
(d) I R.S , Bikaramganj	50
3. Sabour Campus	
(a) Spl. Exn. Block, Sabour	200
(b) N D., Sabour	50
(c) N.S.S , Sabour	100
(d) O.R.P., Munger	200
(e) K V.K., Munger	150
(f) K.V.K. Banka	50
(g) J R.S., Katihar	70
(h) I.R.S., Mahepura	50
(i) I.R.S., Araria	20
Total :—	2,000

Crop demonstrations during 1985-86

	Paddy	Maize	Cade	Jute	Fodder	Fruit	Pulse	Oil seed	Wheat	Potato
TCA. Dholi	375	285	–	–	–	–	250	236	555	–
SRI, Pusa	22	–	4	–	–	–	–	–	–	–
ORP, Adhaura	50	–	–	–	–	–	–	10	–	–
IRS, Bikaramganj	50	–	–	–	–	–	–	50	–	–
SEB, Sabour	30	–	–	–	–	–	7	–	8	–
NSS, Sabour	10	13	–	–	–	–	–	–	–	–
ND, Sabour	–	–	–	–	–	–	3	1	–	–

ORP, Munger	–	9	–	–	–	–	24	9	22	–
JRS. Katihar	47	–	–	20	–	–	50	1	–	–
IRS. Arraria	30	–	–	–	–	–	50	1	–	–
IRS, Madhepura	30	–	–	–	–	–	–	–	28	–
ISS, Arraria	30	–	–	–	–	–	–	–	–	–
KVK, Agwanpur	77	–	–	–	–	–	–	–	100	–
KVK, Munger	12	15	–	–	1	11	189	72	40	29
KVK, Banka	–	35	–	–	11	–	27	–	20	–
ARI, Patna	100	–	–	–	6	–	12	10	80	–
Total :	839	398	4	20	17	11	592	390	925	29

Yield of demonstrations

Yield achievement

Crop	Before the programme	After the programme
Paddy	10-20	40-50
Wheat	15	30
Maize (kharif)	10	25
Rye	5	17-20
Moong	5	17-20
Arhar	5	15
Maize (winter)	25	43-55
Gram	8	15

ALL INDIA CO-ORDINATED PROJECT ON SCHEDULE CASTES AND OTHER BACKWARD COMMUNITES DEVELOPMENT

Schedule caste and other Backward cate Project was started in ths Rajendra Agricultural University, Bihar, Pusa from September, 1982. This University, after deep survey, has selected six villages namely Mahmada, Deopar, Dhobgama, Seikhopura of Pusa Block and Jitwaria and Rampua of Kalyanpur Block. From all the six villages 476 families were selected due to their low socio economic status.

Objectives :

1. To improve agriculture and livestock production through introduction of modern technologies.

2. To establish a suitable infrastruture and knowledge, approaches the problems of the areas in integrated manner to create better rural empolyment.

3. To locate the interested members in home stead vocations allied to agriculture, livestock, fish production, bee-keeping, poultry and agrobased small scale industries.

A. To start informal training programme with help of adult education department.

5. To establish the link between the members of adopted families and various development programme/agencies and financial authorities.

6. To educate about balanced diet, child feeding, and care of newly born babies, cleaner living by adoption of hygine and sanitory measures.

The families selected nnder the project are noted in Table-1

Table–1

Name of village	No. of families selected
Deopar	75
Mahmada	100
Sheikhopur/Dhobgama	91
Jitwaria	112
Rampura	112
	476

Occupational distribution

The occupation of the selected families are presented in Table-2

Table-2

Village	Agriculture	Labours	Others	Total
Mahmada	5	80	15	100
Dhobgama/Sheikhopur	5	76	10	91
Deopar	7	31	37	75
Jitwaria	–	98	–	98
Rampura	10	86	16	112
	27	371	78	476

Achievements of the year 1935-86

Training programmes were organised before the crop seaso's namely, Summer, Kharif and Rabi.

Six training programmes were organised for Papaya cultivation by the Scientists of Horticulture Department. 80 kg wheat seed, 28 kg. gram, 8 kg. lentil, 4 kg. oilseed, 16 kg. maize seed were distributed with full fertilizer and chemicals for conducting the demonstration during Rabi crops season Their details are presented in Table-3 and 4.

Table–3

Crops	Jitwaria	Rampura	Deopar	Mahmada	Sheikhopur/Dhobgama
Maize	1	4	3	3	4
Wheat	1	4	3	3	4
Pulse	1	4	3	3	5
Oilseeds	1				

Table-4

Crop	Max. yield q/na.	Min. yield q/ha.	Average yield q/ha
Maize			
Hemant	45.5	32 8	39 0
Laxmi	43.0	31 5	37.0
Wheat (HP-1102)	29.2	20.1	24.5
Gram (BG-240)	15 3	20.5	12.5
Lentil (PL-406)	13	10.0	12.5
Oilseed	14	10 5	11.0

Two Kirloskar's Diesel Pump sets have been purchased during the year 85-86 for irrigation in the field adopted families on installation cost.

Animal Production

Ten improved breeds of buffaloes and 5 goats were purchased and 90 buffaloes and 25 cows were inseminated through artificial insemination with frozen semen at University and Blocks Insemination Centres.

Home Science

100 women of selected families were trained in case of newly born babies and 60 in the case of better method of cooking and balanced diet. 40 adopted families are getting training in the upliftment of their low socio economic status. Seven singer sewing machines have been purchased for giving training in this trade.

Home-stead vocations :

200 members of adopted families have been selected for training in the different trades like Ropemaking, Basket making, Poultry farming, Bee-keeping, Pumpset repairing etc. for their self employment.

Extension activities :

435 members were benefited by training programmes on agricultural and allied activities. 15 field days were organised with specialist at the site of different demonstration plots. Two Kisan Mela at Seikhopur and Jitwaria and one exhibition at Rampura were organised.

The strategy followed in the project .

"Demonstration followed by training, field days, and field visits" were some of the important mothodology followed for their development in agricultural area.

Co-opration and co-ordination were taken from local development departments and agencies like B.D.O., D.D.O., A E O., D.I.C. & D R D.A. to generate

the maximum days employment to the member of adopted families in non-agricultural and agricultural allied aspects.

Impact :

With a view to increase employment opportunities and income of the families, the number of families trained in different trades and vocations under TYRSEM were as Table 5.

Table 5

Name of trade/vocations	No. of families/members
1. Bee-Keeping	71
2. Poultry	100
3 Pigger	5
4. Sericulture	19
5. Rope Making	101
6. Leather works	17
7. Basket making	42
8. Agriculture pulses	140
9. Oil seeds	72

Qualitative :

1. 100 homeless members were provided with home by State Govt.
2. Their knowledge about nutritional fruit garden and kitchen garden has increased.
3. The ladies members of the families has been trained about new child, nutrition of diet.
4. They took interest in the education of their children.
5. They can consult with b ock, bank and other financial authorities, and project employees without any hesitation.

As a result of organisation of various training programmes knowledge of adopted families about new technology of crop and livestock production has increased. Some of the adopted families have taken up scientific agriculture using hybreed seeds, fertilizers, irrigation and their agricultural production has also increased.

NATIONAL DEMONSTRATION PROJECT

The main objective of the National Demonstration Project is to convincingly demonstrate to the farmers the production potentialities of scientific agricultural technology designed to bring about maximum production from a unit area of land in a unit period of time. These demonstrations also aid in the flow of latest research technology to the farming community.

During the year 1985-86 altogether 25 demonstrations were conducted in Vaishali district. Out of which 4 on three crop sepuence, 15 on two crop sequence and 6 on single crop. At Gaya district altogether 15 and 22 demonstrations were conducted in Kharif and rabi respectively.

OPERATIONAL RESEARCH PROJECT TAUFIR DIARA AREA, MUNGER

The Operational Research Project in Taufir Diara came into function in the year 1975 with a view to (i) introduce suitable crop rotation and high yielding improved variety to get higher yield (ii) to maximise the utilisation of land with growing atleast two crops in a year instead of one and (iii) to develop better agronomic practices for Diara Area with the use of fertilizers, irrigation and adopting plant protection measures.

The achievements of the project have made a great impact on the Diara cultivators and they have adopted the cultivation of high yielding varieties of different crops and methods and practices in respect of scientific cultivation advocated by the project and this is increasing gradually.

Inter State Bio-Gas Training Centre :

During the year 1985-86, five inter-state bio-gas training each of 16 days duration were organised in which 58 trainees 29 supervisors and 29 masons were trained as presented in Table 1.

Table 1

Sl. No.	Training period	States which participated	Trainees trained Super.	Masan	Total
1.	3.6.85-18.6.85	W. Bengal	7	—	
		Bihar	—	3	10
2.	29.10.85-13.11.85	W. Bengal	6	2	
		Bihar	4	2	16
3.	12.12.85-27.12.85	W. Bengal	1	3	
		Bihar	1	5	9
4.	24.1.85-8.2.86	W. Bengal	3	3	
		Bihar	2	5	13
5.	10.3.86-25.3.86	W. Bengal	3	4	
		Manipur	1	—	
		Bihar	—	2	10
		Total	29	29	58

Rural women being educated about Infant Nutrition by Home Science teachers.

Training to Farmers in construction of a Fiogas plant.

Demonstration on Bio-Gas Slurry :

The biogas slurry manure contains more than two times mutrients as compared to cowdung manure. But the farmers in general have got wrong notion that nutrient content of slurry manure is reduced. Therefore, to demonstrate the superiority of slurry manure over cowdung manure, 10 demonstrations on Paddy during kharif and 24 demonstrations on rabi crop (maize-2, wheat-10, gram-4, lentil-4 and potato-4) were conducted. The demonstrations have shown encouraging results.

One day training :

One day training was given to 31 officers and staff of Pusa Block with frequent visit to the site of construction of bio-gas plant in the adopted village Harpur.

KRISHI VIGYAN KENDRA

The objective of the Krishi Vigyan Kendra established at Munger and Banka is to develop skill in the farmer trainees to the point that they can repeat what they have learnt on their own farms with confidence.

At Munger :

During the year 1985-86 a number of off and on campus training programmes were organised for farmers, youth and farm women under three specific situations (i) Diara area (ii) Plateau area & (iii) Plains.

Training programmes were conducted in the disciplines of Agronomy, Horticulture, Agril Engineering, Home Science and Animal Science, as indicated below :

Duration	Agronomy		Horti-culture		Animal Science		Agril. Engg.		Home Science		Total	
	a	b	a	b	a	b	a	b	a	b	a	b
1 day on campus	10	60	15	70	4	40	8	60	12	110	49	350
Off campus	—	—	10	60	5	60	10	115	8	180	33	415
2-6 days on campus	10	40	7	34	1	20	4	80	3	30	25	194
Off campus	—	—	5	24	—	—	1	13	2	30	8	72
2 weeks on campus	4	40	4	40	—	—	3	40	—	—	11	120
Off campus	—	—	—	—	—	—	—	—	—	—	—	—
Total											126	1125

(a) No. of courses conduted
(b) No. of trainees participated

At Banka :

In agronomy, training programmes were organised on cultivrtion of different crops with emphasis on practical operation like seed treatment, seed bed nursery, sowing and transplanting, application of fertilizer and plant protection measures. In animal Science, training pragrammes were organised on Dairy, Poultry, goat and swine management, simple therapeutic and preventive measures for common diseases of different seasons and of different organns.

Training progamme organised during 1985-86

On Campus	
Name of the course	**No. of farmers trained**
Crop Husbandry	111
Animal Husbandry	16
Crop & Animal Husbandry	60
Fruit preservation	50
Horticulture	40
Off campus	
Crop and Animal Husbandry	1252

Lab to land programme has also been taken up with a view to raising the socio-economic conditions of small and marginal farmers and agriculture labourers through adoption of improved technologies in farms and home. The adopted farm families have been provided traininig and technical guidance through regular visit of scientists to the villages and inputs in the form of subsidies for adopting improved farm technologies.

INFORMATION UNIT

The Extensiyn Division provided informetion support to the farmers through "Adhunik Kisan", "Instructions to Farmers and Extension Worker", "Talks", "Discussions and Interviews" etc. arranged by the All India Radio. These items were the highlights of the findings from the University research programmes undertaken by the Faculties of Agriculture, Veterinary, Home Science, Agricltural Engineering, Animal Sciences and Fisheries. Under the Programme Instruction to Farmers and Extension Workers, timely tips were broadcasted from Bhagalpur, Darbhanga & Patna Radio Station. A total of 140 items which were timely and appropriate to the growth cycle of different crops were broadcasted.

About 50 radio talks, interviews and discussions were broadcasted from the Patna and Darbhanga Station of AIR during the year under report by Scientist of the Rajendra Agricultural University.

EXHIBITIONS

The University participated in the Vaishali Agril. Exhibilion from 1 st to 4th April, 86. In this exhibition, informations on the various activities of the University were displayed.

Four Mini-Exhibitions were organised during the year under report at various Research Stations.

RAJENDRA AGRICULTURAL UNIVERSITY NEWS LETTERS

The Communication Centre released a monthly bulletin, the RAU News Letter.

Publication unit :

During the year, the Directorate of Extension Education continued to publish a large number of literature for the benefit of farming community, Extension workers of Bihar State.

(a) Adhunik Kisan (Monthly magazine) :

One thousand five hundred copies of "Adhunik Kisan" are published regularly by the University. At persent there are 1456 subscribers to this magazine.

(b) Adhunik Kisan Diary :

Twenty thousand copies of Adhunik Kisan Diary were published during the year and sold among the farmers and Extension Workers.

(c) Pamplets, leaflets and bulletins :

1. Kharif Dalhan ki kheti.
2. Madhumakhi Palan Kase Karei
3. Rabi Makka ki kheti
4. Kharif Makka ki kheti
5. Unnat Dhang Se Barsati Shabji ki kheti
6. Muh Paka-Khur Paka
7. Aam ke Kirouka Niyantin
8. Kurkute Palan Keo Aur Kase
9. China ke kheti
10. Bihar me Kela ki kheti
11. Kharif Dhan ki kheti
12. Lichi
13. Til ki kheti
14. Diesel Pump, Parichalan. Rakh Rakhao ahaur Dekhbhal.
15. Pan ki kheti
16. Rabi Fasalon ki Jal Nikas
17. Mangralla ki kheti

18. Kharif Telhani faslon ki kheti
19. Kandmul faslon ki sumunat krishi pranali
20. Mishrit Matsya Palan eko aur Kashai
21. Pashuou ke pramukh rog abour upchar

Kisan Mela :

The University organised Kisan Mela at its different campuses to educate the farmers, extension workers and persons engaged in Rural Development work through demonstration, field visit, kisan gosthi, crop competition and farmers talent test, horticultural and cattle show etc.

During the year University organised Kisan Mela at Bihar Agricultural College, Sabour from 7th to 9th Feb. '86, at Pusa from 16th to 18th Feb. '86 and at A.R.I., Mithapur, Patna from 4th to 6th March '86. The number of stalls participated at Sabour, Pusa and Patna were 40, 47 and 19 respectively. The number of registered farmers at Sabour, Pusa and Patna were 527, 1042 and 554 during mela period. The University sold the seeds of different crops worth Rs. 32000/-at Sabour, Rs. 7000/- at Pusa and Rs. 15000/- at Patna. The University Publications were sold worth Rs. 1353.85 at Sabour, Rs. 3409 at Pusa and Rs. 1946 at Patna. About 30, 142 and 94 samples affected by insect pest and diseases were identified at Sabour, Pusa and Patna. The number of enteries in cattle show at Sabour and Pusa were 105 and 268 respectively. The Horticultural show at Sabour, Pusa and Patna were 1123, 1007 and 888 respectively. The number of questions asked by the farmers at Sabour, Pusa anp Patna were 630, 441 and 95 respectively and the answeres were given by the scientist.

The Kisan Mela at Sabour was inaugurated by Sri Awadhesh Bihari Singh, State, Minister and Cattle show was inaugurated by Sri Madan Singh, State minister. The acting Vice-Chancellor, Dr. G. Trivedi presided over the function. At Pusa the Mela was inagurated by the Hon 'ble Governor and Chancellor of Bihar, Sri P. Venkatsubbiah. He also laid the fundation stone of Communication centre. Sri N. K. Sinha, A. P. C., Bihar presided over the function. At Patna the mela was inaugurated by the Hon' ble Minister of Agril., Bihar Shri Lahtan Choudhary and presided over by Sri N. K. Sinha, A. P. C., Bihar. Dr. D. N. Ram, Director of Agril. Bihar attented the Mela. The Hoticultural show at Patna was inaugurated by Hon'ble Speaker, Bihar Vidhan Sabha, prof Shiv Chandra Jha and chairman was Sri Bhola Singh, M. L. A. The prizes at Patna were distributed by the Chief Secretary, Govt. of Bihar Sri K. K. Srivastava.

NATIONAL SERVICE SCHEME

During the period under report, three new sub-centres were organised, each one at College of Home Science, Pusa, College of Agricultural Engineering, Pusa and Sanjay Gandhi Institute of Dairy Technology, Pusa.

Dr. G. Trivedi, Vice-Chancellor, distributing Prizes during Kisan Mela

A total of 172 students of undergraduate classes participated at active volunteers from BAC, Sabour. From TCA, Dholi altogether 127 students, including six girls were enrolled as NSS volunteers. The various programmes covered were development programme, General sanitation, Agro-forestry and Adult literacy programme etc. The students of BVC, Patna also participated in NSS work covering fields like vaccination, poultry keeping, adult education etc.

FIELD DAYS/KISAN GOSTHI/MOBILE EXHIBITION

The University celebrated field days on various occasions at different institutions centres : Four field days and one mobile exhibition at Krishi Vigyan Kendra, Munger; 12 field days at Pusa & 8 at Sabour. Under National Demonstration programme during kharif and rabi season, several Kisan gosthies at A. R. I., Patna, 10 field days under SC/ST scheme adjoining to University, one field day and 2 extension fortnight at Jute Research Station, Katihar, celebration of National Nutrition week at Etaha and Pusa villages and one exhibition for village ladies and children under Educational cultural programme adjoing the University by Home Science Colleg were organised.

CORRESPONDENCE

The farmers were being constantly informed about the latest agril. development through mass media. The querries of farmers were replied after consultation with the Scientists of respective fields.

SCIENTISTS FIELD VISITS

Scientists field visits were organised with a view to provide 'on the spot' technical guidance to the farmers on all aspects of crop production. The Scientists of the University also visited the farmers field wherever they were informed about the occurrence of pests and diseases and other problems with regard to crop production. The team of specialists identified some diseases of various crops in farmers field of Muraul Block, Kalyanpur Block, Samastipur, Muzaffarpur, Darbhgg and adjoining areas of R. A. U., East Champaran, Sitamarhi, Siwan, Biharsharif, Motipur and other places. They suggested suitable control measures for different crops.

VILLAGE ADOPTION PROGRAMME :

The village adoption programme has been conceived as a means to transfer new technology to the farmers, to establish close contact between the research personnel and the farmers providing feed back of field problems for carrying out further research, to conduct trials to evaluate the suitability and profitability to new technology under farmers' field condition etc. During the year 1985-86, the University had adopted 12 villages adjacent to the Main Campus, 9 villages T.C.A., Dholi, 15 villages B.A.C., Sabour, 10 villages B.V.C., Patna and a few

Research Stations. During the year nine new villages were adopted additionally, thus making the total to 55 adopted villages.

Planing materials, fertilizers, chicks, goats etc were distributed to the farmers to each adopted village on no loss no profit basis as a part of their homested development. Seminars were also conducted to educ te the farmers in Scientific farming practices.

TRAINING CAMPS, SEMINARS AND OTHER ACTIVITIES

Five training campus on Agriculture and allied subjects were conducted in the adopted villages. Experts from the University and Agricultural Department handled the classes.

On an average, three to four agricultural seminars were organised in each village. Experts from the University handled classes on various topics in Agriculture, Animal Husbandry etc.

Vaccination of cattle and poultry was arranged with the help of the Veterinary Surgeon.

Fourteen group discussions were conducted in the adopted villages. The experts from the University participated in the discussions. Plant protection measures were also demonstrated to the farmers by the experts. Project leaders visited the villages regularly.

ANNUAL REPORT OF DIRECTORATE OF STUDEMT'S WELFARE

Rajendra Agricultural University, Pusa For 1985-86

The directorate of student's welfare caters the needs of the students vis-a-vis the policies of the University The major functions of this directorate is to inculcate discipline, sportsmanship and team spirit among the students so as to make them ideal citizen. Besides this, the directorate deals with the award of different kinds of fellowship, scholarship and assists the students in their placement in the job market at State and National level. The dirdctorate also coordinates and looks after the hostel, cafetaria, canteen and other mess facilities for the students in each campus. The directorate plans and co-ordinates all the extra-curricular activities in all campuses of the Univ. Following is a brief report on the activities, achievements and future Plans of the various wings of the directorate of stunent's welfare from August, 1985 to August, 1885.

1. Improvement in infrastructure :

(i) For efficient functioning of the cultural activities at main campus, Pusa, the necessary repairs in Vidyapati Kala Kendra (Flex House), Pusa was done and the whole roof of the building was replaced by asbestus sheet roofing. The arrangement of drinking water was done by addition of a water tanky and repairing of water connection. Besides, the electrical connections were repaired.

(ii) The old damaged verandah of Richaria and Patel hostels at Bihar Agril. college, Sabour (Bhagalpur) were thoroughly repaired during the year under report.

(iii) Consrruction of a new hostel at main eampus, Pusa was sanctioned and tenders were called.

(iv) Necessary repair and white washing of the hostels located at T. C. A. & Boys hostel, Pusa campus were done during the year.

(v) Provision of T. V. set in the remaining hostel and water cooler in conteen of T. C. A. was made.

(vi) In the Home Science Hostel a well furnished Common room and an indoor games room were developed. In the remaining rooms fans were provided. For better light Tube lights were provided.

(vii) A proposal was submitted to the Vice-Chancellor for construction of a twelve hundred seated auditerium at the main campus, Pusa.

(viii) A proposal was also submitted to the Directorate of Sports and Youth Welfare, Govt. of Bihar. for sanctioning the amount to develop infrastructure for indoor and autdoor games in the university as well as for granting annual grant to manage the regular plays.

(ix) For efficient functioning of the society at Home Science College, Pusa, all the necessary musical instruments were purchased exclusively for Home Science College and Provision of music room was made for practice of the students.

(x) For smooth functioning of the extra-curricular societies at main campus Pusa, a good P.A. set, a few steel trunks and almirahs were purchased during the year under report.

(xi) Steps have already been taken and money sanctioned and advanced to fix up a display board at main enterence of the university office to display the photographs in antion of the different extra-curricular activities of the students.

(xii) For improvement in hygienic condition in Boys Hostel Pusa, the work on permanent drainage systemstarted.

2. Hostel and its management :

The university maintains 12 hostels with two at the HQrs. at Pusa, two at T.C.A., Dholi, 4 at B.A C., Sabour and 4 at B.V.C. Patna. Two hostels for girls students are maintained one each at H. Qrs. and at B.V.C., Patna respectively. The hostel management and administration was done by Warden and Hostel Supdts, in each campus effectively and efficiently under the supervision of

Assoc Dean-cum-Principal concerned. In each campus, hostel auther iti.s who completed their terms, were replaced by new ones. All the four hostel supris and warden of Boys Hostel, Pusa completed their terms and replaced by new ones during the year. The team showed distinct improvement in the hostel management under the leadership of Dean, College of Basic Sciences who is Officer I/C of the boys hostel, Pusa. The girls hostel was also managed efficiently under the leadership of Dean, College of Home Science, Pusa.

Students were provided all the necessary aminities including news papers, magazines and indoor games in the hostel in each campus. The T.V. sets were provided in the hostels wherever necessary as such, students in each hostel witnessed the T.V. programmes during the year. The messes, cafetaria and canteen were managed efficiently in each campus. The rates of breakfast and meal were quite cheaper as compared to local market.

3. Health Care:

For proper care of student's health there are consultant physicions for each institution of the University who performed their duties effectively. At the main campus, Pusa where a fulfledged hospital with the diagonistic facilities exist under the charge of Chief Medical Officer and male and female medical officers, some necessary equipments and other facilities were added during the year under report.

4. Extra-curricular activities-Organisational set-up :

The extra-curricular activities mainly consist of sports and games, music and drama, literary and debate, film and photography, N.S.S. & N.C.C. For tyre system of functioning in the University.

A. Each college has a society for each extra-curricular activity viz; games and sports, drama and music, literary and debate, film and photographic socie- Secretary, assistant secretary and class representative. Each society is responsible ties headed by the President from among staff members and assisted by students for holding regular activities : Inter-class competition and annual competition to declare college team for each item to participate in inter-college tournament.

B At University level each society has got president and vice-president from among the staff members and this central body operates under the chairmanship of D.S.W. The central body is responsible for holding various inter-college competitions, the selection of the university teams and participation of the university teams in the various All India Inter-University Competitions, besides formulation of policies and plans for development of each extra-curricular activities, in the University.

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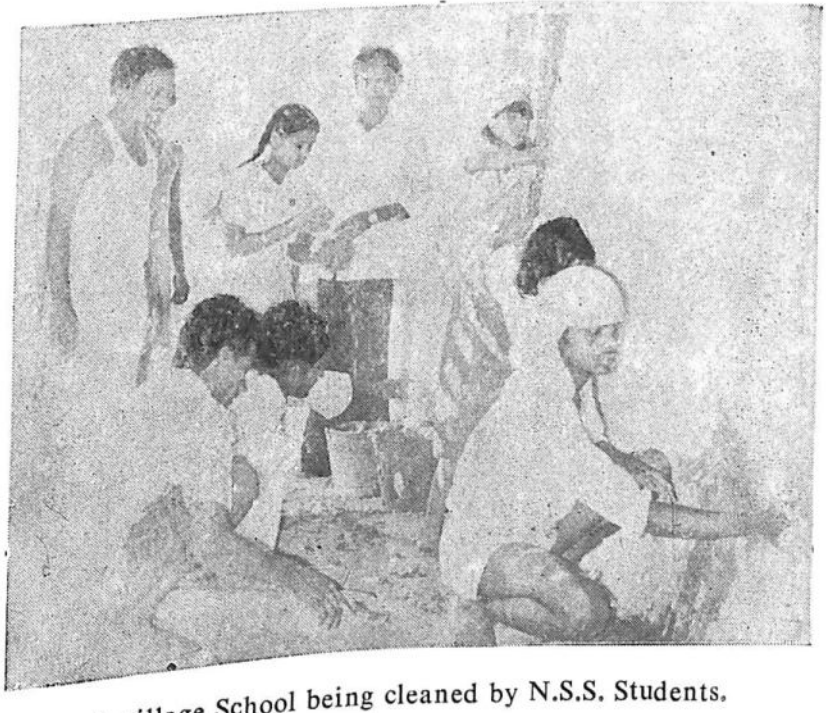
Students Presenting a Duet in a Cultural Evening



A village School being cleaned by N.S.S. Students.

(1) (N) Sports and Games Society-functions and achievements :

(a) College tournament :

Each college conducted inter-class competition and annual competition for both indoor games, besides, the arrangement of regular play for each item in the college during the session under report.

(b) Inter-college Foot Ball Tournament :

The Inter-College Foot Ball Tournament was held from 17 to 19th Oct., '85 at T.C.A., Dholi playground very successfully. The T.C.A., Dholi team came out to be winner and B.A.C., Sabour team runner. The tournament was inaugurated by Dr. G. Trivedi, Director, Extension Education, RAU, Pusa and the prizes were given by Dr. K. K. Jha, Dean (Agriculture), R.A.U., Pusa.

(c) Inter-College Cricket Tournament :

The Inter-College Cricket Tournament was held from 22nd to 26th January, '86 at Pusa playground where B.A.C., Sabour and T.C.A., Dholi teams were declared joint winner. The tournament was inaugurated by the acting Vice-Chancellor, Dr G. Trivedi and prizes given by Mr. J.K. Sanglura Commissioner, Darbhanga Divn. Darbhanga. The Commissioner appreciated the discipline and sportsman spirit of the students.

(d) Inter-College Badminton Tournament (women)

The Inter-College Badminton Tournament was held from 22nd to 26th January, '86 at College of Home Science, Pusa where college of Home Science team came out to be winner and B.V.C., Patna team as runner.

(e) Inter-College Badaminton Tournament (men) :

The Inter-Colloge Badminton Tournament (men) was held from 22nd to 26th January, '86 at pusa but the tournament could not be concluded in time due to heavy engament and hence postponed.

(f) Inter-University Tournament :

A team consisting of 6 players (three girls & three boys) under the leadership of prof. B.B. Singh was sent to participate in Inter-University Badminton (men and women) tournament held at Shillong (Meghalaya) in Nov., '85. In the first indeavour both teams (men and women) showed satisfactory performance though none of them could reach up to final.

In othar tournaments the teames could not be sent due to coincidance of examination dates of the students with the Inter-University Tournament dates. For the next Inter-University Tournaments viz, Foot Ball, Volley Ball, Bandminton, Table Tennis etc., the enterises had already been taken during the year under report.

(ii) Literary and Debating Society :

(a) In each campus the literary and debating events were organised regularly during the session. Each college organised annual competition and selected college team to participate in the All India Agril. Colleges/Universities competition.

(b) Participation in All India Agril. Colleges/Univs. Debate competition :

The All India Agril. Colleges/Universities Debate was organised at B.A.C., Sabour on 17/8/85 and 17/8/86. In the debate organised on 17.8.85, the team of University of Hill and Forest, Solan was declared the best. Among the individual speakers, a speaker from T.C.A., Dholi of this University occupied the third position. In the debate orgadised on 17.8.86 for the first time, post-graduate team of R.A.U. consisting of Sri Prakash Varma & Sri Prabhat Ravi was declared the best and among the individual speakers Mr. Prakash Varma of Post-graduate team was declared the best speaker while the second & third position holders were from B.H.U. and H.A.U., Hissar respectively. In general the performance of R.A.U. colleges team was satisfactery. The team of Pusa-Dholi complex participated under the leadership of Dr. S. N. Ojha, D.S.W. & Dr. A K Singh of CBS & Humanities, Pusa.

For the first time, a proposal to hold Inter-College Debate of this University for selecting an university-debate team to participate in Inter-University Debate was sanctioned during the year under report. This depate will be held at main campus, Pusa wherein all the seven colleges of the Univ will participate. Calendar of events were prepared for the next year.

A scheme for conducting a debate symposium and group discussions on rural development in collaboration with Khadi and Gramocyog Industry, Govt. of India has been proposed for the main campus, Pusa which is under active consideration of Khadi & Gramodyog Industry.

(iii) (i) Music & Drama Society :

Variety entertainment and drama events on different occassions were organised by the students in each campus.

(b) Participation in State Youth Festival :

For the first time a contingent of 10 participants (six girls and four boys) under the leadership of Prof. S. Sahdeo Lal & Mrs. Sunita Mishra participated in music and dance competition held at Ranchi under the auspices of State youth Festival organised by the ministry of Sports and Youth Welfare, Govt. of Bihar. In the first attempt three medals were won by the participants Mrs. Ranu Kumari & Miss. Anita Mahto of Home Science College, Pusa & Mr. Raj Bansi of T.C.A., Dholi in the items of lok Nritya and Sugam Sangit. The performance

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(vii) Fine Arts and Photographic Society :

This Society is fuctioning in each campus of the University. Some steps were taken to strengthen the society so that students may be trained in art of photography.

(5) Fellowship/Scholarship etc. :

As per norms of the University fellowship and scholarship were sanctioned to the students during the year. Besides the fellowship and scholarship by other organisations such as I.C.A.R , Post-matric scholarship, national scholarship for SC/ST candidates, F.C.I. scholarship were sanctioned and paid to the students.

(6) Establishment of Employment and Placement Cell :

Steps were taken to establish placement and employment cell under the directorate of student's welfare. The basic informations regarding establisment of this cell were asked from Agril. Universities located at Pantnagar, Ludhiana and Hissar and the matter is under process in the directorate.

FINANCIAL STATEMENT

The resources of the Rajendra Agricultural University for successful maintenance and development of its institutions and activities mainly consist of the following :

1. Agril. Non Plan :

The Rajendra Agril. University and its constituent units are incurring expenditure on Education, Research and Extension every year out of the grant in-aid received from the State Govt. under Agril. Non Plan Scheme. The University has to spend a huge amount on seed, Fertilizer, Pesticides and Casual labourers for proper maintenance of Agril. Farms and Research. Besides this, the University has to provide lab. equipments, furniture, farm macheneries etc. for the educational sector as well as extension sector hence heavy expenditure is also incurred over vehicle fuel and its maintenance.

According to the Annual Accounts for the year 1984-85 the expenditure for the year under the "Non-Plan" head was Rs. 389.06 lakhs and the expenditure as per Annual Accounts under preparation for the year 1985-86 is expected to be Rs. 534.45 lakhs as per revised estimates of the R.A.U, excluding Rs. 92.19 lakhs as minus balance due to non release of grants by the State Govt. The grant-in-aid received from the State Govt; was Rs. 389.50 lakhs in the year 1985-86 It appears that the State Govt; has released less grant during the year 1985-86 against the expected expenditure to be incurred.

2. Animal Husbandry Non Plan :

A sum of Rs. 79.05 lakhs has been provided in the revised budget 1985-86 under A.H. Non Plan of the R.A.U. against which the State Govt. has released Rs. 33.89 lakhs during the year. It is found that less grants are being released

by the A H. Deptt. vis-a-vis the budget provision causing the University a minus balance of Rs. 93.32 lakhs upto the closure of the year 1984-85. This would go high in the financial year 1985-86, and from the year 1986-87 the grants being released by the A.H. Deptt. will henceforth be released by the Agriculture Department.

Agril. Plan

The University receives grants from the State Govt. for the development of teaching, research, extension as well as its allied activities. Under this assistance the University has successfully implemented the objective set forth for this purpose. This Univ rsity has constructed different types of building for residential as well as official and residential purposes.

The State Govt directed the University to submit a plan proposal for Rs. 220 lakhs during the year 1985-86 and accordingly the University prepared a plan budget for Rs. 220 lakhs. The Govt. have released the said grant during the period.

ICAR Research Scheme :

The Indian Council of Agril. Research is the second major organisation which undertakes the responsibility of providing sizeable financial assistance to the Agril. University. This assistance is of two kinds viz., one for the "Estt. and Development of Agril. Universities" and other for Coordinated and Ad-hoc Projects under Agril. for the several major crops and under A. H.

Under the establishment and development heads the ICAR has released Rs. 30.00 lakhs for the development of this University during 1985-86. Under Co-ordinated Project, more than 50 research schemes on major crops as well as under A.H. are running in the University. The University has implemented the programme under each scheme sucessfully. Under this head ICAR has released Rs. 95.03 lakhs against which the expenditure during 1985-86 is expected to be Rs. 133.73 lakhs as ICAR share over the schemes.

Most of the schemes are financed by the ICAR viz. Extension Research Projeet, NARP. KVK, ORP and Ad-hoc projects etc. on 100% basis and some of the Co-ordinated schemes are in 75% basis of which 25% of exdenditure is met by the State Govt. under Plan Head.

Misc. Schemes

There are few miscellaneous schemes financed by different agencies like PL480 of American Embassy, Govt. of India's Grant and some other factory like Pfyzer etc. Rs. 5.26 lakhs were received by the University for the expenditure to be incurred during 1985-86 under misc. schemes.

The details of expenditure-receipts for all the Non-Plan, Plan, ICAR and Misc. schemes are given below for ready reference.

ABSTRACT

Estimates of Expenditure Part II Agril & Vety Plan (Budget estimate 1985-86)

Sl. No.	Name of the schemes	Actuals 84-85	Budget Estimates 85-86	Revised Estimates 85-86	Budget Estimates 86 87
1.	National Institute of Horticulture	—	32,87,740	10,00,000	12 00,000
2.	BVC, Patna	2,75,649	62,83,540	30,00,000	30,00,000
3.	Deptt of Plant Breeding	—	—	1.00,000	1,50.000
4.	Deptt. of Soil Science	38,974	—	1,00.000	1,50.000
5.	Deptt. of Agronomy	—	—	1,00,000	1,00,000
6.	Deptt. of Plant Pathology	27,555	—	1.00,000	1 00 000
7.	Deptt. of Entomology	—	—	2.00,00	50.000
8.	Deptt. of Nematology	28,475	—	1,00,000	1,50.000
9.	Deptt. of Agril. Economics	—	—	1.00,000	1,00,000
10.	Deptt. of Ext. Education	—	—	1,00,000	1,00,000
11.	Deptt. of Food Sci. & Tech.	—	—	60.000	1 13,000
12.	TCA, Dholi	41,582	5,00,000	12,00,000	18,00 000
13.	BAC, Sabour	4,17,059	7.97,530	12,00,000	18,00,000
14.	ARI, Patna	27.483	3,97,680	3 00,090	3,00 000
15.	SRI, Pusa	—	12,79,640	3,00,000	5,00,000
16	College of Basic Sc. & Humanities	4,30,044	7,69,960	5,00,000	5,00,000
17.	College of Home Science	2,89,703	11,50,180	5,00,000	5,00,000
18.	College of Agril. Engineering	2.83,176	46,04,930	10,00,000	10,00,00
19.	Sanjay Gandhi Ins. of Dairy Tech.	3,85,420	90.96,320	20,00,000	20,00,000
20.	A.P.R I. & Poultry Farm	—	3,60,000	—	2,00,000
21.	University Library	2.90,901	—	3 00,000	5,00.0 0
22.	College of Fisheries	38.666	25 97,760	15,00,000	20,00,000
23.	Campus Development	20,36,246	5,00.000	37,40.000	38,00,000
24.	Head Qrs. (Admn.)	—	—	75,000	1,00,000
25.	Directorate of Extn. Education	—	—	75,000	1.00,000
26	Office of the Registrar	—	—	75,000	1,00,000
27.	Directorate of Research	—	54,40.000	75.000	1,00,000
28.	Planning Cell	7,36,060	—	75.00	10,00,000
29	Students Welfare	—	—	50,000	45,000
30.	Comptroller Office	—	—	75,000	1,22,000
31.	ICAR Cordt. Project	15,94,123	—	35,00,000	37,00,000
32.	Communication Centre	—	—	2,00,000	5,00,000
33.	University Press	—	—	—	2,00,000
34.	ARI, Dholi	—	—	3,00,000	—
	Grand Total	69,46,616	3,70,55630	2,20,00,000	2,52,00,000

ABSTRACT

Part-I Non-Plan (A) Agriculture

Sl. No.	Name of the Units	Accounts 1984-85	Budget estimates 1985-86	Revised estimates 1985-86	Budget estimates 1986-87
1.	R.A.U Headquarters	89,87,174	1,52,97,050	1,60,28,776	1,56,74,776
2.	S.R.I , Pusa	50,34,118	52,88,660	56,25,000	55,01,500
3.	B.A.C., Sabour	1,29 45,969	1,37,98,070	1.50 00,000	1,51,00,000
4.	A R.I , Patna	66,52 262	60,07,310	68,25,385	68,79,400
5.	T.C A., Dholi	41,76,604	44,33,930	49,34,560	47,01,780
6.	BVC, Patna (PIU-2 V.C. Cell)	1 19 007	3,74,580	5,72,500	6,09,100
7.	E E. Dholi-Pusa	3,32,447	12,00,000	12,00,000	16,00,000
8.	E.E Patna/Sabour	58,864	6 95,000	7,95,000	13,45,000
9.	College of Home Science	Merged with RAU H. Qrs.	4,82,630	6,39,000	7,20,000
10.	C B.S & H., Pusa	do	14,77,880	18,25,000	18,95,000
11.	Interest on over draft	6,03,440	—	—	—
	Total :—"A"	3,89,05,952	4,90,55,110	5,34,45,221	5,40.26,556
	B—Animal Husbandry				
1.	B V.C., Patna	40,34,466	49,81,570	54,87,250	57.40.640
2.	Livestock Unit, Pusa	16,99,907	17,85,760	19,70,790	19.72.000
3.	E.E. Pusa/Patna	69,794	4,30,000	4,47,000	4,95,000
4.	Provision of Bonous	—	1.50,000	—	—
	Total "B"	57,95,167	72.67.330	79,05,040	82,07,640
	Total A + B :—	4,47,01,119	5,63.22,440	6,13,50,261	6,22,34,196

Abstract (i) I.C.A.R. Esstt. & Development of Agril. Universities.

1.	For the completion of on going construction works	— Rs. 20.00 lakhs
2.	For establishment of College of Fisheries.	— Rs. 10.00 lakhs
		Total : Rs. 30 00 lakhs.

(ii) I.C.A.R. Coordinated Research Project

Sl. No.	Name of the Units	Actuals 84-85	Budget estimates 85-86	Revised estimates 85-86	Budget estimate 86-87
1.	R.A.U. H. Qrs.	16,16,865	19,03,050	25,34,837	21,20,830
2.	S R.I., Pusa	2,31,069	2,78,110	2,85,400	2,94,720
3.	T.C.A., Dholi	27,65,634	26,17,020	49,60,855	67,72,925
4.	A.R I., Patna	10,39,419	17.10,890	23,98,630	17,53,460
5.	B.A.C., Sabour	32,11,834	60.78,800	66,38,621	59.29,838
6.	B V C., Patna	1,11,816	2,09,400	2,19,240	2,01,700
7.	E.E. Pusa	36,359	—	—	—
8.	E E. Patna	5,17,496	—	—	—
9.	Amount refunded in I C A R.	13,000	—	—	—
	Total :—	95.43,489	1,27,93,270	1,70,37,583	1,70,73,473
	Less Univ share of Expd.	(-)18,94,123	(-)20,00,000	(-)35,00,000	(-)37,00,000
	to Plan Total :—	79,49,366	1,07,93,270	1,35,37,583	1,33,73,473

MISC. SCHEMES

Sl. No.	Name of the scheme	Actuals 84-85	Budget estimates 85-86	Revised estimates 85-86	Budget estimates 86-87
1.	Pharmacokinetics of chemotherapeutics Agents	65,958	53,480	53.480	—
2.	CYMMIT 100 %	—	9.410	20 000	24,410
3.	Ford Foundation A. R. I., Patna	4,000	30,000	5,00,000	2,78,775
4.	N. S. S.	4,340	50,000	30,000	8,284
5.	P. L. 480	1,57,469	5,000	—	—
6.	Potash Research	—	6,000	10,000	4,606
7.	Stypend to V. L. W.	2,64,209	2,25,000	2,25,000	2,25,000
8.	Sports & Games	—	15,000	15,000	10,000
9.	National project on Biogas R. A. U. H. qrs.	1,50,203	2,95,000	2,95,000	—
10.	National Project on Dev. of Blue Green Algiae	15,900	—	30,000	34,100
11.	PL 480 FGIN 630	—	—	2.97,886	89,293
12.	Ganga Project	—	—	1.65,600	1,70,400
13.	Rock Phosphate for Res. M. R. P. in acid soil	—	—	1,000	1,025
14.	Gobar Gas	—	—	4,000	4,000
15.	Unicef	—	—	11,112	—
	Total :	6,62,079	6,88,890	16,58,078	8,49,893